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DECIPHERING APARANTA

A journey through Sindhudurga

Dr. Poorva Keskar Ar. Ketaki Gujar Ar. Sharduli Joshi

CONTENTS

Title: Deciphering Aparanta

Subtitle: A journey through Sindhudurg

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RE - IMAGINING URBAN VOIDS

Verso Page

Title: Re-imagining Urban Voids

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SMEF's Brick School of Architecture has collaborated with multiple urban local bodies on numerous occasions to bring about a lasting impact on complex city-level issues in Pune. One noteworthy experience involved partnering with the Pune Municipal Corporation's Urban95 initiative, which was the genesis of the concept of urban voids. Our students conducted investigations and implemented a total of four tactical intervention projects aimed at enhancing urban spaces for children under the age of five. These initiatives transformed streets, nursing homes, slums, and gardens into playful and engaging environments. Through this work, we instilled in our students a sensitivity to transform neglected or exploited urban areas into successful, child and family-friendly elements in public spaces, mobility, transport, and neighborhood planning.

The program yielded an enhanced understanding and heightened sensitivity among our students, motivating them to delve deeper into this field through their research topics, thesis projects, and even pursue it as a career option in the public sector. The success of this campaign served as inspiration for our institute to engage in multiple projects in collaboration with various stakeholders and NGOs. Moreover, our students' active participation in competitions organized by urban, state, and central-level institutions saw a steady rise.

It has become increasingly evident that colleges must incorporate societal initiatives as a means to sensitize students to the enduring impact on the physical environment. Through discussions on envisioning, redesigning, and implementing change in urban settings, our program's overarching goal, "Re-imagining Urban Voids," and this publication aims to equip architectural schools and educators with the tools necessary to lead local initiatives that drive change. The publication's ultimate objective is to compile the caselets that contribute to the enhancement of the urban environment.

We extend our heartfelt appreciation to all practitioners and academics who generously shared compelling examples of reimagining urban voids in their respective communities. Their invaluable contributions have lent authenticity and depth to this book. We are also grateful to the Council of Architecture, COA-TRC, and, in particular, Prof. Jayashree Deshpande and the Brick School of Architecture for granting us the opportunity to conduct the online training program on Reimagining Urban Voids and for their support in the publication process.

We hope that this book will serve as a milestone, inspiring further efforts in this field. May it act as a catalyst, raising awareness about the importance of improving public spaces within our communities. We dedicate this book to all those who have labored to transform our cities into thriving, interconnected communities.

Ninad and Sharduli

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२७ फेब्रुवारी २०२४

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भाषा जनाची भाषा मनाची

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गोषवारा

शाश्वत पद्धती ही भारतीय संस्कृतीचा अविभाज्य भाग आहे. वास्तुशास्त्र म्हणजे इमारती आणि शहराच्या भौतिक स्वरुपात, संस्कृती आणि सभ्यतेची कलात्मक अभिव्यक्ती आहे.. लेखिकेने भारतीय पारंपारिक सांस्कृतिक संबंधांचे निरीक्षण आणि विचार केला असता, अशी अनेक उदाहरणे सापडली, जिथे निसर्ग आणि त्याचे संवर्धन दोन्ही ह्या संस्कृतीत जपले जातात. संस्कृतीने स्वीकार केलेल्या अशा अनेक पद्धती अलिखित नियमासारख्या आहेत, आणि जनसामान्यांच्या जीवनशैलीत उतरलेल्या आहेत. वेदिक पद्धतीत नित्य नियमाने जे श्लोक म्हणले जातात, त्यातून दिसून येते कि आपल्या पूर्वजांचा, देशाकडे असलेल्या नैसर्गिक आणि मानवनिर्मित वरशाचा मोठा अभ्यास होता. जेव्हा अशा भरभराटीची जाणीव येते, तेव्हा हा वारसा जपून ठेवणे आणि त्याचे संवर्धन करणे ह्याचे महत्व पण कळते. जणू रोज म्हटले जाणारे मंत्र आणि श्लोक हे सगळं लक्ष्यात घेवूनच लिहिले गेले असावेत. लेखिकेने ह्या शोधनिबंधातून, अशी काही उदाहरणे वाचकांसमोर आणली आहेत.

प्रस्तावना

भारतीय पारंपारिक वास्तुकलेचा संस्कृती सह सखोल संबंध आहे. शहर आणि गावांमध्ये काही सार्वजनिक जागा अशा असतात, जिथे जीवनशैली आणि संस्कृती चे दर्शन होतं. तसेच वर्षभरात येणारे सणवार आणि परंपरा काही ठराविक ठिकाणीच साजरी करण्याच्या पद्धती आहेत. जरी हे सगळं कुठे लिहून नाही ठेवलं, तरी हे उत्सव आणि त्यांना साजरं करणाऱ्या जागा, जनसामान्यांचा आयुष्तात उतरलेल्या नियमावली प्रमाणे दिसून येतात. भारत देशात पारंपरिक उद्योग आणि चालीरीती दोन्ही वास्तूकलेबरोबर एकजीव झाले आहेत. उदाहरणार्थ, वनराई, देवराई, उपवन, नदी काठी असलेले घाट, गावात असलेले देऊळ आणि त्या समोर असणारा जलकुंड, बारव, तळे, चौकात असलेली वडाच्या झाडा जवळची पार, बाजार पेठ, कचेरी, प्रत्येक वास्तु समोर असलेले प्रवेश द्वार, उंबरठे आणि त्याला निगडित असलेले आत आणि बाहेर वागण्याचे नियम असे अनेक उदाहरण आहेत जिथे, वास्तुकलेच्या मागचा सखोल विचार दिसून येतो. भारतीय वास्तुकला निसर्गाला जपून, हवामानाच्या अनुरूप, समाजाच्या सगळ्या

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वर्गांना, वयोगटांना समाविष्ट करून आणि सांस्कृतिक पैलू दाखविणारी वैज्ञानिक रिते विकसित झालेली कला आहे. ह्या वैज्ञानिक कलेत, मानवीय सभ्यतेचा विकास, आणि नैसर्गिक आपदांना झेलण्याची तयारी हे वैशिष्ट्ये सहजपणे दिसून येतात.

भारतीय संस्कृतीत नैसर्गिक संसाधनांचे महत्व

भारताला सुजलाम, सुफलाम, मलयाजशीतलं असे म्हटले गेले आहेत [५]. रोज सकाळी उच्चारलेला प्रात: स्मरण उल्लेख करतो- "समुद्रवसने देवी, पर्वत स्तन मंडीते, विष्णूपत्नीम णमस्तुभ्यं, पदस्पर्श क्षमस्वमे [५]. " अर्थात- भारत उपद्वीपाला तिन्ही कडे समुद्र आहे, त्यात असलेले वन, नद्या, आणि निसर्ग, सगळ्या देशवासींचा पोषण करण्याचा सामर्थ्य ठेवतात ह्या तथ्याची आपल्या पूर्वजांना पुरेपूर जाणीव असावी, म्हणूनच तर भारताला "देवी आई" ची संज्ञा दिली आहे, आणि त्या आईला पायानी दिवस भर स्पर्श करायचं आहे, म्हणून सकाळीच काही करण्यापूर्वीच तिची माफी मागण्याची अशी पद्धत ह्या संस्कृतीत निगडित आहे. महादेवाची पूजा संपूर्ण भारतात केली जाते, आणि त्यांना "पशुपतीनाथ" असं म्हटलं जात. संधी विग्रह करून समजत, कि "पशु" अर्थात पृथ्वी वर असणारे जीव, "पती" अर्थात वन्य जीवन, आणि त्यांचा स्वामी असलेला नाथ, हा पशुपतीनाथ म्हणजेच निसर्ग आणि त्यात असलेलं सत्व, आणि माहात्म्य आदरस्वरूपात पुजणारी हि संस्कृती आहे. प्रातः स्मरणातील श्लोक, पूर्वजांचा देशात असलेल्या नद्याचा अस्तित्व आणि महत्व दोन्हींची कल्पना देतात.

गंगा सरस्वती सिंधू, ब्रह्मपुत्रश्च गंडकी,

कावेरी यमुना रेवा कृष्ण गोदा महानदी ll

देशाचा वेगवेगळ्या भागात असणारे हे नैसर्गिक संपन्नतेचे वन, नद्या ह्या दोन श्लोकात आणून, त्याचा उच्चार करणे, हे सगळं, एकप्रकारची कृतज्ञता दाखवण्याचा एक प्रकार वाटत. येथे ज्या नद्यांचा उल्लेख केला आहे त्या गंगा, सरस्वती, सिंधू, ब्रह्मपुत्रा, गंडकी, कावेरी, यमुना, रेवा, कृष्णा, गोदावरी आणि नर्मदा, ह्या मुख्य आहेत. बहुतेक भारतीय शहरे नदीकाठी वसली आहेत. नदी काठी बांधलेले घाट, हे भारतीय संस्कृतीचे वैशिट्य आहे. नदीचा स्पर्श करता आला पाहिजे, आणि काही प्रमाणात, पुरापासून संरक्षण करता आलं पाहिजे, म्हणून हे घाट बांधण्यात आले. ज्या पद्धतीने निसर्गाने नद्यांचा वेगवेगळा स्वरूप तयार केला आहे, त्या-वेळच्या वास्तुकारांनीं, त्या स्थलाकृतिच्या अनुरूप कलात्मक रित्यानी हे घाट बांधले. प्रत्येक घाटाचे बांधकाम आणि स्वरूप दोन्ही पण प्रत्येक ठिकाणी वेगळे दिसतात. त्या वेळाची स्थापत्य कला आणि अभियांत्रिकी उत्कृष्ट होती, आणि म्हणूनच हे घाट इतके प्राचीन असून पण आज पण तसेच आहेत. महेश्वर, वाराणसी, काशी, हरिद्वार, हृषिकेश, उज्जैन, नाशिक, पंढरपूर, राजमुंद्री, कुशलनगर, म्हैसूर, श्रीरंगपटना, तिरुवैयारू, कुंभकोणम असे कितीतरी उदाहरण आहेत, जिथे संपूर्ण वर्ष भर लोक येत राहतात आणि ह्या घाटांवर संस्कृतीचा अनुभव घेतात. आज पण नदीच्या संपर्कात राहून तिला बघून, तिच्या जवळच्या निसर्गरम्य वातावरणाचा आनंद घेऊन जनसामान्यांचा

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आयुष्याचे, अनेक उपक्रम ह्या नदी घाटांवर घडतात. हे घाट सार्वजनिक उपयोगासाठी तयार केले होते. आणि आज पण ह्या घाटांवर प्रजातंत्र दिसून येत. अनेक लोक येतात, भेटतात. हे घाट मानवीय सभ्यतेला, आईच्या कुशीसारखी माया देतात. समाजाला जवळ आणून हे घाट आपल्या संस्कृतीचे परिचय करवतात.

त्यावेळचा राजकारणात असलेली दूरदृष्टी, अशी होती कि जनसामान्याला पाणी पुरवठा नीट झाला तर, शेती, इतर व्यवसाय, सुरळीत चालतात, आणि भरभराटी येते. म्हणून, जिथे नद्या नव्हत्या किंवा लांब होत्या, त्या जागांवर, तळे, कुंड आणि बारव बांधल्या गेल्या. देऊळाजवळच कुंड, एका प्रकारे वर्षा जल संवर्धनासाठी अभियांत्रिकी ज्ञान वापरून बांधलेले वास्तु आहेत. [३] [४]

प्रतिमा क्रमांक १ : आळंदी घाट

प्रतिमा क्रमांक २ : दिवे आगर स्थित जलकुंड

भारतीय नगर आणि स्थापत्य कलेत वन आणि वनस्पतीचं महत्व

महेन्द्रो, मलायसाह्ये देवतात्मा हिमालय,
ध्येयो रेवतको विंध्यो, गिरीशचारावली तथा ॥
या श्लोकानुसार महेंद्र (आता कंबोडियाचा भाग), मलय (ओरिसामध्ये), सह्याद्री (महाराष्ट्रात), हिमालय, रैवतक (आता गिरनार म्हणून ओळखले जाते गुजरात), विंध्याचल (मध्य भारतात), आणि अरावली, (राजस्थान) सर्वात जास्त मानले जाणारे पर्वत आहेत. या पर्वतांमध्ये घनदाट जंगले आणि समृद्ध पर्यावरण आहे. हे पर्वत लुप्तप्राय प्राणी प्रजातींचे निवासस्थान आणि काही नद्यांचे उगमस्थान आहेत. या पर्वतांच्या स्थलाकृति, वनस्पती, प्राणी आणि नद्या, सगळेच जपण्यायोग्य आणि संवर्धन करण्यासाठी महत्वपूर्ण आहेत. नगर आणि वास्तुतज्ञांनी ह्या जागांचा महत्व आणि पावित्र्य राखून नियोजन करावे, असें अर्थ ह्या श्लोकातून काढू शकतो.

गावाबाहेर असलेले उपवन, मानवीय आयुष्याला लागणाऱ्या महत्वाचा गोष्टी, जसे फळ, कंद, औषधे, लाकूड, इत्यादी पुरव्हायचे. आणि त्याचे सार्वजनिक स्वरूपातच संवर्धन केले जायचे. उपवनाचा नंतर

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देवराई (श्रीवन), जिथे, वन्य संपदेची पूजा केली जायची. देवराईतून लाकूड, फळ तोडणे वर्ज्य होते. आणि त्यानंतर सर्वात दाट वनराईत तपोवन असायचे. हे वन इतके दाट होते कि त्यात अनेक ठिकाणी सूर्याचे प्रकाश पण पोचत नसायचे. असे दाट वन आणि त्याला घेऊन, अशी समज होती, कि तपोवनात तपस्वी तपस्या करायला जातात, आणि तिथे घातक प्राणी पण असतात, म्हणून तिथे साधारण मनुष्यांनी वावर करू नये, असें नियम वर्षोनी वर्ष पाळल्या गेले आहेत, आणि जणू त्यामुळेच आपली वन्य संपदा सुरक्षित राहिली. जीवनोपयक्त सामग्री निसर्गाकडून घेणे, आणि आपल्या गरजा एका हद्दी बाहेर ना नेणे, ज्याणेंकरून निसर्ग सुरक्षित राहणार अशी संकल्पना, भारतीय परंपरेचा अभिन्न भाग आहे. देशाचा सर्व भागात, उपवन, श्रीवन आणि तपोवनाला वेगवेगळी नावे आहेत, पण वन्यजीवनाचा सुरक्षेसाठी असें नियम अनेक ठिकाणी दिसून येतात. [६] [७] वृक्षायुर्वेद ही आयुर्वेदाची एक शाखा आहे. हे वनस्पती जीवनाच्या फायद्यासाठी औषधी प्रणालीचे विज्ञानाचे वर्णन करते. या विज्ञानात वनस्पतींची काळजी घेण्यासाठी या विषयाचा सखोल अभ्यास केला गेला होता.

वाड्यांच्या आवारात वनस्पतींचे महत्व

आपलं देश निसर्ग संपन्न आहे, नद्या वन, सगळं आहे, आणि जिथे मानवीय वसाहत आहे, तिथे कशा प्रकार चा वनस्पतीचा वापर केला पाहिजे, त्याचा उल्लेख एकाजागी नसला, तरी अनेक परंपरा त्या वनस्पतींना नित्य आयुष्यात सहजपणे समाविष्ट करतात. उदाहरणार्थ, वडाच्या झाडाचे महत्व गावात आणि शहरात दोन्ही ठिकाणी आहे. ते जपलं गेलं पाहिजे, त्यासाठी वड सावित्री पौर्णिमा सारखे सण संपूर्ण भारतात बघायला मिळतात. मोठ्या वडाचाझाडाजवळची पार वर्षभर एका सार्वजनिक स्थानासारखी उपयोगात येते. हे झाड मात्र एक झाड नसून, एक संपूर्ण परिसरासारखे वातावरण तयार करत. ह्या जागेला भिंती किव्वा दार-खिडक्या नसून , तिचा मोकळेपणा संस्कृतीला समाविष्ट करत.

प्रतिमा क्रमांक ३ : वडाच्या झाड भोवती ची पार

स्रोत :

https://commons.wikimedia.org/wiki/File:Villagers_under_the_Banyan_Tree_%28303569443 01%29.jpg

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कडू-लिंब, पिंपळ आणि वड तिन्ही झाडांचे एकाच ठिकाणी असणं, खूप पवित्र मानलं गेलं आहे. उत्तरभारतात, ह्याला त्रिवेणी म्हटलं जात आणि लोक त्याची पूजा करतात. ह्या पूजेचा मार्गाने का असो, अशी झाडे शेजारी असल्यामुळे एका सार्वजनिक संमेलनाची जागा तयार होते.

केळींची पाने जेवणा साठी, आंब्याची पाने तोरणा साठी पूर्ण देशात वापरली जातात. अनेक फुलांचा संबंध देवांबरोबर जोडला गेला आहे. गणपतीला वाहायची लाल फुले, शंकराला वाहायची पांढरी फुले, बेलाचे पान, देवीला वाहायची सुगंधित फुले, कमळाची फुले, कृष्णाला वाहायची पिवळी फुले, सोनचाफा, आणि तुळशी ची पाने घराच्या जवळ असलेल्या झाडांपासूनच गोळा केली जात असें. त्यामुळे हि सगळी झाडे घराजवळ असायचे आणि जपली जात असें.

अश्या रिते भारतीय संस्कृतीत राष्ट्रीय स्तरावर, नागरीय किव्वा ग्रामीण स्तरावर, वसाहतीत आणि त्याच प्रमाणे खाजगी स्तरावर, नैसर्गिक संपदेचा आदर आणि संवर्धनाचा विचार अगदी स्पष्ट रूपात दिसून येतो.

ह्या शोधनिबंधात स्थानिक वास्तुकलेबद्दल चर्चा नाही झाली, परंतु ह्या विषयावर अनेक संशोधन झाले आहेत [२] आणि संस्कृतीला समाहित करणारे भारतातले स्थानिक बांधकाम पर्यावरणपूरक आहेत.

निष्कर्ष

जगभरात शाश्वत विकासावर भर दिल्या जात आहे. ह्या संदर्भात जर भारतीय संस्कृतीत असलेल्या पद्धतींकडे लक्ष्य देऊन बघितले, तर नदी घाटांसारखे बांधकामे नैसर्गिक स्थलाकृतीला इजा न पोचवता केलेले बांधकाम आहे. तसेच किल्ले, गढ, वाडे, महाल, देऊळ नैसर्गिक स्थलाकृती ला लक्ष्यात घेऊन केलेलं बांधकाम आहे [९]. आज ज्या पद्धतीने बांधकामासाठी संपूर्ण डोंगर उध्वस्त केली जातात, वास्तुविदांना ह्या परंपरागत बांधकामाकडे बघण्याची संधी आहे. दगड, विटा, माती आणि लाकूड वापरण्यात घेऊन पण ह्या संपदेचा संवर्धन महत्वाच आहे, असा संदर्भ ह्या संस्कृतीत बघायला मिळतो. असेच देशाकडे किती नैसर्गिक संपदा आहे आणि त्याचे नियोजन कशा पद्धतीने झाले पाहिजे, हे बघणे अत्यंत आवश्यक आहे. बहुतेक ग्रीन बिल्डिंग रेटिंग सिस्टमबद्दल [८] बोलतात. गेल्या काही २० वर्षात आलेल्या ह्या रेटिंग सिस्टिम्स मध्ये, जी शब्दावली वापरली गेली आहे, तश्या पद्धती तर भारतीय संस्कृतीत किती तरी काळापासून निगडित आहे. जरी जीवनशैली बदलत आहे, परंतु तरीही पारंपारिक बांधकाम पद्धती आणि लँडस्केप संकल्पना नैसर्गिक संसाधनांचा आदर करण्याची पारंपारिक विचारधारा समाजातील विकासानंतरही अपरिवर्तित राहू शकते.

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मराठा स्थापत्य शैलीचा वारसा: श्री कसबा गणपती मंदिर, पुणे

सुधीर देशपांडे,
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मनाली देशमुख,
प्राध्यापक
एस एम ई एफ्स ब्रिक स्कुल ऑफ आर्किटेक्चर, पुणे

गोषवारा :
स्थापत्य, इतिहास आणि सामाजिक राजकीय घटनांचा परस्पर संबंध आपल्याला जगाच्या पातळीवर प्रत्येक प्रदेशात आढळतो. स्थापत्यातील स्थित्यंतरे ही राजकीय स्थित्यंतरांशी अगदी सरळ जोडली गेलेली आहेत. अगदी चोला स्थापत्यापासून, नागर स्थापत्य, द्रविड स्थापत्य, मुघल स्थापत्य, पर्शियन, मराठा स्थापत्य, पुढे कलोनिअल आणि फ्रेंच, पौर्तुगीज अशा स्थापत्यांपर्यंत विविध स्थापत्य शैलींचा प्रभाव त्या त्या राजवटींमुळे भारतातील आणि खास करून महाराष्ट्रातील हेरीटेज वास्तूंवर दिसतो. इतक्या विविध प्रकारच्या स्थापत्यशैली क्वचितच कुठल्या देशात मिळू शकतील. हा शोधनिबंध मराठा स्थापत्य शैलीतील श्री कसबा गणपती मंदिरावर प्रकाशझोत टाकतो. या अभ्यासातून मराठा स्थापत्य शैलीच्या विविध अंगांचा श्री कसबा गणपती मंदिर या उदाहरणातून उहापोह केलेला आहे. या शोध निबंधातून श्री कसबा गणपती मंदिराचा सामाजिक आणि राजकीय इतिहासही मांडलेला आहे. हे संशोधन काही ठळकपणे प्रकाशित झालेल्या शोध साहित्यावर आधारलेले आहे. तसेच काही रेखाटनांचा आणि छायाचित्रांचा वापर स्थापत्य वैशिष्ठ्ये दर्शवण्याकरता केलेला आहे. पुण्यामध्ये प्रामुख्याने पेठांमध्ये असलेल्या मराठा स्थापत्य शैलीचा वारसा उधृत करण्याचा या शोधनिबंधाचा उद्देश आहे.
महत्वाचे शब्द : वारसा, स्थापत्यशैली, मराठा, सामाजिक, राजकीय

परिचय :
स्थापत्य, इतिहास आणि सामाजिक राजकीय घटनांचा परस्पर संबंध आपल्याला जगाच्या पातळीवर प्रत्येक प्रदेशात आढळतो. स्थापत्यातील स्थित्यंतरे हि राजकीय स्थित्यंतरांशी अगदी सरळ जोडली गेलेली आहेत. अगदी चोला स्थापत्यापासून, नागर स्थापत्य, द्रविड स्थापत्य, मुघल स्थापत्य, पर्शियन, मराठा स्थापत्य, पुढे कलोनिअल आणि फ्रेंच, पौर्तुगीज अशा स्थापत्यांपर्यंत विविध स्थापत्य शैलींचा प्रभाव भारतातील हेरीटेज वास्तूंवर दिसतो. इतक्या विविध प्रकारच्या स्थापत्यशैली क्वचितच कुठल्या देशात मिळू शकतील. महाराष्ट्रामध्ये सुप्याचा प्रांत शहाजी राजांना आदिलशाहीची जहागीर म्हणून मिळाला.

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जिजाऊ राणी साहेबांनी तिथे पुनवडी गाव वसवले जे आता पुणे शहर म्हणून प्रस्थापित आहे. पुण्यामध्ये १६ व्या शतकात अनेक मंदिरे बांधली गेली (सोवनी, १९९८). परंतु आदिलशाहीच्या तसेच उत्तरेतल्या मुघल सत्तांच्या वेगवेगळ्या कालखंडात बांधलेली बहुतेक सुंदर मंदिरे विविध युद्धांमध्ये नष्ट झाली. श्री कसबा गणपती मंदिर हे भगवान गणेशाला समर्पित एक हिंदू मंदिर आहे, ज्याला गणपती किंवा विघ्नहर्ता-अडथळ्यांचा नाश करणारा म्हणूनही ओळखले जाते [१]. कसबा पेठेत असलेले हे गणेश मंदिर मराठा इतिहासातील उच्च पारंपारिक मूल्यांचे प्रतिक म्हणून ओळखले जाते.

मराठा स्थापत्य वास्तुशैली - संदर्भ आणि पार्श्वभूमी :

इ.स. १३ व्या शतकाच्या सुरुवातीस देवगिरी ला यादवांचे मराठा साम्राज्य होते. इ.स. १२९४ रोजी रामदेव यादव हे मराठा साम्राज्याच्या गादीवर विराजमान असताना अल्लाउद्दिन खिलजीने आक्रमण केले आणि यादवांचा पराभव केला. या अंती त्याने काही हजार होनांची खंडणी, आर्थिक लूट वसूल केली आणि यादवांवर पुढील काही काळासाठी कर लादला. हा कर इ.स. १३०७ पर्यंत न दिल्याने खिलजीने त्याचा सेनापती मल्लिकाफुर ला यादवांचा बिमोड करण्यासाठी पाठवले. त्यानंतर देवगिरी साम्राज्याचा असत होऊन तिथे खिलजीची राजवट सुरु झाली. त्यानंतर देवगिरीचे नाव बदलून दौलताबाद ठेवण्यात आले. ही सगळी अराजकता मोहम्मद बिन तुघलकाने आपली राजधानी दौलाताबाद ठेवण्यापर्यंत चालूच होती. मधल्या काळात बिरार ला इमादशाही (इ.स.१४९०-१५७४), अहमदनगर ला निजामशाही (इ.स.१४९०-१६३६), विजापूरला आदिलशाही (इ.स.१४९०-१६८६), बिदरला बरीदशाही (इ.स.१४९२-१६१९), गोवळकोण्ड्याला कुतुबशाही (इ.स.१५१८-१६८७) अशा विविध राजवटी प्रस्थापित झाल्या होत्या. तसेच महाराष्ट्रात आणि इतर दक्षिणेत्तर राज्यात कित्येक सरदारांना ह्या राजवटींची जहागिरी होती. उत्तरेत मुघल आणि राजपुतांची मक्तेदारी होती. कित्येक वेळा ह्या राजवटींमध्ये कुरघोड्या, युद्ध होऊन महाराष्ट्रातील सामाजिक आणि राजकीय वातावरण ढवळून निघत असे (तोडे, २०२१). पुढे इ.स. १६ व्या शतकात श्री छत्रपती शिवाजी महाराजांनी स्वराज्याची स्थापना करून ह्या शाह्यांना आव्हान दिले आणि त्यांचे कंबरडे मोडून काढले. पुढे पेशवाई काळात मराठा साम्राज्य अटकेपार स्थापित झाले. इ.स. १८१८ मध्ये पुढे मराठा साम्राज्य अस्ताला जाऊन संपूर्ण हिंदुस्तानात ब्रिटीशांचा अंमल सुरु झाला. ह्या सगळ्या स्थित्यंतराचा महाराष्ट्रातील आणि खास करून पुण्याच्या स्थापत्यावर प्रभाव पडला आणि मुघल, पर्शियन, ब्रिटीश वस्तू स्थापत्याचा प्रभाव असलेली मराठा स्थापत्यशैली प्रस्थापित झाली. १६ व्या शतकाच्या सुरुवातीस फ्रेंच, डच आणि पोर्तुगीज ही व्यापाराच्या निमित्ताने महाराष्ट्रात वास्तव्यास होते. त्यामुळे येथील स्थापत्य शैलीवर फ्रान्स, हॉलंड आणि पोर्तुगाल सारख्या विविध प्रांतातील स्थापत्य घटकांचा प्रभाव होता.

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श्री कसबा गणपती मंदिर - ऐतिहासिक महत्व :

निजामशाहीचा अस्त झाल्यानंतर शहाजी महाराजांना पुणे, इंदापूर आणि सुपा प्रांताची आदिलशाही कडून जहागिरी मिळाल्या नंतर इ.स.१६३० मध्ये जिजाबाई भोसले त्यांच्या कुटुंबासह पुण्यात आल्या. पौराणिक कथेनुसार, जिजाबाईना कळविण्यात आले की मुख्य शहरातील रहिवासी विनायक ठकार यांच्या घराजवळ गणपतीची मूर्ती प्रकट झाली. ह्या घटनेला शुभ संकेत मानून १६३९ मध्ये या जागेवर मंदिर बांधण्याचे काम सुरू झाले. कसबा हा शब्द 'कसबाह' या अरेबिक शब्दावरून आला असावा असे तज्ञ सांगतात. कसबाह चा अर्थ वस्तीतील किल्ला असा आहे [१]. असे मानले जाते की छत्रपती शिवाजी महाराज मंदिराला भेट दिल्याशिवाय युद्धासाठी जात नसत. कसबा गणपती हे पुण्याचे ग्रामदैवत (संरक्षक देवता) मानले जात होते आणि अजूनही मानले जाते [२] . या परिसराला थोरल्या बाजीराव पेशव्यांच्या काळात १७ व्या शतकाच्या उत्तरार्धात कसबा पेठ म्हणून ओळखले जाऊ लागले. पुढे नानासाहेब पेशव्यांनी पुण्याच्या नगर रचनेत विविध पेठा, रस्ते, पागा, व्यायामशाळा, शस्त्र आगारे बनवून मोलाची भर घातली. आणि शहराच्या सध्याच्या काळात पुणे शहराची ओळख म्हणून पुण्याची हेरीटेज ओळख आणि वारसा म्हणून उभ्या आहेत.

स्थापत्य रचना आणि वैशिष्ठ्ये:

कसबा मंदिराची रचना आयताकृती असून तळ मजला आणि वरती नगारखाना असे बांधकाम केलेले आहे. मंदिराचा बाहेरील भाग हा हेमाडपंथी रचनेचा भाग आहे. पूर्वीचे गर्भगृह आणि दैवत हे दगडी बांधकाम असून नंतर त्याचे पुढील बांधकाम चपट्या/पुस्तकी विटांमध्ये शिवाजी महाराज आणि पेशवाई काळात करण्यात आले. आकृती १ मध्ये दर्शवल्याप्रमाणे या वास्तूत खालील बाजूस काळ्या कातळामध्ये बांधकाम केले असून वरील बांधकाम हे चपट्या/पुस्तकी विटांमध्ये केलेले आहे. मंदिराचे खांब हे सागवानी लाकडात असून त्यावर लाकडी तुळया ठेवण्यात आल्या आहेत. आकृती २ मध्ये दाखवल्याप्रमाणे या तुळई आणि खांबाच्या जोडणीवर मयूरनक्षीकाम केलेले सुशोभित ब्रेकेट्स आहेत. या वैशिष्ट्यामध्ये यादव स्थापत्य शैलीचा प्रभाव जाणवतो.

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प्रतिमा क्रमांक १ : समोरील दर्शनी भाग, श्री कसबा गणपती मंदिर, पुणे (स्रोत : लेखक)

प्रतिमा क्रमांक २ : मयूरनक्षीकामयुक्त ब्रेकेट्स, श्री कसबा गणपती मंदिर, पुणे (स्रोत : लेखक)

मंदिराच्या प्रवेशद्वारातून आत प्रवेश केल्यानंतर मुख्य मंदिराची रचना काटकोनात आहे. पुढील बाजूस सभामंडप, अंतराळ आणि गर्भगृह अशी मंदिराची प्राथमिक रचना आहे. सभामंडपाच्या बाजूने गर्भगृहा भोवती प्रदक्षिणा पाथ संरचित केलेला आहे [३] . आकृती ३ मध्ये दर्शवल्याप्रमाणे मंदिराचा सभा मंडप हा दुमजली असून वरील मजल्यावर लोकांसाठी डोकावता येईल अशी बाल्कनीची रचना आहे. दोन खांबांच्या मध्ये असलेल्या लाकडी कमानी या पर्शियन स्थापत्याचा प्रभाव अधोरेखित करतात. सभा मंडपाचे छत हे सागवानी फळ्यांनी केलेले असून मध्यभागी सुशोभित तेल दिव्यांच्या झुंबरासाठी व्यवस्था केलेली आहे. सभा मंडपाच्या प्रांगणाशिवाय आतील बाजूस ओसरी वजा सभा मंडपाचाच भाग आहे. पूर्वीपासून सभा मंडपाचा वापर हा एकत्रित पूजा, आरती, स्तोत्रपठण तसेच कीर्तने, प्रवचने आणि व्याख्याने अशा सामाजिक प्रबोधनपर माध्यमांसाठी होत असतो. मंदिराच्या सभामंडपाच्या भिंती आता अष्टविनायकांच्या चित्रांनी सुशोभित केल्या आहेत. अंतराळ हा भाग नामस्मरणासाठी म्हणून प्रमाणित केलेला असून त्याची त्रिमितीय जागा ही मनुष्य प्रमाणानुसार संरचित केली गेलेली आहे. या भागात अगदी कमी प्रमाणात गवाक्षांचे स्थान निश्चित करण्यात आलेले आहे. त्यामुळे सभा मंडपातून परावार्तीत होणारा मंद प्रकाश आतील लोकांची एकाग्रता वाढवतो. गवाक्षांच्या रचनेमध्ये यादव स्थापत्य शैलीचा प्रभाव जाणवतो. गावाक्षांच्या बाहेरील बाजूस लाकडी बाह्य फ्रेम्स मध्ये लोखंडी सळयांची संरक्षक कड उभी केलेली आहे. मंदिराच्या आवारात एक मारुती मंदिर असून दीपमाळ ही बांधीव काळ्या कातळात उभारली आहे.

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प्रतिमा क्रमांक ३ : दुमजली सभामंडप, श्री कसबा गणपती मंदिर, पुणे (स्रोत : लेखक)

सामाजिक व राजकीय महत्व :

इ.स.१८९३ मध्ये, लोकमान्य बाळ गंगाधर टिळक यांनी सार्वजनिक गणेशोत्सवात गणेश चतुर्थी या घरगुती उत्सवाचे रूपांतर सार्वजनिक गणेश उत्सवात केले. ज्यामुळे जनतेला एकत्र आणता आले आणि राष्ट्रीय एकात्मतेची भावना बळकट झाली. ब्रिटीश राजवटीपासून भारताला मुक्त करण्यासाठी समविचारी लोकांना एकत्र आणण्यासाठी आणि विचारांची देवाणघेवाण करण्यासाठी एकसमान व्यासपीठ तयार केले गेले. लोकांचे प्रबोधन कीर्तने, प्रवचने आणि व्याख्यानांद्वारे केले गेले, ज्यामुळे जनशिक्षण झाले आणि समाजातील विविध वर्गांमधील दरी कमी होण्यास मदत झाली [६]. तसेच ब्रिटिश राजवटीबाबत लोकांमध्ये जागरुकता निर्माण केली. मेळाव्यात सर्वसामान्यांच्या त्रासावरही तोडगा काढण्यात आला. टिळकांच्या प्रयत्नामुळे पुण्यात अनेक क्लब किंवा मंडळे निर्माण झाली. यामुळे गणपती उत्सवाला नवा आयाम मिळाला.

गणेशोत्सवात अनंत चतुर्दशीला श्री गणेशाचे विसर्जन सामूहिक मिरवणूक काढून केले जाऊ लागले. ज्या मध्ये श्री कसबा गणपती ह्याला मानाचे स्थान मिळाले. अजून पर्यंत हा सोहळा दिमाखदार पद्धतीने सुरु आहे. या सार्वजनिक मिरवणुकीची सुरुवात मंडईतल्या टिळक पुतळ्यापासून सार्वजनिक आरतीने सुरु होऊन श्री कसबा गणपतीपुढे पारंपारिक ढोल ताशा, शंख नाद, लेझीम नृत्य असा विविध कलाविष्कार सादर होतात. नवसाला पावणारा श्री गणपती म्हणून ही श्री कसबा गणपतीच्या मौखिक कथा बोलल्या जातात.

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निष्कर्ष :

श्री कसबा गणपती मंदिर हे मराठा स्थापत्यशैलीचे ठळक उदाहरण आहे. या मंदिराला समाजामध्ये एक आदराचे स्थान असून पुण्याच्या ऐतिहासिक आणि सांस्कृतिक मूल्यांचे ते द्योतक आहे. हया मंदिरामध्ये छत्रपती शिवाजी महाराजांच्या काळापासून ते पेशवाई ते ब्रिटीश राजवटी पर्यंत बदल होत गेले. सध्याच्या काळातही आजूबाजूला बरेच बदल झालेले आहेत. सामाजिक, राजकीय आणि सांस्कृतिक स्थित्यंतरे हे पुढच्या पिढीला समजणं हे अत्यंत महत्वाचं असतं. म्हणून हा वारसा पुढे नेण्यासाठी स्थापत्य हा महत्वाचा दुवा आहे. मराठा स्थापत्य वास्तुशैली ही पुण्याची हेरीटेज ओळख आहे आणि हा वारसा जपला जाणं हे अत्यंत गरजेचं आहे.

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Advances in 21st Century Human Settlements

Rama Devi Nandineni
Susan Ang
Norwina Binti Mohd Nawawi *Editors*

Sustainable Resilient Built Environments

Proceedings of SRBE 2022, India

Springer

Advances in 21st Century Human Settlements

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This Series focuses on the entire spectrum of human settlements – from rural to urban, in different regions of the world, with questions such as: What factors cause and guide the process of change in human settlements from rural to urban in character, from hamlets and villages to towns, cities and megacities? Is this process different across time and space, how and why? Is there a future for rural life? Is it possible or not to have industrial development in rural settlements, and how? Why does 'urban shrinkage' occur? Are the rural areas urbanizing or is that urban areas are undergoing 'ruralisation' (in form of underserviced slums)? What are the challenges faced by 'mega urban regions', and how they can be/are being addressed? What drives economic dynamism in human settlements? Is the urban-based economic growth paradigm the only answer to the quest for sustainable development, or is there an urgent need to balance between economic growth on one hand and ecosystem restoration and conservation on the other – for the future sustainability of human habitats? How and what new technology is helping to achieve sustainable development in human settlements? What sort of changes in the current planning, management and governance of human settlements are needed to face the changing environment including the climate and increasing disaster risks? What is the uniqueness of the new 'socio-cultural spaces' that emerge in human settlements, and how they change over time? As rural settlements become urban, are the new 'urban spaces' resulting in the loss of rural life and 'socio-cultural spaces'? What is leading the preservation of rural 'socio-cultural spaces' within the urbanizing world, and how? What is the emerging nature of the rural-urban interface, and what factors influence it? What are the emerging perspectives that help understand the human-environment-culture complex through the study of human settlements and the related ecosystems, and how do they transform our understanding of cultural landscapes and 'waterscapes' in the 21st Century? What else is and/or likely to be new vis-à-vis human settlements – now and in the future? The Series, therefore, welcomes contributions with fresh cognitive perspectives to understand the new and emerging realities of the 21st Century human settlements. Such perspectives will include a multidisciplinary analysis, constituting of the demographic, spatio-economic, environmental, technological, and planning, management and governance lenses.

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Role of Spatial Elements of an Urban Street that Makes It Vital

Garima Mutha, Shraddha Manjrekar, and Akshay Gandhi

Abstract The characteristic of meaningful interactive spaces in the city transforms with change of lifestyle. Certain streets in the urban fabric offer a conducive environment for gathering, and with this attribute, these streets remain lively and vibrant in nature. With time, the buildings get dilapidated, few of them get renovated, and in this process, the architectural character also gets changed. Although the aesthetic character of streets changes, with the developments in the architectural design, the value of urban streets still remains the same in terms of social interaction spaces. Chandni Chowk, Delhi, Mohammad Ali Street and Colaba causeways of Mumbai, Manek Chowk of Ahmedabad, Sarafa Bazaar of Indore and many such streets in the older cities are the spaces that have been attracting people with their traditional food joints and the street elements since many years. The researchers have identified Fergusson College Road of Pune with an objective of studying the spatial aspects of streets and urban vitality that draw people toward them. The study comprises two stages. The first stage includes an interview-based survey of 45 individuals. These visits to a particular street that is covered by eateries and shopping alleys. The second stage includes study of the spatial character of the street under defined parameters with semi-structured interviews and documentation. Remarkably, the documentation covers the nature of the space over the time which have influenced people of three generations.

Keywords Urban vitality · Social interaction · Urban street · Street element · Restaurants

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1 Introduction

The term "urban vitality" refers to the lively activity on city streets. Vitality of the urban areas is in physical, socio-economic, cultural, ecological and behavioral settings. Urban Public Realm demonstrates a significant charm in the practicality of urban public spaces. The urban composition of a city is formed by architectural elements. This notion of composition is seen in both architecture and urban planning. "Urban environment design" can be defined as a complex construction of city public spaces placed on the ground floor level of city buildings and ensuring the vital activity of the urban community [1]. According to urban planners and designers, a small number of public spaces are currently failing in terms of spatial planning and aesthetic design. As a result, in the present context, it becomes important to study and understand the spatial character of specific usage of contemporary urban public spaces and to determine how and in what ways they are used by the general public [2].

For cities, the streets are the most significant public places. The density and diversity of pedestrians on the streets, as well as the range of pedestrian activity on the streets, are markers of urban vitality. The built environment in the city is a product of a society's social establishments, culture and practices. An argument, on the other hand, is that the people's activity pattern and life is guided by spatial layout. The impact of spatial elements in the urban environment on urban life is undeniable [10]. This study is about investigations of such spatial elements. The objectives of the study are:

- Identification of the spatial elements that attract social interaction
- Studying the role of spatial elements that contribute into vitality of the space.

To study and understand these spatial elements contributing to vitality, Pune city has been chosen as the study area. Pune is the second largest city in the Maharashtra, India. The city has also been termed the "*Oxford of the East*" because of its educational assets, which include a large number of educational institutes and a highly qualified workforce [9].

The vitality of the urban form of the city is historical in nature and there are several areas, streets and spaces in the city that characterize the city which also add to its vitality. With this context, a vital area in the city, the Ferguson College (FC) Road has been chosen as the investigation site. It is a busy one-way road, starting from Deccan Gymkhana to Shivajinagar in the city. It is one of the liveliest streets in Pune that is mostly occupied by youngsters. FC Road is home to many of the city's most famous restaurants, street food establishments and street shopping locations. Because of its proximity to the city's top educational institutions like Fergusson College, BMCC, Apte College, COEP and residential districts, this place is a favorite place of young people for dining, shopping and hanging out [6].

2 Background

The fundamental aims of urban sustainable development are urbanity and vitality. A vibrant atmosphere encourages entrepreneurship and prosperity, as well as attracts economic activities, visitors and creative class residents. The vitality potential is defined as the quality of spaces resulting from topological, functional and geometrical aspects of the urban form that impact activity diversity and intensity, as well as the variety of movements, social contacts and transactions [4]. Architecture can play a role in social interaction in urban public spaces, which are seen as a melting pot of many ethnic groups. While a built environment can usually only give opportunities for passive connection, research demonstrates that extra inputs are required to enable active interaction [11].

Generative Mechanism of Urban Vitality (GMUV) [8] conceptualized by Haize Pan, Chuan Yang is composed of various elements like environmental vitality (EnV), economic vitality (EcV), social vitality (SV) and cultural vitality (CV). GMUV is integration with micro enablers and macro manifestations. J. E. Drewes and M. van Aswegen have theorized and developed "*Vitality Index*"-which enables measurement of a town's overall economic, social, physical, environmental, institutional and spatial performance within a regional framework, eventually representing the urban center's spatial importance. [3] This index consists of measurement of four indicators—i.e., normative welfare, satisfaction, descriptive social and spatial indicators.

$$\begin{aligned}\text{Vitality Index} &= (1/4)\ \text{Normative welfare indicator score} \\ &+ (1/4)\ \text{Satisfaction indicator score} \\ &+ (1/4)\ \text{Descriptive social indicator score} \\ &+ (1/4)\ \text{Spatial indicator score}\end{aligned}$$

The normative welfare indicator can be understood by the concept of overall well-being of society. Satisfaction indicators measure psychological satisfaction, happiness and life fulfillment by using survey research instruments that ascertain the subjective reality in which people live; and the most inclusive category, descriptive social indicators, which are indexes of social conditions (i.e., contexts of human existence) and varied therein for various segments of a populations. All these three indicators have direct relation with the spatial indicators [5].

A number of studies have already been done to define these spatial indicators. In the background study done by Nelson Nygaard in year 2015, for street design in Washington, DC, it is stated that the purpose of streets is to provide safe and efficient transportation and also to facilitate safe and efficient movement pattern for economic and other activities and also to support health of people and places [7].

As per the study done by Chiara Garau and Alfonso Annunziata [4], these are Closeness Centrality, Betweenness Centrality, Density of Points of interest, Diversity of Uses, Buildings density/floor area ratio, Proportion of built area, Vertical dimension of buildings, Population Density, Block size, Road density, Proximity to transport nodes, Border Vacuums, Real estate value and Diversity of buildings age.

Another study indicates factors such as complementing spaces, the sensory qualities of them, relation to the human scale, linearity and pause points, safety aspects, universal accessibility and usability make an urban space vital [2].

3 Methodology

With this background, the present research involves a mixed approach of qualitative and quantitative analysis. This study examines a few popular activities that encourage people of all ethnicities to engage, as well as ideas for incorporating them into public urban space, so that the country can reap the greatest benefits from a multiracial network. Methodology of mapping and investigations through interviews that involve the indicators as referred in the background study have been adopted for this study. There are two stages of the analysis. The first stage includes the study of the present context of the street. Stage 1 identifies several spaces that are vital in nature. Some cases are chosen out of these in the Stage 2 for further study. In the stage 2, comparative study of the spatial character of these selected spaces has been done. A statistical analysis to find out the reasons for preference of these spaces by the people.

4 The Present Context of the Street

The present-day FC road of Pune is an arterial road that connects the south to the northwest-east (CBD, railway station). The road is a thoroughfare in mornings, activity/destination in afternoon (lunch) and remains active even till late evening and night hours. The right of way of this road varies from 20 to 24 m. The predominant land use on this road is commercial, with office spaces, showrooms of clothes and accessories, restaurants and cafes. Figure 1 represents the location of the road in its precinct.

FC road is also the transition space between the core city of Pune and the newer developments that are happening in the city. It also tries to connect the rather radial city with its most resourceful educational, trade and transport elements. Figure 2 depicts the urban grain of the road's precinct.

Fig. 1 Centrality. *Source* Graphic made by author

Fig. 2 Figure ground map. *Source* Graphic made by author

To further study the road, a stretch from Good Luck Chowk to Tukaram Paduka Chowk was studied (Fig. 3). This stretch of 2 km was then observed, documented and analyzed for understanding the distribution of spatial elements, their dependencies on the users and density of these elements according to the surrounding area.

Fig. 3 Fergusson college road, Plan. *Source* Graphic made by author

Source Photograph by author

Photographic analysis captured the different types of activities occurring at different locations of time on one particular stretch of FC road. An additional cognitive mapping of places that are often visited by the public was done to understand the categories of eateries with respect to the type of spaces, pedestrians and users and type of services available. Interviews were taken in online and offline mode for 45 individuals based on the kind of occupation and user typology majorly based on activity, duration, intent and opinion. The response of the participants has been used to recognize the key features that shape a particular urban fabric element, i.e., streets. As this road is known for its eating corners; shopping alleys and education institutes present, a detailed mapping of these spaces was carried out. Mapping of all types of eateries was done which led to classification of eateries into majorly three typologies—Stalls, Cafes and Restaurants. Another set of mapping signifies the classification of shopping spaces—temporary and permanent shops/stalls. The road is home to a numerous commercial complex that engage primarily in coaching centers, newspaper editorials and trading arcades.

Figures 4, 5, 6 and 7 are street montages of the entire stretch of study depicting the natures of the built mass, the hierarchy of spaces, the density of users and the vibrant essence of FC road. The yellow patches represent the eateries, green represents the commercial complexes, the pink represents the shopping centers and the blue represents the residential spaces.

The documentation of the road revealed that the road majorly consists of eateries, followed by shopping alleys. During the course of the day, a wide range of users-right

Fig. 4 Montage section from Good luck chowk to Flavors. *Source* Graphics made by author

Fig. 5 Montage section from Flavors to hotel Roopali. *Source* Graphics made by author

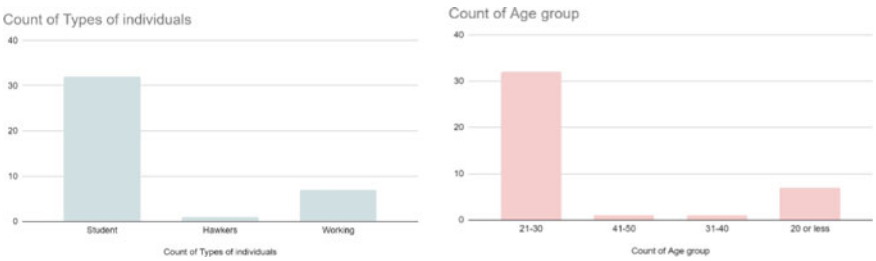
Fig. 6 Montage section from hotel Roopali to hotel Vaishali. *Source* Graphics made by author

Fig. 7 Montage section from hotel Vaishali to Starbucks. *Source* Graphics made by author

from senior citizens to children can be observed. The peak hours largely consist of the lunch and dinner time of the day with heavy vehicular and pedestrian population on the road. The general arrangement of spatial elements is distributed along the road in terms of ground plus two structures, welcoming ambiences of the eateries, engaging arrangements of the shopping alleys, positioning of the road infrastructure and the temporary stalls.

A detailed analysis of the interviews throws light on the users, their choices about the spaces of the road, the spaces that offer interaction and the city's most famous eateries.

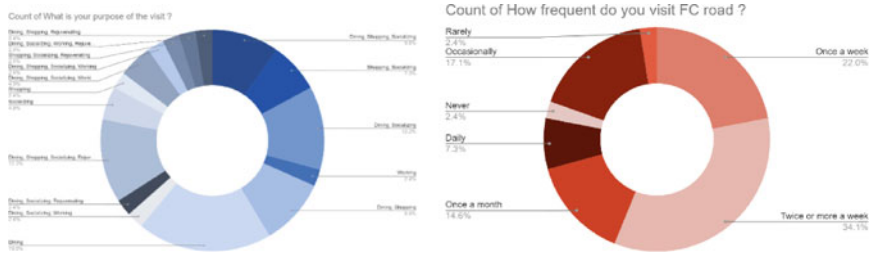
4.1 The User Groups



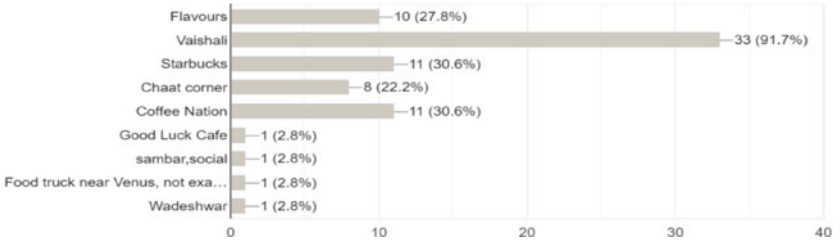
The survey revealed that major public utilizing the road and its facilities are the youth students that age between 21 and 30 years. This implies that major activities attract the teens and young adults that build a major base for social interaction.

4.2 Purpose of Visit

To know the reasons for the street to be so vital during peak hours and also during regular days, a count was done which includes the motive of people approaching the road. To a great extent, the purpose doesn't end at dining, there is always a multi-use visit for people engaging on FC road. The study showed that apart from 80% of the users visiting the road for dining, people also stress on the point of socializing via dining. Secondly, shopping becomes a major influence point for the audience that can be observed throughout the street that surrounds every eating junction.



4.3 Major Magnet Spots



A general trend observed among the users described that the majority of them had the sole purpose of enjoying dining at Vaishali—a well-known restaurant for the last six decades. The next spaces that attract most of the crowd are Starbucks and Coffee Nation—two of the most contemporary cafes that offer newer sets of services and have different ambiances than that of traditional restaurants on the street.

5 Inference

Fergusson College Road offers a variety of spaces for public engagement, user interaction and an economy to all genre of trades. The co-existence of such differential categories makes one understand the alchemy of circumstances that bought the city together, its citizens and its identity. One can significantly observe the reflection of Pune city with only one of its streets. This also compiles to the ongoing reflection of the city's culture, character and its growth toward contemporizing. The presence of the educational institutes, the Tukaram paduka temple holding its religious status during the Vaari season, the manifestation of the artists, students, vendors and citizens in form of a street is what makes Pune an example of patent urban space of significant structure. The urban vitality of the city lies in its tangible terms of spatial elements, their distribution and the intangible elements of safety, mobility and interaction.

6 Conclusion

These interactive spaces are part of a living entity that are the cities that we live in; they have their vibrant language that tell stories of the past journeys and evolves with the changing times and growing population. These spaces that we study and design hoping to encourage social interaction take a live of their own and fit the need to the public that uses them, just as this public makes changes to these spaces to suit their needs. Our greatest challenge will always be to be able to create spaces that apart from satisfying their basic needs have the qualities to evolve with the change in

functions as well. As we have seen through the above case studies, data and analysis, these interactive spaces become the veins of a city have shape its character, urban vitality and spatial developments.

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Sacred Groves of Kudase at Sindhudurg in India: A Discourse on Collective Identity and the Continuity of Tradition

Vaidehi Lavand and Onkar Khebudkar

Abstract Kudase village is a one of the significant biodiversity hotspots located near Tillari River in Sindhudurg district, India. Tillari bioregion retains its significance as a natural heritage. Being situated close to Talkat forest reserve spotted large number endemic and indigenous species of flora and fauna in the Western Ghats, one of the nominated natural heritage site under UNESCO. Sacred groves around the village still retain their spiritual character and sanctity. These sacred groves are undergoing through many threats such as privatization of forestlands getting converted to monoculture, and so on. It is essential to document and rethink these natural heritage sites as a potential cultural landscape cases to be listed and protected on a broader platform. This discourse tries to record and analyze six sacred groves around Kudase village. As per IUCN guidelines, critical evaluation of sacred groves is done with the help of literature review, field visits, and interviews with experts and local communities. Along with this background research, actual mapping, and field visits are done to identify various attributes of natural and cultural heritage. As a result of study along with the mapping of these sacred groves, this research identifies tangible, intangible elements associated with groves and the various aspects of continuation of cultural traditions. It is observed that there is very strong relation of nature and culture which is evident in case of Kudase village settlement. Research further tries to identify issues related to the site and discusses future challenges and directions.

Keywords Sacred grove · Natural heritage · Cultural landscape

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1 Introduction

Sacred groves are the forest areas protected by communities and settlements for many generations. Certainly, many associational, cultural, and religious values are significantly been followed for many centuries for the conservation of these natural and cultural assets [1]. Sacred groves are the collective identities of the settlements around them. These forest areas are living traditions and manifestation of spiritual relationship of humans with nature [2]. Evidence of sacred groves goes back to ancient times before the pre-agrarian stage of human evolution. The significant tradition of protecting these high biodiversity lands dedicated to deities and ancestral spirits helped in natural conservation. This natural heritage with several mysteries, memories, and rituals always played important role in maintaining the ecology of the region.

There are various sizes of groves having small shrines, a temple with the village deity, hermitage, megalith, and hieroglyphs depending upon human interventions at various scales. These are living natural heritage sites having strong cultural associations with the community around them [3]. As mentioned in the extensive studies by Chandran and Hughes in the Western Ghats, smaller groves functions as abodes of gods, taboos and mysteries people believe in whereas larger groves support safety of forest as ecological resource [4]. Discussion highlights sociocultural aspects of groves and its mosaic landscapes that is significant discussion while understanding hierarchy of forestlands around a village settlement [4]. Over 50,000 sacred groves have been reported so far in India. Out of these, more than 2500 are reported from Maharashtra [1]. Sindhudurg district has more than 1800 sacred groves considered as highest density in the Western Ghats region [1, 5].

Kudase village is located in Sindhudurg district in the state of Maharashtra, India, and is a biodiversity hotspot in the context of UNESCO nominated natural heritage site that is Western Ghats. Many transformations are observed due to changing policies and environmental laws, which are affecting adversely upon local ecology of the region [6]. Paper tries to elaborate upon case of Kudase settlement with its cultural associations with surrounding sacred groves. There are many such settlements with larger areas of sacred groves, but for this particular discourse, study is limited to Kudase settlement examining attributes of natural heritage and cultural landscape. This discourse tried to document and analyze six sacred groves so far mapped around Kudase village. With the help of random sampling method, several questions were asked to the locals from different age groups. Data is collected through non-structured interviews and random sampling with a reconnaissance survey with preliminary observations. The formation of the questionnaire was based upon two main criteria; one was to understand basic awareness of several groves and their names, deities, and rituals performed around the village. The second was exploring the relationship of communities with the sacred groves near the settlement. It is observed that some of the sacred groves are community lands and some are private forestlands. Strong association of nature and culture is observed in the context of sacred groves of Kudase village and similar settlements in Sindhudurg district. Result at the end

highlights these sacred groves as cases of natural heritage and cultural landscape. Currently, these sites are facing many challenges such as monoculture in surrounding areas, privatization, and so on. Lack of documentation of this nature–culture linkages raised question of protection of these natural heritage sites. This discussion tries to highlight significance of all these ecosensitive areas in today's fast-growing world.

2 Study Area: Context of Study

Tillari region in Sindhudurg district, Maharashtra, India, is well known for its rich biodiversity and attracts many of the researchers nationally and internationally. The unique geographic setup of the Tillari region imparts significance to its context. Tillari River originates in Tudai Chandgad in Kolhapur district where it is known as Tilotama. The exclusive biodiversity of the Tillari region, the number of endemic, endangered species, and rich flora and fauna mark its uniqueness [7], Figs. 1 and 2. Tillari bioregion is the seventh wildlife corridor in the state to be declared as a 'conservation reserve' and has long history of animal habitation [8, 9]. The studies of wildlife researchers have spotted seven tigers in the region. This presence of tigers in the Sahyadri region entirely depends upon the connectivity of Tillari to the Radhanagari Wildlife Sanctuary [10, 11]. The catchment area in this region has made this region suitable habitat for wildlife. Most of the area in the Tillari region is around 0–300 m in elevation, which act as a water basin area; 0–100 acts as a watershed area.

The Upper Dodamarg region is an important migration corridor for elephants, tigers, and Indian *Gawa* or wild bison, whereas lower areas were observed with immense bird diversity [12].

There are five *wadies* or settlement clusters in Kudase village named as Kudasewadi, Vanoshiwadi, Bharpalwadi, Deomalawadi, and Dhangarwadi. There are approximately nine sacred groves around village still worshiped by local communities at various intervals throughout year [13], Fig. 3. Very less discussion happened so far from nature–culture journey point of view for the context of Sindhudurg district.

3 Methodology

Flowchart explains the framework for research. Data is collected through field visit, mapping, photographic documentation on site, and interviews of locals, Fig. 4.

Fig. 1 Map of India, location of Kudase ref: https://freevectormaps.com

Literature review helped in establishing the context of work and understanding current practices and state of art in the field. Discussion on the data collected and inferences assisted in drawing the conclusions which are site specific but broader to set a methodology to study nature–culture journey. At the end, results are derived from both tangible and intangible attributes observed, documented, and analyzed. Cases of sacred groves in the context of Kudase village near Tillari bioregion are discussed to form a methodology which could be applied in studying similar cases in the region.

4 Results and Discussions

Ecologists and wildlife researchers majorly cover the potential of the sacred grove from a natural heritage point of view, and Western Ghats being UNESCO's world natural heritage site ample study is available for it [14]. Settlements in the Western Ghats and how communities react and get associated with its rich natural setup are less studied and documented [3]. Right from settlement patterns evolved over many centuries, the vernacular architectural language they following and the forest patches or sacred groves they protected around the settlements are significant to be studied with a holistic approach [15] [6]. Jay Patel discusses sacred groves of Ambaji and elaborates upon space-making attributes such as principles of design and esthetics of organic patterns in sacred groves [16]. It could be explored further

Fig. 2 Map of Sindhudurg district location of Kudase ref: www.mapsofindia.com/maps/maharashtra/tehsil/

from its significance as a community heritage and collective identity, a continuation of tradition, rural landscape. It is significant to demarcate its potential as living heritage, shared landscapes, and ecocultural systems. On site observations and interviews of local people helped in understanding what is the role of sacred groves in today's context and how new generation is looking at it. Mapping helped in getting precise indications of what all space-making elements observed on site and how people around intervened in natural setup around their clusters. Following are the results marked in the form of pie charts.

4.1 Interpreting Collective Identity and Continuity of Tradition

Very strong cultural associations and respect toward these sacred forest lands are observed which leads to sustainable model of in-situ conservation practices in the

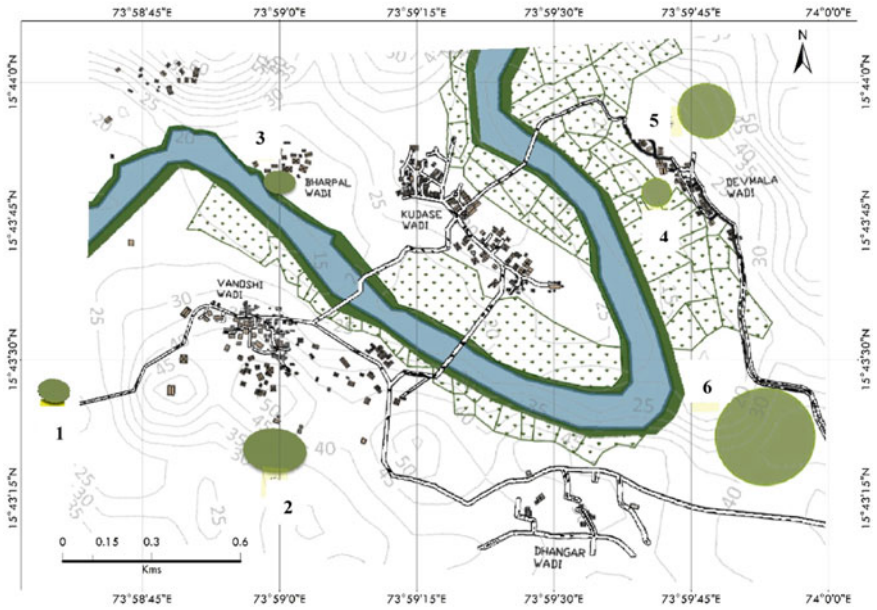

Fig. 3 Location of 6 sacred groves around Kudase village base map created under training and capacity building program by brick school of architecture in collaboration with ICOMOS India coordinated by Author. Legends: 1—Pededeo, 2—Rashtroli, 3—Bhairidevi, 4—Vamanachi Rai, 5—Rashtroli, 6—Thevnekar Ref: Base map prepared on the basis of hardcopy of map from local body and D43 B14_48E14 https://onlinemaps.surveyofindia.gov.in/

context of Kudase village [17, 18]. A total of 15 responses are noted with the help of questionnaire that has underlined strong bonding between nature–culture and people. Various observations are marked through pie charts below. It is seen that throughout the year during important festivals such as Navratri, Holi, Diwali, *Shravani Somvar,* or Holy Mondays in the month of peak Monsoon that is August, and many festivals and occasions these groves are visited and worshiped by the locals.

4.2 Observations: Sacred Groves of Kudase Village

Literature survey helped in exploring concepts of collective identity and continuation of tradition in the context of sacred grove [18]. Sacred groves understood as collective identity and also termed as museum of biodiversity for coming generations [19]. Living and continuation of tradition, [20] vi, vii, ix, x criteria talking about natural heritage, living tradition, natural beauty, fresh water resource, most important, and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation. The term "Biodiversity Heritage Sites" (BHS) refers

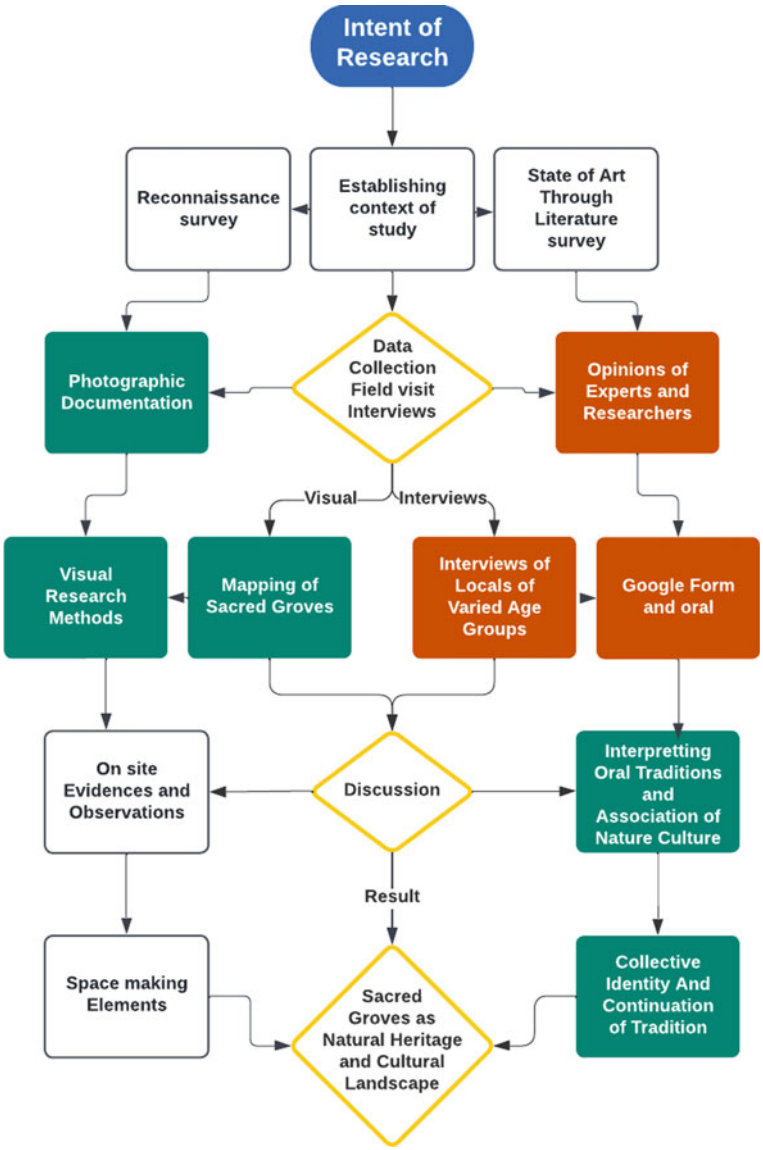

Fig. 4 Flow chart explaining methodology of research

to places with distinctive, ecologically vulnerable ecosystems, rich biodiversity, high endemism, and the presence of rare and threatened species, keystone species, and having significance for the preservation of biological diversity. Figure 12 shows demarcates schematic land use pattern observed around an Indian village settlement. Indian villages where the hierarchy of spaces protected for different reasons such as

area for clusters and houses of local communities then farm lands, grass lands for castles, and protected forest lands such as sacred grove and forest is seen. A village or community usually owns sacred groves, or a single family those maintain them in accordance with a set of customs and traditions those goes back many generations. The protection is given to these areas through mutual understanding and followed in the form of oral traditions. This strong connection of natural ecological settings with the settlement cluster is strongly seen at Kudasewadi **which** shows six sacred groves located around the village and different Wadies. 1—Pededeo, 2—Rashtroli, 3—Bhairidevi, 4—Vamanachi Rai, 5—Thevnekar, and 6—Rashtroli (Fig. 3).

Thevnekar Grove, Vaman Gosavi Grove, and Rashtroli Grove are the three sacred groves around Deomalawadi. Vaman Gosavi Grove is off limits to women. In the community, it also serves as a place for infant interment. Compared to other settlements in the village, Deomalawadi is lush and verdant. Keystone species and water streams can be found in both Rashtroli Grove and Thevnekar Grove. Both have a modest aniconic idol that is been worshipped during particular months. Water as an element and the oldest tree that has ever fallen in the Vaman Gosavi grove are not seen here. Bhairidevi Grove, the sole sacred grove in Bharpalwadi, is a privately owned woodland area that belongs to the Raut family. A lady owner looks after the grove and the nearby farmland. The old lady from the Raut family in Bharpalwadi decided to look after the nearby farms and grove than travel to Mumbai with her children. Small shrine is still present and occasionally worshipped. Less green patches are observed around it and maximum areas converted in to farmlands. The characteristics of a sacred grove include typically water, a keystone species, and a shrine. At the grove, one or more of these three elements—or all three—are present as shown in Figs. 5, 6, 7, 8, 9 and 10. There is a clear connection to the preservation of nature. This keeps its abundant biodiversity and ecology, which serve as migration routes for several wild species and endemic birds. Figures 13 and 14 show some of the glimpse of the sacred groves around Kudase village.

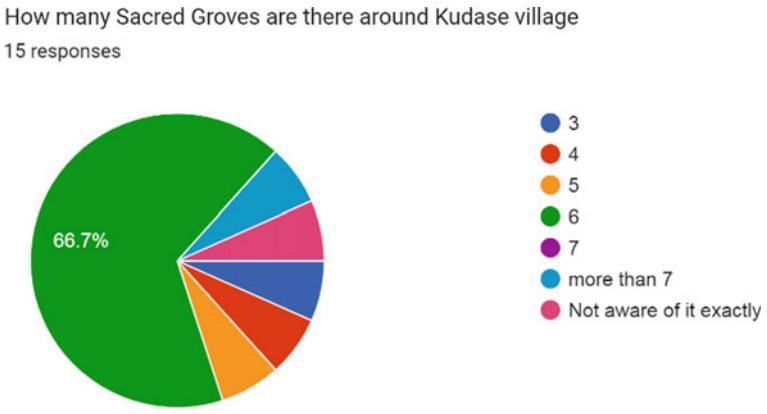

Fig. 5 Pie chart showing number of sacred groves around village

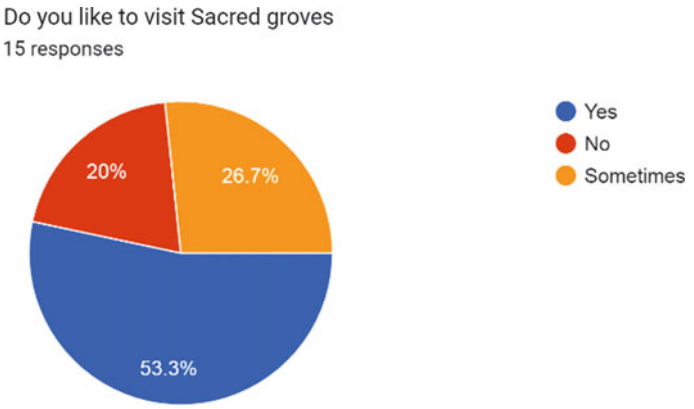

Fig. 6 Pie chart showing villagers response on visiting groves around village

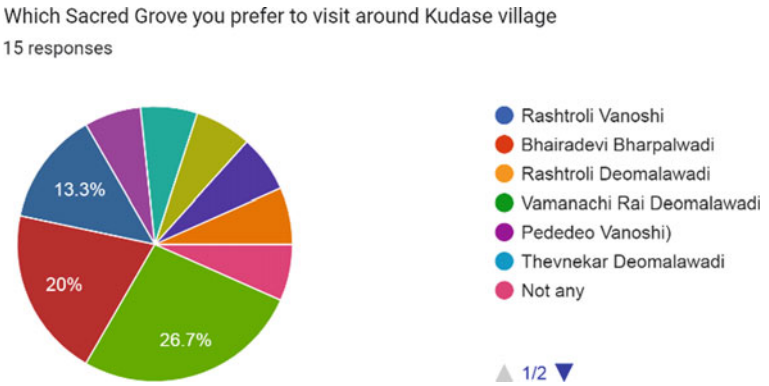

Fig. 7 Pie chart showing villagers preference visiting groves around village

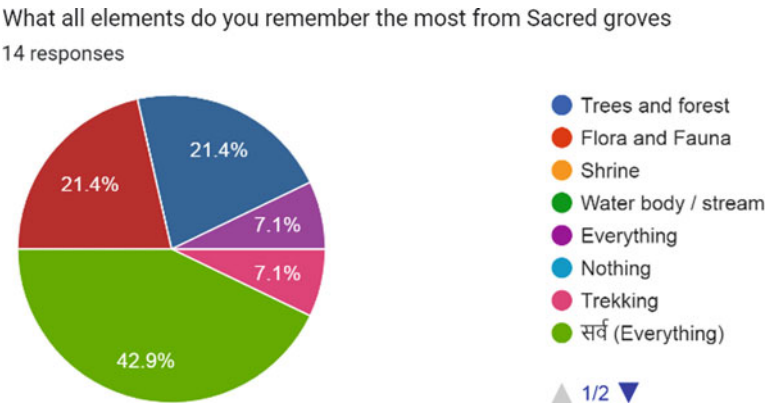

Fig. 8 Pie chart showing responses for space-making elements of sacred groves

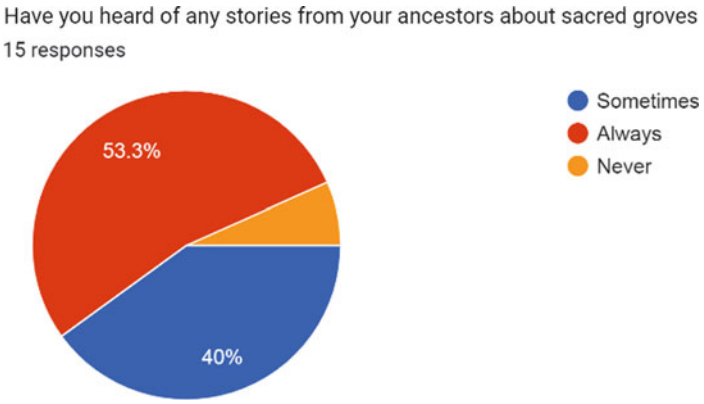

Fig. 9 Pie chart showing responses of intangible associations with the groves

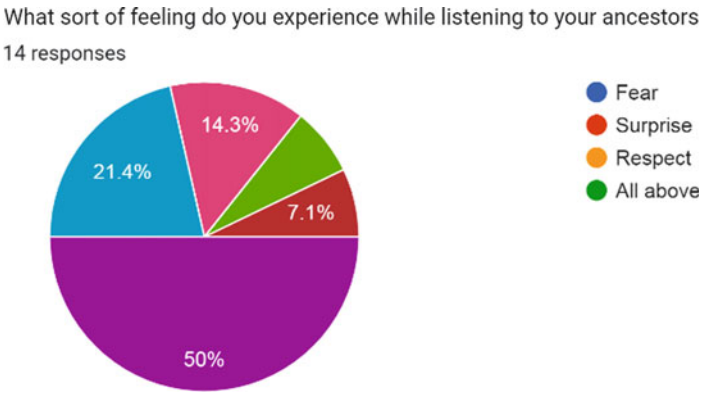

Fig. 10 Pie chart showing responses with respect to emotional associations and memory

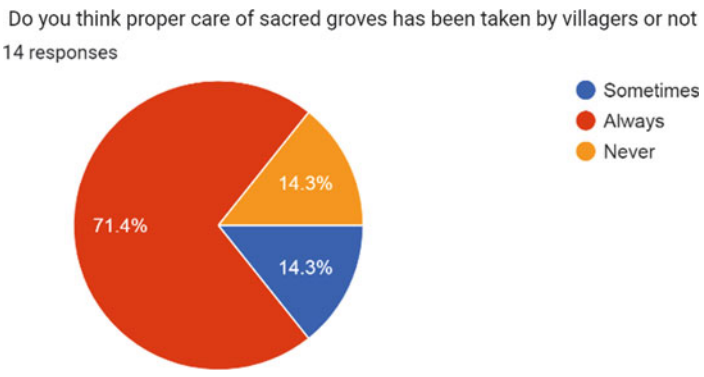

Fig. 11 Pie chart showing responses with respect to the taking care of groves

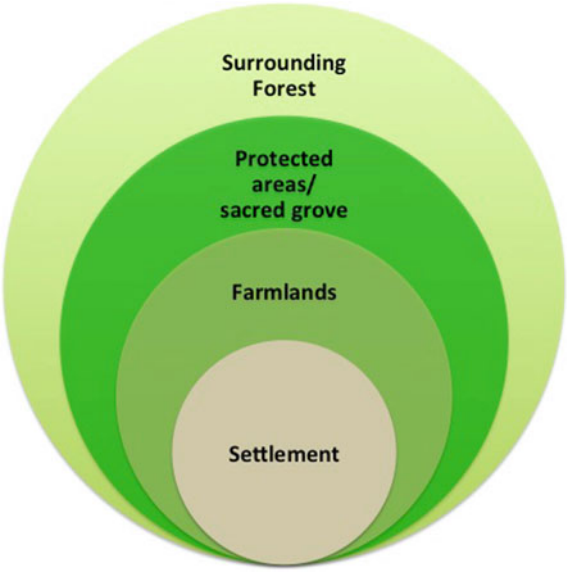

Fig. 12 Schematic land use pattern observed in rural settlement

Fig. 13 Sacred grove of Pededeo

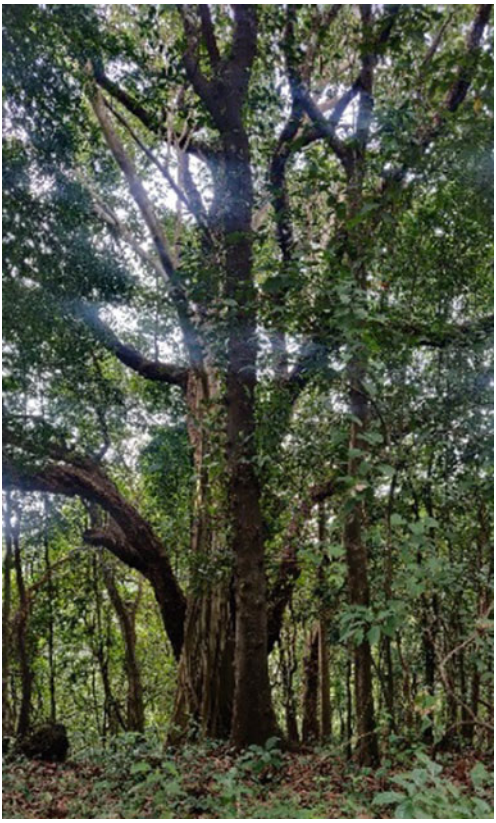

Fig. 14 Sacred grove of Rashtroli

4.3 Results

As discussed by many researchers looking at various literary resources and cases from various regions significant relation of settlement and sacred grove been observed. The natural environment has influenced people's way of life, including their settlement patterns, means of subsistence, cultural traditions, and beliefs. Landscapes include both the tangible and intangible, past and present. According to Dudley and Adrian Phillips in "Forests and Protected Areas," the landscape can be as a place where nature and people interact, as well as the past and the present and physical and intangible values [21]. Protected landscapes provide valuable lessons for sustainable development and act as live examples of resource and land use management. Continuation

of tradition of conserving these forestlands is part of village culture. Sustainability is at the heart of their survival over the centuries [14]. Cases such Osun-Osogbo Sacred Grove are listed under world heritage nomination under criteria II, III, and VI representing cultural associations of Yoruba settlement with nature around [22]. There are 16 sites illustrated by world heritage organization those contain forest and groves with religious significance pertaining to particular culture [23]. Ruritage EU funded project elaborates and sets a model of heritage for regeneration in the context of rural landscapes and historic settlements [24]. This background helps in coming with inferences in the context of Kudase village. In case of Kudase, six groves as mapped and data collected through interviews show there are tangible intangible attributes still exist exhibiting continuation of tradition. Matrix below as given in Table 1 represents space-making elements from all the groves around Kudase village. It also describes significance of groves from cultural associations' point of view.

5 Conclusion

Indigenous settlements of Western Ghats are excellent examples of Ruritage, world rural landscapes and cultural landscapes. Study is limited to sacred groves of Kudase village to build a relation of people and sacred landscapes. It does not go into the details of botanical and zoological surveys and mapping the data concerning to entire ecology of the place. Study is based upon visual research methods and ethnographic research deliberating upon qualitative methods. It tries to identify integrity and authenticity of cultural associations of community with the nature around. While studying the nature–culture journey in the context of the Western Ghats very strong cultural associations were observed through various rituals and indigenous architectural elements developed over the centuries. Looking at six sacred groves, collective identity and continuation of tradition could be traced through various attributes. Various attributes of the cultural landscape tangible and intangible as demonstrated in Fig. 15 could be observed in the case of sacred groves of Kudase village. These concepts can be elaborated further in the context of the sacred groves of Western Ghats, where every village with several *Wadis* or clusters has a system of maintaining reserved grasslands and protected forestlands well known as *Devrai* or sacred grove as a community heritage, continuation of tradition, and collective identity**.**

Table 1 Matrix of onsite observations *NS is not specific

Name of Wadi/cluster		Vanoshiwadi		Deomalawadi			Bharpalwadi
Number of groves		Pededeo	Rashtroli	Thevnekar	Vaman Gosavi	Rashtroli	Bhairidevi (Privately owned)
Area in acres		NS* distributed on both river banks	1 acre	NS at the edge of cluster	NS	NS	NS farms around
Elements of space making (Natural and Manmade) 6 Parameters	Keystone species	No	Yes	Yes	Fallen down	Yes	No
	Water stream	River in between	No	Yes	No	Yes	Close to river
	Shrine	Yes	Yes	Yes	*Samadhi*/ Burial space	Yes	Yes
	Month of ritual	No	May	No	July–August	Not followed any more	May
	Offerings to protecting god	Clay horse votive	Sticks	Flowers	Animal sacrifice	Flowers	Flowers and incense stick
	Accessibility	Open for all	Men only	Open for all	Men only	Open for all	Open for all

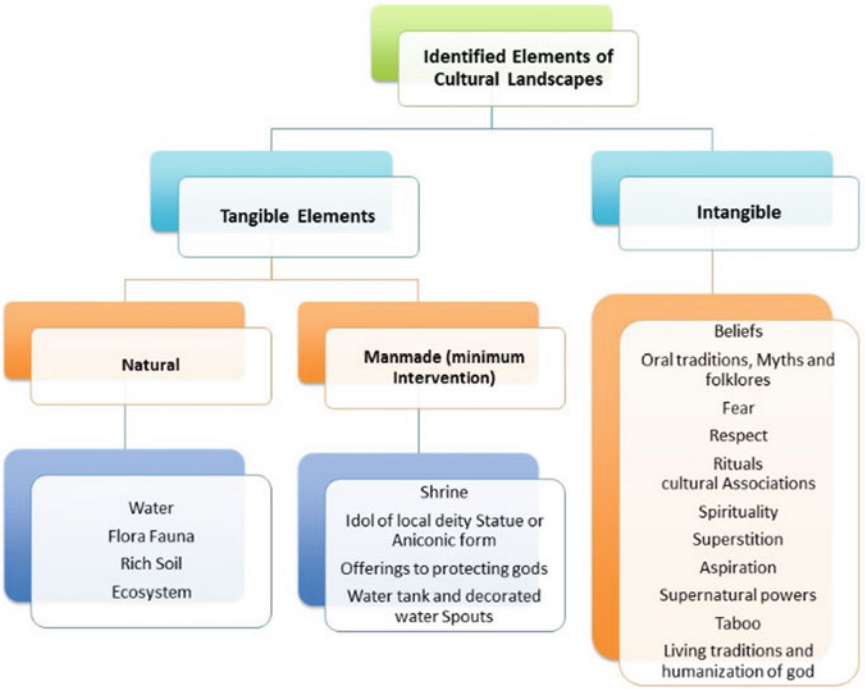

Fig. 15 Flowchart by authors based upon literature review, field study, and interviews

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Advances in 21st Century Human Settlements

Rama Devi Nandineni
Susan Ang
Norwina Binti Mohd Nawawi *Editors*

Sustainable Resilient Built Environments

Proceedings of SRBE 2022, India

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Role of Spatial Elements of an Urban Street that Makes It Vital

Garima Mutha, Shraddha Manjrekar, and Akshay Gandhi

Abstract The characteristic of meaningful interactive spaces in the city transforms with change of lifestyle. Certain streets in the urban fabric offer a conducive environment for gathering, and with this attribute, these streets remain lively and vibrant in nature. With time, the buildings get dilapidated, few of them get renovated, and in this process, the architectural character also gets changed. Although the aesthetic character of streets changes, with the developments in the architectural design, the value of urban streets still remains the same in terms of social interaction spaces. Chandni Chowk, Delhi, Mohammad Ali Street and Colaba causeways of Mumbai, Manek Chowk of Ahmedabad, Sarafa Bazaar of Indore and many such streets in the older cities are the spaces that have been attracting people with their traditional food joints and the street elements since many years. The researchers have identified Fergusson College Road of Pune with an objective of studying the spatial aspects of streets and urban vitality that draw people toward them. The study comprises two stages. The first stage includes an interview-based survey of 45 individuals. These visits to a particular street that is covered by eateries and shopping alleys. The second stage includes study of the spatial character of the street under defined parameters with semi-structured interviews and documentation. Remarkably, the documentation covers the nature of the space over the time which have influenced people of three generations.

Keywords Urban vitality · Social interaction · Urban street · Street element · Restaurants

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1 Introduction

The term "urban vitality" refers to the lively activity on city streets. Vitality of the urban areas is in physical, socio-economic, cultural, ecological and behavioral settings. Urban Public Realm demonstrates a significant charm in the practicality of urban public spaces. The urban composition of a city is formed by architectural elements. This notion of composition is seen in both architecture and urban planning. "Urban environment design" can be defined as a complex construction of city public spaces placed on the ground floor level of city buildings and ensuring the vital activity of the urban community [1]. According to urban planners and designers, a small number of public spaces are currently failing in terms of spatial planning and aesthetic design. As a result, in the present context, it becomes important to study and understand the spatial character of specific usage of contemporary urban public spaces and to determine how and in what ways they are used by the general public [2].

For cities, the streets are the most significant public places. The density and diversity of pedestrians on the streets, as well as the range of pedestrian activity on the streets, are markers of urban vitality. The built environment in the city is a product of a society's social establishments, culture and practices. An argument, on the other hand, is that the people's activity pattern and life is guided by spatial layout. The impact of spatial elements in the urban environment on urban life is undeniable [10]. This study is about investigations of such spatial elements. The objectives of the study are:

- Identification of the spatial elements that attract social interaction
- Studying the role of spatial elements that contribute into vitality of the space.

To study and understand these spatial elements contributing to vitality, Pune city has been chosen as the study area. Pune is the second largest city in the Maharashtra, India. The city has also been termed the "*Oxford of the East*" because of its educational assets, which include a large number of educational institutes and a highly qualified workforce [9].

The vitality of the urban form of the city is historical in nature and there are several areas, streets and spaces in the city that characterize the city which also add to its vitality. With this context, a vital area in the city, the Ferguson College (FC) Road has been chosen as the investigation site. It is a busy one-way road, starting from Deccan Gymkhana to Shivajinagar in the city. It is one of the liveliest streets in Pune that is mostly occupied by youngsters. FC Road is home to many of the city's most famous restaurants, street food establishments and street shopping locations. Because of its proximity to the city's top educational institutions like Fergusson College, BMCC, Apte College, COEP and residential districts, this place is a favorite place of young people for dining, shopping and hanging out [6].

2 Background

The fundamental aims of urban sustainable development are urbanity and vitality. A vibrant atmosphere encourages entrepreneurship and prosperity, as well as attracts economic activities, visitors and creative class residents. The vitality potential is defined as the quality of spaces resulting from topological, functional and geometrical aspects of the urban form that impact activity diversity and intensity, as well as the variety of movements, social contacts and transactions [4]. Architecture can play a role in social interaction in urban public spaces, which are seen as a melting pot of many ethnic groups. While a built environment can usually only give opportunities for passive connection, research demonstrates that extra inputs are required to enable active interaction [11].

Generative Mechanism of Urban Vitality (GMUV) [8] conceptualized by Haize Pan, Chuan Yang is composed of various elements like environmental vitality (EnV), economic vitality (EcV), social vitality (SV) and cultural vitality (CV). GMUV is integration with micro enablers and macro manifestations. J. E. Drewes and M. van Aswegen have theorized and developed "*Vitality Index*"-which enables measurement of a town's overall economic, social, physical, environmental, institutional and spatial performance within a regional framework, eventually representing the urban center's spatial importance. [3] This index consists of measurement of four indicators—i.e., normative welfare, satisfaction, descriptive social and spatial indicators.

$$\begin{aligned}\text{Vitality Index} &= (1/4)\ \text{Normative welfare indicator score} \\ &+ (1/4)\ \text{Satisfaction indicator score} \\ &+ (1/4)\ \text{Descriptive social indicator score} \\ &+ (1/4)\ \text{Spatial indicator score}\end{aligned}$$

The normative welfare indicator can be understood by the concept of overall well-being of society. Satisfaction indicators measure psychological satisfaction, happiness and life fulfillment by using survey research instruments that ascertain the subjective reality in which people live; and the most inclusive category, descriptive social indicators, which are indexes of social conditions (i.e., contexts of human existence) and varied therein for various segments of a populations. All these three indicators have direct relation with the spatial indicators [5].

A number of studies have already been done to define these spatial indicators. In the background study done by Nelson Nygaard in year 2015, for street design in Washington, DC, it is stated that the purpose of streets is to provide safe and efficient transportation and also to facilitate safe and efficient movement pattern for economic and other activities and also to support health of people and places [7].

As per the study done by Chiara Garau and Alfonso Annunziata [4], these are Closeness Centrality, Betweenness Centrality, Density of Points of interest, Diversity of Uses, Buildings density/floor area ratio, Proportion of built area, Vertical dimension of buildings, Population Density, Block size, Road density, Proximity to transport nodes, Border Vacuums, Real estate value and Diversity of buildings age.

Another study indicates factors such as complementing spaces, the sensory qualities of them, relation to the human scale, linearity and pause points, safety aspects, universal accessibility and usability make an urban space vital [2].

3 Methodology

With this background, the present research involves a mixed approach of qualitative and quantitative analysis. This study examines a few popular activities that encourage people of all ethnicities to engage, as well as ideas for incorporating them into public urban space, so that the country can reap the greatest benefits from a multiracial network. Methodology of mapping and investigations through interviews that involve the indicators as referred in the background study have been adopted for this study. There are two stages of the analysis. The first stage includes the study of the present context of the street. Stage 1 identifies several spaces that are vital in nature. Some cases are chosen out of these in the Stage 2 for further study. In the stage 2, comparative study of the spatial character of these selected spaces has been done. A statistical analysis to find out the reasons for preference of these spaces by the people.

4 The Present Context of the Street

The present-day FC road of Pune is an arterial road that connects the south to the northwest-east (CBD, railway station). The road is a thoroughfare in mornings, activity/destination in afternoon (lunch) and remains active even till late evening and night hours. The right of way of this road varies from 20 to 24 m. The predominant land use on this road is commercial, with office spaces, showrooms of clothes and accessories, restaurants and cafes. Figure 1 represents the location of the road in its precinct.

FC road is also the transition space between the core city of Pune and the newer developments that are happening in the city. It also tries to connect the rather radial city with its most resourceful educational, trade and transport elements. Figure 2 depicts the urban grain of the road's precinct.

Fig. 1 Centrality. *Source* Graphic made by author

Fig. 2 Figure ground map. *Source* Graphic made by author

To further study the road, a stretch from Good Luck Chowk to Tukaram Paduka Chowk was studied (Fig. 3). This stretch of 2 km was then observed, documented and analyzed for understanding the distribution of spatial elements, their dependencies on the users and density of these elements according to the surrounding area.

Fig. 3 Fergusson college road, Plan. *Source* Graphic made by author

Source Photograph by author

Photographic analysis captured the different types of activities occurring at different locations of time on one particular stretch of FC road. An additional cognitive mapping of places that are often visited by the public was done to understand the categories of eateries with respect to the type of spaces, pedestrians and users and type of services available. Interviews were taken in online and offline mode for 45 individuals based on the kind of occupation and user typology majorly based on activity, duration, intent and opinion. The response of the participants has been used to recognize the key features that shape a particular urban fabric element, i.e., streets. As this road is known for its eating corners; shopping alleys and education institutes present, a detailed mapping of these spaces was carried out. Mapping of all types of eateries was done which led to classification of eateries into majorly three typologies—Stalls, Cafes and Restaurants. Another set of mapping signifies the classification of shopping spaces—temporary and permanent shops/stalls. The road is home to a numerous commercial complex that engage primarily in coaching centers, newspaper editorials and trading arcades.

Figures 4, 5, 6 and 7 are street montages of the entire stretch of study depicting the natures of the built mass, the hierarchy of spaces, the density of users and the vibrant essence of FC road. The yellow patches represent the eateries, green represents the commercial complexes, the pink represents the shopping centers and the blue represents the residential spaces.

The documentation of the road revealed that the road majorly consists of eateries, followed by shopping alleys. During the course of the day, a wide range of users-right

Fig. 4 Montage section from Good luck chowk to Flavors. *Source* Graphics made by author

Fig. 5 Montage section from Flavors to hotel Roopali. *Source* Graphics made by author

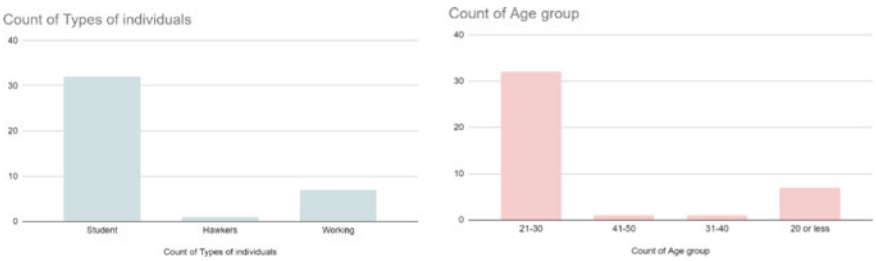
Fig. 6 Montage section from hotel Roopali to hotel Vaishali. *Source* Graphics made by author

Fig. 7 Montage section from hotel Vaishali to Starbucks. *Source* Graphics made by author

from senior citizens to children can be observed. The peak hours largely consist of the lunch and dinner time of the day with heavy vehicular and pedestrian population on the road. The general arrangement of spatial elements is distributed along the road in terms of ground plus two structures, welcoming ambiences of the eateries, engaging arrangements of the shopping alleys, positioning of the road infrastructure and the temporary stalls.

A detailed analysis of the interviews throws light on the users, their choices about the spaces of the road, the spaces that offer interaction and the city's most famous eateries.

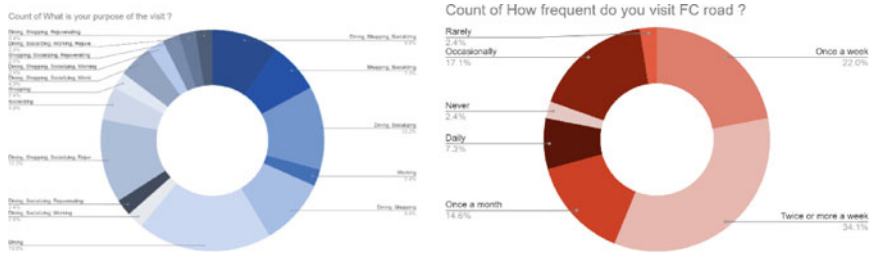
4.1 The User Groups



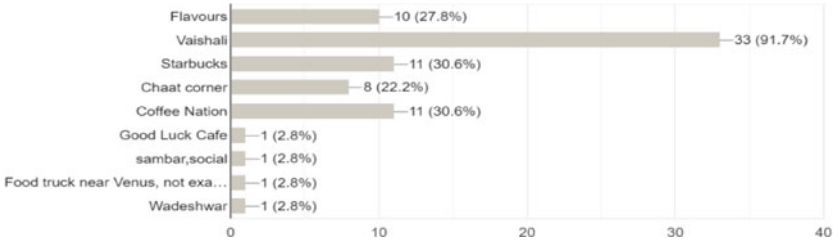
The survey revealed that major public utilizing the road and its facilities are the youth students that age between 21 and 30 years. This implies that major activities attract the teens and young adults that build a major base for social interaction.

4.2 Purpose of Visit

To know the reasons for the street to be so vital during peak hours and also during regular days, a count was done which includes the motive of people approaching the road. To a great extent, the purpose doesn't end at dining, there is always a multi-use visit for people engaging on FC road. The study showed that apart from 80% of the users visiting the road for dining, people also stress on the point of socializing via dining. Secondly, shopping becomes a major influence point for the audience that can be observed throughout the street that surrounds every eating junction.



4.3 Major Magnet Spots



A general trend observed among the users described that the majority of them had the sole purpose of enjoying dining at Vaishali—a well-known restaurant for the last six decades. The next spaces that attract most of the crowd are Starbucks and Coffee Nation—two of the most contemporary cafes that offer newer sets of services and have different ambiances than that of traditional restaurants on the street.

5 Inference

Fergusson College Road offers a variety of spaces for public engagement, user interaction and an economy to all genre of trades. The co-existence of such differential categories makes one understand the alchemy of circumstances that bought the city together, its citizens and its identity. One can significantly observe the reflection of Pune city with only one of its streets. This also compiles to the ongoing reflection of the city's culture, character and its growth toward contemporizing. The presence of the educational institutes, the Tukaram paduka temple holding its religious status during the Vaari season, the manifestation of the artists, students, vendors and citizens in form of a street is what makes Pune an example of patent urban space of significant structure. The urban vitality of the city lies in its tangible terms of spatial elements, their distribution and the intangible elements of safety, mobility and interaction.

6 Conclusion

These interactive spaces are part of a living entity that are the cities that we live in; they have their vibrant language that tell stories of the past journeys and evolves with the changing times and growing population. These spaces that we study and design hoping to encourage social interaction take a live of their own and fit the need to the public that uses them, just as this public makes changes to these spaces to suit their needs. Our greatest challenge will always be to be able to create spaces that apart from satisfying their basic needs have the qualities to evolve with the change in

functions as well. As we have seen through the above case studies, data and analysis, these interactive spaces become the veins of a city have shape its character, urban vitality and spatial developments.

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Sacred Groves of Kudase at Sindhudurg in India: A Discourse on Collective Identity and the Continuity of Tradition

Vaidehi Lavand and Onkar Khebudkar

Abstract Kudase village is a one of the significant biodiversity hotspots located near Tillari River in Sindhudurg district, India. Tillari bioregion retains its significance as a natural heritage. Being situated close to Talkat forest reserve spotted large number endemic and indigenous species of flora and fauna in the Western Ghats, one of the nominated natural heritage site under UNESCO. Sacred groves around the village still retain their spiritual character and sanctity. These sacred groves are undergoing through many threats such as privatization of forestlands getting converted to monoculture, and so on. It is essential to document and rethink these natural heritage sites as a potential cultural landscape cases to be listed and protected on a broader platform. This discourse tries to record and analyze six sacred groves around Kudase village. As per IUCN guidelines, critical evaluation of sacred groves is done with the help of literature review, field visits, and interviews with experts and local communities. Along with this background research, actual mapping, and field visits are done to identify various attributes of natural and cultural heritage. As a result of study along with the mapping of these sacred groves, this research identifies tangible, intangible elements associated with groves and the various aspects of continuation of cultural traditions. It is observed that there is very strong relation of nature and culture which is evident in case of Kudase village settlement. Research further tries to identify issues related to the site and discusses future challenges and directions.

Keywords Sacred grove · Natural heritage · Cultural landscape

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1 Introduction

Sacred groves are the forest areas protected by communities and settlements for many generations. Certainly, many associational, cultural, and religious values are significantly been followed for many centuries for the conservation of these natural and cultural assets [1]. Sacred groves are the collective identities of the settlements around them. These forest areas are living traditions and manifestation of spiritual relationship of humans with nature [2]. Evidence of sacred groves goes back to ancient times before the pre-agrarian stage of human evolution. The significant tradition of protecting these high biodiversity lands dedicated to deities and ancestral spirits helped in natural conservation. This natural heritage with several mysteries, memories, and rituals always played important role in maintaining the ecology of the region.

There are various sizes of groves having small shrines, a temple with the village deity, hermitage, megalith, and hieroglyphs depending upon human interventions at various scales. These are living natural heritage sites having strong cultural associations with the community around them [3]. As mentioned in the extensive studies by Chandran and Hughes in the Western Ghats, smaller groves functions as abodes of gods, taboos and mysteries people believe in whereas larger groves support safety of forest as ecological resource [4]. Discussion highlights sociocultural aspects of groves and its mosaic landscapes that is significant discussion while understanding hierarchy of forestlands around a village settlement [4]. Over 50,000 sacred groves have been reported so far in India. Out of these, more than 2500 are reported from Maharashtra [1]. Sindhudurg district has more than 1800 sacred groves considered as highest density in the Western Ghats region [1, 5].

Kudase village is located in Sindhudurg district in the state of Maharashtra, India, and is a biodiversity hotspot in the context of UNESCO nominated natural heritage site that is Western Ghats. Many transformations are observed due to changing policies and environmental laws, which are affecting adversely upon local ecology of the region [6]. Paper tries to elaborate upon case of Kudase settlement with its cultural associations with surrounding sacred groves. There are many such settlements with larger areas of sacred groves, but for this particular discourse, study is limited to Kudase settlement examining attributes of natural heritage and cultural landscape. This discourse tried to document and analyze six sacred groves so far mapped around Kudase village. With the help of random sampling method, several questions were asked to the locals from different age groups. Data is collected through non-structured interviews and random sampling with a reconnaissance survey with preliminary observations. The formation of the questionnaire was based upon two main criteria; one was to understand basic awareness of several groves and their names, deities, and rituals performed around the village. The second was exploring the relationship of communities with the sacred groves near the settlement. It is observed that some of the sacred groves are community lands and some are private forestlands. Strong association of nature and culture is observed in the context of sacred groves of Kudase village and similar settlements in Sindhudurg district. Result at the end

highlights these sacred groves as cases of natural heritage and cultural landscape. Currently, these sites are facing many challenges such as monoculture in surrounding areas, privatization, and so on. Lack of documentation of this nature–culture linkages raised question of protection of these natural heritage sites. This discussion tries to highlight significance of all these ecosensitive areas in today's fast-growing world.

2 Study Area: Context of Study

Tillari region in Sindhudurg district, Maharashtra, India, is well known for its rich biodiversity and attracts many of the researchers nationally and internationally. The unique geographic setup of the Tillari region imparts significance to its context. Tillari River originates in Tudai Chandgad in Kolhapur district where it is known as Tilotama. The exclusive biodiversity of the Tillari region, the number of endemic, endangered species, and rich flora and fauna mark its uniqueness [7], Figs. 1 and 2. Tillari bioregion is the seventh wildlife corridor in the state to be declared as a 'conservation reserve' and has long history of animal habitation [8, 9]. The studies of wildlife researchers have spotted seven tigers in the region. This presence of tigers in the Sahyadri region entirely depends upon the connectivity of Tillari to the Radhanagari Wildlife Sanctuary [10, 11]. The catchment area in this region has made this region suitable habitat for wildlife. Most of the area in the Tillari region is around 0–300 m in elevation, which act as a water basin area; 0–100 acts as a watershed area.

The Upper Dodamarg region is an important migration corridor for elephants, tigers, and Indian *Gawa* or wild bison, whereas lower areas were observed with immense bird diversity [12].

There are five *wadies* or settlement clusters in Kudase village named as Kudasewadi, Vanoshiwadi, Bharpalwadi, Deomalawadi, and Dhangarwadi. There are approximately nine sacred groves around village still worshiped by local communities at various intervals throughout year [13], Fig. 3. Very less discussion happened so far from nature–culture journey point of view for the context of Sindhudurg district.

3 Methodology

Flowchart explains the framework for research. Data is collected through field visit, mapping, photographic documentation on site, and interviews of locals, Fig. 4.

Fig. 1 Map of India, location of Kudase ref: https://freevectormaps.com

Literature review helped in establishing the context of work and understanding current practices and state of art in the field. Discussion on the data collected and inferences assisted in drawing the conclusions which are site specific but broader to set a methodology to study nature–culture journey. At the end, results are derived from both tangible and intangible attributes observed, documented, and analyzed. Cases of sacred groves in the context of Kudase village near Tillari bioregion are discussed to form a methodology which could be applied in studying similar cases in the region.

4 Results and Discussions

Ecologists and wildlife researchers majorly cover the potential of the sacred grove from a natural heritage point of view, and Western Ghats being UNESCO's world natural heritage site ample study is available for it [14]. Settlements in the Western Ghats and how communities react and get associated with its rich natural setup are less studied and documented [3]. Right from settlement patterns evolved over many centuries, the vernacular architectural language they following and the forest patches or sacred groves they protected around the settlements are significant to be studied with a holistic approach [15] [6]. Jay Patel discusses sacred groves of Ambaji and elaborates upon space-making attributes such as principles of design and esthetics of organic patterns in sacred groves [16]. It could be explored further

Fig. 2 Map of Sindhudurg district location of Kudase ref: www.mapsofindia.com/maps/maharashtra/tehsil/

from its significance as a community heritage and collective identity, a continuation of tradition, rural landscape. It is significant to demarcate its potential as living heritage, shared landscapes, and ecocultural systems. On site observations and interviews of local people helped in understanding what is the role of sacred groves in today's context and how new generation is looking at it. Mapping helped in getting precise indications of what all space-making elements observed on site and how people around intervened in natural setup around their clusters. Following are the results marked in the form of pie charts.

4.1 Interpreting Collective Identity and Continuity of Tradition

Very strong cultural associations and respect toward these sacred forest lands are observed which leads to sustainable model of in-situ conservation practices in the

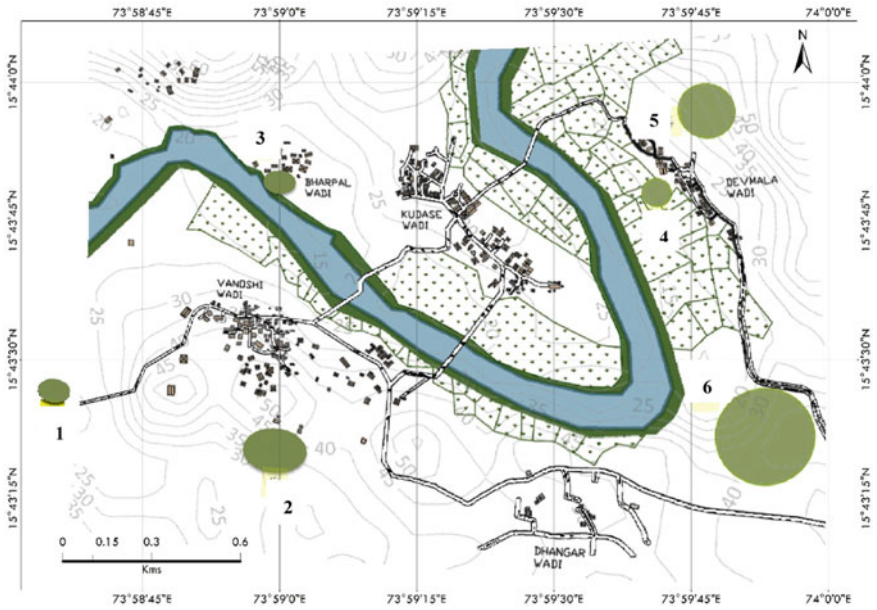

Fig. 3 Location of 6 sacred groves around Kudase village base map created under training and capacity building program by brick school of architecture in collaboration with ICOMOS India coordinated by Author. Legends: 1—Pededeo, 2—Rashtroli, 3—Bhairidevi, 4—Vamanachi Rai, 5—Rashtroli, 6—Thevnekar Ref: Base map prepared on the basis of hardcopy of map from local body and D43 B14_48E14 https://onlinemaps.surveyofindia.gov.in/

context of Kudase village [17, 18]. A total of 15 responses are noted with the help of questionnaire that has underlined strong bonding between nature–culture and people. Various observations are marked through pie charts below. It is seen that throughout the year during important festivals such as Navratri, Holi, Diwali, *Shravani Somvar,* or Holy Mondays in the month of peak Monsoon that is August, and many festivals and occasions these groves are visited and worshiped by the locals.

4.2 Observations: Sacred Groves of Kudase Village

Literature survey helped in exploring concepts of collective identity and continuation of tradition in the context of sacred grove [18]. Sacred groves understood as collective identity and also termed as museum of biodiversity for coming generations [19]. Living and continuation of tradition, [20] vi, vii, ix, x criteria talking about natural heritage, living tradition, natural beauty, fresh water resource, most important, and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation. The term "Biodiversity Heritage Sites" (BHS) refers

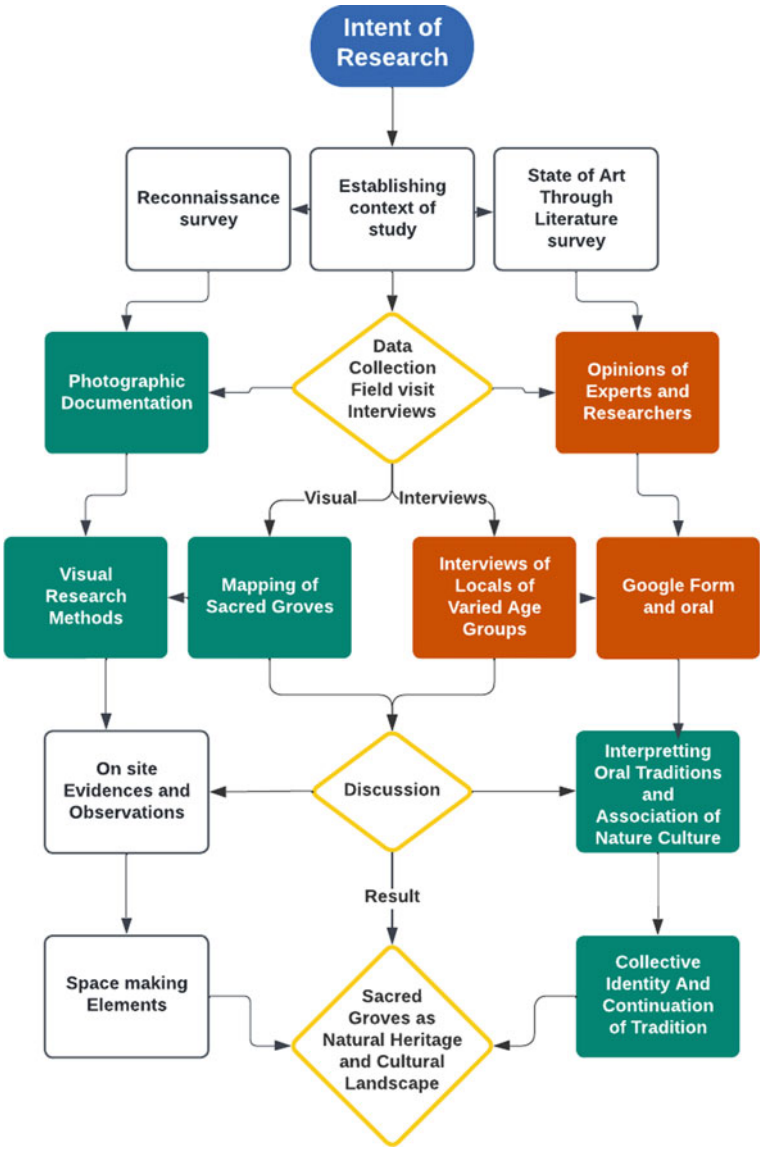

Fig. 4 Flow chart explaining methodology of research

to places with distinctive, ecologically vulnerable ecosystems, rich biodiversity, high endemism, and the presence of rare and threatened species, keystone species, and having significance for the preservation of biological diversity. Figure 12 shows demarcates schematic land use pattern observed around an Indian village settlement. Indian villages where the hierarchy of spaces protected for different reasons such as

area for clusters and houses of local communities then farm lands, grass lands for castles, and protected forest lands such as sacred grove and forest is seen. A village or community usually owns sacred groves, or a single family those maintain them in accordance with a set of customs and traditions those goes back many generations. The protection is given to these areas through mutual understanding and followed in the form of oral traditions. This strong connection of natural ecological settings with the settlement cluster is strongly seen at Kudasewadi **which** shows six sacred groves located around the village and different Wadies. 1—Pededeo, 2—Rashtroli, 3—Bhairidevi, 4—Vamanachi Rai, 5—Thevnekar, and 6—Rashtroli (Fig. 3).

Thevnekar Grove, Vaman Gosavi Grove, and Rashtroli Grove are the three sacred groves around Deomalawadi. Vaman Gosavi Grove is off limits to women. In the community, it also serves as a place for infant interment. Compared to other settlements in the village, Deomalawadi is lush and verdant. Keystone species and water streams can be found in both Rashtroli Grove and Thevnekar Grove. Both have a modest aniconic idol that is been worshipped during particular months. Water as an element and the oldest tree that has ever fallen in the Vaman Gosavi grove are not seen here. Bhairidevi Grove, the sole sacred grove in Bharpalwadi, is a privately owned woodland area that belongs to the Raut family. A lady owner looks after the grove and the nearby farmland. The old lady from the Raut family in Bharpalwadi decided to look after the nearby farms and grove than travel to Mumbai with her children. Small shrine is still present and occasionally worshipped. Less green patches are observed around it and maximum areas converted in to farmlands. The characteristics of a sacred grove include typically water, a keystone species, and a shrine. At the grove, one or more of these three elements—or all three—are present as shown in Figs. 5, 6, 7, 8, 9 and 10. There is a clear connection to the preservation of nature. This keeps its abundant biodiversity and ecology, which serve as migration routes for several wild species and endemic birds. Figures 13 and 14 show some of the glimpse of the sacred groves around Kudase village.

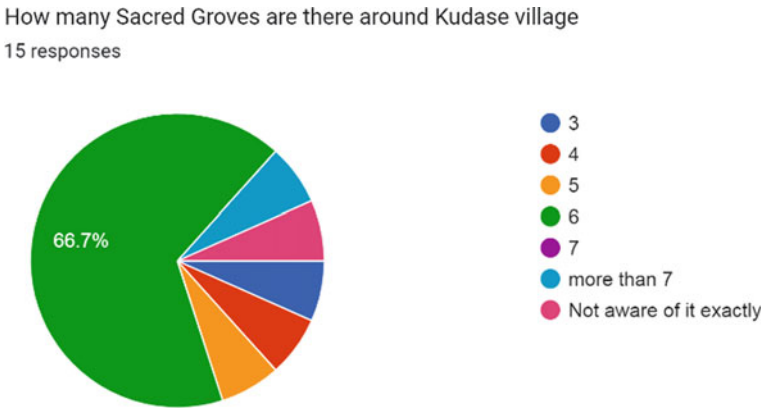

Fig. 5 Pie chart showing number of sacred groves around village

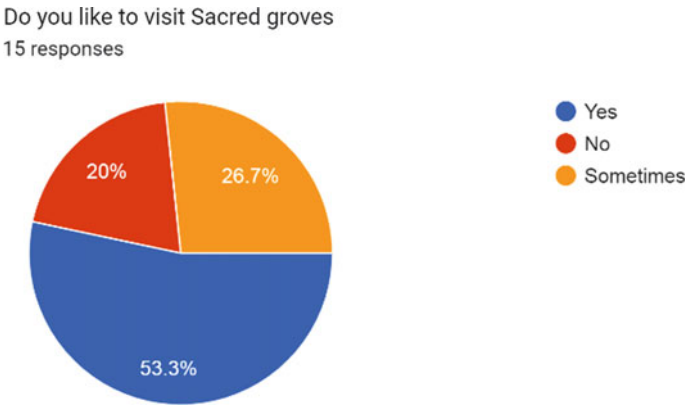

Fig. 6 Pie chart showing villagers response on visiting groves around village

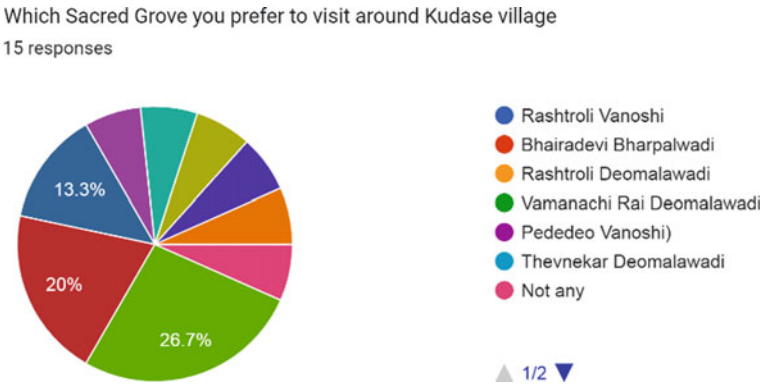

Fig. 7 Pie chart showing villagers preference visiting groves around village

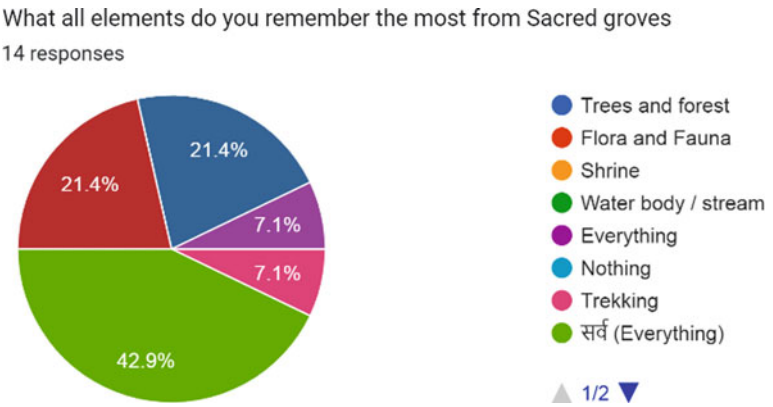

Fig. 8 Pie chart showing responses for space-making elements of sacred groves

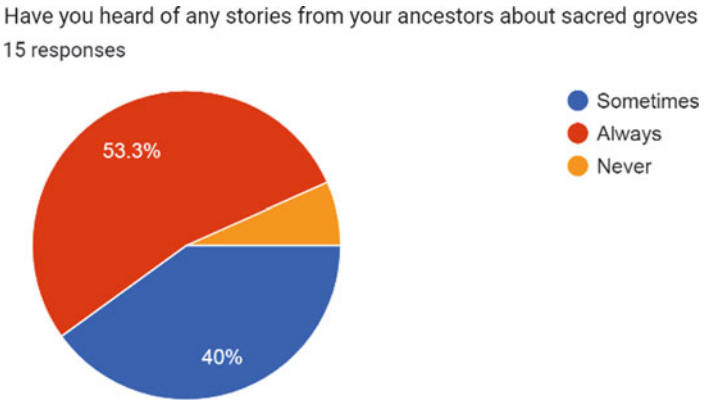

Fig. 9 Pie chart showing responses of intangible associations with the groves

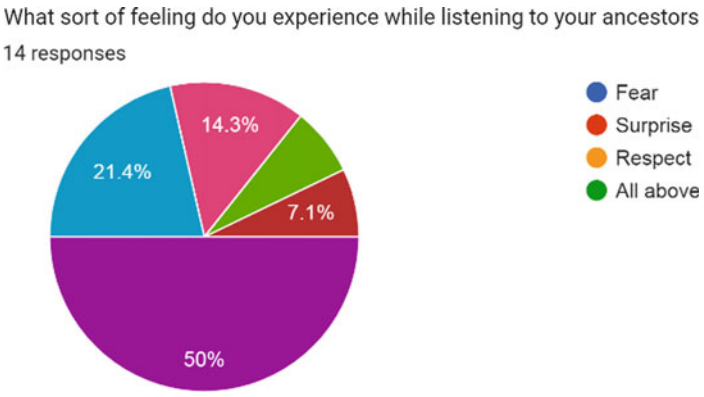

Fig. 10 Pie chart showing responses with respect to emotional associations and memory

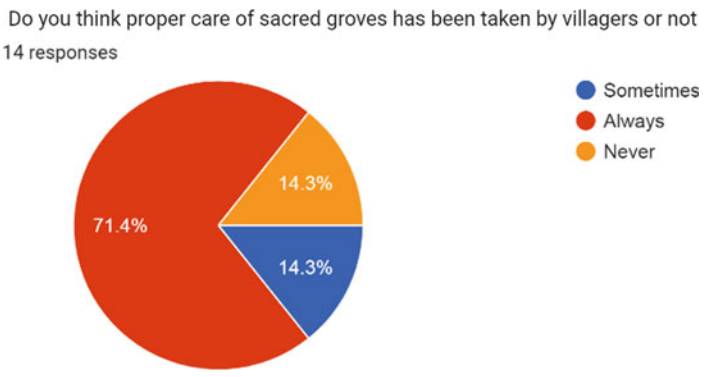

Fig. 11 Pie chart showing responses with respect to the taking care of groves

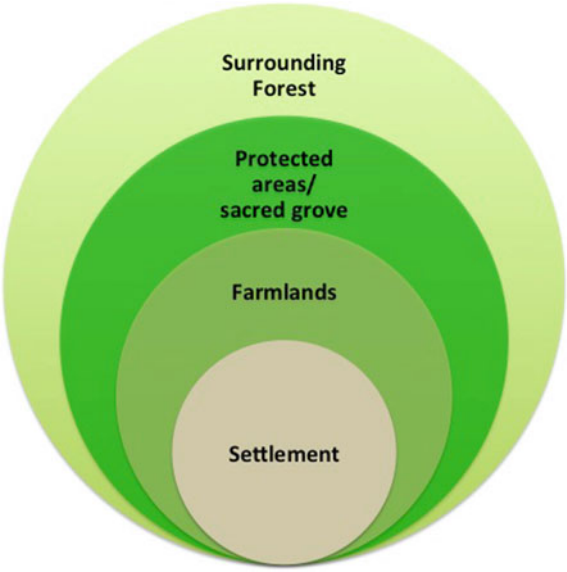

Fig. 12 Schematic land use pattern observed in rural settlement

Fig. 13 Sacred grove of Pededeo

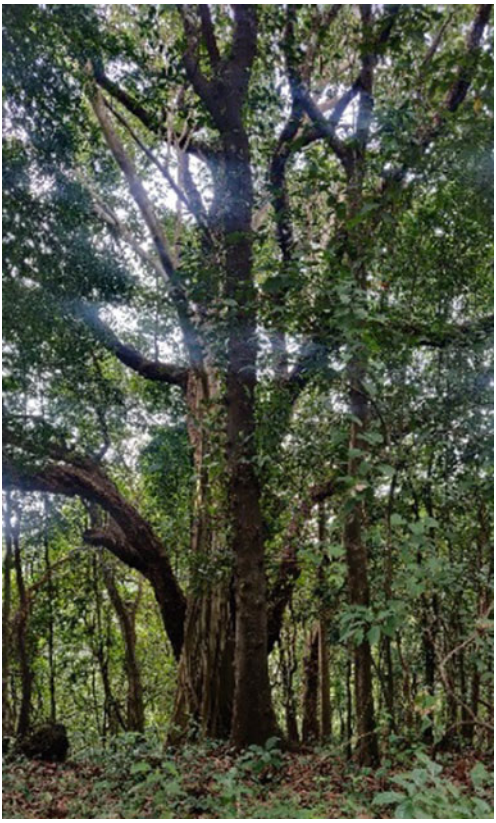

Fig. 14 Sacred grove of Rashtroli

4.3 Results

As discussed by many researchers looking at various literary resources and cases from various regions significant relation of settlement and sacred grove been observed. The natural environment has influenced people's way of life, including their settlement patterns, means of subsistence, cultural traditions, and beliefs. Landscapes include both the tangible and intangible, past and present. According to Dudley and Adrian Phillips in "Forests and Protected Areas," the landscape can be as a place where nature and people interact, as well as the past and the present and physical and intangible values [21]. Protected landscapes provide valuable lessons for sustainable development and act as live examples of resource and land use management. Continuation

of tradition of conserving these forestlands is part of village culture. Sustainability is at the heart of their survival over the centuries [14]. Cases such Osun-Osogbo Sacred Grove are listed under world heritage nomination under criteria II, III, and VI representing cultural associations of Yoruba settlement with nature around [22]. There are 16 sites illustrated by world heritage organization those contain forest and groves with religious significance pertaining to particular culture [23]. Ruritage EU funded project elaborates and sets a model of heritage for regeneration in the context of rural landscapes and historic settlements [24]. This background helps in coming with inferences in the context of Kudase village. In case of Kudase, six groves as mapped and data collected through interviews show there are tangible intangible attributes still exist exhibiting continuation of tradition. Matrix below as given in Table 1 represents space-making elements from all the groves around Kudase village. It also describes significance of groves from cultural associations' point of view.

5 Conclusion

Indigenous settlements of Western Ghats are excellent examples of Ruritage, world rural landscapes and cultural landscapes. Study is limited to sacred groves of Kudase village to build a relation of people and sacred landscapes. It does not go into the details of botanical and zoological surveys and mapping the data concerning to entire ecology of the place. Study is based upon visual research methods and ethnographic research deliberating upon qualitative methods. It tries to identify integrity and authenticity of cultural associations of community with the nature around. While studying the nature–culture journey in the context of the Western Ghats very strong cultural associations were observed through various rituals and indigenous architectural elements developed over the centuries. Looking at six sacred groves, collective identity and continuation of tradition could be traced through various attributes. Various attributes of the cultural landscape tangible and intangible as demonstrated in Fig. 15 could be observed in the case of sacred groves of Kudase village. These concepts can be elaborated further in the context of the sacred groves of Western Ghats, where every village with several *Wadis* or clusters has a system of maintaining reserved grasslands and protected forestlands well known as *Devrai* or sacred grove as a community heritage, continuation of tradition, and collective identity**.**

Table 1 Matrix of onsite observations *NS is not specific

Name of Wadi/cluster		Vanoshiwadi		Deomalawadi			Bharpalwadi
Number of groves		Pededeo	Rashtroli	Thevnekar	Vaman Gosavi	Rashtroli	Bhairidevi (Privately owned)
Area in acres		NS* distributed on both river banks	1 acre	NS at the edge of cluster	NS	NS	NS farms around
Elements of space making (Natural and Manmade) 6 Parameters	Keystone species	No	Yes	Yes	Fallen down	Yes	No
	Water stream	River in between	No	Yes	No	Yes	Close to river
	Shrine	Yes	Yes	Yes	*Samadhi*/ Burial space	Yes	Yes
	Month of ritual	No	May	No	July–August	Not followed any more	May
	Offerings to protecting god	Clay horse votive	Sticks	Flowers	Animal sacrifice	Flowers	Flowers and incense stick
	Accessibility	Open for all	Men only	Open for all	Men only	Open for all	Open for all

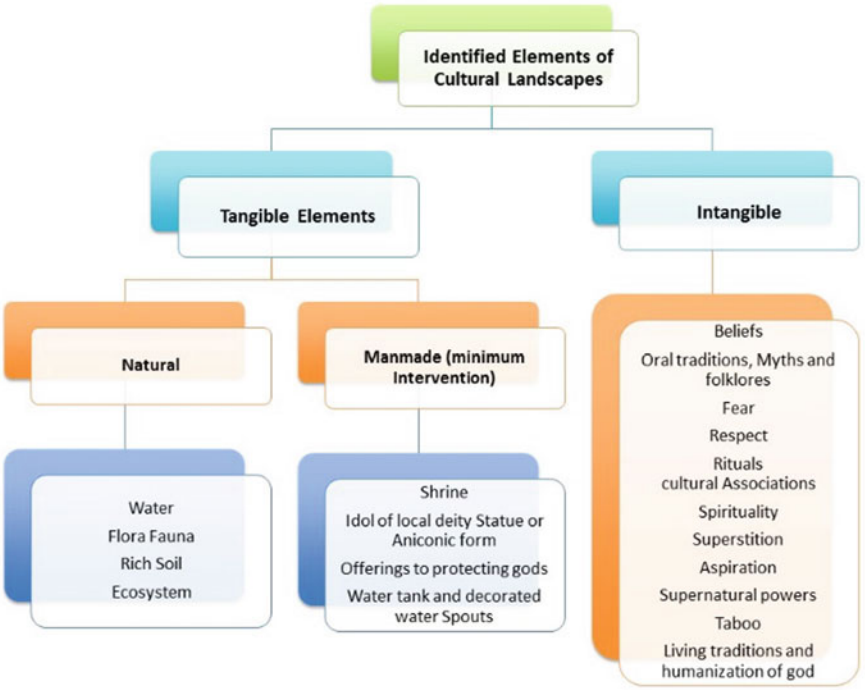

Fig. 15 Flowchart by authors based upon literature review, field study, and interviews

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शोधनिबंध पुस्तिका

भाषा जनाची भाषा मनाची

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श्रध्दा माहोरे मांजरेकर,
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सहाय्यक प्राध्यापक
ब्रिक स्कूल ऑफ आर्किटेक्चर

गोषवारा

शाश्वत पद्धती ही भारतीय संस्कृतीचा अविभाज्य भाग आहे. वास्तुशास्त्र म्हणजे इमारती आणि शहराच्या भौतिक स्वरुपात, संस्कृती आणि सभ्यतेची कलात्मक अभिव्यक्ती आहे.. लेखिकेने भारतीय पारंपारिक सांस्कृतिक संबंधांचे निरीक्षण आणि विचार केला असता, अशी अनेक उदाहरणे सापडली, जिथे निसर्ग आणि त्याचे संवर्धन दोन्ही ह्या संस्कृतीत जपले जातात. संस्कृतीने स्वीकार केलेल्या अशा अनेक पद्धती अलिखित नियमासारख्या आहेत, आणि जनसामान्यांच्या जीवनशैलीत उतरलेल्या आहेत. वेदिक पद्धतीत नित्य नियमाने जे श्लोक म्हणले जातात, त्यातून दिसून येते कि आपल्या पूर्वजांचा, देशाकडे असलेल्या नैसर्गिक आणि मानवनिर्मित वरशाचा मोठा अभ्यास होता. जेव्हा अशा भरभराटीची जाणीव येते, तेव्हा हा वारसा जपून ठेवणे आणि त्याचे संवर्धन करणे ह्याचे महत्व पण कळते. जणू रोज म्हटले जाणारे मंत्र आणि श्लोक हे सगळं लक्ष्यात घेवूनच लिहिले गेले असावेत. लेखिकेने ह्या शोधनिबंधातून, अशी काही उदाहरणे वाचकांसमोर आणली आहेत.

प्रस्तावना

भारतीय पारंपारिक वास्तुकलेचा संस्कृती सह सखोल संबंध आहे. शहर आणि गावांमध्ये काही सार्वजनिक जागा अशा असतात, जिथे जीवनशैली आणि संस्कृती चे दर्शन होतं. तसेच वर्षभरात येणारे सणवार आणि परंपरा काही ठराविक ठिकाणीच साजरी करण्याच्या पद्धती आहेत. जरी हे सगळं कुठे लिहून नाही ठेवलं, तरी हे उत्सव आणि त्यांना साजरं करणाऱ्या जागा, जनसामान्यांचा आयुष्तात उतरलेल्या नियमावली प्रमाणे दिसून येतात. भारत देशात पारंपरिक उद्योग आणि चालीरीती दोन्ही वास्तूकलेबरोबर एकजीव झाले आहेत. उदाहरणार्थ, वनराई, देवराई, उपवन, नदी काठी असलेले घाट, गावात असलेले देऊळ आणि त्या समोर असणारा जलकुंड, बारव, तळे, चौकात असलेली वडाच्या झाडा जवळची पार, बाजार पेठ, कचेरी, प्रत्येक वास्तु समोर असलेले प्रवेश द्वार, उंबरठे आणि त्याला निगडित असलेले आत आणि बाहेर वागण्याचे नियम असे अनेक उदाहरण आहेत जिथे, वास्तुकलेच्या मागचा सखोल विचार दिसून येतो. भारतीय वास्तुकला निसर्गाला जपून, हवामानाच्या अनुरूप, समाजाच्या सगळ्या

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वर्गांना, वयोगटांना समाविष्ट करून आणि सांस्कृतिक पैलू दाखविणारी वैज्ञानिक रिते विकसित झालेली कला आहे. ह्या वैज्ञानिक कलेत, मानवीय सभ्यतेचा विकास, आणि नैसर्गिक आपदांना झेलण्याची तयारी हे वैशिष्ट्ये सहजपणे दिसून येतात.

भारतीय संस्कृतीत नैसर्गिक संसाधनांचे महत्व

भारताला सुजलाम, सुफलाम, मलयाजशीतलं असे म्हटले गेले आहेत [५]. रोज सकाळी उच्चारलेला प्रात: स्मरण उल्लेख करतो- "समुद्रवसने देवी, पर्वत स्तन मंडीते, विष्णूपत्नीम णमस्तुभ्यं, पदस्पर्श क्षमस्वमे [५]. " अर्थात- भारत उपद्वीपाला तिन्ही कडे समुद्र आहे, त्यात असलेले वन, नद्या, आणि निसर्ग, सगळ्या देशवासींचा पोषण करण्याचा सामर्थ्य ठेवतात ह्या तथ्याची आपल्या पूर्वजांना पुरेपूर जाणीव असावी, म्हणूनच तर भारताला "देवी आई" ची संज्ञा दिली आहे, आणि त्या आईला पायानी दिवस भर स्पर्श करायचं आहे, म्हणून सकाळीच काही करण्यापूर्वीच तिची माफी मागण्याची अशी पद्धत ह्या संस्कृतीत निगडित आहे. महादेवाची पूजा संपूर्ण भारतात केली जाते, आणि त्यांना "पशुपतीनाथ" असं म्हटलं जात. संधी विग्रह करून समजत, कि "पशु" अर्थात पृथ्वी वर असणारे जीव, "पती" अर्थात वन्य जीवन, आणि त्यांचा स्वामी असलेला नाथ, हा पशुपतीनाथ म्हणजेच निसर्ग आणि त्यात असलेलं सत्व, आणि माहात्म्य आदरस्वरूपात पुजणारी हि संस्कृती आहे. प्रातः स्मरणातील श्लोक, पूर्वजांचा देशात असलेल्या नद्याचा अस्तित्व आणि महत्व दोन्हींची कल्पना देतात.

गंगा सरस्वती सिंधू, ब्रह्मपुत्रश्च गंडकी,

कावेरी यमुना रेवा कृष्ण गोदा महानदी ll

देशाचा वेगवेगळ्या भागात असणारे हे नैसर्गिक संपन्नतेचे वन, नद्या ह्या दोन श्लोकात आणून, त्याचा उच्चार करणे, हे सगळं, एकप्रकारची कृतज्ञता दाखवण्याचा एक प्रकार वाटत. येथे ज्या नद्यांचा उल्लेख केला आहे त्या गंगा, सरस्वती, सिंधू, ब्रह्मपुत्रा, गंडकी, कावेरी, यमुना, रेवा, कृष्णा, गोदावरी आणि नर्मदा, ह्या मुख्य आहेत. बहुतेक भारतीय शहरे नदीकाठी वसली आहेत. नदी काठी बांधलेले घाट, हे भारतीय संस्कृतीचे वैशिट्य आहे. नदीचा स्पर्श करता आला पाहिजे, आणि काही प्रमाणात, पुरापासून संरक्षण करता आलं पाहिजे, म्हणून हे घाट बांधण्यात आले. ज्या पद्धतीने निसर्गाने नद्यांचा वेगवेगळा स्वरूप तयार केला आहे, त्या-वेळच्या वास्तुकारांनीं, त्या स्थलाकृतिच्या अनुरूप कलात्मक रित्यानी हे घाट बांधले. प्रत्येक घाटाचे बांधकाम आणि स्वरूप दोन्ही पण प्रत्येक ठिकाणी वेगळे दिसतात. त्या वेळाची स्थापत्य कला आणि अभियांत्रिकी उत्कृष्ट होती, आणि म्हणूनच हे घाट इतके प्राचीन असून पण आज पण तसेच आहेत. महेश्वर, वाराणसी, काशी, हरिद्वार, हृषिकेश, उज्जैन, नाशिक, पंढरपूर, राजमुंद्री, कुशलनगर, म्हैसूर, श्रीरंगपटना, तिरुवैयारू, कुंभकोणम असे कितीतरी उदाहरण आहेत, जिथे संपूर्ण वर्ष भर लोक येत राहतात आणि ह्या घाटांवर संस्कृतीचा अनुभव घेतात. आज पण नदीच्या संपर्कात राहून तिला बघून, तिच्या जवळच्या निसर्गरम्य वातावरणाचा आनंद घेऊन जनसामान्यांचा

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आयुष्याचे, अनेक उपक्रम ह्या नदी घाटांवर घडतात. हे घाट सार्वजनिक उपयोगासाठी तयार केले होते. आणि आज पण ह्या घाटांवर प्रजातंत्र दिसून येत. अनेक लोक येतात, भेटतात. हे घाट मानवीय सभ्यतेला, आईच्या कुशीसारखी माया देतात. समाजाला जवळ आणून हे घाट आपल्या संस्कृतीचे परिचय करवतात.

त्यावेळचा राजकारणात असलेली दूरदृष्टी, अशी होती कि जनसामान्याला पाणी पुरवठा नीट झाला तर, शेती, इतर व्यवसाय, सुरळीत चालतात, आणि भरभराटी येते. म्हणून, जिथे नद्या नव्हत्या किंवा लांब होत्या, त्या जागांवर, तळे, कुंड आणि बारव बांधल्या गेल्या. देऊळाजवळच कुंड, एका प्रकारे वर्षा जल संवर्धनासाठी अभियांत्रिकी ज्ञान वापरून बांधलेले वास्तु आहेत. [३] [४]

प्रतिमा क्रमांक १ : आळंदी घाट

प्रतिमा क्रमांक २ : दिवे आगर स्थित जलकुंड

भारतीय नगर आणि स्थापत्य कलेत वन आणि वनस्पतीचं महत्व

महेन्द्रो, मलायसाह्ये देवतात्मा हिमालय,
ध्येयो रेवतको विंध्यो, गिरीशचारावली तथा ॥
या श्लोकानुसार महेंद्र (आता कंबोडियाचा भाग), मलय (ओरिसामध्ये), सह्याद्री (महाराष्ट्रात), हिमालय, रैवतक (आता गिरनार म्हणून ओळखले जाते गुजरात), विंध्याचल (मध्य भारतात), आणि अरावली, (राजस्थान) सर्वात जास्त मानले जाणारे पर्वत आहेत. या पर्वतांमध्ये घनदाट जंगले आणि समृद्ध पर्यावरण आहे. हे पर्वत लुप्तप्राय प्राणी प्रजातींचे निवासस्थान आणि काही नद्यांचे उगमस्थान आहेत. या पर्वतांच्या स्थलाकृति, वनस्पती, प्राणी आणि नद्या, सगळेच जपण्यायोग्य आणि संवर्धन करण्यासाठी महत्वपूर्ण आहेत. नगर आणि वास्तुतज्ञांनी ह्या जागांचा महत्व आणि पावित्र्य राखून नियोजन करावे, असें अर्थ ह्या श्लोकातून काढू शकतो.

गावाबाहेर असलेले उपवन, मानवीय आयुष्याला लागणाऱ्या महत्वाचा गोष्टी, जसे फळ, कंद, औषधे, लाकूड, इत्यादी पुरव्हायचे. आणि त्याचे सार्वजनिक स्वरूपातच संवर्धन केले जायचे. उपवनाचा नंतर

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देवराई (श्रीवन), जिथे, वन्य संपदेची पूजा केली जायची. देवराईतून लाकूड, फळ तोडणे वर्ज्य होते. आणि त्यानंतर सर्वात दाट वनराईत तपोवन असायचे. हे वन इतके दाट होते कि त्यात अनेक ठिकाणी सूर्याचे प्रकाश पण पोचत नसायचे. असे दाट वन आणि त्याला घेऊन, अशी समज होती, कि तपोवनात तपस्वी तपस्या करायला जातात, आणि तिथे घातक प्राणी पण असतात, म्हणून तिथे साधारण मनुष्यांनी वावर करू नये, असें नियम वर्षोनी वर्ष पाळल्या गेले आहेत, आणि जणू त्यामुळेच आपली वन्य संपदा सुरक्षित राहिली. जीवनोपयक्त सामग्री निसर्गाकडून घेणे, आणि आपल्या गरजा एका हद्दी बाहेर ना नेणे, ज्याणेंकरून निसर्ग सुरक्षित राहणार अशी संकल्पना, भारतीय परंपरेचा अभिन्न भाग आहे. देशाचा सर्व भागात, उपवन, श्रीवन आणि तपोवनाला वेगवेगळी नावे आहेत, पण वन्यजीवनाचा सुरक्षेसाठी असें नियम अनेक ठिकाणी दिसून येतात. [६] [७] वृक्षायुर्वेद ही आयुर्वेदाची एक शाखा आहे. हे वनस्पती जीवनाच्या फायद्यासाठी औषधी प्रणालीचे विज्ञानाचे वर्णन करते. या विज्ञानात वनस्पतींची काळजी घेण्यासाठी या विषयाचा सखोल अभ्यास केला गेला होता.

वाड्यांच्या आवारात वनस्पतींचे महत्व

आपलं देश निसर्ग संपन्न आहे, नद्या वन, सगळं आहे, आणि जिथे मानवीय वसाहत आहे, तिथे कशा प्रकार चा वनस्पतीचा वापर केला पाहिजे, त्याचा उल्लेख एकाजागी नसला, तरी अनेक परंपरा त्या वनस्पतींना नित्य आयुष्यात सहजपणे समाविष्ट करतात. उदाहरणार्थ, वडाच्या झाडाचे महत्व गावात आणि शहरात दोन्ही ठिकाणी आहे. ते जपलं गेलं पाहिजे, त्यासाठी वड सावित्री पौर्णिमा सारखे सण संपूर्ण भारतात बघायला मिळतात. मोठ्या वडाचाझाडाजवळची पार वर्षभर एका सार्वजनिक स्थानासारखी उपयोगात येते. हे झाड मात्र एक झाड नसून, एक संपूर्ण परिसरासारखे वातावरण तयार करत. ह्या जागेला भिंती किव्वा दार-खिडक्या नसून , तिचा मोकळेपणा संस्कृतीला समाविष्ट करत.

प्रतिमा क्रमांक ३ : वडाच्या झाड भोवती ची पार

स्रोत :

https://commons.wikimedia.org/wiki/File:Villagers_under_the_Banyan_Tree_%28303569443 01%29.jpg

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कडू-लिंब, पिंपळ आणि वड तिन्ही झाडांचे एकाच ठिकाणी असणं, खूप पवित्र मानलं गेलं आहे. उत्तरभारतात, ह्याला त्रिवेणी म्हटलं जात आणि लोक त्याची पूजा करतात. ह्या पूजेचा मार्गाने का असो, अशी झाडे शेजारी असल्यामुळे एका सार्वजनिक संमेलनाची जागा तयार होते.

केळींची पाने जेवणा साठी, आंब्याची पाने तोरणा साठी पूर्ण देशात वापरली जातात. अनेक फुलांचा संबंध देवांबरोबर जोडला गेला आहे. गणपतीला वाहायची लाल फुले, शंकराला वाहायची पांढरी फुले, बेलाचे पान, देवीला वाहायची सुगंधित फुले, कमळाची फुले, कृष्णाला वाहायची पिवळी फुले, सोनचाफा, आणि तुळशी ची पाने घराच्या जवळ असलेल्या झाडांपासूनच गोळा केली जात असें. त्यामुळे हि सगळी झाडे घराजवळ असायचे आणि जपली जात असें.

अश्या रिते भारतीय संस्कृतीत राष्ट्रीय स्तरावर, नागरीय किव्वा ग्रामीण स्तरावर, वसाहतीत आणि त्याच प्रमाणे खाजगी स्तरावर, नैसर्गिक संपदेचा आदर आणि संवर्धनाचा विचार अगदी स्पष्ट रूपात दिसून येतो.

ह्या शोधनिबंधात स्थानिक वास्तुकलेबद्दल चर्चा नाही झाली, परंतु ह्या विषयावर अनेक संशोधन झाले आहेत [२] आणि संस्कृतीला समाहित करणारे भारतातले स्थानिक बांधकाम पर्यावरणपूरक आहेत.

निष्कर्ष

जगभरात शाश्वत विकासावर भर दिल्या जात आहे. ह्या संदर्भात जर भारतीय संस्कृतीत असलेल्या पद्धतींकडे लक्ष्य देऊन बघितले, तर नदी घाटांसारखे बांधकामे नैसर्गिक स्थलाकृतीला इजा न पोचवता केलेले बांधकाम आहे. तसेच किल्ले, गढ, वाडे, महाल, देऊळ नैसर्गिक स्थलाकृती ला लक्ष्यात घेऊन केलेलं बांधकाम आहे [९]. आज ज्या पद्धतीने बांधकामासाठी संपूर्ण डोंगर उध्वस्त केली जातात, वास्तुविदांना ह्या परंपरागत बांधकामाकडे बघण्याची संधी आहे. दगड, विटा, माती आणि लाकूड वापरण्यात घेऊन पण ह्या संपदेचा संवर्धन महत्वाच आहे, असा संदर्भ ह्या संस्कृतीत बघायला मिळतो. असेच देशाकडे किती नैसर्गिक संपदा आहे आणि त्याचे नियोजन कशा पद्धतीने झाले पाहिजे, हे बघणे अत्यंत आवश्यक आहे. बहुतेक ग्रीन बिल्डिंग रेटिंग सिस्टमबद्दल [८] बोलतात. गेल्या काही २० वर्षात आलेल्या ह्या रेटिंग सिस्टिम्स मध्ये, जी शब्दावली वापरली गेली आहे, तश्या पद्धती तर भारतीय संस्कृतीत किती तरी काळापासून निगडित आहे. जरी जीवनशैली बदलत आहे, परंतु तरीही पारंपारिक बांधकाम पद्धती आणि लँडस्केप संकल्पना नैसर्गिक संसाधनांचा आदर करण्याची पारंपारिक विचारधारा समाजातील विकासानंतरही अपरिवर्तित राहू शकते.

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मराठा स्थापत्य शैलीचा वारसा: श्री कसबा गणपती मंदिर, पुणे

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प्राध्यापक
एस एम ई एफ्स ब्रिक स्कुल ऑफ आर्किटेक्चर, पुणे

गोषवारा :
स्थापत्य, इतिहास आणि सामाजिक राजकीय घटनांचा परस्पर संबंध आपल्याला जगाच्या पातळीवर प्रत्येक प्रदेशात आढळतो. स्थापत्यातील स्थित्यंतरे ही राजकीय स्थित्यंतरांशी अगदी सरळ जोडली गेलेली आहेत. अगदी चोला स्थापत्यापासून, नागर स्थापत्य, द्रविड स्थापत्य, मुघल स्थापत्य, पर्शियन, मराठा स्थापत्य, पुढे कलोनिअल आणि फ्रेंच, पौर्तुगीज अशा स्थापत्यांपर्यंत विविध स्थापत्य शैलींचा प्रभाव त्या त्या राजवटींमुळे भारतातील आणि खास करून महाराष्ट्रातील हेरीटेज वास्तूंवर दिसतो. इतक्या विविध प्रकारच्या स्थापत्यशैली क्वचितच कुठल्या देशात मिळू शकतील. हा शोधनिबंध मराठा स्थापत्य शैलीतील श्री कसबा गणपती मंदिरावर प्रकाशझोत टाकतो. या अभ्यासातून मराठा स्थापत्य शैलीच्या विविध अंगांचा श्री कसबा गणपती मंदिर या उदाहरणातून उहापोह केलेला आहे. या शोध निबंधातून श्री कसबा गणपती मंदिराचा सामाजिक आणि राजकीय इतिहासही मांडलेला आहे. हे संशोधन काही ठळकपणे प्रकाशित झालेल्या शोध साहित्यावर आधारलेले आहे. तसेच काही रेखाटनांचा आणि छायाचित्रांचा वापर स्थापत्य वैशिष्ठ्ये दर्शवण्याकरता केलेला आहे. पुण्यामध्ये प्रामुख्याने पेठांमध्ये असलेल्या मराठा स्थापत्य शैलीचा वारसा उधृत करण्याचा या शोधनिबंधाचा उद्देश आहे.
महत्वाचे शब्द : वारसा, स्थापत्यशैली, मराठा, सामाजिक, राजकीय

परिचय :
स्थापत्य, इतिहास आणि सामाजिक राजकीय घटनांचा परस्पर संबंध आपल्याला जगाच्या पातळीवर प्रत्येक प्रदेशात आढळतो. स्थापत्यातील स्थित्यंतरे हि राजकीय स्थित्यंतरांशी अगदी सरळ जोडली गेलेली आहेत. अगदी चोला स्थापत्यापासून, नागर स्थापत्य, द्रविड स्थापत्य, मुघल स्थापत्य, पर्शियन, मराठा स्थापत्य, पुढे कलोनिअल आणि फ्रेंच, पौर्तुगीज अशा स्थापत्यांपर्यंत विविध स्थापत्य शैलींचा प्रभाव भारतातील हेरीटेज वास्तूंवर दिसतो. इतक्या विविध प्रकारच्या स्थापत्यशैली क्वचितच कुठल्या देशात मिळू शकतील. महाराष्ट्रामध्ये सुप्याचा प्रांत शहाजी राजांना आदिलशाहीची जहागीर म्हणून मिळाला.

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जिजाऊ राणी साहेबांनी तिथे पुनवडी गाव वसवले जे आता पुणे शहर म्हणून प्रस्थापित आहे. पुण्यामध्ये १६ व्या शतकात अनेक मंदिरे बांधली गेली (सोवनी, १९९८). परंतु आदिलशाहीच्या तसेच उत्तरेतल्या मुघल सत्तांच्या वेगवेगळ्या कालखंडात बांधलेली बहुतेक सुंदर मंदिरे विविध युद्धांमध्ये नष्ट झाली. श्री कसबा गणपती मंदिर हे भगवान गणेशाला समर्पित एक हिंदू मंदिर आहे, ज्याला गणपती किंवा विघ्नहर्ता-अडथळ्यांचा नाश करणारा म्हणूनही ओळखले जाते [१]. कसबा पेठेत असलेले हे गणेश मंदिर मराठा इतिहासातील उच्च पारंपारिक मूल्यांचे प्रतिक म्हणून ओळखले जाते.

मराठा स्थापत्य वास्तुशैली - संदर्भ आणि पार्श्वभूमी :

इ.स. १३ व्या शतकाच्या सुरुवातीस देवगिरी ला यादवांचे मराठा साम्राज्य होते. इ.स. १२९४ रोजी रामदेव यादव हे मराठा साम्राज्याच्या गादीवर विराजमान असताना अल्लाउद्दिन खिलजीने आक्रमण केले आणि यादवांचा पराभव केला. या अंती त्याने काही हजार होनांची खंडणी, आर्थिक लूट वसूल केली आणि यादवांवर पुढील काही काळासाठी कर लादला. हा कर इ.स. १३०७ पर्यंत न दिल्याने खिलजीने त्याचा सेनापती मल्लिकाफुर ला यादवांचा बिमोड करण्यासाठी पाठवले. त्यानंतर देवगिरी साम्राज्याचा असत होऊन तिथे खिलजीची राजवट सुरु झाली. त्यानंतर देवगिरीचे नाव बदलून दौलताबाद ठेवण्यात आले. ही सगळी अराजकता मोहम्मद बिन तुघलकाने आपली राजधानी दौलाताबाद ठेवण्यापर्यंत चालूच होती. मधल्या काळात बिरार ला इमादशाही (इ.स.१४९०-१५७४), अहमदनगर ला निजामशाही (इ.स.१४९०-१६३६), विजापूरला आदिलशाही (इ.स.१४९०-१६८६), बिदरला बरीदशाही (इ.स.१४९२-१६१९), गोवळकोण्ड्याला कुतुबशाही (इ.स.१५१८-१६८७) अशा विविध राजवटी प्रस्थापित झाल्या होत्या. तसेच महाराष्ट्रात आणि इतर दक्षिणेत्तर राज्यात कित्येक सरदारांना ह्या राजवटींची जहागिरी होती. उत्तरेत मुघल आणि राजपुतांची मक्तेदारी होती. कित्येक वेळा ह्या राजवटींमध्ये कुरघोड्या, युद्ध होऊन महाराष्ट्रातील सामाजिक आणि राजकीय वातावरण ढवळून निघत असे (तोडे, २०२१). पुढे इ.स. १६ व्या शतकात श्री छत्रपती शिवाजी महाराजांनी स्वराज्याची स्थापना करून ह्या शाह्यांना आव्हान दिले आणि त्यांचे कंबरडे मोडून काढले. पुढे पेशवाई काळात मराठा साम्राज्य अटकेपार स्थापित झाले. इ.स. १८१८ मध्ये पुढे मराठा साम्राज्य अस्ताला जाऊन संपूर्ण हिंदुस्तानात ब्रिटीशांचा अंमल सुरु झाला. ह्या सगळ्या स्थित्यंतराचा महाराष्ट्रातील आणि खास करून पुण्याच्या स्थापत्यावर प्रभाव पडला आणि मुघल, पर्शियन, ब्रिटीश वस्तू स्थापत्याचा प्रभाव असलेली मराठा स्थापत्यशैली प्रस्थापित झाली. १६ व्या शतकाच्या सुरुवातीस फ्रेंच, डच आणि पोर्तुगीज ही व्यापाराच्या निमित्ताने महाराष्ट्रात वास्तव्यास होते. त्यामुळे येथील स्थापत्य शैलीवर फ्रान्स, हॉलंड आणि पोर्तुगाल सारख्या विविध प्रांतातील स्थापत्य घटकांचा प्रभाव होता.

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श्री कसबा गणपती मंदिर - ऐतिहासिक महत्व :

निजामशाहीचा अस्त झाल्यानंतर शहाजी महाराजांना पुणे, इंदापूर आणि सुपा प्रांताची आदिलशाही कडून जहागिरी मिळाल्या नंतर इ.स.१६३० मध्ये जिजाबाई भोसले त्यांच्या कुटुंबासह पुण्यात आल्या. पौराणिक कथेनुसार, जिजाबाईना कळविण्यात आले की मुख्य शहरातील रहिवासी विनायक ठकार यांच्या घराजवळ गणपतीची मूर्ती प्रकट झाली. ह्या घटनेला शुभ संकेत मानून १६३९ मध्ये या जागेवर मंदिर बांधण्याचे काम सुरू झाले. कसबा हा शब्द 'कसबाह' या अरेबिक शब्दावरून आला असावा असे तज्ञ सांगतात. कसबाह चा अर्थ वस्तीतील किल्ला असा आहे [१]. असे मानले जाते की छत्रपती शिवाजी महाराज मंदिराला भेट दिल्याशिवाय युद्धासाठी जात नसत. कसबा गणपती हे पुण्याचे ग्रामदैवत (संरक्षक देवता) मानले जात होते आणि अजूनही मानले जाते [२] . या परिसराला थोरल्या बाजीराव पेशव्यांच्या काळात १७ व्या शतकाच्या उत्तरार्धात कसबा पेठ म्हणून ओळखले जाऊ लागले. पुढे नानासाहेब पेशव्यांनी पुण्याच्या नगर रचनेत विविध पेठा, रस्ते, पागा, व्यायामशाळा, शस्त्र आगारे बनवून मोलाची भर घातली. आणि शहराच्या सध्याच्या काळात पुणे शहराची ओळख म्हणून पुण्याची हेरीटेज ओळख आणि वारसा म्हणून उभ्या आहेत.

स्थापत्य रचना आणि वैशिष्ठ्ये:

कसबा मंदिराची रचना आयताकृती असून तळ मजला आणि वरती नगारखाना असे बांधकाम केलेले आहे. मंदिराचा बाहेरील भाग हा हेमाडपंथी रचनेचा भाग आहे. पूर्वीचे गर्भगृह आणि दैवत हे दगडी बांधकाम असून नंतर त्याचे पुढील बांधकाम चपट्या/पुस्तकी विटांमध्ये शिवाजी महाराज आणि पेशवाई काळात करण्यात आले. आकृती १ मध्ये दर्शवल्याप्रमाणे या वास्तूत खालील बाजूस काळ्या कातळामध्ये बांधकाम केले असून वरील बांधकाम हे चपट्या/पुस्तकी विटांमध्ये केलेले आहे. मंदिराचे खांब हे सागवानी लाकडात असून त्यावर लाकडी तुळया ठेवण्यात आल्या आहेत. आकृती २ मध्ये दाखवल्याप्रमाणे या तुळई आणि खांबाच्या जोडणीवर मयूरनक्षीकाम केलेले सुशोभित ब्रेकेट्स आहेत. या वैशिष्ट्यामध्ये यादव स्थापत्य शैलीचा प्रभाव जाणवतो.

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प्रतिमा क्रमांक १ : समोरील दर्शनी भाग, श्री कसबा गणपती मंदिर, पुणे (स्रोत : लेखक)

प्रतिमा क्रमांक २ : मयूरनक्षीकामयुक्त ब्रेकेट्स, श्री कसबा गणपती मंदिर, पुणे (स्रोत : लेखक)

मंदिराच्या प्रवेशद्वारातून आत प्रवेश केल्यानंतर मुख्य मंदिराची रचना काटकोनात आहे. पुढील बाजूस सभामंडप, अंतराळ आणि गर्भगृह अशी मंदिराची प्राथमिक रचना आहे. सभामंडपाच्या बाजूने गर्भगृहा भोवती प्रदक्षिणा पाथ संरचित केलेला आहे [३] . आकृती ३ मध्ये दर्शवल्याप्रमाणे मंदिराचा सभा मंडप हा दुमजली असून वरील मजल्यावर लोकांसाठी डोकावता येईल अशी बाल्कनीची रचना आहे. दोन खांबांच्या मध्ये असलेल्या लाकडी कमानी या पर्शियन स्थापत्याचा प्रभाव अधोरेखित करतात. सभा मंडपाचे छत हे सागवानी फळ्यांनी केलेले असून मध्यभागी सुशोभित तेल दिव्यांच्या झुंबरासाठी व्यवस्था केलेली आहे. सभा मंडपाच्या प्रांगणाशिवाय आतील बाजूस ओसरी वजा सभा मंडपाचाच भाग आहे. पूर्वीपासून सभा मंडपाचा वापर हा एकत्रित पूजा, आरती, स्तोत्रपठण तसेच कीर्तने, प्रवचने आणि व्याख्याने अशा सामाजिक प्रबोधनपर माध्यमांसाठी होत असतो. मंदिराच्या सभामंडपाच्या भिंती आता अष्टविनायकांच्या चित्रांनी सुशोभित केल्या आहेत. अंतराळ हा भाग नामस्मरणासाठी म्हणून प्रमाणित केलेला असून त्याची त्रिमितीय जागा ही मनुष्य प्रमाणानुसार संरचित केली गेलेली आहे. या भागात अगदी कमी प्रमाणात गवाक्षांचे स्थान निश्चित करण्यात आलेले आहे. त्यामुळे सभा मंडपातून परावार्तीत होणारा मंद प्रकाश आतील लोकांची एकाग्रता वाढवतो. गवाक्षांच्या रचनेमध्ये यादव स्थापत्य शैलीचा प्रभाव जाणवतो. गावाक्षांच्या बाहेरील बाजूस लाकडी बाह्य फ्रेम्स मध्ये लोखंडी सळयांची संरक्षक कड उभी केलेली आहे. मंदिराच्या आवारात एक मारुती मंदिर असून दीपमाळ ही बांधीव काळ्या कातळात उभारली आहे.

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प्रतिमा क्रमांक ३ : दुमजली सभामंडप, श्री कसबा गणपती मंदिर, पुणे (स्रोत : लेखक)

सामाजिक व राजकीय महत्व :

इ.स.१८९३ मध्ये, लोकमान्य बाळ गंगाधर टिळक यांनी सार्वजनिक गणेशोत्सवात गणेश चतुर्थी या घरगुती उत्सवाचे रूपांतर सार्वजनिक गणेश उत्सवात केले. ज्यामुळे जनतेला एकत्र आणता आले आणि राष्ट्रीय एकात्मतेची भावना बळकट झाली. ब्रिटीश राजवटीपासून भारताला मुक्त करण्यासाठी समविचारी लोकांना एकत्र आणण्यासाठी आणि विचारांची देवाणघेवाण करण्यासाठी एकसमान व्यासपीठ तयार केले गेले. लोकांचे प्रबोधन कीर्तने, प्रवचने आणि व्याख्यानांद्वारे केले गेले, ज्यामुळे जनशिक्षण झाले आणि समाजातील विविध वर्गांमधील दरी कमी होण्यास मदत झाली [६]. तसेच ब्रिटिश राजवटीबाबत लोकांमध्ये जागरुकता निर्माण केली. मेळाव्यात सर्वसामान्यांच्या त्रासावरही तोडगा काढण्यात आला. टिळकांच्या प्रयत्नामुळे पुण्यात अनेक क्लब किंवा मंडळे निर्माण झाली. यामुळे गणपती उत्सवाला नवा आयाम मिळाला.

गणेशोत्सवात अनंत चतुर्दशीला श्री गणेशाचे विसर्जन सामूहिक मिरवणूक काढून केले जाऊ लागले. ज्या मध्ये श्री कसबा गणपती ह्याला मानाचे स्थान मिळाले. अजून पर्यंत हा सोहळा दिमाखदार पद्धतीने सुरु आहे. या सार्वजनिक मिरवणुकीची सुरुवात मंडईतल्या टिळक पुतळ्यापासून सार्वजनिक आरतीने सुरु होऊन श्री कसबा गणपतीपुढे पारंपारिक ढोल ताशा, शंख नाद, लेझीम नृत्य असा विविध कलाविष्कार सादर होतात. नवसाला पावणारा श्री गणपती म्हणून ही श्री कसबा गणपतीच्या मौखिक कथा बोलल्या जातात.

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निष्कर्ष :

श्री कसबा गणपती मंदिर हे मराठा स्थापत्यशैलीचे ठळक उदाहरण आहे. या मंदिराला समाजामध्ये एक आदराचे स्थान असून पुण्याच्या ऐतिहासिक आणि सांस्कृतिक मूल्यांचे ते द्योतक आहे. हया मंदिरामध्ये छत्रपती शिवाजी महाराजांच्या काळापासून ते पेशवाई ते ब्रिटीश राजवटी पर्यंत बदल होत गेले. सध्याच्या काळातही आजूबाजूला बरेच बदल झालेले आहेत. सामाजिक, राजकीय आणि सांस्कृतिक स्थित्यंतरे हे पुढच्या पिढीला समजणं हे अत्यंत महत्वाचं असतं. म्हणून हा वारसा पुढे नेण्यासाठी स्थापत्य हा महत्वाचा दुवा आहे. मराठा स्थापत्य वास्तुशैली ही पुण्याची हेरीटेज ओळख आहे आणि हा वारसा जपला जाणं हे अत्यंत गरजेचं आहे.

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Advances in 21st Century Human Settlements

Rama Devi Nandineni
Susan Ang
Norwina Binti Mohd Nawawi *Editors*

Sustainable Resilient Built Environments

Proceedings of SRBE 2022, India

Springer

Advances in 21st Century Human Settlements

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This Series focuses on the entire spectrum of human settlements – from rural to urban, in different regions of the world, with questions such as: What factors cause and guide the process of change in human settlements from rural to urban in character, from hamlets and villages to towns, cities and megacities? Is this process different across time and space, how and why? Is there a future for rural life? Is it possible or not to have industrial development in rural settlements, and how? Why does 'urban shrinkage' occur? Are the rural areas urbanizing or is that urban areas are undergoing 'ruralisation' (in form of underserviced slums)? What are the challenges faced by 'mega urban regions', and how they can be/are being addressed? What drives economic dynamism in human settlements? Is the urban-based economic growth paradigm the only answer to the quest for sustainable development, or is there an urgent need to balance between economic growth on one hand and ecosystem restoration and conservation on the other – for the future sustainability of human habitats? How and what new technology is helping to achieve sustainable development in human settlements? What sort of changes in the current planning, management and governance of human settlements are needed to face the changing environment including the climate and increasing disaster risks? What is the uniqueness of the new 'socio-cultural spaces' that emerge in human settlements, and how they change over time? As rural settlements become urban, are the new 'urban spaces' resulting in the loss of rural life and 'socio-cultural spaces'? What is leading the preservation of rural 'socio-cultural spaces' within the urbanizing world, and how? What is the emerging nature of the rural-urban interface, and what factors influence it? What are the emerging perspectives that help understand the human-environment-culture complex through the study of human settlements and the related ecosystems, and how do they transform our understanding of cultural landscapes and 'waterscapes' in the 21st Century? What else is and/or likely to be new vis-à-vis human settlements – now and in the future? The Series, therefore, welcomes contributions with fresh cognitive perspectives to understand the new and emerging realities of the 21st Century human settlements. Such perspectives will include a multidisciplinary analysis, constituting of the demographic, spatio-economic, environmental, technological, and planning, management and governance lenses.

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Role of Spatial Elements of an Urban Street that Makes It Vital

Garima Mutha, Shraddha Manjrekar, and Akshay Gandhi

Abstract The characteristic of meaningful interactive spaces in the city transforms with change of lifestyle. Certain streets in the urban fabric offer a conducive environment for gathering, and with this attribute, these streets remain lively and vibrant in nature. With time, the buildings get dilapidated, few of them get renovated, and in this process, the architectural character also gets changed. Although the aesthetic character of streets changes, with the developments in the architectural design, the value of urban streets still remains the same in terms of social interaction spaces. Chandni Chowk, Delhi, Mohammad Ali Street and Colaba causeways of Mumbai, Manek Chowk of Ahmedabad, Sarafa Bazaar of Indore and many such streets in the older cities are the spaces that have been attracting people with their traditional food joints and the street elements since many years. The researchers have identified Fergusson College Road of Pune with an objective of studying the spatial aspects of streets and urban vitality that draw people toward them. The study comprises two stages. The first stage includes an interview-based survey of 45 individuals. These visits to a particular street that is covered by eateries and shopping alleys. The second stage includes study of the spatial character of the street under defined parameters with semi-structured interviews and documentation. Remarkably, the documentation covers the nature of the space over the time which have influenced people of three generations.

Keywords Urban vitality · Social interaction · Urban street · Street element · Restaurants

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1 Introduction

The term "urban vitality" refers to the lively activity on city streets. Vitality of the urban areas is in physical, socio-economic, cultural, ecological and behavioral settings. Urban Public Realm demonstrates a significant charm in the practicality of urban public spaces. The urban composition of a city is formed by architectural elements. This notion of composition is seen in both architecture and urban planning. "Urban environment design" can be defined as a complex construction of city public spaces placed on the ground floor level of city buildings and ensuring the vital activity of the urban community [1]. According to urban planners and designers, a small number of public spaces are currently failing in terms of spatial planning and aesthetic design. As a result, in the present context, it becomes important to study and understand the spatial character of specific usage of contemporary urban public spaces and to determine how and in what ways they are used by the general public [2].

For cities, the streets are the most significant public places. The density and diversity of pedestrians on the streets, as well as the range of pedestrian activity on the streets, are markers of urban vitality. The built environment in the city is a product of a society's social establishments, culture and practices. An argument, on the other hand, is that the people's activity pattern and life is guided by spatial layout. The impact of spatial elements in the urban environment on urban life is undeniable [10]. This study is about investigations of such spatial elements. The objectives of the study are:

- Identification of the spatial elements that attract social interaction
- Studying the role of spatial elements that contribute into vitality of the space.

To study and understand these spatial elements contributing to vitality, Pune city has been chosen as the study area. Pune is the second largest city in the Maharashtra, India. The city has also been termed the "*Oxford of the East*" because of its educational assets, which include a large number of educational institutes and a highly qualified workforce [9].

The vitality of the urban form of the city is historical in nature and there are several areas, streets and spaces in the city that characterize the city which also add to its vitality. With this context, a vital area in the city, the Ferguson College (FC) Road has been chosen as the investigation site. It is a busy one-way road, starting from Deccan Gymkhana to Shivajinagar in the city. It is one of the liveliest streets in Pune that is mostly occupied by youngsters. FC Road is home to many of the city's most famous restaurants, street food establishments and street shopping locations. Because of its proximity to the city's top educational institutions like Fergusson College, BMCC, Apte College, COEP and residential districts, this place is a favorite place of young people for dining, shopping and hanging out [6].

2 Background

The fundamental aims of urban sustainable development are urbanity and vitality. A vibrant atmosphere encourages entrepreneurship and prosperity, as well as attracts economic activities, visitors and creative class residents. The vitality potential is defined as the quality of spaces resulting from topological, functional and geometrical aspects of the urban form that impact activity diversity and intensity, as well as the variety of movements, social contacts and transactions [4]. Architecture can play a role in social interaction in urban public spaces, which are seen as a melting pot of many ethnic groups. While a built environment can usually only give opportunities for passive connection, research demonstrates that extra inputs are required to enable active interaction [11].

Generative Mechanism of Urban Vitality (GMUV) [8] conceptualized by Haize Pan, Chuan Yang is composed of various elements like environmental vitality (EnV), economic vitality (EcV), social vitality (SV) and cultural vitality (CV). GMUV is integration with micro enablers and macro manifestations. J. E. Drewes and M. van Aswegen have theorized and developed "*Vitality Index*"-which enables measurement of a town's overall economic, social, physical, environmental, institutional and spatial performance within a regional framework, eventually representing the urban center's spatial importance. [3] This index consists of measurement of four indicators—i.e., normative welfare, satisfaction, descriptive social and spatial indicators.

$$\begin{aligned}\text{Vitality Index} &= (1/4)\ \text{Normative welfare indicator score} \\ &+ (1/4)\ \text{Satisfaction indicator score} \\ &+ (1/4)\ \text{Descriptive social indicator score} \\ &+ (1/4)\ \text{Spatial indicator score}\end{aligned}$$

The normative welfare indicator can be understood by the concept of overall well-being of society. Satisfaction indicators measure psychological satisfaction, happiness and life fulfillment by using survey research instruments that ascertain the subjective reality in which people live; and the most inclusive category, descriptive social indicators, which are indexes of social conditions (i.e., contexts of human existence) and varied therein for various segments of a populations. All these three indicators have direct relation with the spatial indicators [5].

A number of studies have already been done to define these spatial indicators. In the background study done by Nelson Nygaard in year 2015, for street design in Washington, DC, it is stated that the purpose of streets is to provide safe and efficient transportation and also to facilitate safe and efficient movement pattern for economic and other activities and also to support health of people and places [7].

As per the study done by Chiara Garau and Alfonso Annunziata [4], these are Closeness Centrality, Betweenness Centrality, Density of Points of interest, Diversity of Uses, Buildings density/floor area ratio, Proportion of built area, Vertical dimension of buildings, Population Density, Block size, Road density, Proximity to transport nodes, Border Vacuums, Real estate value and Diversity of buildings age.

Another study indicates factors such as complementing spaces, the sensory qualities of them, relation to the human scale, linearity and pause points, safety aspects, universal accessibility and usability make an urban space vital [2].

3 Methodology

With this background, the present research involves a mixed approach of qualitative and quantitative analysis. This study examines a few popular activities that encourage people of all ethnicities to engage, as well as ideas for incorporating them into public urban space, so that the country can reap the greatest benefits from a multiracial network. Methodology of mapping and investigations through interviews that involve the indicators as referred in the background study have been adopted for this study. There are two stages of the analysis. The first stage includes the study of the present context of the street. Stage 1 identifies several spaces that are vital in nature. Some cases are chosen out of these in the Stage 2 for further study. In the stage 2, comparative study of the spatial character of these selected spaces has been done. A statistical analysis to find out the reasons for preference of these spaces by the people.

4 The Present Context of the Street

The present-day FC road of Pune is an arterial road that connects the south to the northwest-east (CBD, railway station). The road is a thoroughfare in mornings, activity/destination in afternoon (lunch) and remains active even till late evening and night hours. The right of way of this road varies from 20 to 24 m. The predominant land use on this road is commercial, with office spaces, showrooms of clothes and accessories, restaurants and cafes. Figure 1 represents the location of the road in its precinct.

FC road is also the transition space between the core city of Pune and the newer developments that are happening in the city. It also tries to connect the rather radial city with its most resourceful educational, trade and transport elements. Figure 2 depicts the urban grain of the road's precinct.

Fig. 1 Centrality. *Source* Graphic made by author

Fig. 2 Figure ground map. *Source* Graphic made by author

To further study the road, a stretch from Good Luck Chowk to Tukaram Paduka Chowk was studied (Fig. 3). This stretch of 2 km was then observed, documented and analyzed for understanding the distribution of spatial elements, their dependencies on the users and density of these elements according to the surrounding area.

Fig. 3 Fergusson college road, Plan. *Source* Graphic made by author

Source Photograph by author

Photographic analysis captured the different types of activities occurring at different locations of time on one particular stretch of FC road. An additional cognitive mapping of places that are often visited by the public was done to understand the categories of eateries with respect to the type of spaces, pedestrians and users and type of services available. Interviews were taken in online and offline mode for 45 individuals based on the kind of occupation and user typology majorly based on activity, duration, intent and opinion. The response of the participants has been used to recognize the key features that shape a particular urban fabric element, i.e., streets. As this road is known for its eating corners; shopping alleys and education institutes present, a detailed mapping of these spaces was carried out. Mapping of all types of eateries was done which led to classification of eateries into majorly three typologies—Stalls, Cafes and Restaurants. Another set of mapping signifies the classification of shopping spaces—temporary and permanent shops/stalls. The road is home to a numerous commercial complex that engage primarily in coaching centers, newspaper editorials and trading arcades.

Figures 4, 5, 6 and 7 are street montages of the entire stretch of study depicting the natures of the built mass, the hierarchy of spaces, the density of users and the vibrant essence of FC road. The yellow patches represent the eateries, green represents the commercial complexes, the pink represents the shopping centers and the blue represents the residential spaces.

The documentation of the road revealed that the road majorly consists of eateries, followed by shopping alleys. During the course of the day, a wide range of users-right

Fig. 4 Montage section from Good luck chowk to Flavors. *Source* Graphics made by author

Fig. 5 Montage section from Flavors to hotel Roopali. *Source* Graphics made by author

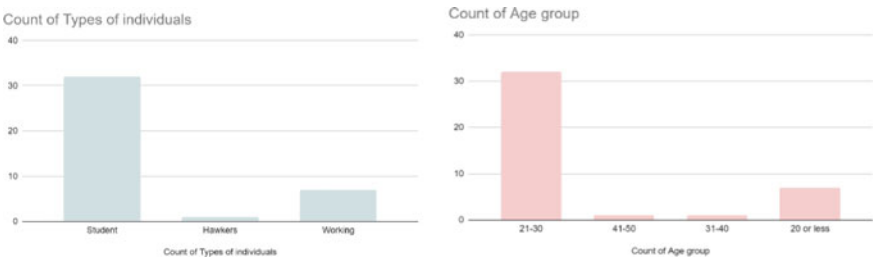
Fig. 6 Montage section from hotel Roopali to hotel Vaishali. *Source* Graphics made by author

Fig. 7 Montage section from hotel Vaishali to Starbucks. *Source* Graphics made by author

from senior citizens to children can be observed. The peak hours largely consist of the lunch and dinner time of the day with heavy vehicular and pedestrian population on the road. The general arrangement of spatial elements is distributed along the road in terms of ground plus two structures, welcoming ambiences of the eateries, engaging arrangements of the shopping alleys, positioning of the road infrastructure and the temporary stalls.

A detailed analysis of the interviews throws light on the users, their choices about the spaces of the road, the spaces that offer interaction and the city's most famous eateries.

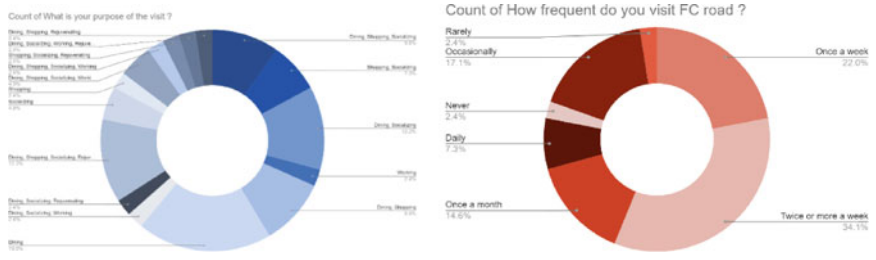
4.1 The User Groups



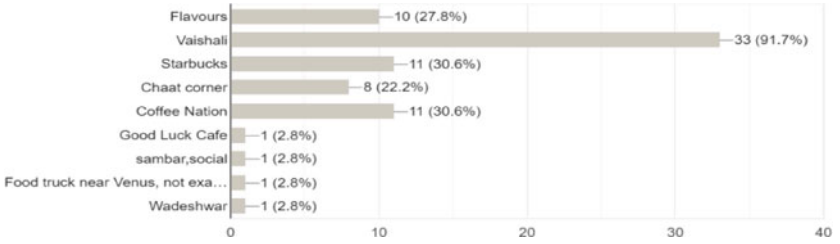
The survey revealed that major public utilizing the road and its facilities are the youth students that age between 21 and 30 years. This implies that major activities attract the teens and young adults that build a major base for social interaction.

4.2 Purpose of Visit

To know the reasons for the street to be so vital during peak hours and also during regular days, a count was done which includes the motive of people approaching the road. To a great extent, the purpose doesn't end at dining, there is always a multi-use visit for people engaging on FC road. The study showed that apart from 80% of the users visiting the road for dining, people also stress on the point of socializing via dining. Secondly, shopping becomes a major influence point for the audience that can be observed throughout the street that surrounds every eating junction.



4.3 Major Magnet Spots



A general trend observed among the users described that the majority of them had the sole purpose of enjoying dining at Vaishali—a well-known restaurant for the last six decades. The next spaces that attract most of the crowd are Starbucks and Coffee Nation—two of the most contemporary cafes that offer newer sets of services and have different ambiances than that of traditional restaurants on the street.

5 Inference

Fergusson College Road offers a variety of spaces for public engagement, user interaction and an economy to all genre of trades. The co-existence of such differential categories makes one understand the alchemy of circumstances that bought the city together, its citizens and its identity. One can significantly observe the reflection of Pune city with only one of its streets. This also compiles to the ongoing reflection of the city's culture, character and its growth toward contemporizing. The presence of the educational institutes, the Tukaram paduka temple holding its religious status during the Vaari season, the manifestation of the artists, students, vendors and citizens in form of a street is what makes Pune an example of patent urban space of significant structure. The urban vitality of the city lies in its tangible terms of spatial elements, their distribution and the intangible elements of safety, mobility and interaction.

6 Conclusion

These interactive spaces are part of a living entity that are the cities that we live in; they have their vibrant language that tell stories of the past journeys and evolves with the changing times and growing population. These spaces that we study and design hoping to encourage social interaction take a live of their own and fit the need to the public that uses them, just as this public makes changes to these spaces to suit their needs. Our greatest challenge will always be to be able to create spaces that apart from satisfying their basic needs have the qualities to evolve with the change in

functions as well. As we have seen through the above case studies, data and analysis, these interactive spaces become the veins of a city have shape its character, urban vitality and spatial developments.

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Sacred Groves of Kudase at Sindhudurg in India: A Discourse on Collective Identity and the Continuity of Tradition

Vaidehi Lavand and Onkar Khebudkar

Abstract Kudase village is a one of the significant biodiversity hotspots located near Tillari River in Sindhudurg district, India. Tillari bioregion retains its significance as a natural heritage. Being situated close to Talkat forest reserve spotted large number endemic and indigenous species of flora and fauna in the Western Ghats, one of the nominated natural heritage site under UNESCO. Sacred groves around the village still retain their spiritual character and sanctity. These sacred groves are undergoing through many threats such as privatization of forestlands getting converted to monoculture, and so on. It is essential to document and rethink these natural heritage sites as a potential cultural landscape cases to be listed and protected on a broader platform. This discourse tries to record and analyze six sacred groves around Kudase village. As per IUCN guidelines, critical evaluation of sacred groves is done with the help of literature review, field visits, and interviews with experts and local communities. Along with this background research, actual mapping, and field visits are done to identify various attributes of natural and cultural heritage. As a result of study along with the mapping of these sacred groves, this research identifies tangible, intangible elements associated with groves and the various aspects of continuation of cultural traditions. It is observed that there is very strong relation of nature and culture which is evident in case of Kudase village settlement. Research further tries to identify issues related to the site and discusses future challenges and directions.

Keywords Sacred grove · Natural heritage · Cultural landscape

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1 Introduction

Sacred groves are the forest areas protected by communities and settlements for many generations. Certainly, many associational, cultural, and religious values are significantly been followed for many centuries for the conservation of these natural and cultural assets [1]. Sacred groves are the collective identities of the settlements around them. These forest areas are living traditions and manifestation of spiritual relationship of humans with nature [2]. Evidence of sacred groves goes back to ancient times before the pre-agrarian stage of human evolution. The significant tradition of protecting these high biodiversity lands dedicated to deities and ancestral spirits helped in natural conservation. This natural heritage with several mysteries, memories, and rituals always played important role in maintaining the ecology of the region.

There are various sizes of groves having small shrines, a temple with the village deity, hermitage, megalith, and hieroglyphs depending upon human interventions at various scales. These are living natural heritage sites having strong cultural associations with the community around them [3]. As mentioned in the extensive studies by Chandran and Hughes in the Western Ghats, smaller groves functions as abodes of gods, taboos and mysteries people believe in whereas larger groves support safety of forest as ecological resource [4]. Discussion highlights sociocultural aspects of groves and its mosaic landscapes that is significant discussion while understanding hierarchy of forestlands around a village settlement [4]. Over 50,000 sacred groves have been reported so far in India. Out of these, more than 2500 are reported from Maharashtra [1]. Sindhudurg district has more than 1800 sacred groves considered as highest density in the Western Ghats region [1, 5].

Kudase village is located in Sindhudurg district in the state of Maharashtra, India, and is a biodiversity hotspot in the context of UNESCO nominated natural heritage site that is Western Ghats. Many transformations are observed due to changing policies and environmental laws, which are affecting adversely upon local ecology of the region [6]. Paper tries to elaborate upon case of Kudase settlement with its cultural associations with surrounding sacred groves. There are many such settlements with larger areas of sacred groves, but for this particular discourse, study is limited to Kudase settlement examining attributes of natural heritage and cultural landscape. This discourse tried to document and analyze six sacred groves so far mapped around Kudase village. With the help of random sampling method, several questions were asked to the locals from different age groups. Data is collected through non-structured interviews and random sampling with a reconnaissance survey with preliminary observations. The formation of the questionnaire was based upon two main criteria; one was to understand basic awareness of several groves and their names, deities, and rituals performed around the village. The second was exploring the relationship of communities with the sacred groves near the settlement. It is observed that some of the sacred groves are community lands and some are private forestlands. Strong association of nature and culture is observed in the context of sacred groves of Kudase village and similar settlements in Sindhudurg district. Result at the end

highlights these sacred groves as cases of natural heritage and cultural landscape. Currently, these sites are facing many challenges such as monoculture in surrounding areas, privatization, and so on. Lack of documentation of this nature–culture linkages raised question of protection of these natural heritage sites. This discussion tries to highlight significance of all these ecosensitive areas in today's fast-growing world.

2 Study Area: Context of Study

Tillari region in Sindhudurg district, Maharashtra, India, is well known for its rich biodiversity and attracts many of the researchers nationally and internationally. The unique geographic setup of the Tillari region imparts significance to its context. Tillari River originates in Tudai Chandgad in Kolhapur district where it is known as Tilotama. The exclusive biodiversity of the Tillari region, the number of endemic, endangered species, and rich flora and fauna mark its uniqueness [7], Figs. 1 and 2. Tillari bioregion is the seventh wildlife corridor in the state to be declared as a 'conservation reserve' and has long history of animal habitation [8, 9]. The studies of wildlife researchers have spotted seven tigers in the region. This presence of tigers in the Sahyadri region entirely depends upon the connectivity of Tillari to the Radhanagari Wildlife Sanctuary [10, 11]. The catchment area in this region has made this region suitable habitat for wildlife. Most of the area in the Tillari region is around 0–300 m in elevation, which act as a water basin area; 0–100 acts as a watershed area.

The Upper Dodamarg region is an important migration corridor for elephants, tigers, and Indian *Gawa* or wild bison, whereas lower areas were observed with immense bird diversity [12].

There are five *wadies* or settlement clusters in Kudase village named as Kudasewadi, Vanoshiwadi, Bharpalwadi, Deomalawadi, and Dhangarwadi. There are approximately nine sacred groves around village still worshiped by local communities at various intervals throughout year [13], Fig. 3. Very less discussion happened so far from nature–culture journey point of view for the context of Sindhudurg district.

3 Methodology

Flowchart explains the framework for research. Data is collected through field visit, mapping, photographic documentation on site, and interviews of locals, Fig. 4.

Fig. 1 Map of India, location of Kudase ref: https://freevectormaps.com

Literature review helped in establishing the context of work and understanding current practices and state of art in the field. Discussion on the data collected and inferences assisted in drawing the conclusions which are site specific but broader to set a methodology to study nature–culture journey. At the end, results are derived from both tangible and intangible attributes observed, documented, and analyzed. Cases of sacred groves in the context of Kudase village near Tillari bioregion are discussed to form a methodology which could be applied in studying similar cases in the region.

4 Results and Discussions

Ecologists and wildlife researchers majorly cover the potential of the sacred grove from a natural heritage point of view, and Western Ghats being UNESCO's world natural heritage site ample study is available for it [14]. Settlements in the Western Ghats and how communities react and get associated with its rich natural setup are less studied and documented [3]. Right from settlement patterns evolved over many centuries, the vernacular architectural language they following and the forest patches or sacred groves they protected around the settlements are significant to be studied with a holistic approach [15] [6]. Jay Patel discusses sacred groves of Ambaji and elaborates upon space-making attributes such as principles of design and esthetics of organic patterns in sacred groves [16]. It could be explored further

Fig. 2 Map of Sindhudurg district location of Kudase ref: www.mapsofindia.com/maps/maharashtra/tehsil/

from its significance as a community heritage and collective identity, a continuation of tradition, rural landscape. It is significant to demarcate its potential as living heritage, shared landscapes, and ecocultural systems. On site observations and interviews of local people helped in understanding what is the role of sacred groves in today's context and how new generation is looking at it. Mapping helped in getting precise indications of what all space-making elements observed on site and how people around intervened in natural setup around their clusters. Following are the results marked in the form of pie charts.

4.1 Interpreting Collective Identity and Continuity of Tradition

Very strong cultural associations and respect toward these sacred forest lands are observed which leads to sustainable model of in-situ conservation practices in the

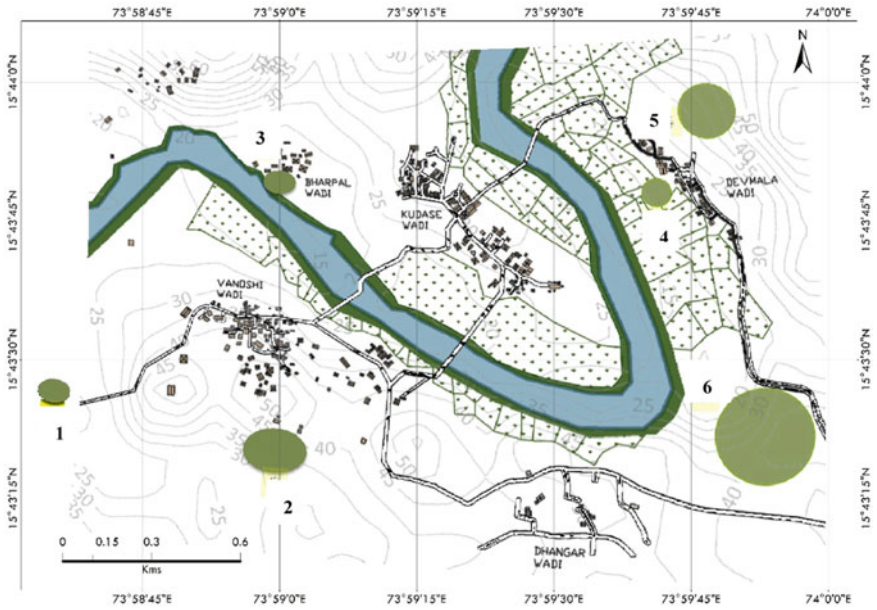

Fig. 3 Location of 6 sacred groves around Kudase village base map created under training and capacity building program by brick school of architecture in collaboration with ICOMOS India coordinated by Author. Legends: 1—Pededeo, 2—Rashtroli, 3—Bhairidevi, 4—Vamanachi Rai, 5—Rashtroli, 6—Thevnekar Ref: Base map prepared on the basis of hardcopy of map from local body and D43 B14_48E14 https://onlinemaps.surveyofindia.gov.in/

context of Kudase village [17, 18]. A total of 15 responses are noted with the help of questionnaire that has underlined strong bonding between nature–culture and people. Various observations are marked through pie charts below. It is seen that throughout the year during important festivals such as Navratri, Holi, Diwali, *Shravani Somvar,* or Holy Mondays in the month of peak Monsoon that is August, and many festivals and occasions these groves are visited and worshiped by the locals.

4.2 Observations: Sacred Groves of Kudase Village

Literature survey helped in exploring concepts of collective identity and continuation of tradition in the context of sacred grove [18]. Sacred groves understood as collective identity and also termed as museum of biodiversity for coming generations [19]. Living and continuation of tradition, [20] vi, vii, ix, x criteria talking about natural heritage, living tradition, natural beauty, fresh water resource, most important, and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation. The term "Biodiversity Heritage Sites" (BHS) refers

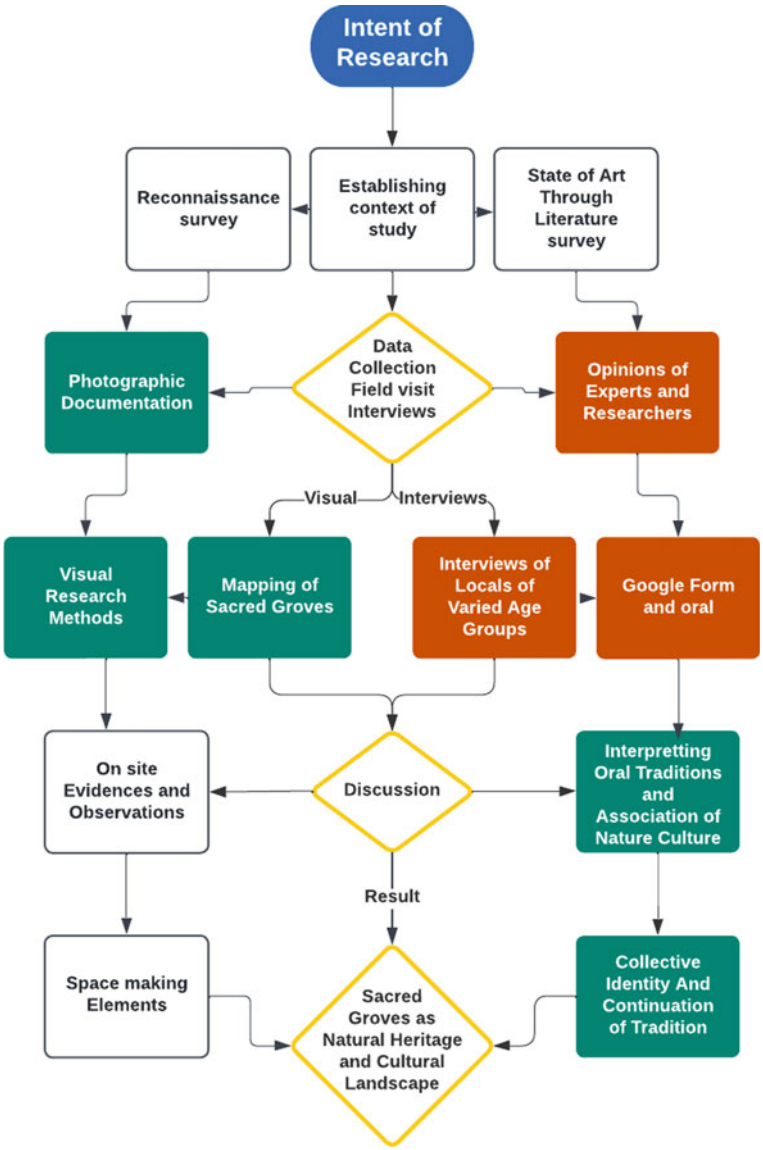

Fig. 4 Flow chart explaining methodology of research

to places with distinctive, ecologically vulnerable ecosystems, rich biodiversity, high endemism, and the presence of rare and threatened species, keystone species, and having significance for the preservation of biological diversity. Figure 12 shows demarcates schematic land use pattern observed around an Indian village settlement. Indian villages where the hierarchy of spaces protected for different reasons such as

area for clusters and houses of local communities then farm lands, grass lands for castles, and protected forest lands such as sacred grove and forest is seen. A village or community usually owns sacred groves, or a single family those maintain them in accordance with a set of customs and traditions those goes back many generations. The protection is given to these areas through mutual understanding and followed in the form of oral traditions. This strong connection of natural ecological settings with the settlement cluster is strongly seen at Kudasewadi **which** shows six sacred groves located around the village and different Wadies. 1—Pededeo, 2—Rashtroli, 3—Bhairidevi, 4—Vamanachi Rai, 5—Thevnekar, and 6—Rashtroli (Fig. 3).

Thevnekar Grove, Vaman Gosavi Grove, and Rashtroli Grove are the three sacred groves around Deomalawadi. Vaman Gosavi Grove is off limits to women. In the community, it also serves as a place for infant interment. Compared to other settlements in the village, Deomalawadi is lush and verdant. Keystone species and water streams can be found in both Rashtroli Grove and Thevnekar Grove. Both have a modest aniconic idol that is been worshipped during particular months. Water as an element and the oldest tree that has ever fallen in the Vaman Gosavi grove are not seen here. Bhairidevi Grove, the sole sacred grove in Bharpalwadi, is a privately owned woodland area that belongs to the Raut family. A lady owner looks after the grove and the nearby farmland. The old lady from the Raut family in Bharpalwadi decided to look after the nearby farms and grove than travel to Mumbai with her children. Small shrine is still present and occasionally worshipped. Less green patches are observed around it and maximum areas converted in to farmlands. The characteristics of a sacred grove include typically water, a keystone species, and a shrine. At the grove, one or more of these three elements—or all three—are present as shown in Figs. 5, 6, 7, 8, 9 and 10. There is a clear connection to the preservation of nature. This keeps its abundant biodiversity and ecology, which serve as migration routes for several wild species and endemic birds. Figures 13 and 14 show some of the glimpse of the sacred groves around Kudase village.

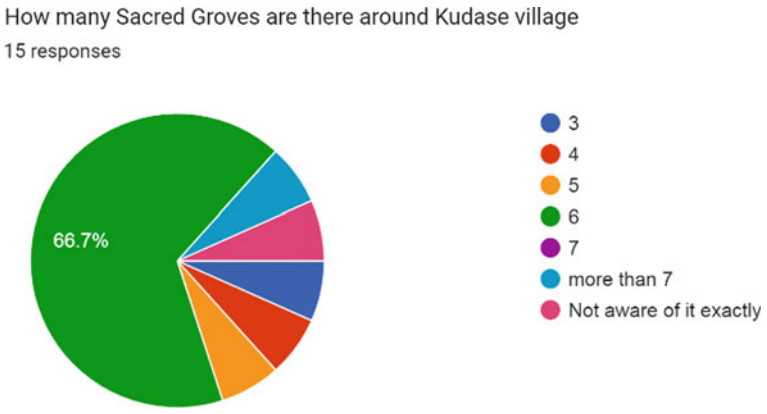

Fig. 5 Pie chart showing number of sacred groves around village

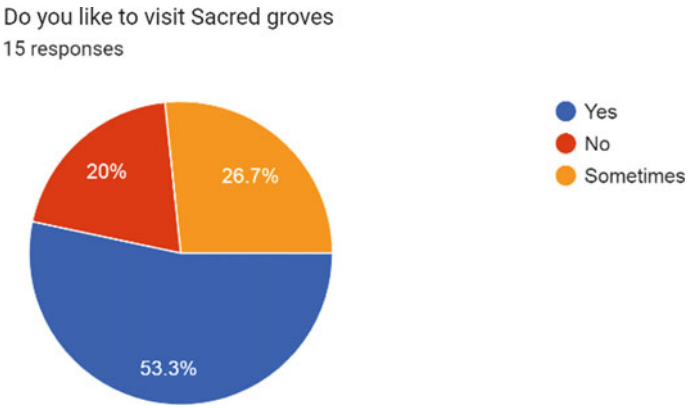

Fig. 6 Pie chart showing villagers response on visiting groves around village

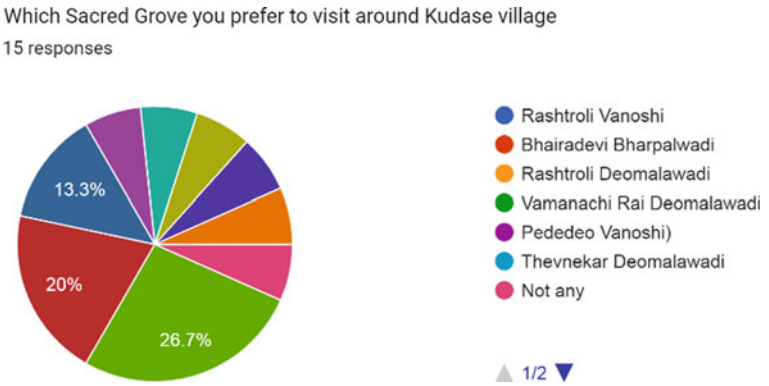

Fig. 7 Pie chart showing villagers preference visiting groves around village

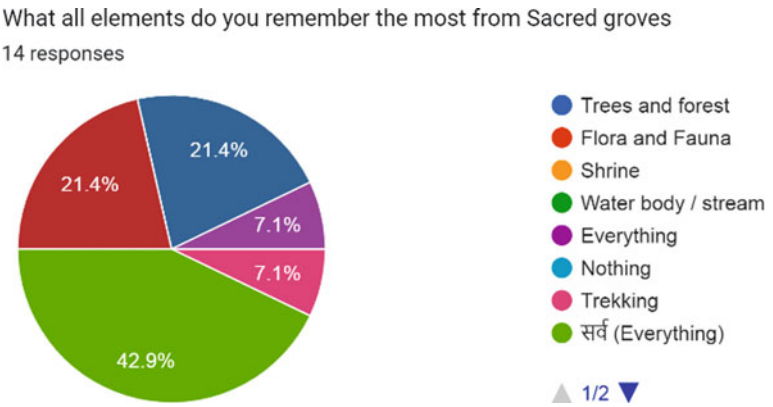

Fig. 8 Pie chart showing responses for space-making elements of sacred groves

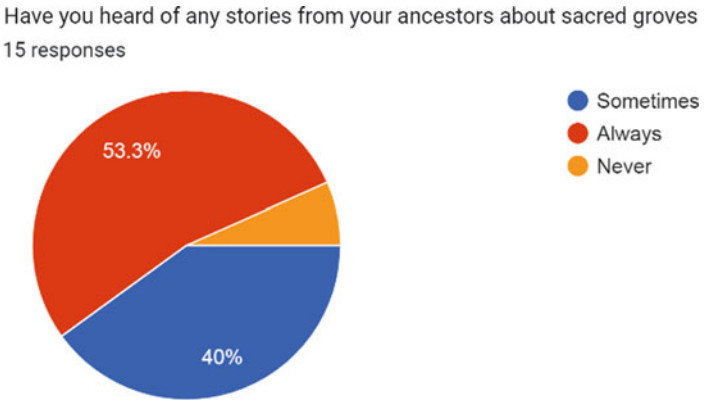

Fig. 9 Pie chart showing responses of intangible associations with the groves

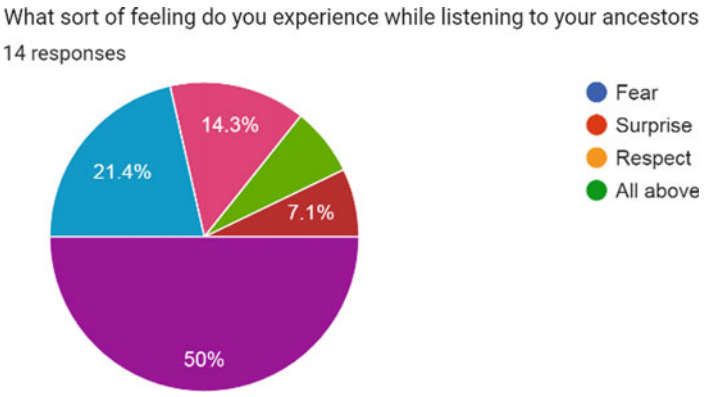

Fig. 10 Pie chart showing responses with respect to emotional associations and memory

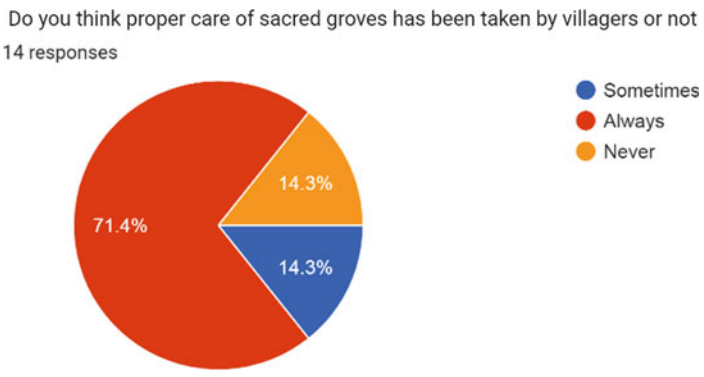

Fig. 11 Pie chart showing responses with respect to the taking care of groves

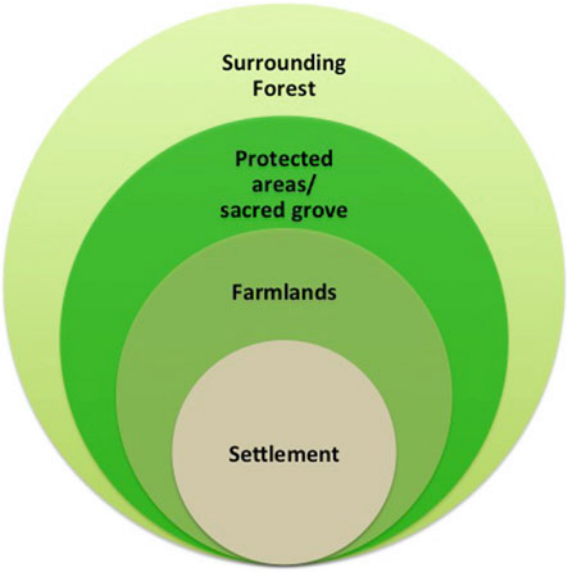

Fig. 12 Schematic land use pattern observed in rural settlement

Fig. 13 Sacred grove of Pededeo

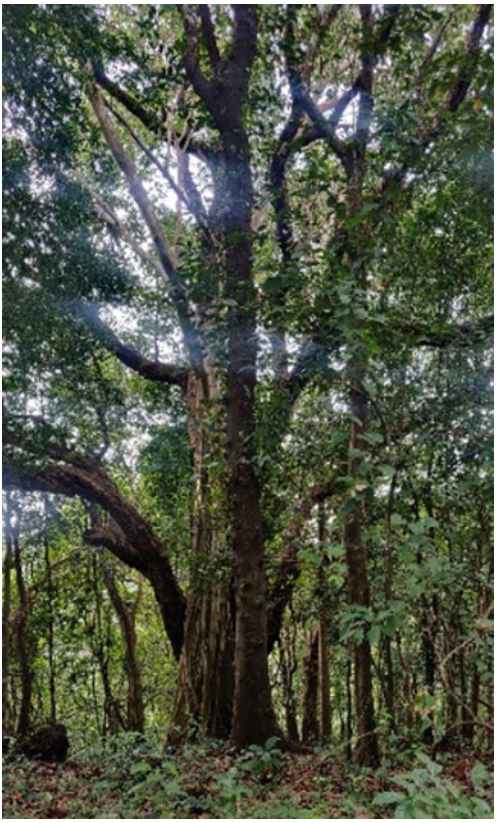

Fig. 14 Sacred grove of Rashtroli

4.3 Results

As discussed by many researchers looking at various literary resources and cases from various regions significant relation of settlement and sacred grove been observed. The natural environment has influenced people's way of life, including their settlement patterns, means of subsistence, cultural traditions, and beliefs. Landscapes include both the tangible and intangible, past and present. According to Dudley and Adrian Phillips in "Forests and Protected Areas," the landscape can be as a place where nature and people interact, as well as the past and the present and physical and intangible values [21]. Protected landscapes provide valuable lessons for sustainable development and act as live examples of resource and land use management. Continuation

of tradition of conserving these forestlands is part of village culture. Sustainability is at the heart of their survival over the centuries [14]. Cases such Osun-Osogbo Sacred Grove are listed under world heritage nomination under criteria II, III, and VI representing cultural associations of Yoruba settlement with nature around [22]. There are 16 sites illustrated by world heritage organization those contain forest and groves with religious significance pertaining to particular culture [23]. Ruritage EU funded project elaborates and sets a model of heritage for regeneration in the context of rural landscapes and historic settlements [24]. This background helps in coming with inferences in the context of Kudase village. In case of Kudase, six groves as mapped and data collected through interviews show there are tangible intangible attributes still exist exhibiting continuation of tradition. Matrix below as given in Table 1 represents space-making elements from all the groves around Kudase village. It also describes significance of groves from cultural associations' point of view.

5 Conclusion

Indigenous settlements of Western Ghats are excellent examples of Ruritage, world rural landscapes and cultural landscapes. Study is limited to sacred groves of Kudase village to build a relation of people and sacred landscapes. It does not go into the details of botanical and zoological surveys and mapping the data concerning to entire ecology of the place. Study is based upon visual research methods and ethnographic research deliberating upon qualitative methods. It tries to identify integrity and authenticity of cultural associations of community with the nature around. While studying the nature–culture journey in the context of the Western Ghats very strong cultural associations were observed through various rituals and indigenous architectural elements developed over the centuries. Looking at six sacred groves, collective identity and continuation of tradition could be traced through various attributes. Various attributes of the cultural landscape tangible and intangible as demonstrated in Fig. 15 could be observed in the case of sacred groves of Kudase village. These concepts can be elaborated further in the context of the sacred groves of Western Ghats, where every village with several *Wadis* or clusters has a system of maintaining reserved grasslands and protected forestlands well known as *Devrai* or sacred grove as a community heritage, continuation of tradition, and collective identity**.**

Table 1 Matrix of onsite observations *NS is not specific

Name of Wadi/cluster		Vanoshiwadi		Deomalawadi			Bharpalwadi
Number of groves		Pededeo	Rashtroli	Thevnekar	Vaman Gosavi	Rashtroli	Bhairidevi (Privately owned)
Area in acres		NS* distributed on both river banks	1 acre	NS at the edge of cluster	NS	NS	NS farms around
Elements of space making (Natural and Manmade) 6 Parameters	Keystone species	No	Yes	Yes	Fallen down	Yes	No
	Water stream	River in between	No	Yes	No	Yes	Close to river
	Shrine	Yes	Yes	Yes	*Samadhi*/ Burial space	Yes	Yes
	Month of ritual	No	May	No	July–August	Not followed any more	May
	Offerings to protecting god	Clay horse votive	Sticks	Flowers	Animal sacrifice	Flowers	Flowers and incense stick
	Accessibility	Open for all	Men only	Open for all	Men only	Open for all	Open for all

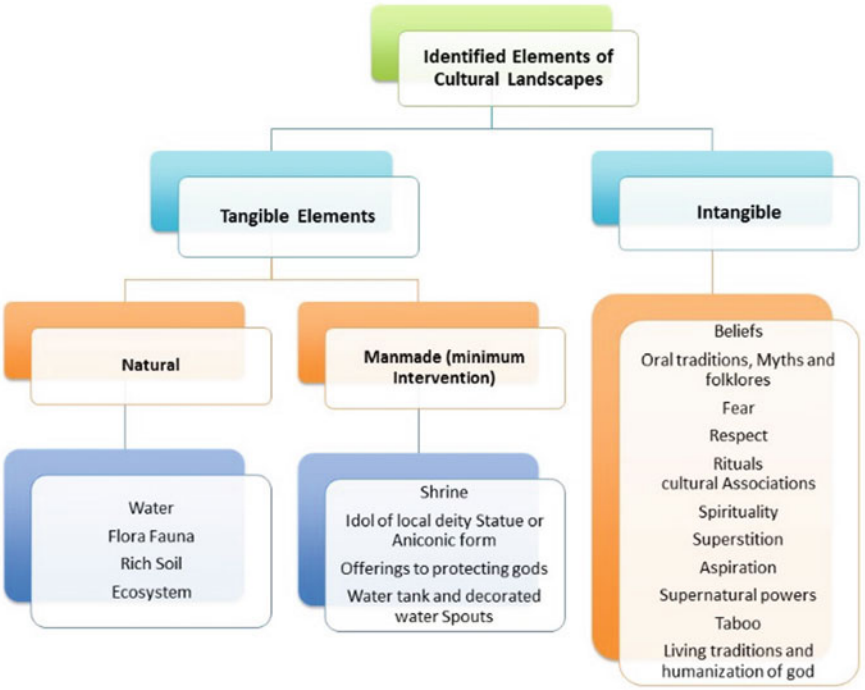

Fig. 15 Flowchart by authors based upon literature review, field study, and interviews

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आयोजक

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भारतीय संस्कृतीत अंतर्भूत असलेल्या शाश्वत पद्धतींचा अभ्यास

श्रध्दा माहोरे मांजरेकर,
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ब्रिक स्कूल ऑफ आर्किटेक्चर

गोषवारा

शाश्वत पद्धती ही भारतीय संस्कृतीचा अविभाज्य भाग आहे. वास्तुशास्त्र म्हणजे इमारती आणि शहराच्या भौतिक स्वरुपात, संस्कृती आणि सभ्यतेची कलात्मक अभिव्यक्ती आहे.. लेखिकेने भारतीय पारंपारिक सांस्कृतिक संबंधांचे निरीक्षण आणि विचार केला असता, अशी अनेक उदाहरणे सापडली, जिथे निसर्ग आणि त्याचे संवर्धन दोन्ही ह्या संस्कृतीत जपले जातात. संस्कृतीने स्वीकार केलेल्या अशा अनेक पद्धती अलिखित नियमासारख्या आहेत, आणि जनसामान्यांच्या जीवनशैलीत उतरलेल्या आहेत. वेदिक पद्धतीत नित्य नियमाने जे श्लोक म्हणले जातात, त्यातून दिसून येते कि आपल्या पूर्वजांचा, देशाकडे असलेल्या नैसर्गिक आणि मानवनिर्मित वरशाचा मोठा अभ्यास होता. जेव्हा अशा भरभराटीची जाणीव येते, तेव्हा हा वारसा जपून ठेवणे आणि त्याचे संवर्धन करणे ह्याचे महत्व पण कळते. जणू रोज म्हटले जाणारे मंत्र आणि श्लोक हे सगळं लक्ष्यात घेवूनच लिहिले गेले असावेत. लेखिकेने ह्या शोधनिबंधातून, अशी काही उदाहरणे वाचकांसमोर आणली आहेत.

प्रस्तावना

भारतीय पारंपारिक वास्तुकलेचा संस्कृती सह सखोल संबंध आहे. शहर आणि गावांमध्ये काही सार्वजनिक जागा अशा असतात, जिथे जीवनशैली आणि संस्कृती चे दर्शन होतं. तसेच वर्षभरात येणारे सणवार आणि परंपरा काही ठराविक ठिकाणीच साजरी करण्याच्या पद्धती आहेत. जरी हे सगळं कुठे लिहून नाही ठेवलं, तरी हे उत्सव आणि त्यांना साजरं करणाऱ्या जागा, जनसामान्यांचा आयुष्तात उतरलेल्या नियमावली प्रमाणे दिसून येतात. भारत देशात पारंपरिक उद्योग आणि चालीरीती दोन्ही वास्तूकलेबरोबर एकजीव झाले आहेत. उदाहरणार्थ, वनराई, देवराई, उपवन, नदी काठी असलेले घाट, गावात असलेले देऊळ आणि त्या समोर असणारा जलकुंड, बारव, तळे, चौकात असलेली वडाच्या झाडा जवळची पार, बाजार पेठ, कचेरी, प्रत्येक वास्तु समोर असलेले प्रवेश द्वार, उंबरठे आणि त्याला निगडित असलेले आत आणि बाहेर वागण्याचे नियम असे अनेक उदाहरण आहेत जिथे, वास्तुकलेच्या मागचा सखोल विचार दिसून येतो. भारतीय वास्तुकला निसर्गाला जपून, हवामानाच्या अनुरूप, समाजाच्या सगळ्या

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वर्गांना, वयोगटांना समाविष्ट करून आणि सांस्कृतिक पैलू दाखविणारी वैज्ञानिक रिते विकसित झालेली कला आहे. ह्या वैज्ञानिक कलेत, मानवीय सभ्यतेचा विकास, आणि नैसर्गिक आपदांना झेलण्याची तयारी हे वैशिष्ट्ये सहजपणे दिसून येतात.

भारतीय संस्कृतीत नैसर्गिक संसाधनांचे महत्व

भारताला सुजलाम, सुफलाम, मलयाजशीतलं असे म्हटले गेले आहेत [५]. रोज सकाळी उच्चारलेला प्रात: स्मरण उल्लेख करतो- "समुद्रवसने देवी, पर्वत स्तन मंडीते, विष्णूपत्नीम णमस्तुभ्यं, पदस्पर्श क्षमस्वमे [५]. " अर्थात- भारत उपद्वीपाला तिन्ही कडे समुद्र आहे, त्यात असलेले वन, नद्या, आणि निसर्ग, सगळ्या देशवासींचा पोषण करण्याचा सामर्थ्य ठेवतात ह्या तथ्याची आपल्या पूर्वजांना पुरेपूर जाणीव असावी, म्हणूनच तर भारताला "देवी आई" ची संज्ञा दिली आहे, आणि त्या आईला पायानी दिवस भर स्पर्श करायचं आहे, म्हणून सकाळीच काही करण्यापूर्वीच तिची माफी मागण्याची अशी पद्धत ह्या संस्कृतीत निगडित आहे. महादेवाची पूजा संपूर्ण भारतात केली जाते, आणि त्यांना "पशुपतीनाथ" असं म्हटलं जात. संधी विग्रह करून समजत, कि "पशु" अर्थात पृथ्वी वर असणारे जीव, "पती" अर्थात वन्य जीवन, आणि त्यांचा स्वामी असलेला नाथ, हा पशुपतीनाथ म्हणजेच निसर्ग आणि त्यात असलेलं सत्व, आणि माहात्म्य आदरस्वरूपात पुजणारी हि संस्कृती आहे. प्रातः स्मरणातील श्लोक, पूर्वजांचा देशात असलेल्या नद्याचा अस्तित्व आणि महत्व दोन्हींची कल्पना देतात.

गंगा सरस्वती सिंधू, ब्रह्मपुत्रश्च गंडकी,

कावेरी यमुना रेवा कृष्ण गोदा महानदी ll

देशाचा वेगवेगळ्या भागात असणारे हे नैसर्गिक संपन्नतेचे वन, नद्या ह्या दोन श्लोकात आणून, त्याचा उच्चार करणे, हे सगळं, एकप्रकारची कृतज्ञता दाखवण्याचा एक प्रकार वाटत. येथे ज्या नद्यांचा उल्लेख केला आहे त्या गंगा, सरस्वती, सिंधू, ब्रह्मपुत्रा, गंडकी, कावेरी, यमुना, रेवा, कृष्णा, गोदावरी आणि नर्मदा, ह्या मुख्य आहेत. बहुतेक भारतीय शहरे नदीकाठी वसली आहेत. नदी काठी बांधलेले घाट, हे भारतीय संस्कृतीचे वैशिट्य आहे. नदीचा स्पर्श करता आला पाहिजे, आणि काही प्रमाणात, पुरापासून संरक्षण करता आलं पाहिजे, म्हणून हे घाट बांधण्यात आले. ज्या पद्धतीने निसर्गाने नद्यांचा वेगवेगळा स्वरूप तयार केला आहे, त्या-वेळच्या वास्तुकारांनीं, त्या स्थलाकृतिच्या अनुरूप कलात्मक रित्यानी हे घाट बांधले. प्रत्येक घाटाचे बांधकाम आणि स्वरूप दोन्ही पण प्रत्येक ठिकाणी वेगळे दिसतात. त्या वेळाची स्थापत्य कला आणि अभियांत्रिकी उत्कृष्ट होती, आणि म्हणूनच हे घाट इतके प्राचीन असून पण आज पण तसेच आहेत. महेश्वर, वाराणसी, काशी, हरिद्वार, हृषिकेश, उज्जैन, नाशिक, पंढरपूर, राजमुंद्री, कुशलनगर, म्हैसूर, श्रीरंगपटना, तिरुवैयारू, कुंभकोणम असे कितीतरी उदाहरण आहेत, जिथे संपूर्ण वर्ष भर लोक येत राहतात आणि ह्या घाटांवर संस्कृतीचा अनुभव घेतात. आज पण नदीच्या संपर्कात राहून तिला बघून, तिच्या जवळच्या निसर्गरम्य वातावरणाचा आनंद घेऊन जनसामान्यांचा

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आयुष्याचे, अनेक उपक्रम ह्या नदी घाटांवर घडतात. हे घाट सार्वजनिक उपयोगासाठी तयार केले होते. आणि आज पण ह्या घाटांवर प्रजातंत्र दिसून येत. अनेक लोक येतात, भेटतात. हे घाट मानवीय सभ्यतेला, आईच्या कुशीसारखी माया देतात. समाजाला जवळ आणून हे घाट आपल्या संस्कृतीचे परिचय करवतात.

त्यावेळचा राजकारणात असलेली दूरदृष्टी, अशी होती कि जनसामान्याला पाणी पुरवठा नीट झाला तर, शेती, इतर व्यवसाय, सुरळीत चालतात, आणि भरभराटी येते. म्हणून, जिथे नद्या नव्हत्या किंवा लांब होत्या, त्या जागांवर, तळे, कुंड आणि बारव बांधल्या गेल्या. देऊळाजवळच कुंड, एका प्रकारे वर्षा जल संवर्धनासाठी अभियांत्रिकी ज्ञान वापरून बांधलेले वास्तु आहेत. [३] [४]

प्रतिमा क्रमांक १ : आळंदी घाट

प्रतिमा क्रमांक २ : दिवे आगर स्थित जलकुंड

भारतीय नगर आणि स्थापत्य कलेत वन आणि वनस्पतीचं महत्व

महेन्द्रो, मलायसाह्ये देवतात्मा हिमालय,
ध्येयो रेवतको विंध्यो, गिरीशचारावली तथा ॥
या श्लोकानुसार महेंद्र (आता कंबोडियाचा भाग), मलय (ओरिसामध्ये), सह्याद्री (महाराष्ट्रात), हिमालय, रैवतक (आता गिरनार म्हणून ओळखले जाते गुजरात), विंध्याचल (मध्य भारतात), आणि अरावली, (राजस्थान) सर्वात जास्त मानले जाणारे पर्वत आहेत. या पर्वतांमध्ये घनदाट जंगले आणि समृद्ध पर्यावरण आहे. हे पर्वत लुप्तप्राय प्राणी प्रजातींचे निवासस्थान आणि काही नद्यांचे उगमस्थान आहेत. या पर्वतांच्या स्थलाकृति, वनस्पती, प्राणी आणि नद्या, सगळेच जपण्यायोग्य आणि संवर्धन करण्यासाठी महत्वपूर्ण आहेत. नगर आणि वास्तुतज्ञांनी ह्या जागांचा महत्व आणि पावित्र्य राखून नियोजन करावे, असें अर्थ ह्या श्लोकातून काढू शकतो.

गावाबाहेर असलेले उपवन, मानवीय आयुष्याला लागणाऱ्या महत्वाचा गोष्टी, जसे फळ, कंद, औषधे, लाकूड, इत्यादी पुरव्हायचे. आणि त्याचे सार्वजनिक स्वरूपातच संवर्धन केले जायचे. उपवनाचा नंतर

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देवराई (श्रीवन), जिथे, वन्य संपदेची पूजा केली जायची. देवराईतून लाकूड, फळ तोडणे वर्ज्य होते. आणि त्यानंतर सर्वात दाट वनराईत तपोवन असायचे. हे वन इतके दाट होते कि त्यात अनेक ठिकाणी सूर्याचे प्रकाश पण पोचत नसायचे. असे दाट वन आणि त्याला घेऊन, अशी समज होती, कि तपोवनात तपस्वी तपस्या करायला जातात, आणि तिथे घातक प्राणी पण असतात, म्हणून तिथे साधारण मनुष्यांनी वावर करू नये, असें नियम वर्षोनी वर्ष पाळल्या गेले आहेत, आणि जणू त्यामुळेच आपली वन्य संपदा सुरक्षित राहिली. जीवनोपयक्त सामग्री निसर्गाकडून घेणे, आणि आपल्या गरजा एका हद्दी बाहेर ना नेणे, ज्याणेंकरून निसर्ग सुरक्षित राहणार अशी संकल्पना, भारतीय परंपरेचा अभिन्न भाग आहे. देशाचा सर्व भागात, उपवन, श्रीवन आणि तपोवनाला वेगवेगळी नावे आहेत, पण वन्यजीवनाचा सुरक्षेसाठी असें नियम अनेक ठिकाणी दिसून येतात. [६] [७] वृक्षायुर्वेद ही आयुर्वेदाची एक शाखा आहे. हे वनस्पती जीवनाच्या फायद्यासाठी औषधी प्रणालीचे विज्ञानाचे वर्णन करते. या विज्ञानात वनस्पतींची काळजी घेण्यासाठी या विषयाचा सखोल अभ्यास केला गेला होता.

वाड्यांच्या आवारात वनस्पतींचे महत्व

आपलं देश निसर्ग संपन्न आहे, नद्या वन, सगळं आहे, आणि जिथे मानवीय वसाहत आहे, तिथे कशा प्रकार चा वनस्पतीचा वापर केला पाहिजे, त्याचा उल्लेख एकाजागी नसला, तरी अनेक परंपरा त्या वनस्पतींना नित्य आयुष्यात सहजपणे समाविष्ट करतात. उदाहरणार्थ, वडाच्या झाडाचे महत्व गावात आणि शहरात दोन्ही ठिकाणी आहे. ते जपलं गेलं पाहिजे, त्यासाठी वड सावित्री पौर्णिमा सारखे सण संपूर्ण भारतात बघायला मिळतात. मोठ्या वडाचाझाडाजवळची पार वर्षभर एका सार्वजनिक स्थानासारखी उपयोगात येते. हे झाड मात्र एक झाड नसून, एक संपूर्ण परिसरासारखे वातावरण तयार करत. ह्या जागेला भिंती किव्वा दार-खिडक्या नसून , तिचा मोकळेपणा संस्कृतीला समाविष्ट करत.

प्रतिमा क्रमांक ३ : वडाच्या झाड भोवती ची पार

स्रोत :

https://commons.wikimedia.org/wiki/File:Villagers_under_the_Banyan_Tree_%28303569443 01%29.jpg

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कडू-लिंब, पिंपळ आणि वड तिन्ही झाडांचे एकाच ठिकाणी असणं, खूप पवित्र मानलं गेलं आहे. उत्तरभारतात, ह्याला त्रिवेणी म्हटलं जात आणि लोक त्याची पूजा करतात. ह्या पूजेचा मार्गाने का असो, अशी झाडे शेजारी असल्यामुळे एका सार्वजनिक संमेलनाची जागा तयार होते.

केळींची पाने जेवणा साठी, आंब्याची पाने तोरणा साठी पूर्ण देशात वापरली जातात. अनेक फुलांचा संबंध देवांबरोबर जोडला गेला आहे. गणपतीला वाहायची लाल फुले, शंकराला वाहायची पांढरी फुले, बेलाचे पान, देवीला वाहायची सुगंधित फुले, कमळाची फुले, कृष्णाला वाहायची पिवळी फुले, सोनचाफा, आणि तुळशी ची पाने घराच्या जवळ असलेल्या झाडांपासूनच गोळा केली जात असें. त्यामुळे हि सगळी झाडे घराजवळ असायचे आणि जपली जात असें.

अश्या रिते भारतीय संस्कृतीत राष्ट्रीय स्तरावर, नागरीय किव्वा ग्रामीण स्तरावर, वसाहतीत आणि त्याच प्रमाणे खाजगी स्तरावर, नैसर्गिक संपदेचा आदर आणि संवर्धनाचा विचार अगदी स्पष्ट रूपात दिसून येतो.

ह्या शोधनिबंधात स्थानिक वास्तुकलेबद्दल चर्चा नाही झाली, परंतु ह्या विषयावर अनेक संशोधन झाले आहेत [२] आणि संस्कृतीला समाहित करणारे भारतातले स्थानिक बांधकाम पर्यावरणपूरक आहेत.

निष्कर्ष

जगभरात शाश्वत विकासावर भर दिल्या जात आहे. ह्या संदर्भात जर भारतीय संस्कृतीत असलेल्या पद्धतींकडे लक्ष्य देऊन बघितले, तर नदी घाटांसारखे बांधकामे नैसर्गिक स्थलाकृतीला इजा न पोचवता केलेले बांधकाम आहे. तसेच किल्ले, गढ, वाडे, महाल, देऊळ नैसर्गिक स्थलाकृती ला लक्ष्यात घेऊन केलेलं बांधकाम आहे [९]. आज ज्या पद्धतीने बांधकामासाठी संपूर्ण डोंगर उध्वस्त केली जातात, वास्तुविदांना ह्या परंपरागत बांधकामाकडे बघण्याची संधी आहे. दगड, विटा, माती आणि लाकूड वापरण्यात घेऊन पण ह्या संपदेचा संवर्धन महत्वाच आहे, असा संदर्भ ह्या संस्कृतीत बघायला मिळतो. असेच देशाकडे किती नैसर्गिक संपदा आहे आणि त्याचे नियोजन कशा पद्धतीने झाले पाहिजे, हे बघणे अत्यंत आवश्यक आहे. बहुतेक ग्रीन बिल्डिंग रेटिंग सिस्टमबद्दल [८] बोलतात. गेल्या काही २० वर्षात आलेल्या ह्या रेटिंग सिस्टिम्स मध्ये, जी शब्दावली वापरली गेली आहे, तश्या पद्धती तर भारतीय संस्कृतीत किती तरी काळापासून निगडित आहे. जरी जीवनशैली बदलत आहे, परंतु तरीही पारंपारिक बांधकाम पद्धती आणि लँडस्केप संकल्पना नैसर्गिक संसाधनांचा आदर करण्याची पारंपारिक विचारधारा समाजातील विकासानंतरही अपरिवर्तित राहू शकते.

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मराठा स्थापत्य शैलीचा वारसा: श्री कसबा गणपती मंदिर, पुणे

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गोषवारा :
स्थापत्य, इतिहास आणि सामाजिक राजकीय घटनांचा परस्पर संबंध आपल्याला जगाच्या पातळीवर प्रत्येक प्रदेशात आढळतो. स्थापत्यातील स्थित्यंतरे ही राजकीय स्थित्यंतरांशी अगदी सरळ जोडली गेलेली आहेत. अगदी चोला स्थापत्यापासून, नागर स्थापत्य, द्रविड स्थापत्य, मुघल स्थापत्य, पर्शियन, मराठा स्थापत्य, पुढे कलोनिअल आणि फ्रेंच, पौर्तुगीज अशा स्थापत्यांपर्यंत विविध स्थापत्य शैलींचा प्रभाव त्या त्या राजवटींमुळे भारतातील आणि खास करून महाराष्ट्रातील हेरीटेज वास्तूंवर दिसतो. इतक्या विविध प्रकारच्या स्थापत्यशैली क्वचितच कुठल्या देशात मिळू शकतील. हा शोधनिबंध मराठा स्थापत्य शैलीतील श्री कसबा गणपती मंदिरावर प्रकाशझोत टाकतो. या अभ्यासातून मराठा स्थापत्य शैलीच्या विविध अंगांचा श्री कसबा गणपती मंदिर या उदाहरणातून उहापोह केलेला आहे. या शोध निबंधातून श्री कसबा गणपती मंदिराचा सामाजिक आणि राजकीय इतिहासही मांडलेला आहे. हे संशोधन काही ठळकपणे प्रकाशित झालेल्या शोध साहित्यावर आधारलेले आहे. तसेच काही रेखाटनांचा आणि छायाचित्रांचा वापर स्थापत्य वैशिष्ठ्ये दर्शवण्याकरता केलेला आहे. पुण्यामध्ये प्रामुख्याने पेठांमध्ये असलेल्या मराठा स्थापत्य शैलीचा वारसा उधृत करण्याचा या शोधनिबंधाचा उद्देश आहे.
महत्वाचे शब्द : वारसा, स्थापत्यशैली, मराठा, सामाजिक, राजकीय

परिचय :
स्थापत्य, इतिहास आणि सामाजिक राजकीय घटनांचा परस्पर संबंध आपल्याला जगाच्या पातळीवर प्रत्येक प्रदेशात आढळतो. स्थापत्यातील स्थित्यंतरे हि राजकीय स्थित्यंतरांशी अगदी सरळ जोडली गेलेली आहेत. अगदी चोला स्थापत्यापासून, नागर स्थापत्य, द्रविड स्थापत्य, मुघल स्थापत्य, पर्शियन, मराठा स्थापत्य, पुढे कलोनिअल आणि फ्रेंच, पौर्तुगीज अशा स्थापत्यांपर्यंत विविध स्थापत्य शैलींचा प्रभाव भारतातील हेरीटेज वास्तूंवर दिसतो. इतक्या विविध प्रकारच्या स्थापत्यशैली क्वचितच कुठल्या देशात मिळू शकतील. महाराष्ट्रामध्ये सुप्याचा प्रांत शहाजी राजांना आदिलशाहीची जहागीर म्हणून मिळाला.

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जिजाऊ राणी साहेबांनी तिथे पुनवडी गाव वसवले जे आता पुणे शहर म्हणून प्रस्थापित आहे. पुण्यामध्ये १६ व्या शतकात अनेक मंदिरे बांधली गेली (सोवनी, १९९८). परंतु आदिलशाहीच्या तसेच उत्तरेतल्या मुघल सत्तांच्या वेगवेगळ्या कालखंडात बांधलेली बहुतेक सुंदर मंदिरे विविध युद्धांमध्ये नष्ट झाली. श्री कसबा गणपती मंदिर हे भगवान गणेशाला समर्पित एक हिंदू मंदिर आहे, ज्याला गणपती किंवा विघ्नहर्ता-अडथळ्यांचा नाश करणारा म्हणूनही ओळखले जाते [१]. कसबा पेठेत असलेले हे गणेश मंदिर मराठा इतिहासातील उच्च पारंपारिक मूल्यांचे प्रतिक म्हणून ओळखले जाते.

मराठा स्थापत्य वास्तुशैली - संदर्भ आणि पार्श्वभूमी :

इ.स. १३ व्या शतकाच्या सुरुवातीस देवगिरी ला यादवांचे मराठा साम्राज्य होते. इ.स. १२९४ रोजी रामदेव यादव हे मराठा साम्राज्याच्या गादीवर विराजमान असताना अल्लाउद्दिन खिलजीने आक्रमण केले आणि यादवांचा पराभव केला. या अंती त्याने काही हजार होनांची खंडणी, आर्थिक लूट वसूल केली आणि यादवांवर पुढील काही काळासाठी कर लादला. हा कर इ.स. १३०७ पर्यंत न दिल्याने खिलजीने त्याचा सेनापती मल्लिकाफुर ला यादवांचा बिमोड करण्यासाठी पाठवले. त्यानंतर देवगिरी साम्राज्याचा असत होऊन तिथे खिलजीची राजवट सुरु झाली. त्यानंतर देवगिरीचे नाव बदलून दौलताबाद ठेवण्यात आले. ही सगळी अराजकता मोहम्मद बिन तुघलकाने आपली राजधानी दौलाताबाद ठेवण्यापर्यंत चालूच होती. मधल्या काळात बिरार ला इमादशाही (इ.स.१४९०-१५७४), अहमदनगर ला निजामशाही (इ.स.१४९०-१६३६), विजापूरला आदिलशाही (इ.स.१४९०-१६८६), बिदरला बरीदशाही (इ.स.१४९२-१६१९), गोवळकोण्ड्याला कुतुबशाही (इ.स.१५१८-१६८७) अशा विविध राजवटी प्रस्थापित झाल्या होत्या. तसेच महाराष्ट्रात आणि इतर दक्षिणेत्तर राज्यात कित्येक सरदारांना ह्या राजवटींची जहागिरी होती. उत्तरेत मुघल आणि राजपुतांची मक्तेदारी होती. कित्येक वेळा ह्या राजवटींमध्ये कुरघोड्या, युद्ध होऊन महाराष्ट्रातील सामाजिक आणि राजकीय वातावरण ढवळून निघत असे (तोडे, २०२१). पुढे इ.स. १६ व्या शतकात श्री छत्रपती शिवाजी महाराजांनी स्वराज्याची स्थापना करून ह्या शाह्यांना आव्हान दिले आणि त्यांचे कंबरडे मोडून काढले. पुढे पेशवाई काळात मराठा साम्राज्य अटकेपार स्थापित झाले. इ.स. १८१८ मध्ये पुढे मराठा साम्राज्य अस्ताला जाऊन संपूर्ण हिंदुस्तानात ब्रिटीशांचा अंमल सुरु झाला. ह्या सगळ्या स्थित्यंतराचा महाराष्ट्रातील आणि खास करून पुण्याच्या स्थापत्यावर प्रभाव पडला आणि मुघल, पर्शियन, ब्रिटीश वस्तू स्थापत्याचा प्रभाव असलेली मराठा स्थापत्यशैली प्रस्थापित झाली. १६ व्या शतकाच्या सुरुवातीस फ्रेंच, डच आणि पोर्तुगीज ही व्यापाराच्या निमित्ताने महाराष्ट्रात वास्तव्यास होते. त्यामुळे येथील स्थापत्य शैलीवर फ्रान्स, हॉलंड आणि पोर्तुगाल सारख्या विविध प्रांतातील स्थापत्य घटकांचा प्रभाव होता.

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श्री कसबा गणपती मंदिर - ऐतिहासिक महत्व :

निजामशाहीचा अस्त झाल्यानंतर शहाजी महाराजांना पुणे, इंदापूर आणि सुपा प्रांताची आदिलशाही कडून जहागिरी मिळाल्या नंतर इ.स.१६३० मध्ये जिजाबाई भोसले त्यांच्या कुटुंबासह पुण्यात आल्या. पौराणिक कथेनुसार, जिजाबाईना कळविण्यात आले की मुख्य शहरातील रहिवासी विनायक ठकार यांच्या घराजवळ गणपतीची मूर्ती प्रकट झाली. ह्या घटनेला शुभ संकेत मानून १६३९ मध्ये या जागेवर मंदिर बांधण्याचे काम सुरू झाले. कसबा हा शब्द 'कसबाह' या अरेबिक शब्दावरून आला असावा असे तज्ञ सांगतात. कसबाह चा अर्थ वस्तीतील किल्ला असा आहे [१]. असे मानले जाते की छत्रपती शिवाजी महाराज मंदिराला भेट दिल्याशिवाय युद्धासाठी जात नसत. कसबा गणपती हे पुण्याचे ग्रामदैवत (संरक्षक देवता) मानले जात होते आणि अजूनही मानले जाते [२] . या परिसराला थोरल्या बाजीराव पेशव्यांच्या काळात १७ व्या शतकाच्या उत्तरार्धात कसबा पेठ म्हणून ओळखले जाऊ लागले. पुढे नानासाहेब पेशव्यांनी पुण्याच्या नगर रचनेत विविध पेठा, रस्ते, पागा, व्यायामशाळा, शस्त्र आगारे बनवून मोलाची भर घातली. आणि शहराच्या सध्याच्या काळात पुणे शहराची ओळख म्हणून पुण्याची हेरीटेज ओळख आणि वारसा म्हणून उभ्या आहेत.

स्थापत्य रचना आणि वैशिष्ठ्ये:

कसबा मंदिराची रचना आयताकृती असून तळ मजला आणि वरती नगारखाना असे बांधकाम केलेले आहे. मंदिराचा बाहेरील भाग हा हेमाडपंथी रचनेचा भाग आहे. पूर्वीचे गर्भगृह आणि दैवत हे दगडी बांधकाम असून नंतर त्याचे पुढील बांधकाम चपट्या/पुस्तकी विटांमध्ये शिवाजी महाराज आणि पेशवाई काळात करण्यात आले. आकृती १ मध्ये दर्शवल्याप्रमाणे या वास्तूत खालील बाजूस काळ्या कातळामध्ये बांधकाम केले असून वरील बांधकाम हे चपट्या/पुस्तकी विटांमध्ये केलेले आहे. मंदिराचे खांब हे सागवानी लाकडात असून त्यावर लाकडी तुळया ठेवण्यात आल्या आहेत. आकृती २ मध्ये दाखवल्याप्रमाणे या तुळई आणि खांबाच्या जोडणीवर मयूरनक्षीकाम केलेले सुशोभित ब्रेकेट्स आहेत. या वैशिष्ट्यामध्ये यादव स्थापत्य शैलीचा प्रभाव जाणवतो.

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प्रतिमा क्रमांक १ : समोरील दर्शनी भाग, श्री कसबा गणपती मंदिर, पुणे (स्रोत : लेखक)

प्रतिमा क्रमांक २ : मयूरनक्षीकामयुक्त ब्रेकेट्स, श्री कसबा गणपती मंदिर, पुणे (स्रोत : लेखक)

मंदिराच्या प्रवेशद्वारातून आत प्रवेश केल्यानंतर मुख्य मंदिराची रचना काटकोनात आहे. पुढील बाजूस सभामंडप, अंतराळ आणि गर्भगृह अशी मंदिराची प्राथमिक रचना आहे. सभामंडपाच्या बाजूने गर्भगृहा भोवती प्रदक्षिणा पाथ संरचित केलेला आहे [३] . आकृती ३ मध्ये दर्शवल्याप्रमाणे मंदिराचा सभा मंडप हा दुमजली असून वरील मजल्यावर लोकांसाठी डोकावता येईल अशी बाल्कनीची रचना आहे. दोन खांबांच्या मध्ये असलेल्या लाकडी कमानी या पर्शियन स्थापत्याचा प्रभाव अधोरेखित करतात. सभा मंडपाचे छत हे सागवानी फळ्यांनी केलेले असून मध्यभागी सुशोभित तेल दिव्यांच्या झुंबरासाठी व्यवस्था केलेली आहे. सभा मंडपाच्या प्रांगणाशिवाय आतील बाजूस ओसरी वजा सभा मंडपाचाच भाग आहे. पूर्वीपासून सभा मंडपाचा वापर हा एकत्रित पूजा, आरती, स्तोत्रपठण तसेच कीर्तने, प्रवचने आणि व्याख्याने अशा सामाजिक प्रबोधनपर माध्यमांसाठी होत असतो. मंदिराच्या सभामंडपाच्या भिंती आता अष्टविनायकांच्या चित्रांनी सुशोभित केल्या आहेत. अंतराळ हा भाग नामस्मरणासाठी म्हणून प्रमाणित केलेला असून त्याची त्रिमितीय जागा ही मनुष्य प्रमाणानुसार संरचित केली गेलेली आहे. या भागात अगदी कमी प्रमाणात गवाक्षांचे स्थान निश्चित करण्यात आलेले आहे. त्यामुळे सभा मंडपातून परावार्तीत होणारा मंद प्रकाश आतील लोकांची एकाग्रता वाढवतो. गवाक्षांच्या रचनेमध्ये यादव स्थापत्य शैलीचा प्रभाव जाणवतो. गावाक्षांच्या बाहेरील बाजूस लाकडी बाह्य फ्रेम्स मध्ये लोखंडी सळयांची संरक्षक कड उभी केलेली आहे. मंदिराच्या आवारात एक मारुती मंदिर असून दीपमाळ ही बांधीव काळ्या कातळात उभारली आहे.

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प्रतिमा क्रमांक ३ : दुमजली सभामंडप, श्री कसबा गणपती मंदिर, पुणे (स्रोत : लेखक)

सामाजिक व राजकीय महत्व :

इ.स.१८९३ मध्ये, लोकमान्य बाळ गंगाधर टिळक यांनी सार्वजनिक गणेशोत्सवात गणेश चतुर्थी या घरगुती उत्सवाचे रूपांतर सार्वजनिक गणेश उत्सवात केले. ज्यामुळे जनतेला एकत्र आणता आले आणि राष्ट्रीय एकात्मतेची भावना बळकट झाली. ब्रिटीश राजवटीपासून भारताला मुक्त करण्यासाठी समविचारी लोकांना एकत्र आणण्यासाठी आणि विचारांची देवाणघेवाण करण्यासाठी एकसमान व्यासपीठ तयार केले गेले. लोकांचे प्रबोधन कीर्तने, प्रवचने आणि व्याख्यानांद्वारे केले गेले, ज्यामुळे जनशिक्षण झाले आणि समाजातील विविध वर्गांमधील दरी कमी होण्यास मदत झाली [६]. तसेच ब्रिटिश राजवटीबाबत लोकांमध्ये जागरुकता निर्माण केली. मेळाव्यात सर्वसामान्यांच्या त्रासावरही तोडगा काढण्यात आला. टिळकांच्या प्रयत्नामुळे पुण्यात अनेक क्लब किंवा मंडळे निर्माण झाली. यामुळे गणपती उत्सवाला नवा आयाम मिळाला.

गणेशोत्सवात अनंत चतुर्दशीला श्री गणेशाचे विसर्जन सामूहिक मिरवणूक काढून केले जाऊ लागले. ज्या मध्ये श्री कसबा गणपती ह्याला मानाचे स्थान मिळाले. अजून पर्यंत हा सोहळा दिमाखदार पद्धतीने सुरु आहे. या सार्वजनिक मिरवणुकीची सुरुवात मंडईतल्या टिळक पुतळ्यापासून सार्वजनिक आरतीने सुरु होऊन श्री कसबा गणपतीपुढे पारंपारिक ढोल ताशा, शंख नाद, लेझीम नृत्य असा विविध कलाविष्कार सादर होतात. नवसाला पावणारा श्री गणपती म्हणून ही श्री कसबा गणपतीच्या मौखिक कथा बोलल्या जातात.

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निष्कर्ष :

श्री कसबा गणपती मंदिर हे मराठा स्थापत्यशैलीचे ठळक उदाहरण आहे. या मंदिराला समाजामध्ये एक आदराचे स्थान असून पुण्याच्या ऐतिहासिक आणि सांस्कृतिक मूल्यांचे ते द्योतक आहे. हया मंदिरामध्ये छत्रपती शिवाजी महाराजांच्या काळापासून ते पेशवाई ते ब्रिटीश राजवटी पर्यंत बदल होत गेले. सध्याच्या काळातही आजूबाजूला बरेच बदल झालेले आहेत. सामाजिक, राजकीय आणि सांस्कृतिक स्थित्यंतरे हे पुढच्या पिढीला समजणं हे अत्यंत महत्वाचं असतं. म्हणून हा वारसा पुढे नेण्यासाठी स्थापत्य हा महत्वाचा दुवा आहे. मराठा स्थापत्य वास्तुशैली ही पुण्याची हेरीटेज ओळख आहे आणि हा वारसा जपला जाणं हे अत्यंत गरजेचं आहे.

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CONFERENCE PROCEEDINGS

A COMPILATION OF ABSTRACTS

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Municipality of Alanya

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Applying the Phenomenological Approach to Educational Place: A Case Study Analysis of a College Experience through Time

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Abstract
Applying the phenomenological approach to architecture relies on integrating human experiences and sensory aspects into the designed space, materials, and light to create a place that has a lasting impact on the memory in the human mind. This experience can change if the person experiences the space at a different time. This case study focuses on some students' sensory experiences of the college of engineering at the university of Bahrain who attended college during their academic years and then visited it after a long detachment period. This study relies on interviews with the students focusing on their previous and actual college experience to discover the changes in the experience of the same space through different times. The results are promising and showcase that mental images have changed, and students' attachment has become more substantial due to detachment and time.

Keywords: Phenomenology; Educational Place; Case Study; Sensory Experience; Analysis.

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Using a Phenomenological Approach for the Analysis of Two Different Houses in Bahrain

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Abstract
Phenomenological practices in the design process will create the quality of spaces where the users will feel a sense of place and will last in their memory. Furthermore, it will encourage the user to revisit the place in contrast with the places not achieving a phenomenological approach. Through a phenomenological approach, this study aims to investigate the bodily and sensory experiences of the users in two different houses in the kingdom of Bahrain. The first selected house is one of the cultural heritage sites located on the String of pearl bath, specifically in the old city of Muharraq. The second house is a contemporary one, located in Sharq al Hid, designed by one of the authors. The findings of this analysis are promising.

Keywords: Sensory; Experience; Bodily; Heritage; Culture; Phenomenological; Senses.

Manuscript ID: ICCAUA2023EN0158

Evaluation of the Energy-Positive Aspects for Optimal Construction Efficiency through Material Realism

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Abstract
Developing upon the tenets of SDG 7 and SDG 11, this paper studies the relationship between materials used in 21st-century construction and their characteristic scope for energy-positive application in the housing sector against criterias of 'optimal construction efficiency through material realism' (OCEMR). On account of climate change being grossly influenced by the construction sector and both further decrementing affordability in housing, there is a need to study the optimum construction efficiency of a material by studying its many aspects to encourage a realistic reduction in energy consumption, and a realistic increase in energy generation. The proposition of a gradation (OCEMR) is analyzed and later formulated based on material choice, regionality of materials, mode of application of materials, alternative technology, material lifecycle studies, etc. The mentioned factors are deduced through case studies which show a co-variation between the factors for gradation but an informed co-relation between optimized energy efficiency.

Keywords: Energy Positive; Climate Positive; Optimum Efficiency; Construction Materials; Optimization.

Manuscript ID: ICCAUA2023EN0156

Installation of Photovoltaic Panels on Historic Buildings and Heritage Areas: Lessons to Learn and Consideration for North Cyprus

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Abstract
The preservation of heritage areas and historic buildings and the adoption of new technology to reduce energy losses in these buildings are simultaneously crucial. In different cities all over the world, the installation of photovoltaic panels (PV panels) on historic buildings has expanded recently. In this study, the standards for installation and collaboration between PV panels, historic buildings, and heritage areas are reviewed, ten famous historic monuments that use PV panels are studied, and the main impacts, effectiveness, risks, and benefits of installing PV panels in heritage areas are investigated. Finally, the possibility, risks, and benefits of installing PV panels on historic buildings and considerations for collaboration between heritage areas and PV panels in accordance with North Cyprus conditions are discounted. Some recommendations are then made to enhance a planning guide for PV panel installation regulations for historic buildings in North Cyprus.
Keywords: Heritage Areas; Historic Buildings; Installation; North Cyprus; PV Panels.

Manuscript ID: ICCAUA2023EN0160

Religious Territorialism through Architecture: Parametrizing a Dynamic Trend of the Third World

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Abstract
'Territorialism', 'Architectural Territorialism' and 'Religious Territorialism through Architecture' (RTTA), all implicate the voluntary or involuntary act of territorializing other communities, a noticeable trend for centuries. The hypothesis is explored along Warburton's principal argument on origins, spatiality, and transformative capacity of religious architecture. The discussion is most relevant to the third world scenario, especially India. The paper deals with understanding the trends on local, national, and global scales through court jurisdictions, books, official documentation, and research to plot the variety of factors that influence religious territorialism through architecture in India and the third world countries. Post-identification of the parameters, they are mapped on a thematic map, against their degrees of dependency and co-dependency to transparentize the trend. It is concluded that RTTA is dynamic by nature as a result of the parameters being influential on varying degrees, consequentially sensitizing communities in different ways.
Keywords: Territorialism; Religious Architecture; Warburton's Principles; Architectural Territorialism.

Manuscript ID: ICCAUA2023EN0165

Reflections of the Memories: A Microhistory on Konak Atatürk Square, İzmir, 1960-70s

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Abstract
The spaces can be described by the experiences of real characters who lived in that period. In this study, the spatial relations of İzmir Konak Atatürk Square and its surroundings are explained and the reflections of the social and cultural life on the urban and architectural environment are revealed. This study emphasizes the architectural and interior values of the main buildings that give the Konak Atatürk Square its identity and some important public spaces in the city in 1960-1970. The method includes a literature review, photographic examinations, and oral history studies. Spatial stories will be created based on the data obtained and the memories of the characters who lived in the city. The study, which connects people's memories and archival documents through spatial storytelling, creates a different urban story from the past to the present by focusing on microhistory.
Keywords: Urban Narrative; Social and Cultural History; Urban Memory; Konak Atatürk Square; İzmir.

Manuscript ID: ICCAUA2023EN0217

Nigerian Worship Space Based on Religion Culture in North Cyprus

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Abstract
Nigerians are greatly influenced by their cultural heritage, when Christianity came to Nigeria in 16th century continent some cultural practices like the use of herbs, African musical and instruments stopped and new religion culture took over in Nigeria which concern about simplistic in space and dance pray music mix with Christian religion till this moment. Frustration with the socio-economic conditions of the country, along with high unemployment rates, has increased emigration from Nigeria come to north Cyprus for education and have better life, most of Nigerians have strong religion believe so Nigerian follow their religion culture in north Cyprus. The aim of this paper is how Nigerian religion culture effect on worship space in north Cyprus. The study will be describing how Nigerian create worship space based on their culture. mythology compose mixed methods qualitative and quantities research and using observations, interviews with Nigerian who are members of the church and other data sources collected in the field.
Keywords: Nigerian; Religion Culture; Space; Worship.

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A Critical Review on the Effect of Gender on Architectural Spaces

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Abstract
This paper, mainly examines the effect of gender on architectural spaces with the case of collective houses, firstly appear in North European countries; Denmark, Sweden and North Germany through the history of architecture, around 18th and early 19th century. The main reasons for the birth of collective dwellings has been researched by Dune Vestbro and Dolares Hayden studies, which both academician indicated the necessity for collective dwellings came forward with the beginning of women to work in industry, and to create democracy inside the house for both women and man. The changes on social structures after industrial revolution, created a grand domestic revolution, as indicated by Dolares Hayden; at her book 'Grand Domestic Revolution' she especially expresses the functional changes in physical structures, was a result of to relocate domestic activities so as to free females from unpaid, household labor. Shared spaces created the main spatial revolution on domestic architecture at industrial revolution time.
Keywords: Collective Houses; Working Class Women; Gender & Space; Spatial Transformations.

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Evaluation of Existing Slum Dwellings in Urban Settings to Meet the UN SDG Goals

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Abstract
Over the past two decades, urban environmental quality has declined, and slums are seen as the primary concern. Despite numerous slum upgrading strategies to address urban poverty in developing countries, the issue is only projected to get worse. The lack of sustainable slum redevelopment guidelines in India is a policy gap that needs to be addressed. To make sure that the upcoming LIG housing stocks are sustainable, a logical design and planning approach is required to address climate change and the Sustainable Development Goals. This paper focuses on the study and analysis of existing slum dwellings and their living conditions, and from the observations of the study, it aims to propose recommendations for creating sustainable and sensitive redevelopment. As part of a new approach for slum upgrading projects to meet SDG objectives, it will also investigate the criteria required to construct climate-responsive urban dwellings that are closer to Net-Zero Buildings.
Keywords: Sustainable Development; Slum Redevelopment; UN SDG; Climate Responsive; Urbanization.

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मा. डॉ. दत्तात्रेय जाधव
डॉ. अभिजीत नातू
डॉ. पराग नारखेडे
प्रा. प्रज्ञा पतकी

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व
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('ऑनलाईन' प्रणाली द्वारे)

मराठी भाषा गौरव दिनानिमित्त सोमवार दिनांक २७ फेब्रुवारी २०२३ रोजी राज्यस्तरीय वास्तुकला मराठी परिषदेचे आयोजन करण्यात येत आहे. वास्तुकला विषयाशी निगडीत माहिती व साहित्य समृद्ध तसेच व्यापक आहे. परंतु तुलनात्मक दृष्ट्या, मराठी भाषेत या विषयावर पुरेसे संदर्भ, पुस्तके उपलब्ध नाही. परिषदेचे आयोजन मराठी भाषेत करून, पुढाकार व प्रोत्साहनाचा हा एक महत्वाचा प्रयत्न व सुरुवात ठरेल असा विश्वास आहे. वास्तुकला क्षेत्रातील यशस्वी मान्यवर प्राध्यापक वर्ग विद्यार्थी तसेच व्यवसायिक या साऱ्यांनाच व्यासपीठ उपलब्ध होऊन, त्या संबंधिचे लिखाण, सादरीकरण व चर्चा यास उत्तम प्रतिसाद लाभेल अशी खात्री आहे. विविध विषयांवरील उत्तम लिखाण शोधनिबंध पुस्तिका रूपाने प्रकाशित केले जाईल.

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२. सर्वसमावेशकता
३. पर्यायी व नाविन्यपूर्ण तंत्रज्ञान
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११. वास्तुकला व्यवसायातील आव्हाने
१२. वास्तुकलेतील संगणकीय अनुप्रयोग
१३. वास्तुकलेशी निगडीत असा इतर कुठलाही विषय

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अनुक्रमणिका

। श्री ।

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शिवकालीन लष्करी स्थापत्याचा तौलनिक अभ्यास: किल्ले राजगड व रायगड

तनय ललवाणी, सुधीर देशपांडे
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गोषवारा:
भारत हा देश वारसास्थळांनी भरलेला आहे. राजस्थानचे सुंदर राजवाडे, आसामचे बांबू बांधकाम, दिल्लीचे मुघल स्थापत्य सौंदर्य, दक्षिणेतील द्रविडीयन मंदिरे अशी प्रत्येक राज्याची स्वतःची ओळख असते. त्याचप्रमाणे महाराष्ट्राचा विचार केल्यास सह्याद्रीच्या पर्वतरांगा आणि त्यावरील किल्ले हे गौरवाचे स्थान आहे. महाराष्ट्रातील किल्ले हे छत्रपती शिवाजीमहाराज यांनी स्थापलेल्या स्वराज्याचा कणा होते. या महाराष्ट्रातील किल्ल्यांचे सातवाहन काळापासूनचे पुरावे आहेत. वेळ आणि तंत्रज्ञानानुसार त्याची संरक्षण रचना बदलत राहिली. त्यातील इस्लामी राजवट प्रखर असताना महाराष्ट्रामध्ये छत्रपती शिवाजी महाराजांनी काही दुर्गांच्या स्थापत्यशैलीत आणि संरचनेत काही बदल केले. हा शोधनिबंध वरील बदलांची महिती आणि त्यातील स्थापत्या संबंधीचे बारकावे स्थापत्य ह्यावर प्रकाश टाकतो. यासाठी दुर्ग राजगड व दुर्ग रायगड ह्यांच्या स्थापत्यशैलीच्या ठळक वैशिष्ट्यांची उदाहरण म्हणून मांडणी केली आहे. या संशोधनाचा उद्देश शिवाजी महाराजांनी विकसित केलेल्या दुर्गशैलीचा अभ्यास करणे हा आहे.

प्रमुख शब्द: किल्ले, संरक्षणवास्तुकला, संरचना, स्थापत्यशैली, दुर्ग

1. परिचय:

महाराष्ट्रातील किल्ल्यांचे ३ टप्प्यात वर्गीकरण केले आहे. 1. इस्लामीआक्रमणापूर्वी (१ल शतक ते 13वे शतक) 2.इस्लामी राजवट (१४वेशतक ते १६वेशतक) 3. मराठा राजवट (१७वेशतक ते १८वे शतक). हे संशोधन मराठा राजवटीत संरक्षण वास्तुशास्त्राच्या प्रगतीवर आणि त्यांच्या फायद्यांवर लक्ष केंद्रित करतो ज्यामुळे हे गिरिदुर्ग एक परिपूर्ण संरक्षण संरचना बनली आहे.

2. पार्श्वभूमी आणि संदर्भ:

भारताच्या वैभवशाली भूतकाळात लष्करी स्थापत्यास विशेष महत्त्व आहे. सर्वात जुन्या दुर्गांचे)3500BCE ते 1800BCE (पुरातत्वीय अवशेष सिंधूखोऱ्यातील बनवली, लोथल,धोलावीरा इत्यादी इथे आढळते. कौटिल्यअर्थशास्त्र ,नीतीशास्त्र, राज्यशास्त्र आणि पुराण सारख्या प्राचीन ग्रंथातून विविध संदर्भ मिळतात जे दुर्गांच्या तत्त्वांबद्दल आणि कोणत्याही साम्राज्याचे संरक्षण करण्यासाठी त्याच्या महत्त्वाच्या भूमिकेबद्दल बोलतात. ग्रंथांमध्ये किल्ल्यांचे 6 प्रमुख प्रकारांमध्ये वर्गीकरण केले आहे, ते म्हणजे भुईकोट (जमिनीवर बांधलेले किल्ले), गिरिदुर्ग (डोंगरांवर बांधलेले किल्ले), वनदुर्ग (जंगलात बांधलेले किल्ले), जलदुर्ग (पाण्यात बांधलेले किल्ले), सागरीदुर्ग (किनाऱ्यावर बांधलेले किल्ले). आणि मिश्रदुर्ग (एकापेक्षा जास्त प्रकारांचे मिश्रण असलेला किल्ला). त्याचे धोरणात्मक स्थान, बांधकामसाहित्य, तंत्रज्ञान आणि उद्देश यासारख्या घटकांमुळे किल्ल्याची जडण घडण प्रभावित होते (जैन, २०२१).

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भारतातील सर्वात मोठी दुर्ग श्रृंखला महाराष्ट्रात आहे.ज्यामधे ५०० हून अधिक दुर्गांचा समावेश होतो. सागरी किनाऱ्यावरील बंदरापासून ते डोंगर माथ्यापर्यंत पसरलेल्या प्राचीन व्यापार मार्गांचे संरक्षण करण्यासाठी सुमारे ३५० दुर्गांची साखळी तयार केली गेली. किल्ल्यांचे हे अनोखे जाळे जगात कुठेही आढळत नाही. हे किल्ले राष्ट्रकूट ते मराठा राजवटीत बांधले होते परंतु या किल्ल्यांचा एक मजबूत संरक्षण समुह म्हणून विकास छत्रपती शिवाजी महाराजांनी केला. मूलभूत इस्लामिक वास्तुकले मध्ये गनिमी युद्धनीतीनुसार महाराजांनी अनेक बदल केले.

आकृती १ : राजगडआणि रायगड प्रभावातील दुर्ग
(स्रोत: लेखक)

3. राजगड आणि रायगड: स्थापत्यशैलीतील ठळक वैशिट्ये:

हे संशोधन ह्या घटकांमुळे निर्माण झालेल्या मराठा संरक्षण वास्तुकलेवर प्रकाश टाकण्यावर भर देते. ही उत्क्रांती समजून घेण्यासाठी राजगड आणि राजगड दोन राजधानीच्या किल्ल्यांच्या तुलना केली आहे. हे दोन्ही राजदुर्ग भूप्रदेश, इतिहास, नियोजन, प्रवेशद्वार, तटबंदी आणि बुरुज या मुद्द्यांखाली अभ्यासले आहेत.

३.१ राजगडकिल्ला:

राजगड किल्ला छत्रपती शिवाजी महाराजांनी निर्माण केलेल्या मराठा साम्राज्याची पहिली राजधानी होती. किल्ला आजही त्याच्या अद्वितीय लष्करी वास्तुकलेच्या मांडणीमुळे मोहित करतो. २४-२५ वर्ष स्वराज्याची राजधानी असलेल्या हा किल्ला अनेक गौरवशाली घटनांचा आणि अद्भुत लढायांचा साक्षीदार आहे.

३.१.१. भूप्रदेश:

राजगड हा गुंजन मावळ परिसरातील सह्याद्रीच्या पूर्वेकडील डोंगर रांगेमधिल मुरूमदेव डोंगरावर बांधला गेला. रणनीतीनुसार राजगड हा तोरणा, सिंहगड पुरंदर, रोहिडा, केंजळगड, लिंगाणा आणि कावल्या

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यासारख्य भक्कम किल्ल्यांनी वेढलेला अहे. शेवत्या घाट, मधे घाट आणि गोप्या घाट ह्या व्याप्यारी मार्गांवर राजगडावरुन नजर ठेवता येते. त्याच्या लगतच्या दक्षिणेला कानड नदीचे खोरे आहे आणि उत्तरेला गुंजन नदीचे खोरे आहे. एकएक छोटी पर्वतरांग राजगड व तोरणा दुर्गाना जोडते, त्यामुळे तोरणा हा राजगडचा सहाय्यक दुर्ग म्हणून कार्य करतो. हे फायदे लक्षात घेऊन महाराजांनी इथे राजधानीचा किल्ला बांधला (चिळे, २०१३).

३.१.२. इतिहास:

मुरुमदेव पर्वत हा सातवाहन राजवटीच्या अंदाजे २००० वर्षापासून ओळखला जातो. नंतर बहामनी आणि अहमदनगरच्या निजामाच्या अधिपत्याखाली होता. १६२५ मध्ये ते आदिलशाहीच्या ताब्यात आले .तेव्हा अत्यंत कमी बांधकाम असलेला हा तृतीय किल्ला होता. त्यानंतर १६४६-१६४७ च्या सुमारास छत्रपती शिवाजी महाराजांनी तोरणा व मुरुमदेव किल्ले ताब्यात घेऊन मजबूत करून राजधानी केली. त्यानंतर त्याचे 'राजगड' असे नामकरण करण्यात आले. सरतेशेवटी राजधानी रायगडावर हलवण्यात आली आणि शेवटी संभाजी महाराजांच्या मृत्यूनंतर औरंगजेबाने १७०७ मध्ये किल्ला ताब्यात घेतला आणि त्याचे नाव 'नबीशहागड' असे ठेवले. ते नंतर मराठ्यांनी परत घेतले आणि शेवटी १८१८ मध्ये ते ब्रिटिशांच्या ताब्यात गेले (घाणेकर, २००१).

आकृती २: **बालेकिल्ला, राजगड**
(स्रोत: लेखक)

३.१.३ नियोजन:

संपूर्ण किल्ला ४ क्षेत्रांमध्ये (माची) विभागलेला आहे. पद्मावतीमाची, सुवेलामाची, संजीवनीमाची, आणि बालेकिल्ला हे विभाग स्वतंत्र किल्ल्याप्रमाणे कार्य करतात. उत्तरेकडील पद्मावती, पश्चिमेकडील संजीवनी व पूर्वेकडील सुवेळा, अश्या 3 माच्यांच्या मध्यभागी सुळक्यावर बालेकिल्ला उभारला आहे. पद्मावती माची ही सर्वात मोठी असून तिच्यावर राजसदर, खलबतखाना, पद्मावती देवी मंदिर, 2 मोठ्या पाण्याची टाकी, चोर दरवाजा आणि इतार अवशेष आढळतात. सुवेळा माची लांब, अरुंद आणि दुहेरी तटबंदीची आहे. संजीवनी माचीची रचना तीन टप्प्यात केली आहे. अतिशय मजबूत दुहेरी तटबंदी सोबत चिलखती बुरुज आहे. माचीच्या दोन्ही आतील बाजूस बनावटी भिंती आहेत, कदाचित खंदक तयार करण्याचा

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प्रयत्न करत असावेत. या वैशिष्ट्यांमुळे ही माची इतर 2 माचींमध्ये खरोखरच अद्वितीय बनते (घाणेकर, २००१). बालेकिल्ल्याचा त्रिकोणी आराखडा असून त्याची 3 टोके खाली असलेल्या 3 माच्यांच्या दिशेने आहेत. सर्व बाजूंनी सरळ कडा एक चांगले नैसर्गिक संरक्षण वैशिष्ट्य आहे, ज्याचे तिन्ही कोपरे 2-मजली बुरुजांनी मजबूत केले आहे. बालेकिल्ल्याला जाण्यासाठी एकच मार्ग आहे जो दोन्ही बाजूंनी षटकोनी बुरुजांच्या प्रवेशद्वाराने संरक्षित केले आहे (पाळंदे, २०१४).

३.१.४ प्रवेशद्वार:

खालील प्रमाणे किल्ल्याला 3 मुख्यमार्ग आहेत, प्रत्येक मार्ग एका माचीवर उघडतो:

1. पाली गावातून पद्मावती माचीकडे जाणारा- पाली दरवाजा
2. गुंजवणे गावापासून सुवेळा माचीपर्यंत - गुंजवणे दरवाजा
3. तोरणा ते संजीवनी माची - अळू दरवाजा

हे सर्व मार्ग प्रत्येकी दोन प्रवेशद्वारांनी संरक्षित आहेत. हे दोन्ही प्रवेशद्वार दोन्ही बाजूंना मोठ्या तटबंदीसह अरुंद मार्गाने जोडलेले आहेत. या तटबंदीमध्ये अंतराने बंदुकी साठी अनेकफटी तयार केल्या आहेत. परंतु मराठ्यांनी बांधलेल्या इतर किल्ल्यांप्रमाणे हे प्रवेशद्वार अगदी सोपे आणि थेट दृष्टीस पडणारे आहेत जे स्वराज्य स्थापनेच्या सुरुवातीच्या काळात बांधलेले आहे. प्रवेशद्वाराच्या दर्शनी भागावर गजलक्ष्मी, फुलांच्या पाकळ्या आणि शरब अशी अनेक शिल्पे आहेत. खालच्या किल्ल्याला प्रत्येक माचीसाठी स्वतंत्र लहानप्रवेशद्वारांसह अंतर्गत तटबंदी देखील आहे जेणेकरून ते स्वतःचे वैयक्तिक किल्ले म्हणून कार्य करू शकतील.

आकृती ३ : **पाली दरवाजा**
(स्रोत: लेखक)

३.१.५ तटबंदी आणि बुरुज:

तटबंदीच्या दृष्टीने गडाचे बुरुज बऱ्यापैकी मजबूत आहेत. बालेकिल्ल्यावरील बुरुज आणि प्रवेशद्वाराच्या सभोवतालचे बुरुज दोन मजली आहेत ज्यात तोफा आणि बंदूकीच्या माऱ्यासाठी मोठ्या आणि लहान

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फटी आहेत. तटबंदी किल्ल्याच्या प्रत्येक कोपऱ्याला एकमेकांशी जोडून तटबंदीचे विविध स्तर तयार करतात. प्रत्येक माची चारही बाजूंनी तटबंदीने वेढलेल्या स्वतंत्र किल्ल्याप्रमाणे काम करते. पद्मावती माचीला तुरळक बुरुजांसह तटबंदीचा एकच थर आहे. सुवेळा माचीला तटबंदीचे दोन थर असून वरच्या थरावर एक बुरुज आहे. संजीवनी माचीला मजबूत तटबंदीचे तीन टप्पे आहेत. या तटबंदीच्या बुरुजांवर २-३ थर चिलखती बुरुजाचे आहे. तटबंदीच्या सर्वात खालच्या टप्प्यात ०.६ मीटर जाडीची अतिरिक्त अंतर्गत भिंत आहे, ज्यामुळे बाहेरील आणि आतील भिंती मध्ये काही सेंटीमीटर ते ६ मीटर खोली निर्माण होते. राजगडची तटबंदी आणि बुरुज हे लष्करी स्थापत्याचा एक अद्वितीय नमुना आहे त्या . मूळे त्याला "गडांचाराजा, राज्यांचागड असेही "संबोधले जाते. राजगडाचे स्थान सह्याद्रीच्या पूर्वेला असल्याने दख्खनकडून कोणत्याही हल्ल्याची शक्यता जास्त होतीआणि स्वराज्याच्या प्रसारासाठी मोठ्या क्षेत्राची आवश्यकता होती. त्यामुळे राजधानी रायगडला हलवण्याचा निर्णय घेण्यात आला (बॉम्बे गॅझिटिअर्स, १८८४).

आकृती ४ : संजीवनी माची
(स्रोत: लेखक)

३.२ रायगडकिल्ला:

रायगड मराठा साम्राज्याची दुसरी राजधानी असून स्वतःमध्ये एक उत्कृष्ट नमुना आहे. मराठ्यांच्या इतिहासात रायगडाला एक महत्त्वपूर्ण स्थान आहे. नियोजन, शाश्वत स्थापत्य आणि दुर्गनीतीचे एक उत्कृष्ट उदाहरण आहे. वास्तुविशारद हिरोजी इंदुलकर यांनी हा किल्ला छत्रपती शिवाजी महाराजांच्या देखरेखीखाली बांधला होता. युरोपीय लोक या किल्ल्याला पूर्वेकडील जिब्राल्टर म्हणतात. गडाच्या स्थापत्यकलेने सर्वांना कसे आकर्षित केले हे यातून दिसून येते.

३.२.१ भूप्रदेश:

रायगडचा डोंगर चारही बाजूंनी असलेल्या दरीमुळे व उत्तर आणि पूर्वेला असलेल्या काळ नदीच्या खोऱ्यामुळे सह्याद्रीपासून विलग झालेला आहे. त्याला सर्व बाजूंनी नैसर्गिक संरक्षणाचा मोठा फायदा

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आहे. पश्चिमेला लहान डोंगररांगा आणि कोकणमैदाने आहेत आणि दक्षिणेला दोन लहान पर्वतरांगा आहेत. एकेकाळी जिथून १८१८ मध्ये रायगडावर भडिमार झाला होता आणि दुसरा गोयारी शिखराचा प्रमुख माथा आहे. दक्षिणेकडील पर्वत रांगेचा पट्टा महाड शहरापर्यंत जाऊन संपतो जे त्यावेळेस वरंधा घाटाच्या महत्त्वाच्या व्यापारी मार्गावर असलेले प्रसिद्ध अंतराळ बंदर होते. राजगड आणि तोरणाकडे जाणाऱ्या इतर अनेक छोट्या घाटवाटा आहेत .रायगडाच्या आजूबाजूला अनेक किल्ले आहेत जसे की उत्तरेला कोकणदिवा आणि मानगड, पूर्वेला लिंगाणा, तोरणा आणि राजगड, दक्षिणेला कावळ्या , मोहनगड आणि कांगोरी व पश्चिमेला पन्हाळे दुर्ग , सोनगड आणि चांभारगड. रायगडाच्या डोंगरमाथ्यावर जवळपास २.५ किमी मैदानी प्रदेश आहे (चिळे, २०१३). पर्वत सर्व बाजूंनी नैसर्गिक संरक्षण भिंती बनवतो. रायगडाचा हा भूभाग आणि संदर्भ अनेक फायदे देतो जसे की:

1. हा किल्ला कोकणच्या मैदानाच्या अगदी जवळ आहे त्यामुळे कोकण किनारपट्टीवर नियंत्रण ठेवणे खूप सोपे झाले आहे आणि जंजिरा जवळ असल्यामुळे सिद्धींच्या भूभागाच्या हालचालीं वर नियंत्रण ठेवण्यास फायदा झाला.
2. कोणत्याही शत्रूला हल्ला करायचा असेल तर त्याला सह्याद्रीच्या ५००-६०० मीटरखाली चढावे लागते. घाट आणि नंतर पुन्हा पायथ्याशी जाण्यासाठी चढून जावे लागते किंवा काळनदीचे पात्र ओलांडावे लागते.
3. अतिशय कार्यक्षम पाण्याच्या उपलब्धतेसह मोठे भांडवल व्यापण्यासाठी डोंगरमाथ्यावर प्रचंड जागा.
4. चारही बाजूने असलेल्या कातळकड्यामूळे किल्ल्याला अतिशय मजबूत नैसर्गिक संरक्षण आहे, नैसर्गिक खंदक म्हणून काळनदी आहे.
5. घाटमार्ग आणि व्यापारी मार्गांनी वेढलेले, तसेच विविध किल्ले राजधानी भोवती मजबूत जाळी तयार करतात.

आकृती ५: रायगडकिल्ला
(स्रोत: लेखक)

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३.२.२ इतिहास:

यादव आणि विजयनगर राजघराण्यांच्या संदर्भासह हा किल्ला १२ व्या शतकापासून ओळखला जातो. तो नंतर बहामनी, निजामशाही आणि नंतर आदिलशाहीच्या ताब्यात गेला, त्याचे व्यवस्थापन जावळीच्या मोरेंनी केले. १६५६ मध्ये छत्रपती शिवाजी महाराजांनी मोरे यांच्याकडून रायरी जिंकली .शिवाजी महाराजांनी किल्ला जिंकल्यावर त्याला भेट दिली. त्याची क्षमता पाहून ते प्रभावित झाले व राजधानी बनवण्याचा निर्णय घेतला.

सभासद बखर सांगते *"राजाखासा जाऊन पाहता गड बहुतच खोटा चौतर्फा गडाचे कडे तासिल्या प्रमाणे दिडगांव उंच. पर्जन्यकाळी कडियावर गवत उगवत नाही आणि धोंडा तासीव एकच आहे. दौलताबाद पृथ्वीवरच खोट गड खरा, परंतु तो उंचीने थोडका. दौलताबादचेद शगुणी गड उंच असे देखोन बहुत संतुष्ट झाले आणि बोलिले, तक्तास जागा हाच गड करावा."* शिवाजीमहाराजांनी आपली राजधानी राजगडावरून रायगड येथे हलवली आणि १६७५ मध्ये मराठा साम्राज्याचा छत्रपती म्हणून शिवाजी महाराजांचा राज्याभिषेक झाला. १६८० मध्ये शिवाजी महाराजांच्या मृत्यूनंतर, संभाजी महाराजांच छत्रपती झाले. संभाजीच्या महाराजांच्या हत्येनंतर त्यांचा भाऊ राजाराम महाराजांचा १६८९ मध्ये राज्याभिषेक झाला. .याच वर्षी औरंगजेबाने रायगडाला वेढा घातला ज्यामुळे राजाराम महाराजांना रायगडहून जिंजीला पलायन केले. हा किल्ला जवळपास ८-९ महिने मुघलांशी लढला पण नेतृत्वाचा अभाव आणि अंतर्गत कलहामुळे हा किल्ला मुघलांच्या ताब्यात गेला आणि त्याचे 'इस्लामगड' असे नामकरण झाले. सरतेशेवटी १७३३ मध्ये मराठ्यांनी तो परत जिंकला. १८१८ मध्ये ब्रिटिशांने किल्ल्याच्या दक्षिणेला असलेल्या पोतल्याचा डोंगरावरून तोफांचा भडिमार करून गड ताब्यात घेतला (पाळंदे, २०१४).

३.२.३ नियोजन:

रायगडाचे क्षेत्रफळ आणि घेरा खूप मोठा आहे. त्याच्या माथ्यावर ४ मोक्याची टोक आहेत, पश्चिमेला हिरकणी, उत्तरेला टकमक, पूर्वेला भवानीचा आणि दक्षिणेला श्रीगोंदाचा. मुख्यप्रवेशद्वारा कडील राजमार्ग पश्चिम पायथ्याकडील गावांमधून येतो. किल्ल्याची तेवढी एकच बाजु डोंगर उतारावर असल्याने महा-दरवाजा, नाणे-दरवाजा आणि चित्त दरवाजा तिथे बांधले गेले. या जागेच्या सुरक्षेसाठी तटबंदीचे २ थर टकमक टोक ते हिरकणी पर्यंत जातात. वास्तूशास्त्राच्या सर्वबाबी विचारात घेऊन किल्ल्याचे नियोजन केले आहे. जगदीश्वराचे मुख्य मंदिर आणि महाराजांची समाधी गडाच्या पूर्वेला सर्वात वरच्या भागात आहे (पाळंदे, २०१४). पश्चिमेला असलेल्या बालेकिल्ल्यात राजदरबार, रजनिवास, राणीनिवास, प्रशासकीय कार्यालये आणि इतर वाद्यांचे अवशेष आहेत. राजवाड्याला आदिलशाही स्थापत्याचा प्रभाव असलेले २ गोल मिनार आहेत. अष्टप्रधान मंडळाचे वाडे गडाच्या दक्षिणेला खालच्या स्तरावर आहेत. वाडे आणि कोठारांचे इतर अनेक अवशेष संपूर्ण किल्ल्यात आढळतात. हे अवशेष, मंदिर आणि पाण्याच्या टाक्यांसह विविध समूह बनवतात जे योग्य नियोजन आणि योग्य विचार प्रक्रिया दर्शवतात.

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आकृती ६ : राजवाड्याचे गोल मिनार
(स्रोत: लेखक)

३.२.४ प्रवेशद्वार:

किल्ल्याच्या पायथ्याशी दोन प्रमुख गावे आहेत एक म्हणजे छत्री - निजामपूर आणि दुसरे पाचाड .पाचाड गावात शिवाजी महाराजांनी आपल्या आई जिजाबाईंसाठी वाडा बांधला. पाचाड येथून रायगडावर जाणार्या वाटेवर आज फक्त खुबलढा बुरुज आहे.निजापूर ते रायगडावर जाणाऱ्या मार्गावर किल्ल्याच्या पायथ्याशी नाणे दरवाजाबांधला आहे. दरवाजाच्या दोन्ही बाजूंना बुरुज आहेत आणि फक्त दोन कमानींचे अवशेष आहेत. हे दोन्ही मार्ग एका मध्यवर्ती बिंदूला भेटतात ज्यामध्ये काही जोत्यांचे अवशेष आहेत. पुढे हा मार्गमहा-दरवाजाकडे जातो, जो मराठा लष्करीवास्तुकलेचा उत्कृष्ट नमुना आहे. महा-दरवाजा हा गोमुखी आकाराचा (वक्राकार) मोठा प्रवेशद्वार आहे. दुसरा मार्ग बालेकिल्ल्याच्या दक्षिणेस पाचाडकडे जातो जो वाघप्रवेशद्वाराने संरक्षित आहे. हया मार्गतून राजाराम महाराजांची सुटका झाली. हया प्रवेशद्वारामध्ये मावळ्यांच्या मुक्कामासाठी देवड्याची व्यवस्था आहे. प्रवेशद्वारांच्या पुढील दर्शनी भागावर शरब आणि फुलांच्या पाकळ्या कोरलेली शिल्पे आहेत.

आकृती ७ : गोमुखीआकाराचामहा-दरवाजा
(स्रोत: लेखक)

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३.२.५ तटबंदीआणिबुरुज:

तटबंदी अतिशय विखुरलेली आहे आणि ती फक्त किल्ल्याच्या पश्चिमेकडील भागात, प्रवेशद्वाराजवळ आणि हिरकणी येथे पाहता येते. महादरवाजा जवळ तटबंदीचे २-३ थर आहेत. वाघदरवाजा जवळ एकच थर आहे. हिरकणी येथे एक बुरुजआहे. संपूर्ण गडाला नैसर्गिक तटबंदी लाभली आहे. गडाभोवती कोणतीही अनावश्यक तटबंदी करण्यात आली नाही. यावरून किल्ला मजबूत करण्यासाठी केलेले योग्य विश्लेषण दिसून येते (बॉम्बे गॅझिटिअर्स, १८८४).

४. विश्लेषण:

	राजगड	**रायगड**
भूप्रदेश	भूप्रदेश शत्रुस सोपा,फक्त बालेकिल्ल्याला नैसर्गिकसंरक्षण, भक्कम किल्ल्यानी वेढलेला.	भूप्रदेश शत्रुस अवघड, पूर्णकिल्ल्याला नैसर्गिक संरक्षण, छोट्याकिल्ल्यानीवेढलेला.
इतिहास	मराठाची पहिली राजधानी, शिवाजी महाराजांचे वास्तव्य 24-25 वर्ष.	मराठाची दूसरी राजधानी, शिवाजी महाराजांचा राज्याभिषेक झाला.
नियोजन	क्षेत्र छोट असल्याने संक्षिप्त नियोजन, वास्तु पेक्षा तटबंदीची जास्त बांधणी.	क्षेत्र मोठे असल्यने सूटसूटीत नियोजन, तटबंदीपेक्षा वास्तुची बांधणी जास्त.
प्रवेशद्वार	भरपूर प्रवेशद्वार, सोप्पी इस्लामिक पद्धतीची बांधणी, दर्शनी भाग कमी कोरिव. दोन दरवेज्यांनमधली नाळ तटबंदीयुक्त सुरक्षित. प्रतिक माची साथी दरवाजे	चारप्रवेशद्वार, गोमुखी प्रकारची मराठा पद्धतीची बांधणी. दर्शनीभाग कोरीव. दरवाजे बाजूच्या बुरुजांनी सुरक्षित, कुठलीही नाळ, प्रत्येक मोठ्या वास्तूसाठी दरवाजे
तटबंदी	तटाबंदी - मोठ्या प्रमाणात बांधणी, संजीवनी- सुवेला माचीवर 2-3 थर बांधणी, माची तटबंदी युक्त, दुमजली बंधकाम आणि 2-3 चिलखती बुरुजांचा थर. संजीवनीला बनावटी भिंत आतल्या बाजूस	तटबंदी अतिशय विखुरलेली, पश्चिमेकडील भागात बांधणी.महादरवाजा जवळ २-३ थर आणि वाघदरवाजाजवळ एकचथर . बुरुज आकारानी मोठे, पण संख्येत कमी. नैसर्गिक तटबंदीची देणं .

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आकृती ८,९: राजगड आणि रायगड किल्ल्यांचे थर
(स्रोत: लेखक)

५. निष्कर्ष:

राजगड आणि रायगड हा एकच स्वराज्याने बांधले असले तरी त्या दोन्ही किल्ल्यांमध्ये मोठा फरक दिसतो. त्यांच्यत फरक असला तरी दोन्ही किल्ले आपापल्या परीने लष्करी स्थापत्याचे उत्तम उदाहरण आहे. खालील काही निष्कर्ष नमूद करावेसे वाटतात.

1. **भूप्रदेशाचा उत्तम अभ्यास केला जाई. ज्या दुर्गाचा भूप्रदेश शत्रूस अवघड असेल त्याला नैसर्गिकरित्या मिळालेली देण तशीच ठेवून हवी तेथेच तटबंदीची बांधणी करण्यात येत.ज्या दुर्गांचा भूप्रदेश सोपा त्याला तटबंदीचे थर रचून भक्कम केले जाई**
2. **महाराष्ट्राच्या दूर्गस्थापत्यामधे छत्रपती शिवाजी महाराजांनी अनेक घटक दिले. हे घटक तिथल्या भूप्रदेशाच्या अनुषंगाने वापरलेले दिसतात. गोमुखी दरवाजाची रचना, माचीला तटबंदी बांधणी, चिलखतीबुरुज, हत्तीतला व इत्यादी.**
3. **राजगड आणि रायगडच्या स्थापत्यमधे अजून एका कारणामुळे फरक दिसून येतो. राजगड हा महाराजांच्या एक्दम सुरुवातीच्या काळात बांधलेला असल्याने अनेकप्रयोग केलेले दिसतात आणि रायगड हा राजगडनंतर अनेक वर्षांनी बांधला गेल्याने बऱ्यापैकी सुटसुटीत आणि मराठा स्थापत्य दर्शवणारा दुर्ग म्हणून दिसतो.**

या मराठा किल्ल्यांमध्ये संरक्षणाची परिपूर्ण संकल्पना असलेली एक अतिशय उत्कृष्ट संरक्षण यंत्रणाआहे, ही वस्तुस्थिती कोणीही दुर्लक्षित करू शकत नाही.

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गौरव गुरुबाळ माळी, सुधीर देशपांडे
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गजबजलेल्या वाटा, घुसमटणारी हवा, काँक्रेट च्याजवळजवळ उभ्या राहिलेल्या टोलेजंग इमारती हे सध्याच्या शहरांचे चित्र आहे. शहरांची समाविष्ट करून घेण्याची क्षमता संपत चालली आहे. जगातील सगळ्याच शहरांची अशीच प्रतिमा डोळ्यासमोर उभी राहते. आणि म्हणूनच शाश्वत विकासाची व्याख्या खरंच शाश्वत आहे का असा प्रश्न बरेच अभ्यासक विचारताना दिसतात. दिवसेंदिवस शहरीकरणाचं अनियोजित पद्धतीने होणारं जाळं वेग धरत आहे. ह्या शोधनिबंधात पुणे शहराचा उदाहरण म्हणून नगर रचनेच्या पातळीवर अभ्यास केलेला आहे, आणि अनियोजित पद्धतीने होएयाच्या शहरीकरणाबद्दलच्या समस्या आणि त्या संबंधीचे उपाय ह्याची साधक बाधक चर्चा केली आहे. हा शोधनिबंध पुण्याच्या शहरीकरणाच्या विकासाची सुसंगत अशा कल्पनांची मांडणी करतो तसेच भविष्यातील उपाययोजनांचा वेध घेतो. शहरांना मोकळा श्वास घेता यावा आणि मनगरांबरोबरच इतर शहरांचा विकास व्हावा असा हेतू या शोधनिबंधाचा आहे.

१. परिचय :
भारत, प्रगतीपथावर अग्रेसर असणारा देश, सर्वच क्षेत्रात उन्नतीचा मार्गावर वाटचाल करतोय, आणि ह्यात वेग धरतय शहरीकरणाच जाळं. झपाट्यानं वाढणारी शहरं दिवसेंदिवस भौगोलिक दृष्ट्या पसरत चाललेली आहेत. शहरांचा विस्तार हा आजच्या काळातील चिंतेचा विषय नाही, हा भारतातील शहर विकासाच्या अनेक दशकांपासून विचाराधीन आणि सतत उत्क्रांत होत जाणारा मुद्दा आहे. भारताच्या स्वातंत्र्यानंतर वाढत्या शहरांमध्ये पायाभूत सुविधांचा विकास वाढत आहे आणि त्यामुळे लोक शहरांकडे स्थलांतर करू लागले आहेत. यामागील प्रमुख कारण म्हणजे रोजगाराच्या संधी आणि शहरी भागातील आधुनिक जीवनशैली.

२. संदर्भ आणि पार्श्वभूमी :
उदाहरण म्हणून पुणे शहराचा अभ्यास करता येईल. पुणे शहर महानगरीय भागात वाढत आहे ज्यामुळे केंद्रीकृत विकास वैशिष्ट्यांना जन्म दिला आहे. आणि यामुळे ग्रामीण भागातून शहरी भागात जलद आणि मोठ्या प्रमाणावर स्थलांतराला चालना मिळाली आहे जिथे आता शहरे एकसमान आणि असंघटित पद्धतीने विस्तारत आहेत. त्यामुळे शहरे भौगोलिकदृष्ट्या वाढत आहेत. [अगरवाल,२०१५]

पुणे शहर हे १९९५ च्या आधी पेन्शनर्स टाउन म्हणून ओळखलं जायचं. मात्र माहिती व तंत्रज्ञान क्षेत्राचा शिरकाव झाल्यानंतर आशिया खंडातील सर्वात जास्त झपाट्यानं विकास झालेल्या शहरांमध्ये पुणे अग्रेसर आहे. ह्यामुळे पुण्याच्या सार्वजनिक क्षेत्रात मोठा बदल होऊन प्राथमिक नागरिक गरजांची उणीव भासू

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लागली. नुकत्याच जाहीर झालेल्या स्मार्ट सिटी योजनेअंतर्गत पुण्यामध्ये विकासकाम मोठ्या प्रमाणावर सुरु झाली. मात्र सतत वाढणारा लोकांचा बोजा, पायाभूत सुविधांची उणीव, निरोगी जीवन, सामाजिक कल्याण अशी आव्हानं आता पुणे शहरासमोर उभी आहेत.

३. संशोधन कार्यप्रणाली :

या अभ्यासासाठी पुणे शहर क्षेत्र निवडले गेले आहे आणि या अभ्यासात गेल्या काही दशकांमध्ये झालेल्या शहरी विस्ताराचा अभ्यास केला गेला आहे. या अभ्यासासाठीची माहिती प्राथमिक आणि दुय्यम दोन्ही स्त्रोतांकडून गोळा केली आहे. प्राथमिक माहिती फील्ड सर्व्हे आणि शहर नियोजक, महापालिका अधिकारी, रिअल इस्टेट डेव्हलपर आणि शहरातील रहिवासी यांसारख्या महत्त्वाच्या माहिती देणाऱ्यांच्या मुलाखतीद्वारे गोळा केली आहे. क्षेत्रीय सर्वेक्षणांमध्ये जमिनीचा वापर, वाहतूक, गृहनिर्माण आणि इतर संबंधित घटकांवरील माहिती गोळा केली आहे. दुय्यम माहिती प्रकाशित अहवाल, शैक्षणिक लेख आणि नकाशे, उपग्रह प्रतिमा आणि सांख्यिकीय डेटा यासारख्या इतर स्त्रोतांकडून गोळा केला गेला आहे.

फील्ड सर्वेक्षण आणि मुलाखतींद्वारे गोळा केलेला डेटा सामग्री विश्लेषण आणि थीमॅटिक विश्लेषण यासारख्या गुणात्मक पद्धती वापरून लिप्यंतरण आणि विश्लेषण केले आहे. सांख्यिकीय विश्लेषण आणि मॅपिंग यासारख्या परिमाणवाचक पद्धती वापरून दुय्यम माहितीचे विश्लेषण केले आहे.

४. अनियोजित शहरीकरण : समस्या आणि उपाय योजना

लोकसंख्या वाढ, आर्थिक विकास, वाहतूक पायाभूत सुविधा आणि गृहनिर्माण धोरणे यांसारख्या पुणे शहरातील नागरी विस्ताराला कारणीभूत असलेल्या घटकांची ओळख पटविण्यावर विश्लेषणाचा भर आहे. पर्यावरणाचा ऱ्हास, शेतजमिनीचे नुकसान आणि सामाजिक असमानता यासारख्या शहरी विस्ताराचे परिणाम देखील विश्लेषणाद्वारे ओळखले आहे.

टेबल क्र. १ - अनियोजित शहरीकरण : समस्या आणि उपाय योजना

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मुद्दा	समस्या	उपायोजना
अर्थव्यवस्था	पुणे जसजसे मेट्रो सिटी बनले आहे तसतसे विविध आर्थिक क्षेत्रे येथे स्थायिक होऊ लागली आहेत आणि वाढू लागली आहेत. यामुळे शहरावर पायाभूत सुविधांचा भार पडला आहे आणि पायाभूत सुविधांची उच्च मागणी परंतु ती ठेवण्याची क्षमता कमी असल्यामुळे एकसमान विकास होण्यास धडपडत आहे.	या समस्येला रोखण्यासाठी, शहरासाठी विकेंद्रित क्षेत्रीय विकास आराखडा तयार केला पाहिजे, जेथे आर्थिक क्षेत्रे विभागली गेली आहेत आणि वेगवेगळ्या भागात स्थित आहेत ज्यामुळे पायाभूत भार समान रीतीने विभाजित होईल. यामुळे शहराचा शाश्वत आणि संघटित विकास होण्यास मदत होईल.
शहराची ओळख	पुणे, सेवानिवृत्तांचे शहर आणि शिक्षण केंद्र हीच त्याची ओळख 1995 पर्यंत शहरात आयटी क्षेत्र येईपर्यंत होती. त्यानंतर शहराचे जलद नगरीकरण दिसून आले आणि भरपूर शहरी मोकळ्या जागा असलेले शांत शहर आणि 2 दशकांपूर्वी तेथे असलेल्या शहराचा एकंदरीत संथ गतीवर तीव्र परिणाम झाला. जलद नागरीकरणाने शहराचे अंगभूत स्वरूप देखील नष्ट केले आहे आणि शहराच्या हद्दीत पसरलेल्या काचेच्या दर्शनी भागाच्या उंच इमारतींनी बदलले आहे.  प्रतिमा क्रमांक १ : पुणे शहराची नवीन प्रतिमा [स्रोत-इंडिया tv]	प्रभावित झालेल्या शहराचे स्वरूप बदलण्यासाठी धोरणात्मक बदल आवश्यक आहेत. सामाजिक-सांस्कृतिक पैलूंचा विचार करून नवीन शहरी नियोजन आणि डिझाईन संवेदनशीलपणे तयार करणे आवश्यक आहे. गर्दीने भरलेले शहर क्षेत्र नवीन बांधकामासाठी कायद्यांनुसार योग्यरित्या आयोजित केले जाणे आवश्यक आहे आणि शहराची ओळख टिकवून ठेवण्यासाठी शहरी लँडस्केप आणि पर्यावरण आणि यांचे संवर्धन करण्यासाठी विशेष काळजी घेणे आवश्यक आहे. त्याच बरोबर पुणे शहराची ऐतिहासिक ओळख जपणं हे देखील महत्वाचे आहे. त्याकरता, संवर्धनात्मक धोरणे लागू करणे आवश्यक आहे.  प्रतिमा क्रमांक २ : संवेदनशील पादचारी मार्ग [स्रोत-ITDP]

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ग्रामीण भागातील शहरीकरण	पुणे शहराची हद्द अनेकदा वाढली आहे. आणि यामुळे शहराच्या हद्दालगतची अनेक गावे शहरी भागात आली आहेत. त्यामुळे या गावांमध्ये नियोजनशून्य पायाभूत सुविधांची वाढ झाली आहे. त्यापैकी काही पूर्णपणे निवासी क्षेत्र म्हणून वाढले आहेत, काही औद्योगिक क्षेत्र म्हणून आणि इतर विस्ताराचा एक भाग बनले आहेत. यामुळे शहरी ग्रामीण अस्मिता आणि विकास संघर्ष निर्माण झाला आहे कारण दर काही वर्षांनी जमिनीच्या वाढीमुळे महापालिका प्रशासन आणि संस्थेवर भार पडतो. तसेच, ही गावे त्यांचे स्वतंत्र अस्तित्व गमावत असल्याने, या भागांचा स्वतःचा विकास होत नाही. ते शहराच्या अर्थशास्त्रावर अवलंबून असलेले भाग बनतात.	शहराच्या नजीकची किंवा शहराच्या विस्तार आराखड्यात असलेली गावे अतिवृद्ध विकास क्षेत्रे मानली जावीत आणि त्यानुसार नियोजन करावे. खेड्यांचे वेगाने शहरांमध्ये रूपांतर होऊ नये यासाठी नियोजनाचा विचार करणे आवश्यक आहे. गावाच्या विकासासाठी विविध विकास घटकांची आवश्यकता आहे आणि सामाजिक सांस्कृतिक आणि आर्थिक घटकांचा विचार केला पाहिजे, आणि म्हणूनच त्यांचा उपग्रह शहर म्हणजेच विकेंद्रित क्षेत्र म्हणून केला जाऊ शकतो. तसेच अशा प्रकरणांमध्ये ग्रामस्थ त्यांच्या जमिनी डेव्हलपरना विकतात आणि त्यामुळे गाव क्षेत्रीय विकासापासून वंचित राहते. नियोजन व्यवस्थित करण्यासाठी अशा प्रकरणांवर काम करणे आवश्यक आहे.
पायाभूत सुविधांचा भार	पुण्यातील लोकसंख्येच्या कमालीच्या वाढीमुळे शहरावर पायाभूत सुविधांचा मोठा भार पडला आहे. वाढत्या लोकसंख्येमुळे आणि स्थलांतरामुळे घरांच्या गरजा वाढल्या आहेत आणि त्यामुळे सर्वत्र मोठ्या प्रमाणात उंच इमारती बांधल्या जात आहेत. इमारतीबरोबरच रस्त्यांचे जाळे, पाइपलाइन, ड्रेनेज आणि पाण्याचा पुरवठा, कचऱ्याची विल्हेवाट आणि उपचार आणि शहराची स्वच्छता या गरजा पूर्ण होताना दिसत नाहीत. (Aithal et.al. 2014)	प्रत्येक शहराला विशिष्ट लोकसंख्या आणि पायाभूत सुविधा टिकवून ठेवण्यासाठी एक विशिष्ट मर्यादा असते, त्यामुळे पुणे महानगरपालिकेने मर्यादा परिभाषित करणे आणि वाढ नियंत्रित करण्यासाठी धोरणे आखणे आवश्यक आहे. शहराच्या नव्याने वाढणाऱ्या भागात भविष्यातील भार लक्षात घेऊन नियोजित सेवा नेटवर्कची रचना करणे आवश्यक आहे जेणेकरून भविष्यात शहरी जागा अनुकूल आणि सुस्थितीत ठेवता येईल.

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जीवनशैली	शहरीकरणामुळे शहरी जीवनशैलीचा कल येतो. भारतात, ते बहुतेक पाश्चिमात्य जगाद्वारे प्रभावित आहे. सध्याच्या पुणे शहराच्या जीवनशैलीशी विरोधाभास असलेली अशी जीवनशैली झपाट्याने वाढत आहे आणि त्यामुळे शहराच्या जडणघडणीचाही एक महत्त्वाचा भाग बनला आहे. नोकरी, शिक्षण आणि पुण्यातील शहरी जीवनासाठी स्थलांतर यामुळे देशभरातून पुण्यात स्थलांतरित झाली आहे . अशा संमिश्र लोकसंख्येमुळे वैविध्यपूर्ण जीवनशैलीही येते. विस्तारलेल्या ग्रामीण शहरी विस्ताराची खेडी जीवनशैली आहे जी शहरापेक्षा खूप वेगळी आहे, परंतु जेव्हा ते शहरामध्ये पायाभूतदृष्ट्या विकसित होते तेव्हा ग्रामीण जीवनशैली नष्ट होते आणि लोक शहरी राहणीमानाचे वर्तन आणि अनुकरण करतात. बदलत्या जीवनशैलीमुळे शारीरिक आणि मानसिक आजार झपाट्याने वाढत आहेत. पुण्याचे वाढते तापमान, ध्वनी आणि वायू प्रदूषण, जलद जीवनशैलीमुळे ताण तणाव हे आणि अश्या बऱ्याच समस्या दिवसेंदिवस वाढल्या आहेत.  प्रतिमा क्रमांक ३ : शहरी झोपडपट्टीतील जीवनशैली [स्रोत-: प्रॉब्लेम्स ऑफ अर्बन इंडिया]	जलद शहरी राहणीमान आणि संथ गतीची शांत ग्रामीण जीवनशैली यांचा कुठेतरी संगम होणे आवश्यक आहे जेणेकरुन अचानक बदल होऊ नयेत आणि शहर आणि त्यात राहणाऱ्या गावकऱ्यांच्या जीवनशैलीचे नुकसान होऊ नये. पायाभूत विकासाचे आयोजन आणि विलगीकरण करून ग्रामीण अस्मिता टिकवून ठेवली पाहिजे. स्मार्ट व्हिलेज प्रस्तावित केले पाहिजे जेणेकरुन गावांचा विकास होईल परंतु त्यांची ओळख देखील टिकेल आणि शहरीकरणामुळे लोकांना अचानक बदललेल्या जीवनशैलीचा सामना करावा लागणार नाही. (UVDPF Report 2020) शहरातील लोकांचे स्वास्थ्य संवेदनशील पायाभूत सुविधा आणि नियोजन केल्याने सुधारता येईल. तसेच जलद जीवनशैलीला पर्यावरण पूरक सार्वजनिक सुखसुविधा देणे आवश्यक आहे. (Hoque et.al 2014)  प्रतिमा क्रमांक ४ : शहरी जीवनशैली [स्रोत-: AFD]

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निष्कर्ष :

लोकसंख्या वाढ, आर्थिक विकास, वाहतूक पायाभूत सुविधा आणि गृहनिर्माण धोरणे यासह पुणे शहराच्या शहरी विस्ताराला कारणीभूत ठरणाऱ्या अनेक घटकांची ओळख या अभ्यासात करण्यात आली आहे. एकीकडे रोजगाराच्या संधी वाढणे, मूलभूत सेवांमध्ये सुधारित प्रवेश आणि सुधारित राहणीमान, आणि दुसरीकडे पर्यावरणाचा ऱ्हास, शेतजमिनीची हानी आणि सामाजिक असमानता यामुळे शहरी विस्ताराचे परिणाम सकारात्मक आणि नकारात्मक आहेत. शहरी विस्ताराच्या नकारात्मक परिणामांना तोंड देण्यासाठी शाश्वत शहरी नियोजन आणि विकासाचे महत्त्व देखील अधोरेखित केले आहे. शाश्वत विकास धोरणे ज्यात नैसर्गिक संसाधने जतन करणे, सार्वजनिक वाहतुकीला चालना देणे आणि छोट्या-छोट्या शेतीला आधार देणे यावर लक्ष केंद्रित केल्याने पुणे शहर आणि जवळपासच्या गावांमधील शहरी विस्ताराचे नकारात्मक परिणाम कमी करण्यात मदत होऊ शकते.

एकूणच, हा शोधनिबंध पुणे शहराच्या संदर्भात शहरीकरण, विकास आणि टिकाऊपणा यांच्यातील गुंतागुंतीच्या परस्परसंबंध समजून घेण्यास हातभार लावतो. अशी आशा आहे की या अभ्यासाचे निष्कर्ष धोरणात्मक निर्णय आणि पुणे आणि भारतातील आणि त्यापलीकडे वेगाने शहरी होत असलेल्या इतर शहरांमध्ये शाश्वत शहरी विकासाला चालना देण्याच्या उद्देशाने केलेल्या नियोजन प्रयत्नांची माहिती देतील. म्हणूनच आज गरज आहे ती ह्याच विषयावर विचार करून सध्य परिस्थिती अभ्यासायची, जेणेकरून शहरांचा आणि त्यामधून देशाचा सर्वांगीण पण संवेदनशील आणि नियोजित विकास घडेल.

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A journey through Sindhudurga

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Introduction

Perception of Konkan

Dense forests, meandering roads, serene landscapes, unending coastlines and a lot could be said to explain beauty of Konkan. The humble houses with sloping roofs, rice fields, mouth-watering seafood, and mesmerizing sunsets make this a charming region to explore. Laced by the Arabian ocean on one side and Sahyadri mountain ranges (Western Ghats) on the other, this slice of paradise will surely be a treat to all the five senses. Along with its scenic beauty, Konkan is also a land of fertile soil and has climate favourable for agricultural produce. Crops like Rice and millet along with various exotic fruits like Mangoes, Jackfruits, coconut, Jamb, Kokum are grown in the region. Apart from this, dry fruits and nuts like cashew nuts, betel nuts; Spices like pepper, nutmeg, cinnamon, bay leaves, and a variety of fish like prawns, sharks, skates, rays, mackerels, sardines, tuna, surmai, pomfret, karel, catfish, crabs, Bombay duck are also abundantly available here.

Marked by Sahyadri mountain ranges in the east with undulating terrain comprise many coastlines, estuaries, lateritic plateaus and foothills. The physical setting of Konkan with many rivers originating from mountain ranges makes it one of the place with flourishing biodiversity.

This naturally gifted region is 410 km North-south. Damanganga River marks the boundary on the north and Terekhol River on the south. The width of the region is approximately 50 km. Konkan includes five administrative districts namely Palghar, Thane, Raigad, Ratnagiri & Sindhudurg along with Mumbai city and Mumbai suburban area.

An evening at Harnai Beach

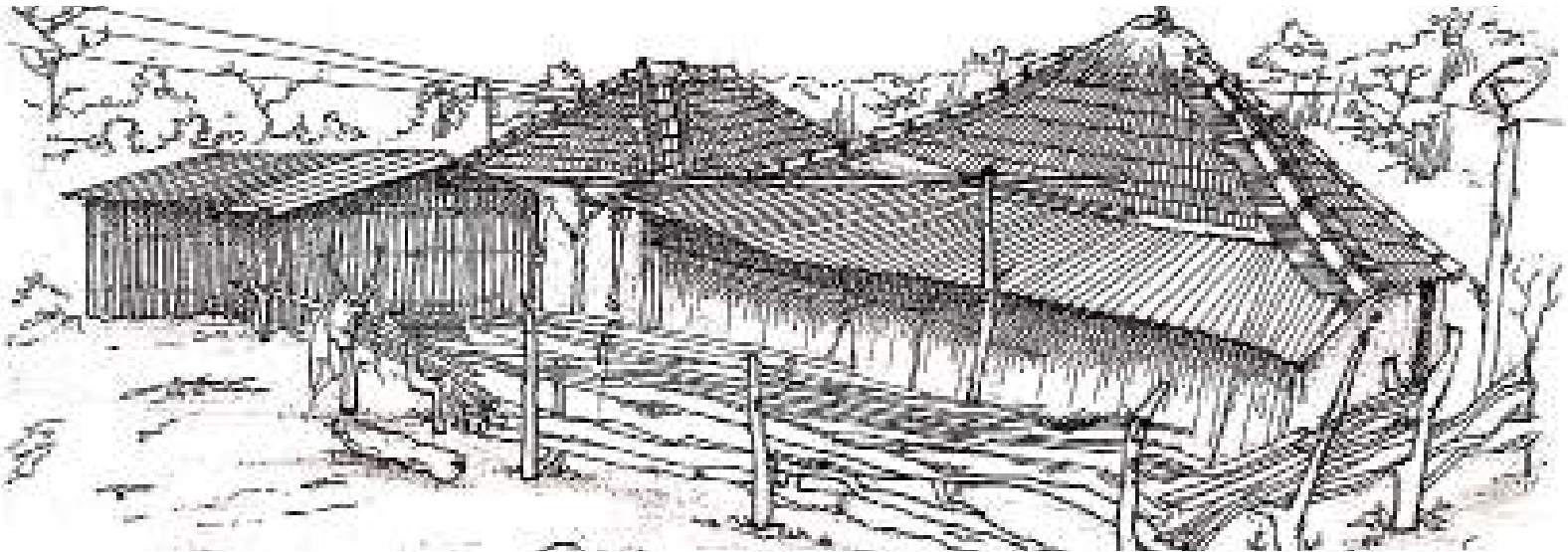


Illustration by Mario Miranda

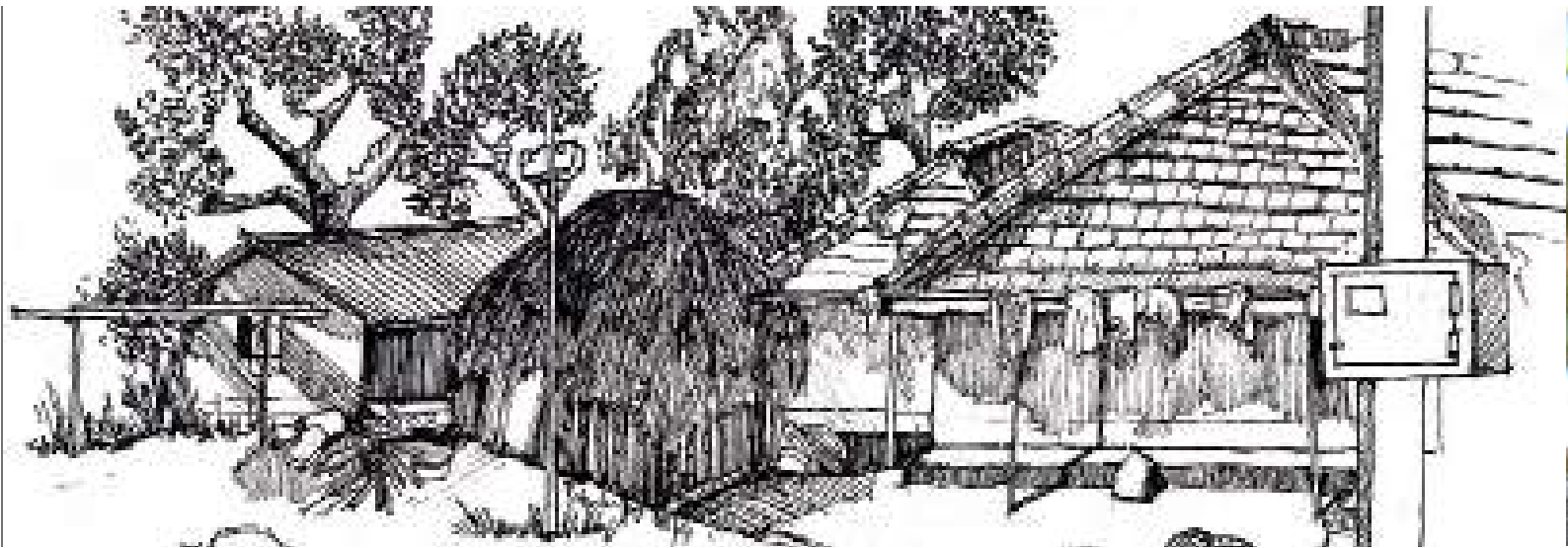
Illustration by Milind Mulik

illustrated humble houses, landscapes, lifestyle and people inhabiting Konkan in their own style. The very famous late Padmabhushan P. L. Deshpande has narrated Konkan many times in his literature. He has brought one of the characters alive in his book, Vyakti aani Valli. This character is an excellent image of Konkani people and their way of existence.

Western Ghats in Konkan

The Western Ghats are a chain of hills, running parallel to the West Indian coast. One among the eight hottest biodiversity hotspots, the region is recognized as a UNESCO World Heritage Site. The Western Ghats are considered older than the Himalayas, and their formation started when the earth's crust was being formed. The Ghats are said to be faulted edges of the elevated Deccan plateau and it runs across the states of Gujarat, Maharashtra, Goa, Karnataka and Kerala.

Western Ghats include some of the best representatives of non-equatorial tropical evergreen forests in the world. At least 325 globally threatened (IUCN Red Data List) species are found here that includes both flora and fauna. They are represented by 229 plant species, thirty one mammal species, fifteen bird species, forty three amphibian species, five reptile species and one fish species. Of the total 325 globally threatened species in the Western



Contemporary Konkan

Undulating terrain, gigantic forests made it difficult for Konkani people to easily travel to the rest of Maharashtra earlier. Especially Ratnagiri and Sindhudurg were considered to be most underdeveloped districts of Maharashtra (Prabhu S, 1989). Accessibility was one of the major reasons of slow development of Konkani towns, in terms of basic amenities like electricity, roads, telecommunications etc. The economy could not expand beyond agriculture, horticulture and fisheries and small local industries based on the primary resources. With this scenario, younger generations started migrating out for modern economic aspirations.

The scenario has changed gradually. The government has made development plans for towns, villages of Konkan with the help of different experts. For economic development, connectivity plays a major role as it links different towns, cities, markets, human resources, natural resources to each other. Connectivity to major towns with Mumbai, the trade and commerce capital of India through different modes of transport has resulted in development of economic conditions and subsequently the socio culture of the region.

Connectivity Map of Konkan to be redrawn

An important example of jaldurg i.e. Seafort, a very important fort on the trade route from sea. Also, to keep watch on the enemies from sea as well as the land.

In a detail study done by Tanay Lalvani, a student of SMEF's Brick School of Architecture, he observed that there is a specific pattern followed by the forts built in Sindhudurg region. The location to build a costal fort or the forts built at the sea-shore is chosen where in the land is surrounded by water from three side and only one side of the fort is attached to land, which is again protected by a small dry moat. Due to this there is an offset formed behind the fort which gives a protective harbour. Similar pattern can be seen in the Giridurg an i.e. mountain fort of Konkan that is the forts which built on this range protrudes out of the main range as if they are the bastions of the main Sahyadri range. These forts have valleys on three sides and a piece of a land on the other side which is usually an access point. These forts are mostly located along some trade route or in some cases larger part of the trade is covered due to the protruding part of the fort and also act as a watch tower.

Palaces in Sindhudurg

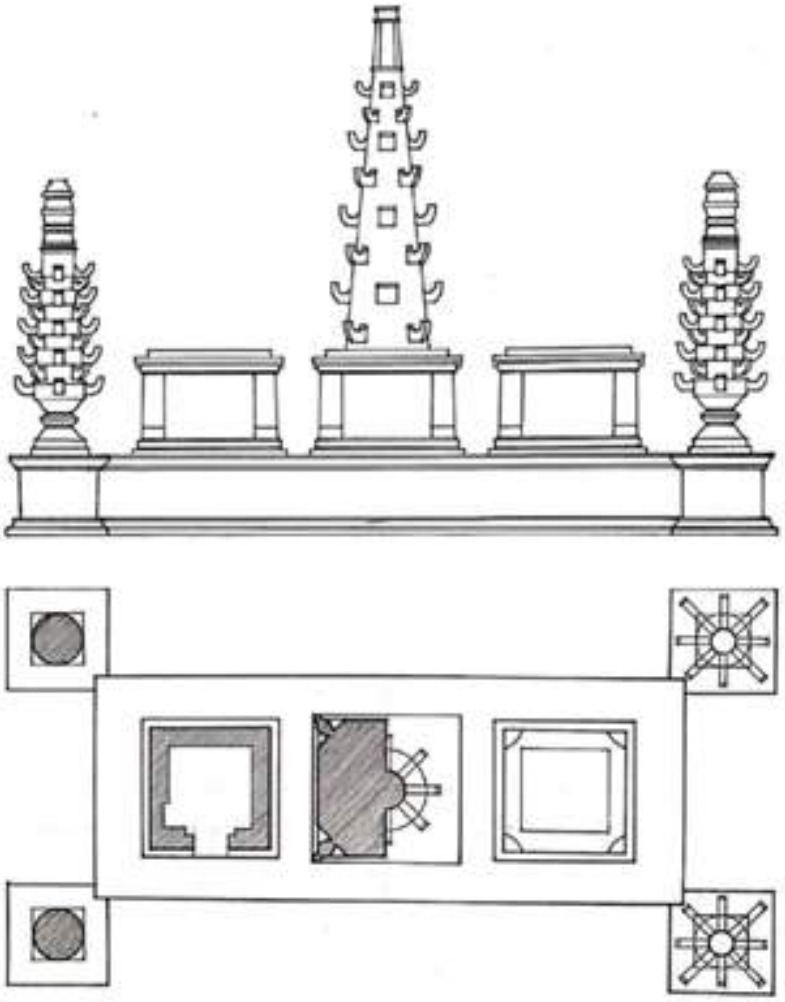
- **Sawantwadi Palace**

The Royal Palace of Sawantwadi is one of the important places politically in the history of Sindhudurg and is built by Khem Savant Bhonsle, the ruler of this region during 1755-1803. It is located in the centre of the Sawantwadi city. The laterite stone construction with Mangalore tile roof loudly speaks about the local material but the elements like arcade of Verandah with pointed arches, the windows with similar pointed arches a circular window at the top on the central opening with a pyramidal roof, the use of Quoins at the entrance speaks a mixed influence of British, Bahamani and the Maratha rule on the land. Location of Sawantwadi palace is very unique and it creates a focal point of the settlement of Sawantwadi. It's situated at an important junction and opposite to the Moti talao (lake) which takes central place of the town. The lake is surrounded by all important places of the town. MSRTC bus stand at the entrance of the town and very near from the Moti talao, fish market on one side, gymkhana ground on the

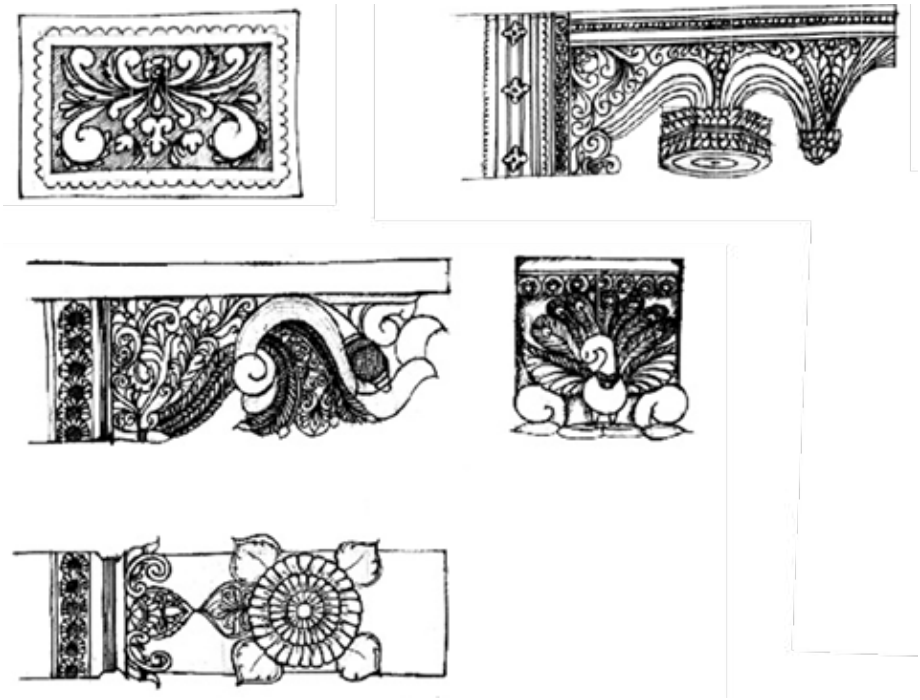
Sawantwadi

Deep stambh: Made of granite

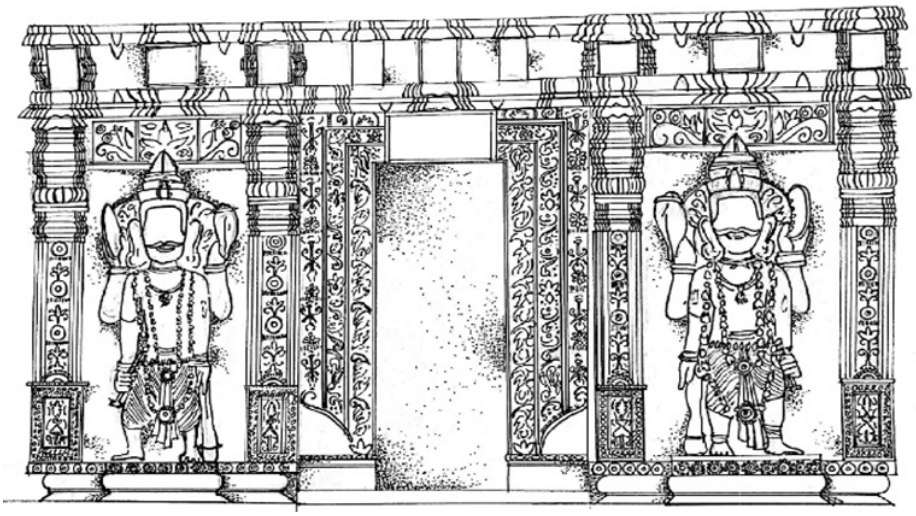
There are total five stambhs on an elevated platform with the longest at centre. The stambhs' lamp stands are beautifully carved into faces of horses, monkeys, parrots, and mythical creature. The stambhs are lit mainly during a grand festival like Ram Navmi.



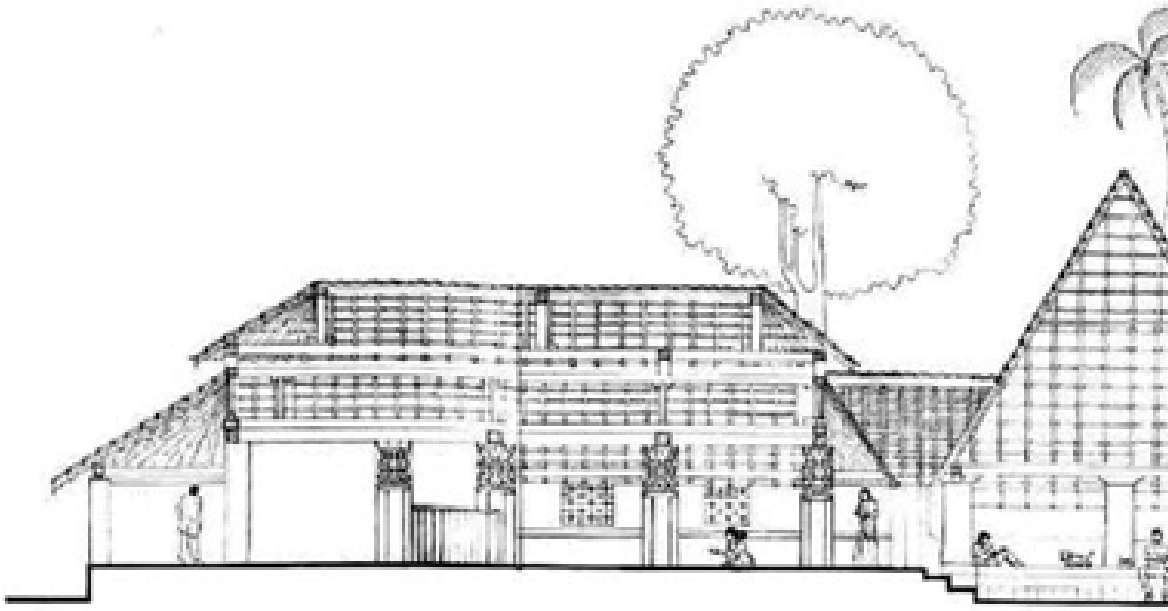
Detailed drawing of Deep Stambh

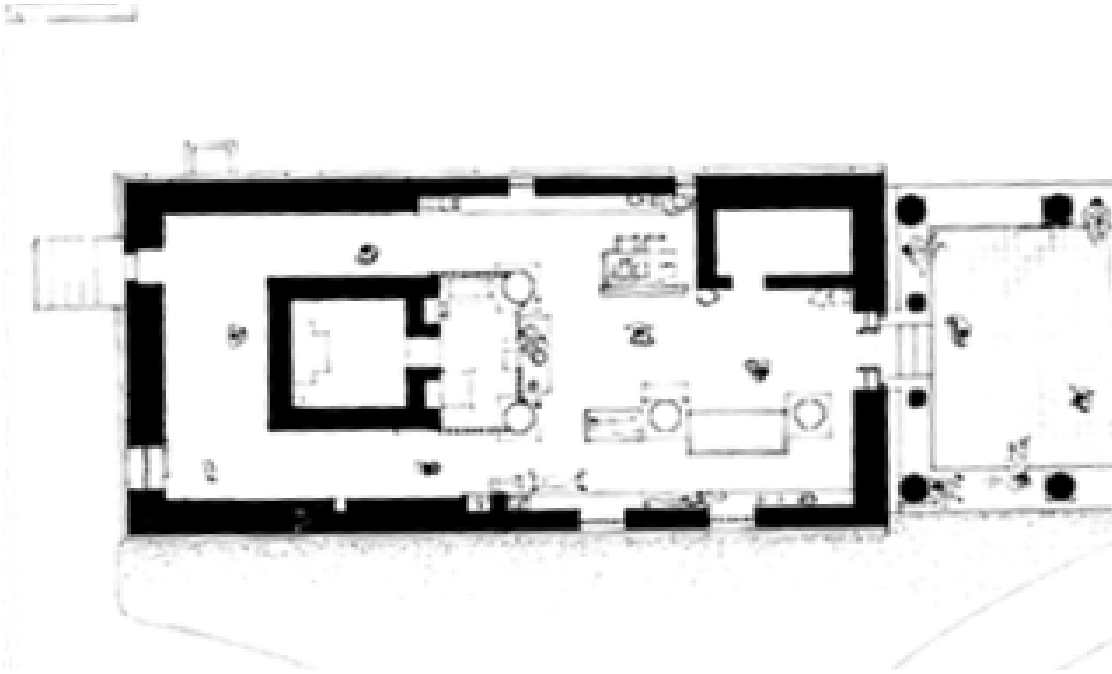


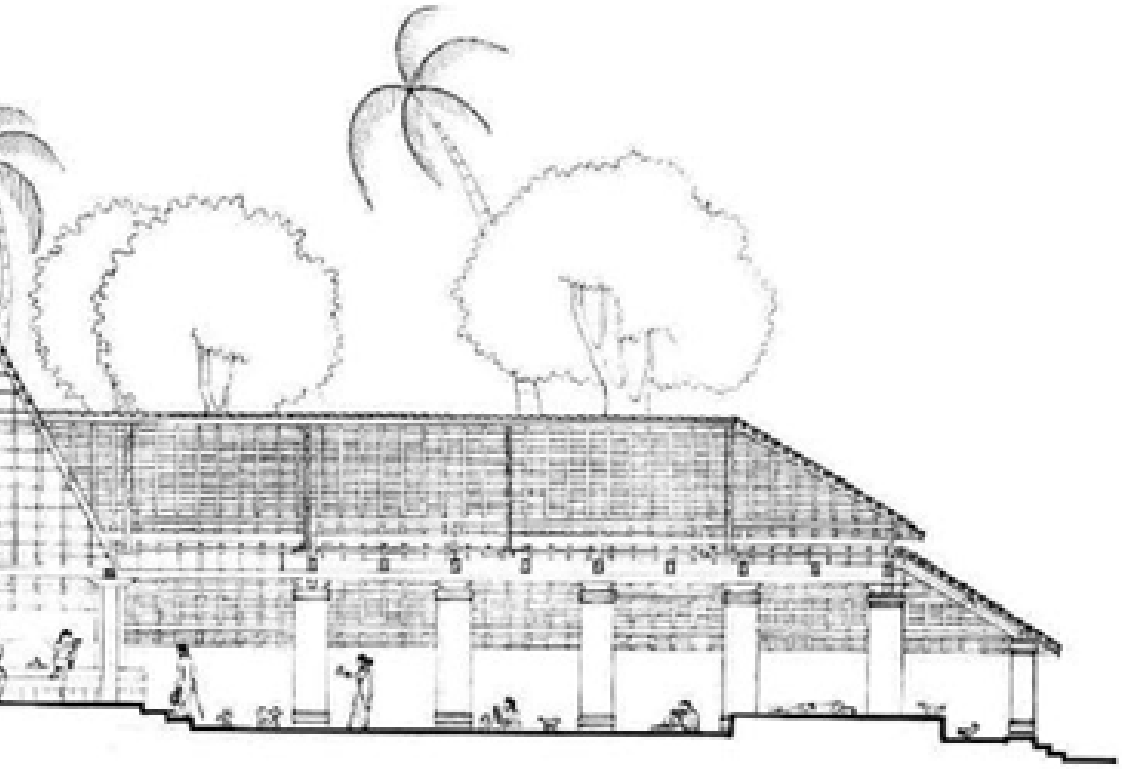
Details of Carving on brackets, columns and beams

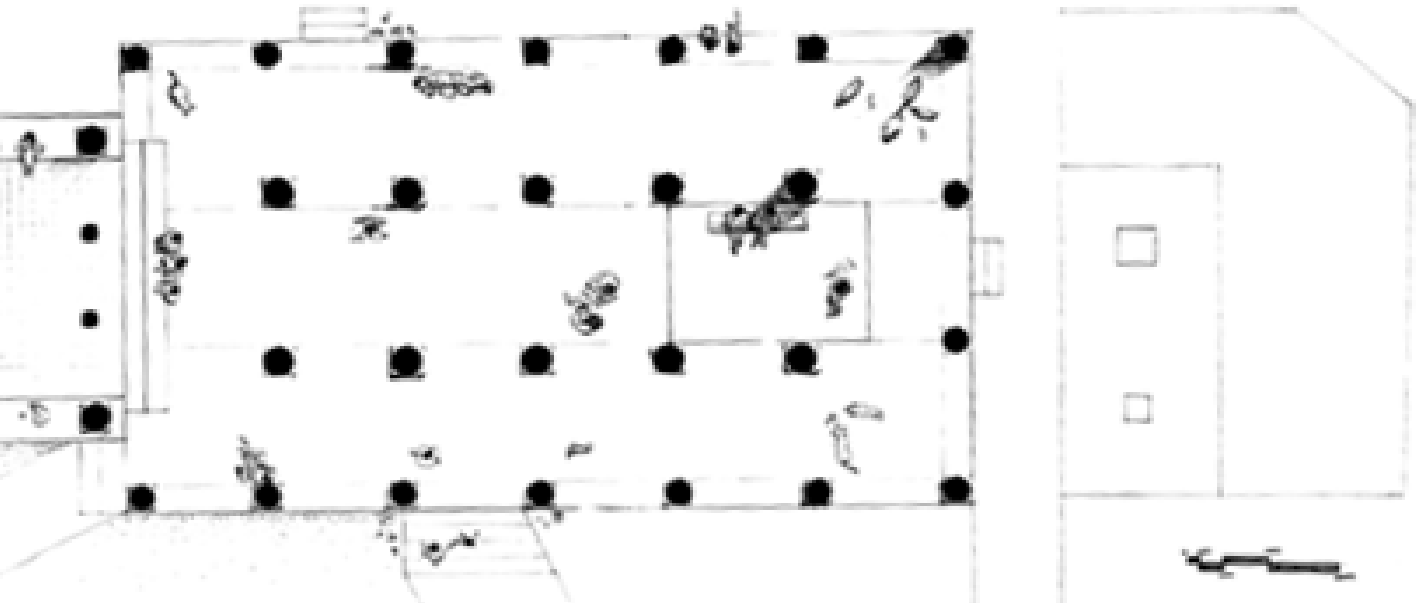


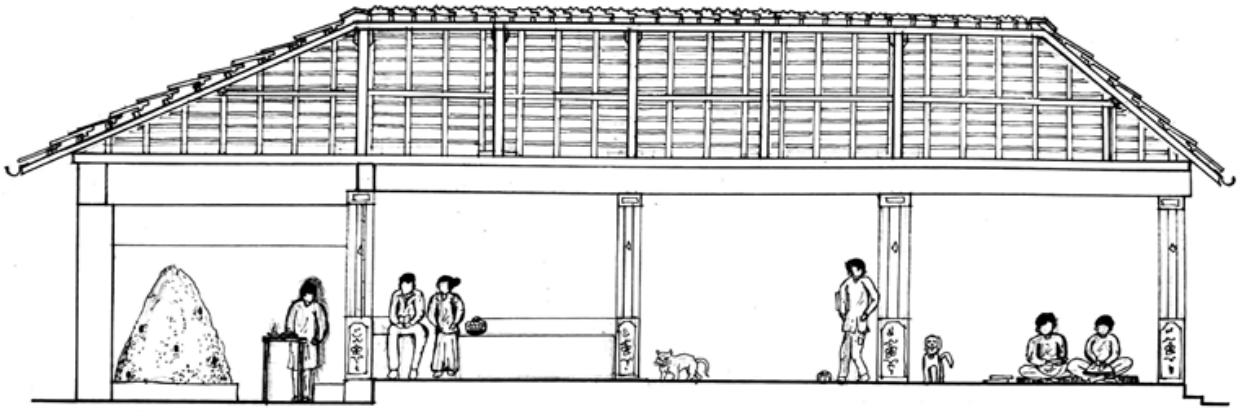
Entrance details of Garbhagriha

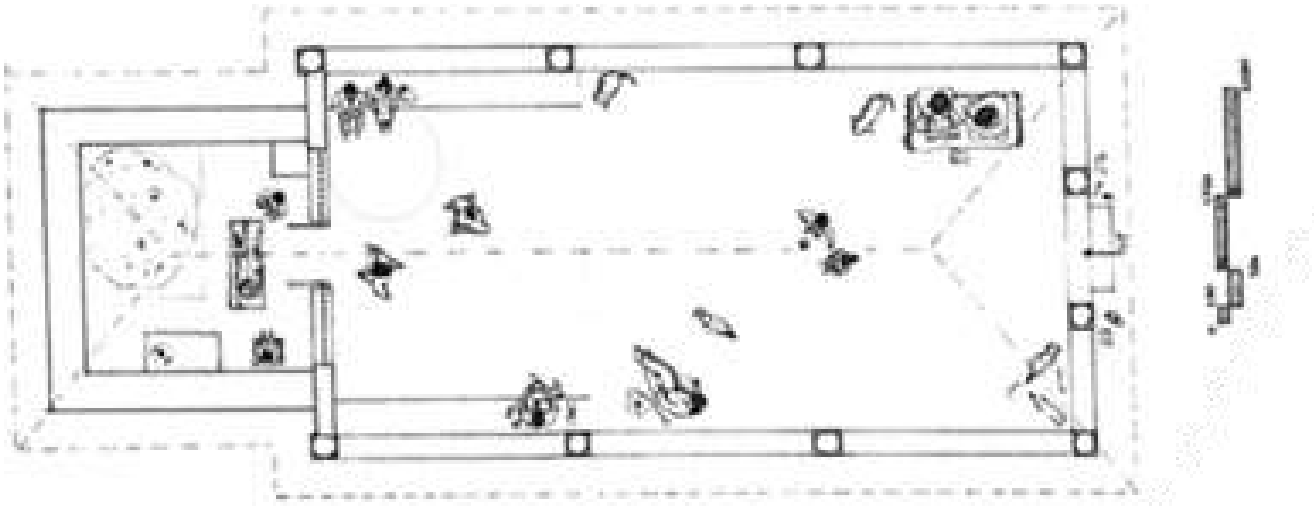


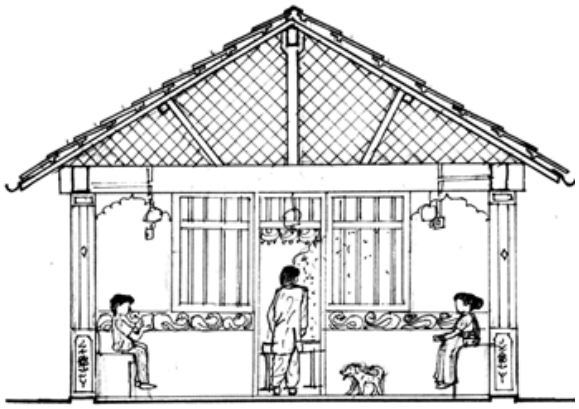


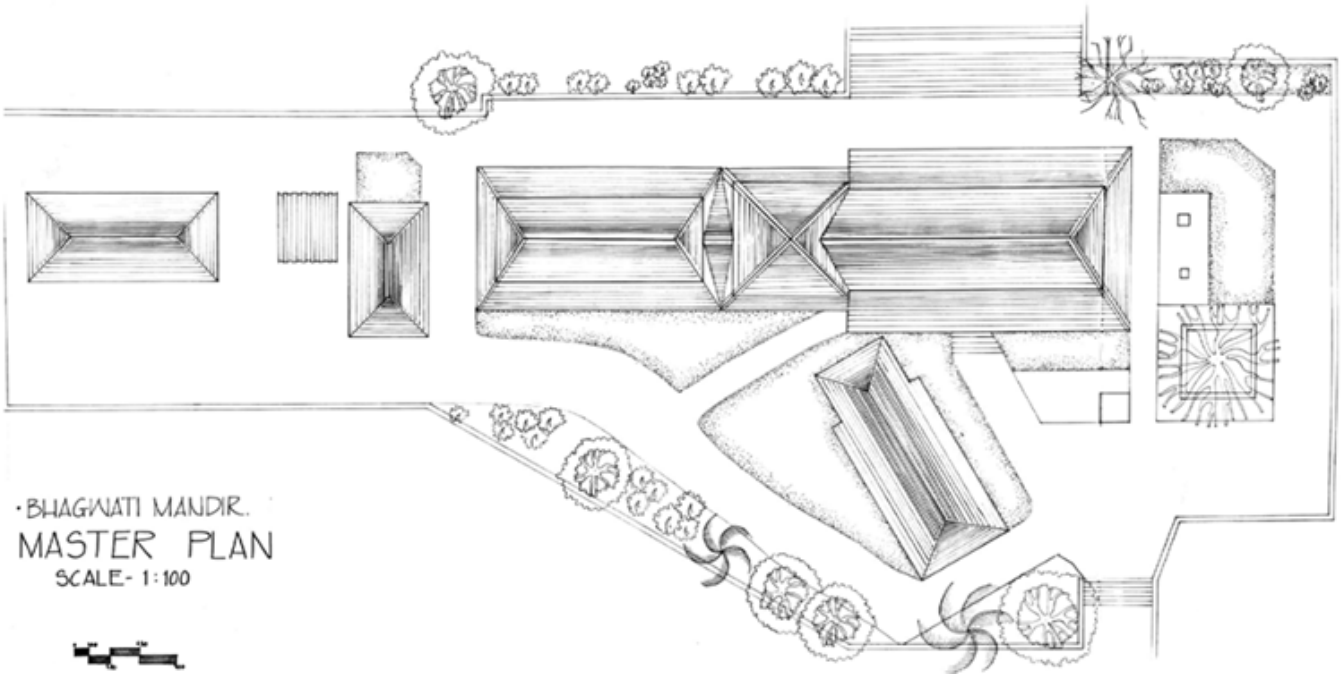








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Discourse on Lost Pages of History: Architectural Works of Vasudev Kanitkar in Western India

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Keywords: Eclectic Architecture, Colonial India, Local Contractors, Royal Engineers, Public Architecture

Abstract

Ample western historiographical resources are available to understand Colonial Architecture in India. Architectural language evolved during Colonial period in India was a collaborative effort of British Royal and Local engineers from several parts. The eclectic architectural language of British India is a product of the amalgamation of western models and eastern knowledge simultaneously. They worked in collaboration with Indian philanthropists, engineers, contractors and artisans. Much is available to read about royal engineers as pride for the British sovereign but contributions of local engineers who equally built colonial India are lost in the pages of history. This Paper tried to document and discuss works of local contractor Vasudev Kanitkar born in Baroda and worked at several places in Western India. With the help of archival resources and primary secondary surveys conducted this research paper compiles architectural contributions of Vasudev Kanitkar less known for his many landmark edifices he designed and built in western India.

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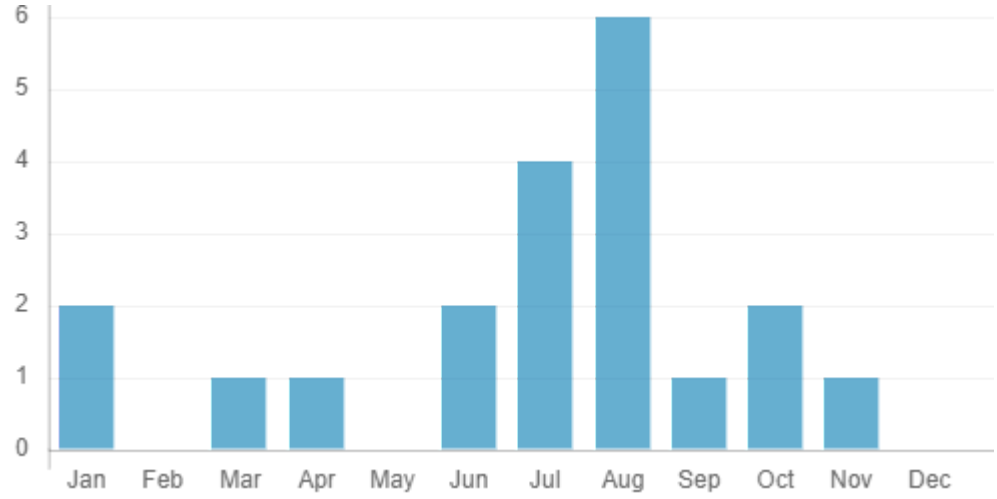
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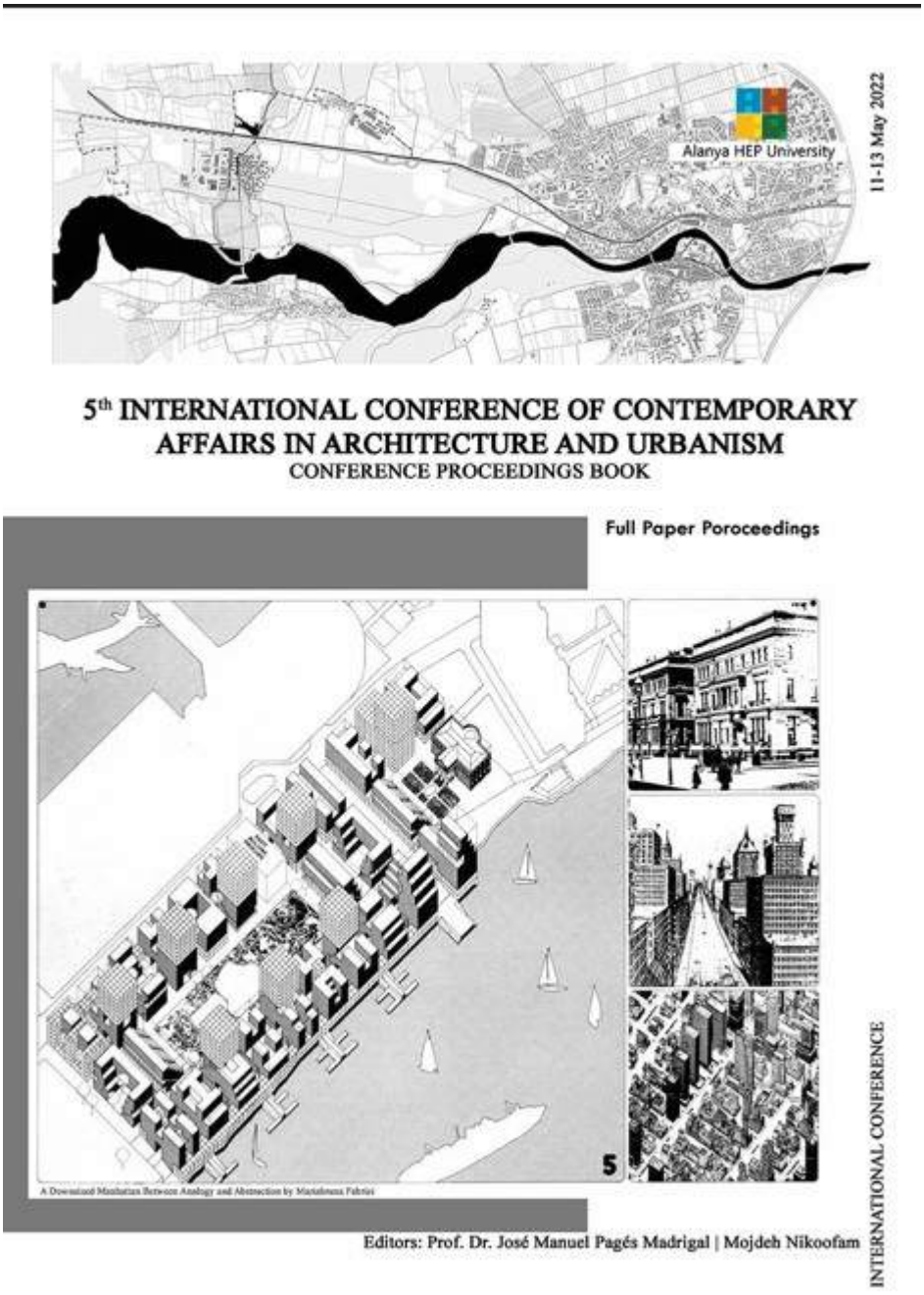
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Contents

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Redesign to Live Longer: Architecture and Mental Health

Tanya Jose Rama Raghavan
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Abstract: The spectrum of mental health is broad; it has several variables in relation to one's daily activities and interactions with the environment. However, one's physical environment is observed to affect the behavioral pattern of the user. This paper will focus on different parameters that affect the quality of life of the user. It presents a framework for experiential design that is reflective in the built environment that may enhance one's lives through a connection with the senses. Since research shows that engaging with stimulating environments yields greater mental benefits and increases longevity. In addition, with the introduction of COVID-19, the aspect of mental health has become a pressing concern, where homes have replaced workplaces, schools, gyms, where many are spending more time in them than ever before.

The intended audience are people who wish to break the boundaries of conventional dwelling norms to heighten the living experience that could potentially be a stepping stone for architects to redesign to live longer!

Keywords: *Isolation, Dwelling, Mental Health, Experiential Architecture, Sensory Stimulus.*

INTRODUCTION AND BACKGROUND OF STUDY

According to WHO definition, "health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. "While well-being is described as the state of being happy, healthy, or prosperous."

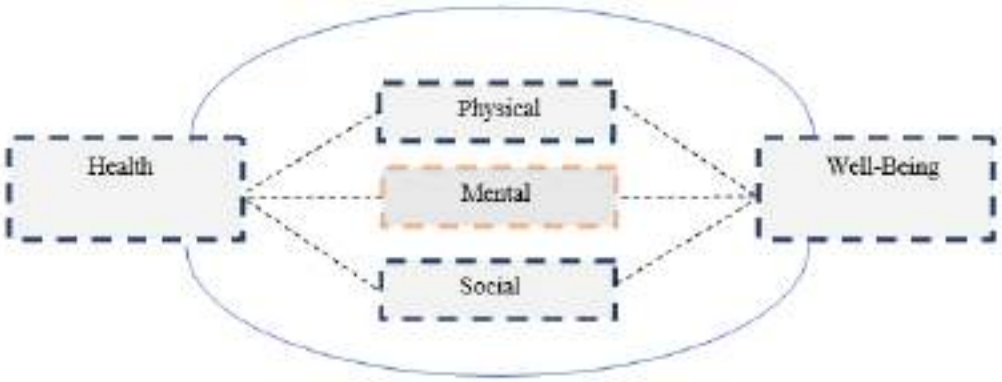

Figure 1: Relation of Health and Well-Being

It is observed often, the physical well-being has been given more priority than the mental and social wellbeing, especially in Architecture. The built Spaces do not consider the overall experience of the end-user. Moreover, the aspect of the Covid-19 pandemic has added fuel to the fire and study shows that deaths due to mental health in times of isolation have surged higher reaching an overwhelming 35% increase in India. Hence, the physical environment plays an important role in affecting the behavioral pattern of the user. The **aim** of this paper is to relate the study to the importance of the built environment with the senses and hence present a framework for designing an "optimal space" in the future based on the current scenario posed by the COVID-19 outbreak.

- **Objectives**: To study different parameters based on the Well Building standards with respect to the mind that affect the quality of life of the user.
- **Scope and Limitations of the Study:** The environments that force humans to engage stimulus in day-to-day activities, can push one to experience life exponentially by observing the world through the senses and mind. Thereby, strengthening the empirical evidence for bridging the gap between architecture and mental health and raising its priorities in both design research and design practice. However, the **limitation** of this study is that there are many

variables hence parameters to take into consideration when talking about built environment, activities and its relationship with mental health and may vary from person to person. Also pointing out that the study carried out is done in small sample sizes, not to be generalized to the wider public, and heterogeneity in parameters make it difficult to make direct comparisons between other studies.

LITERATURE REVIEW

Architects must pay more attention to the physical environment's impacts on the individual's body and mind health (Zhang, 2016) In the past, psychologists paid more attention to illness than health and happiness (Diener, 2009) Today it is more important to pay attention to improving positive emotions such as calmness, sympathy, attachment, and love in people (M. Bagheri, 2018) House quarantine has been considered as the first solution to maintain the physical health. However, this measure will threaten the mental health of people and cause problems such as boredom, stress and a sense of loneliness. (PariaAkbariaSeyed, 2021 Nov 1)The COVID-19 epidemic has underscored potential gaps in mental health services during emergencies (National Council for Scientific and Technological Development, 2020).

Architecture exerts a profound influence over our well-being, given that the majority of the world's population living in urban areas spend something like 95% of their time indoors. (Spence, 2020) While the physical structure of the house provides shelter, housing is more than a shelter, providing comfort, privacy and security, and affecting health at all levels of structure, psychology and community (S.F. Suglia, 2011) Since there were fewer studies in the field of mental health during this period, (PariaAkbariaSeyed, 2021 Nov. 1) tries to investigate the indicators of housing and mental health during the quarantine imposed by the outbreak of COVID-19, which is a significant subject for architects in relation to epidemic diseases. Placinga specific focus on some of the key physical factors (e.g., light, temperature, sound, and air quality) of indoor environmental quality that strongly influence occupant perception of built spaces, attention is also given to the value of multi-sensory variability. (Building and Environment, 2020) However, the majority of architecture tends to neglect the non-visual senses of hearing, smell, touch, and even taste. (S.F. Suglia, 2011) an experiential approach is the pursuit not of technology but of human sensual perception to invoke an animating force of design and creativity (Waterworth, 2016) Fundamentally multisensory nature of perception that one can really hope to explain a number of surprising atmospheric interactions, such as between lighting color and thermal comfort (Spence, 2020)or between sound and the perceived safety of public spaces ("Sound and safe", 2015), that have been reported in recent years.

In order to design buildings and environments that promote our health and well-being, it is necessary not only to consider the impact of the various senses on a building's inhabitants, but also to be aware of the way in which sensory atmospheric cues interact. Multisensory integration will help to explain how it is that our senses conjointly contribute to delivering our multisensory experience of space (Spence, 2020). A new framework emerges, accentuating the integration of diverse new competencies required to support the design and operation of built environments that respond to the multifaceted physical, physiological, and psychological needs of their occupants. (Building and Environment, 2020)

MATERIAL AND METHODO

A questionnaire was formulated to understand how the respective dwellings respond to the different parameters for the mind formulated by well building standards. To study the response of users living in three different typologies of houses. Interviews done in online method and offline method for 5 individuals from each of the 3 typologies based on 7 parameters namely acoustics, thermal comfort, furnishing, workspace light quality, air quality, maintenance, layout. Labelling the level of comfort in existing typologies from most desirable to least desirable on a scale ranging from 1-10.1 being least desirable whereas 10 being the most desirable rating. The response of the participants has been used to understand the correlation of the senses with the parameters. Recognizing preferences especially in times of isolation where one's mental health is affected due the monotonous lifestyle and less social interaction can lead to designs that provide an appropriate space to stay-in conditions

CONTEXT FOR THE STUD

Dwelling referred to as a building or place of shelter to live in; place of residence; abode; home. Dwellings that were initially built for spending 30% of time in a day has exponentially increased in times of Covid-19, making it crucial to move away from the present dwelling norms and build for the future. Studying the context becomes crucial since the parameters for studying the well-being can only be judged when the dwelling is studied with its context.

Maharashtra is a hotspot that accounts for nearly 22.35% of the total cases in India as well as about 30.55% of all deaths. As of 10 May 2021, the state's case fatality rate is nearly 1.49%. Pune is the worst-affected city in Maharashtra, with about 930,809 cases as of 10 May 2021 even in comparison Mumbai Metropolitan Region (MMR) that have half the cases.

In Pune, the cases of the pandemic have surged the highest in the month of May 2021 which resulted in lockdowns and more quarantine time to prevent the spread of the virus. As a result, more time at home!!

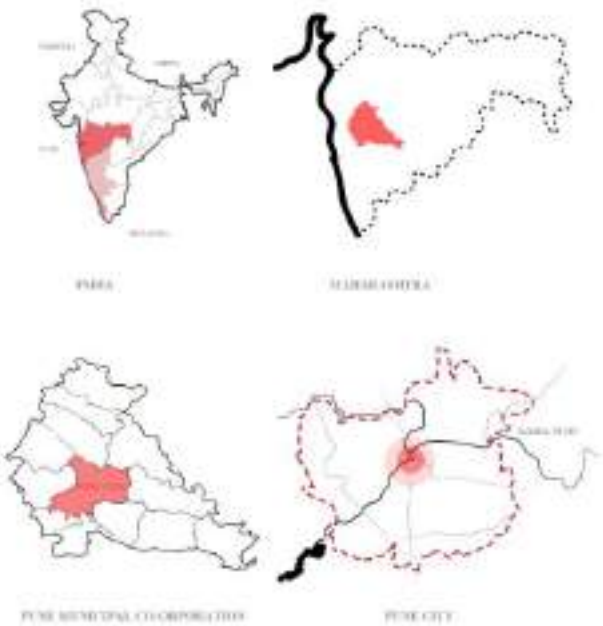

Figure 2: Most Affected Regions in India Due to COVID-19

In Pune, the Kasba Peth area have closer knit communities, densely packed with low living standards and a lack of sanitation. The houses are pressed up against one another leaving no space for circulation. This made it impossible to follow the guidelines for Covid-19 pandemic due to the pre-existing living conditions.

For the study, broadly categorizing the 3 typical layouts of dwellings namely

1. Wada
2. Apartments
3. Rowhouse.

Figure 3: Plan Showing Typology Mapping of Studied Area

1. **Row House:** The first typology is the Row house system found in both core and fringe areas of Kasbapeth. The row houses are found around the fish market near the core are built-in timber and brick.

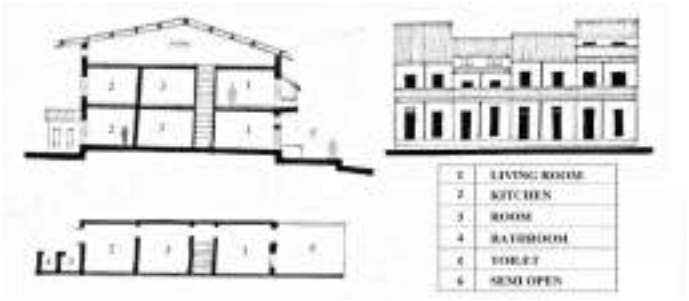

Figure 4: Plan, Sectionand Elevation of Rowhouse

2. **Wada:** Large, two or more storey, building typically with a group of rooms arranged around an open courtyard built with local materials such as bricks, limestone, and timber.

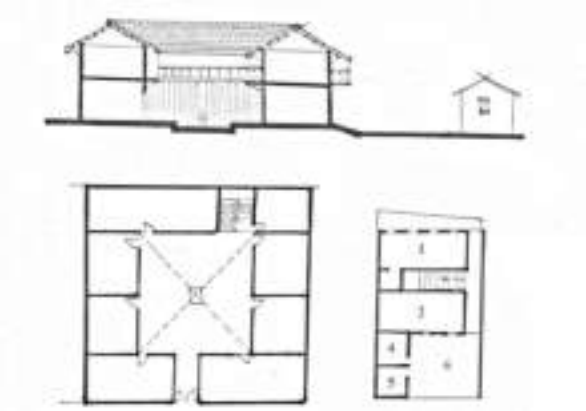

Figure 5: Plan, Section of Wada

3. **Apartments**: Towards the fringe region of this core, there are number of newer apartment systems built in RCC construction. Five to seven storey apartment buildings are found mainly in the mixed residential community the layout as shown in the Figure 6.

Sr No.	*Parameter*	*Typology*														
		Rowhouse					*Wada*					*Apartment*				
1.	Acoustics	4	6	7	9	8	3	4	5	3	3	5	4	6	5	5
		34					18					25				
2.	Thermal comfort	5	6	4	7	5	7	8	9	8	7	2	4	5	3	3
		27					39					17				
3	Furnishing	3	2	1	4	6	4	5	3	5	3	3	4	3	2	1
		16					20					13				
4	Light quality	5	7	8	6	8	7	8	8	6	7	5	4	2	4	3
		34					36					18				
5	Odour	2	3	3	1	2	3	2	3	4	5	4	6	6	4	7
		11					17					27				
6	Cleanliness	1	3	6	5	2	5	4	5	6	4	5	5	4	5	6
		17					24					25				
7	Layout	1	3	2	3	4	6	4	7	6	5	3	2	4	1	1
		13					28					11				

Figure 6: Plan, Section and Elevation of Apartments

With the new measures of quarantine and its effects on routine activities and livelihood of people. The interviews recorded shows the acknowledgement of the parameters regarding the experience of spaces during the pandemic. The following table shows the rating of individuals living in the typologies of Wada, rowhouse, apartment system based on the 7 parameters.

Least Rating Most Rating

Table 1: Rating of People of Typology against Parameter

Average Rating of desirable factor = Total Rating/Total no. of people.

1. Rowhouse = 3
2. Wada = 4.8
3. Apartment = 3

RESULTS AND DISCUSSIONS

The response recorded from the user shows the following findings. The accounted parameters can be related to the senses they effect. Moreover, conclusions that people find the well-being standard better in the Wada typology of house when considering the mind whereas the newer flat system have a lower rating. This can be accounted for the following reasons.

- **Row House:** The row house typology shows the least desirable parameter is Odour and most desirable is Acoustics. This may be accounted for due the meat market in close proximity and since its in the core and away from the main roads less noise. Hence this typology shows neglect in sense of smell and vision.
- **Wada:** The typology of Wada's shows neglect in the parameter of acoustics whereas the most desirable parameter is lighting. From the average rating of the desirable factor, it can be observed that the Wada typology has a higher rating comparable to the rest. This could be due to reason that Wadas are comparatively spacious, and due to multiple members in Wada typology more human interaction and more acoustical issues. Hence, leading to discrepancies in sense of sound, touch.

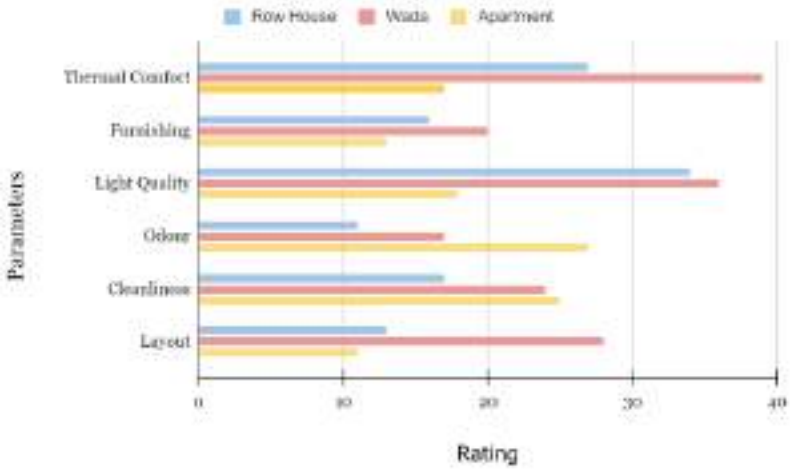

Table 2: Bar Graph Showing Rating against Parameter

- **Apartment:** In flat system, layout is shown to have the least rating and odour is most desirable in times of isolation. The most desirable and least desirable factors are very close from which one can infer that the wellbeing of people in times of isolation was the least. Since away from ground issues of odour, cleanliness comparatively lower. The reason can be again contributed to lack in parameters of light, layout, thermal comfort, and acoustics that affect sense of vision, touch.

Layout, odour are the least desirable parameters amongst the three typologies. This shows that in all the typologies combined, the sense of smell/taste and touch are neglected in the dwelling spaces of KasbaPeth. These results show that that there is a great neglect when designing dwellings with respect the senses. Because especially in times of isolation people complain about the monotony in daily activities and how the external environment is only increasing this feeling. Hence by acting on the sense of neglect according to user change can be introduced.

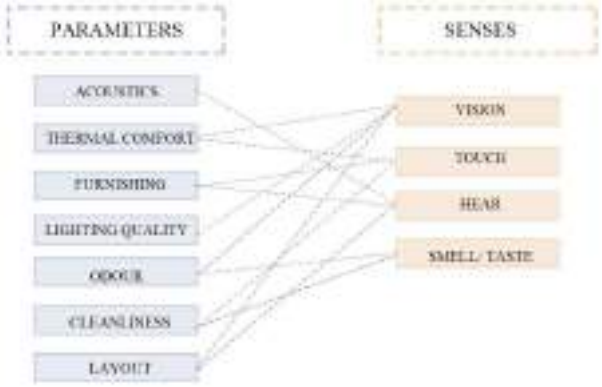

Figure 7: Correlation of Parameters with Senses

Hence, the results can help define the parameters that need to change in the future keeping in mind while designing the spaces in connection with the mind and senses. Defining the needs of the user and the context adjoining it can help understand the patterns of behavior living in order to design for the future.

NEEDS FOR

From the following study there is a need to change the way dwelling spaces are built. Since the functionality has changed in the recent years. The reason for a space being least desirable may be a result of the space not arousing any interest and this arousal ofinterestis known as stimulation. However, from research patterns of human behavior can be speculated to some extent and certain conclusions can be drawn in how the senses can stimulate to arouse interest. The aim being to create the least desirable spaces into more desirable ones and the solution being involving the senses. These research's may not be directly applicable to the built environment but thoughtful implementation to these can prove to be beneficial. This implementation of the study is experiential design that can be defined as the response to the external environment in connection with the senses to navigate across a design. Today because we are habituated to closed white boxes, the mind isn't stimulated enough hence individuals face the feeling of entrapment that hinders mental development.

However, the primitive man living amidst nature was healthier both physically and mentally. Although the times cannot be directly comparable, the environment can be credited for the healthier state of mind. The role of nature to provide stimulating environments can be applied to the built environment through experiential design. Hence, the question for architects is "How to in-cooperate experiential design in dwellings?"

- **Vision:** The human brain usually shuts off if there are more than three to four colors at a time. By having a multichromatic spaces, it awakens the brain to interact with various hues.
- **For Example:** When in a forest the different hues keep the mind aroused.
- **Application:** Patterns and symmetry represent order and helps make sense of the world around.
- **Touch**: Uneven texture and surfaces stimulate the brain to be more aware of the surrounding.
- **For example:** Interaction of the sense of touch with the uneven texture of the stones, on a hill keeps the mind stimulated.

- **Application:** Texture, temperature, as well as the weight of materials tend to influence, emotions and behavior. This explains why concrete is deemed as a brutal material, unlike wood, which evokes feelings of warmth.
- **Hear:** Certain rhythms help stay psychologically calm whereas some keep one concentrated.
- **For example:** The rain noise is great at sound masking, which makes it easier to fall asleep and remain sleeping all night long.
- **Application:** The perception of sound in built is complex however can provide subtle cues as to the proportions of a space, even hinting at its function. The context becomes essential for this sense and must be treated carefully.
- **Smell/Taste:** The nose/tongue is known to be the most powerful generator of memories. Recollection typically floods the mind with visual images associated with the specific smell.
- **For Example:** When raindrops hit the earth and interact with dirt, rocks and plants, a fragrance surge up. The scent of wet earth is called petrichor. Literally: "essence derived from stone". The smell that is deemed to be comforting for many.
- **Application:** Understanding of material is often achieved by a perception of its smell, its and by the way in which it modulates the acoustics of the space. This sense is also heavily affected by the context.

From the following study shows a set relation between the parameters with context and senses that affects the consciousness of an individual. Therefore, the key to reduce and feelings of entrapment and monotony and increase well-being is by producing stimulating environments, since it relates back to the mind.

CONCLUSION

The findings support the study determining the preferences of users in current scenario and accordingly what needs to be changed in the future considering the shift in functionality of dwellings. Due to the outbreak of COVID-19, the aspect of mental health is being hampered and needs to be given equal importance in order to design for any such unforeseen pandemics. Hence, the importance of connection with the senses for the built environment should be prioritized as a criterion among healthy house factors. According to research by the Royal Institute of British Architects shows that engaging with stimulating environments yields greater mental benefits, hence increases one's life expectancy. Thereby, the framework of experiential design may prove to be beneficial not only for creating stimulating environments for dwelling but also other built environments. The key being stimulating one's consciousness. Since at the end our awareness is a response to the external environment. This defines consciousness as "an individual's response to the built environment in order to navigate an individual across any design." Looking to the future, the hope is that architectural design practice will increasingly incorporate our growing understanding of the human senses, and how they influence one another.

Therefore, the positive impacts of experiential architecture can help to achieve a multisensory approach to articulate the relationships between architecture, senses, mental health and built environment so that we may experience the human benefits in the design applications of our own homes.

> *"The ultimate meaning of Architecture is beyond just a building it directs our consciousness back to the world and to the self and being".*
>
> ***—Juhani Pallasmma***

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Table 2: Stage 3: Cells Highlighted in Red Show which Images Gained the Maximum Votes

Age Group	*No. of Responses*	*Fig. 1*	*Fig. 2*	*Fig. 3*	*Fig. 4*	*Fig. 5*
12–18	**a:** Actual Crime Scene	3	4	5	6	9
	b	8	4	1	4	3
	c	3	7	8	5	6
	d	5	1	6	6	3
19–25	**a:** Actual Crime Scene	9	3	11	13	12
	b	5	10	1	9	7
	c	5	10	6	4	9
	d	5	3	7	7	3
26–55	**a:** Actual Crime Scene	8	4	5	4	6
	b	3	5	1	2	3
	c	2	5	5	4	7
	d	2	2	5	6	3

Source: By the author.

The result (Table 2) reveals a pattern, where participants under the age 18 and those older than 26, have partially succeeded in identifying the crime scenes—only 2 out of 5 crime scenes were chosen by majority. Majority of the participants between 19-25 years have correctly identified most of the crime scenes—4 out of 5. In this age range were 8 architectural students out of the total 16 participants. The rest were students in miscellaneous fields of study.

Looking at the overall responses (Flowchart 2), combining all the age groups, the results state that the majority have guessed the correct alleys with the criminal past—all except one (Figure 2(a)). The one crime scene which was not guessed right, was chosen by a surprisingly low amount of participants.

Expected Outcome

Stage 1 was the first impression of the participant to a certain built environment and thus captured their feelings in a raw form. No crime scene was voted as the safest on the scale by any majority. Stage 2 highlighted 5 independent physical variables in the order of preference are ‘width of alley’, ‘vegetation’, ‘land use’, ‘destination it leads to’, ‘number of windows’. Stage 3: Considering the obliviousness to locations, the crime status and the number of crime scenes (1 out of 4), the pattern of the results achieved on the other four samplings (Figure 1, 3-5) are very close to the ideal result.

Unexpected Outcome:

Stage 1 marked a majority of crime scenes under the safer categories, making the link of the fear and actual crime weaker.

Stage 2: ‘Width’ was the constant variable of this study—4m.

Stage 3: Figure 2(a) was voted very low as the crime scene, which seems to fade the link to the ideal result expected.

Justification of Findings

Stage 1 being the agent of the first impression—never saw a crime scene rated the safest, and hence justifies how there are still factors existing, preventing it to be perceived as safe. Stage 2 highlighting ‘width of alley’ as one of the most chosen independent variables—which keeps changing—can only mean that due to the adjacent building heights, the width appears to change image to image making the alley ‘congested’ or ‘open’. Stage 3: Figure 2. can help us understand that the result might have changed due to the adjacent portrayal of all the images of the sampling data—where the alley receiving the most nominations (Figure 2(b)) seems to have a consistent pattern of chosen variables (Table 1) to that of Figure 1(a)—another crime scene—the variable being ‘land use’. Hence, it can be safely stated that if there exists an alley which does not have a criminal past, but is deemed unsafe, it automatically holds potential for criminal activities.

CONCLUSION

'Width of alley' can be translated to 'proportion of height to width'—due to width being constant throughout. It is the most important physical independent variable and deciding factor of fear of crime. Through a new lens—to find the most probable crime scene within many alleys—the prediction is mostly always right owing to the variables derived while analyzing the fear of crime. Hence, fear of crime is indirectly proportionate to the actual status of crime.

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Recommendations & Scope for Future Research: From how to make an alley seem less congested than it is—by reducing the building height; to street design interventions on rear alleys, the scope in The Indian context is vast.

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Lakshmi Relating Built Environment to Crime and Peace in Alleys of Communities

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ABSTRACT: This research proposal is focused on unwinding the concept of crime and its relation to the built environment, with keeping in mind the psychological factors facilitating it. The scope of study is limited to compact 'alley-ways'—for a preferable visual frame. The methodology is to start by listing spaces with crime already committed. The independent variables are varying, which is to be solidified via survey.

This research will help in understanding the tangible criminal enablers better—that can be avoided in the planning stage itself by listing the components that need a preventive measure to be implemented. Visual surveys are to be the major tool, with a questionnaire targeting unbiased participants residing far from the space in question, to receive observational opinions. The relationship between built environment and status of violent crime committed—if any, is to be revealed as a conclusion to this study.

Keywords: *Crime, Alley, Fear, Built, Proportion, Visual.*

INTRODUCTION & BACKG

The concept of an alley can be conceived as one of the oldest forms of land for common public use, and thus one of the richest sites to understand social relationships between people (Rebecca 2019). There have been studies to understand alleys in Japan ('roji') and Shanghai ('lilong') as informal community spaces. (Ima Heidi, 2015; Non-Arkaraprasertkul, 2013). In the city of Covington, Kentucky—honey cart alleys (3 to 5 feet wide), 10 to 15 feet wide service alleys, and 20 to 24 feet center access alleys are omnipresent (Paul Voos, 1993). Hence, passing time always brought with it a new functionality for the typical 'alley-way'.

An alley is usually perceived to be a space with a negative impact—the uncertainty in management and ownership to the said shared spaces, create convenient opportunities for crime (Aiden Sidebottom, 2017). Among the locational typologies of alleys, back alleys—present in high density cities providing services for major urban blocks—are often overlooked by the urban authorities (Bin Jiang, 2017).

Research Questions asked: First of all, why is it that some spaces have more factors contributing to crime than the others? Secondly, what is the relationship of the built environment to the crime committed?

Aim: To state the relationship between built environment and the status of crime committed, considering the factor of fear.

Objective: To let observers share their unbiased opinions, which are to be analyzed to formulate a pattern.

Limitations: The concept of an 'alley' has been put into use majorly in countries outside of the Indian context. Whenever this term is taken up henceforth, the scope of the research paper is to be taken into consideration.

Scope: An 'alley', 'alleyway' or 'alley-way' when mentioned in this research paper, has been defined by its function—which is anything which provides rear access to an urban block.

LITERATURE REVIEW

Photograph surveys have been actively contributing in studying the safety of alleys in order to come up with respective preventive measures (Mona Seymour, 2010). The Likert scale can be a means to analyze the safety perceptions of a certain space via imagery—which ranges from "very unsafe (1)," "unsafe (2)," "uncertain (3)," "safe (4)," to "very safe (5)" (Bin Jiang, 2017). The methodology is to list all the visible characteristics of a photograph in order to narrow down to the most

common ones affecting the perceptive fear. Crime can be broadly categorized into—standard violent crime (homicide, criminal sexual assault, robbery, assault); property crime and non-index crimes (Erica N. Morrow, 2000). This paper limits itself to standard violent crime.

A Research Gap: As identified, there is to be a holistic understanding of tangible criminal enablers, suiting locational typologies universally. Which among the previously studied independent variables (Frances E. Kuo, 2001; Thomas D. Stucky, 2009) holds the most importance?

MATERIAL AND METHODO

The sites chosen, depend upon its status of crime. Researchers have always based the criminal mind to recurring patterns of conduct. The source of information ideally needs to be abundant—to be narrowed down to what is required for the study. Hence, unbiased information is to be prioritized. Podcasts, documentaries by third parties, video recordings by bystanders, police documents (Frances E. Kuo, 2001; Thomas D. Stucky, 2009) etc. are to be given a positive consideration. News reports, court statements, self-documentaries are to be avoided.

- ***Sources of Information:*** The notable ones were true crime podcasts (Rotten Mango, Crime Junkie), police websites (Cleveland, Ohio), video recordings by bystanders and documentaries (YouTube).
- ***Selecting the Main Case Study:*** By accessing all the sources as mentioned, 5 crime scenes (alleys) in varied geographical locations—preferably in low-crime areas (Flowchart 1) are to be listed. Rear access alleyways in the cities—New York, Sydney, Ohio, South Korea, and Moscow are chosen—also considering the abundance of Google Street Views. The alleys are all to be constant in their width—4m—always towards the rear of an urban block. This would help in the synthesis of a uniform sampling. Each crime scene is to have a distinct land use adjacent to the alleyway.
- ***Formation of the Sampling*:** Within a geographical radius of 600 m of the 5 previously collected sampling, 3 other scenes for each are to be selected—each of these abiding to the same land use as that of the original 5 scenes. They may or may not be a crime scene (Flowchart 1). It is to be noted again that their width 4 m is to remain constant throughout. The overall sampling hence consists of 5 categories of different locational and land use typologies, each having 4 sub-categories.

Flowchart 1: The Methodology

Source: By the author.

- ***Formation of the Questionnaire:*** Having formed the sampling, the questions need to direct the study to find the relationship between built mass and the status of crime committed. To holistically gain the first impression of the participants, the major questions asked were: first of all, how safe does one think a particular alley is—on a Likert Scale (Bin Jiang, 2017). Why does one think that way—independent variable(s) making up the alley personality (Paul Voos, 1993) need to be selected? Secondly, in which of the alley(s) in the figure (Figure 1–5) do you think is a crime scene?
- ***Dependent Variables:*** Crime (standard violent crime), Safety.
- ***Initial Independent Variables:*** Location, land use.
- ***Final Independent Variables:*** (To be the result of the methodology.)
- ***Constant Variables:*** The width of the alleyway—4 m.
- ***Photographic elements:*** The time of the day showcased on the crime scene is to be according to that of the crime documented. The rest of the sampling does not follow any such rule and are results of Google Street Views.

Figure 1: Commercial and Residential: Kew Gardens, New York

Source: Google Earth street views.

(a) Main case study: Tudor building
(Crime scene—Kitty Genovese murdered).
(b) 125–1231 83rd Drive (Not a crime scene).
(c) 116–17 Grosvenor Lane (Not a crime scene).
(d) 84–17 Abingdon Road (Not a crime scene).

RESULTS AND DISCUSSI

***The Questionnaire*:** A sample size of 40 participants, via Google forms. 11 of them were aged 12–18 years. 16 of them were 19–25 years. The remaining 13 fell were 26–55 years. The location of the alleys (Figure 1–5) were not revealed, to maintain unbiased opinions solely on physical characteristics. Each image went under 3 stages. The order of the questionnaire: Stage 1: Figure 1(a). Stage 2: Figure 1(a). Stage 1: Figure 1(b). Stage 2: Figure 1(b). Stage 1: Figure 1(c). Stage 2: Figure 1(c). Stage 1: Figure 1(d). Stage 2: Figure 1(d). Stage 3: Figure 1(a)-(d) so on to Stage 1: Figure 2(a), finally to Stage 3: Figure 5(a)-(d).

Figure 2: Commercial and Commercial: Mosman, Sydney

Source: Google Earth street views.

(a) Main case study: 82 Military Road
(Crime scene—Gwendolin Mitchelhill murdered).
(b) 66 spit Road (Not a crime scene).
(c) 32 Hordern Lane (Not a crime scene).
(d) 126 Kemble Lane (Not a crime scene).

Figure 3: Residential and Residential: Toledo, Ohio

Source: Google Earth street views.

(a) Main case study: 700 Utah Street
(Crime scene—David Fishbein attacked).
(b) 864 Utah Street (Not a crime scene).
(c) 542 Milton Street (Not a crime scene).
(d) 656 State Route (Not a crime scene).

Stage 1: Fear of Crime

The participants were to answer how safe an alley felt on a scale from 0 (Unsafe) to 5 (Feels the safest). Scale rating 2 and 3 are neutral values. This provides the participant with an opportunity to rethink, for an answer closer to the two extremities. The results show the actual crime scene not necessarily making a person feel the most unsafe (Table 1). For e.g., Figure 1(a) & Figure 5(a) one of the most notorious, but 14 participants (accounting to 35% of the total) rated it a 4 out of 5—safer than neutral. But there is a factor keeping the crime scenes from being rated the safest.

Figure 4: Agricultural and Agricultural: Hwaseong-si, South Korea

Source: Google Earth street views.

(a) Main case study: Ridge between paddy fields
(Crime scene—Lee Kyu-sook murdered).
(b) Ridge between paddy fields (Not a crime scene).
(c) Ridge between paddy fields (Not a crime scene).
(d) Ridge between paddy fields (Not a crime scene).

Figure 5: Residential and Open Spaces: Academicheskaya, Moscow

Source: Google Earth street views.

(a) Main case study: Tudor building
(Crime scene—Natalia Pronina murdered).
(b) Same neighborhood (Not a crime scene).
(c) Same neighborhood (Not a crime scene).
(d) Same neighborhood (Not a crime scene).

Table 1: Stage 1, Stage 2: Cells Highlighted in Green Showcase the Most Popular Choice

No. of responses	**Figure 1 (Commercial & Residential)**						
	0 (Feels unsafe)	**1**	**2**	**3**	**4**	**5** (Feels the safest)	**Independent variables affecting Fear of Crime**
a: Actual Crime Scene	1	2	7	8	14	8	Type of adjacent building (50%)
b	0	2	5	11	14	8	Type of adjacent building (47.5%), No. of windows adjacent (35%)
c	1	5	9	16	6	5	Type of adjacent building (52.5%)
d	0	7	6	12	11	4	Width of alley (42.5%), Vegetation present (30%)
No. of responses	**Figure 2 (Commercial & Commercial)**						
	0 (Feels unsafe)	**1**	**2**	**3**	**4**	**5** (Feels the safest)	**Independent variables affecting Fear of Crime**
a: Actual Crime Scene	2	3	4	11	11	9	Type of adjacent building (50%), Width of alley (50%)
b	0	3	4	4	8	21	Width of alley (72.5%)
c	1	14	8	9	5	3	Width of alley (57.5%)
d	3	4	9	12	7	5	Width of alley (62.5%)
No. of responses	**Figure 3 (Residential & Residential)**						
	0 (Feels unsafe)	**1**	**2**	**3**	**4**	**5** (Feels the safest)	**Independent variables affecting Fear of Crime**
a: Actual Crime Scene	5	6	8	10	5	6	Vegetation (87.5%)
b	1	3	2	2	11	21	Type of adjacent building (72.5%)

c	7	10	10	6	5	2	Width of alley (62.5%)
d	5	5	3	8	12	7	Type of adjacent building (55%)
No. of responses	**Figure 4 (Agricultural & Agricultural)**						
	0 (Feels unsafe)	**1**	**2**	**3**	**4**	**5** (Feels the safest)	**Independent variables affecting Fear of Crime**
a: Actual Crime Scene	4	3	7	10	9	7	Destination it leads to (60%)
b	0	5	8	12	10	5	Vegetation (70%)
c	4	14	7	6	9	0	Destination it leads to (55%)
d	6	5	8	7	10	4	Destination it leads to (72.5%)
No. of responses	**Figure 5 (Residential & Open)**						
	0 (Feels unsafe)	**1**	**2**	**3**	**4**	**5** (Feels the safest)	**Independent variables affecting Fear of Crime**
a: Actual Crime Scene	2	4	6	11	14	3	Vegetation (60%)
b	8	8	11	5	5	3	Type of adjacent building (47.5%), Width of alley (47.5%)
c	3	12	9	9	4	3	Vegetation (55%)
d	8	9	6	8	5	4	Vegetation (80%)

Source: By the author.

Stage 2: Independent Variables Affecting Fear.

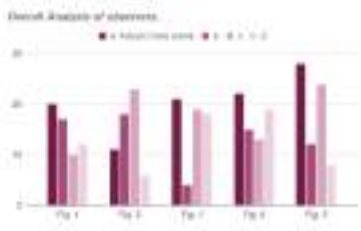
Every important physical variables as proved to be important to the personality of the alley (Paul Voos, 1993) were to be listed. The most appropriate and impulsive option led to them rating the same places either positively or negatively in Stage 1 (Table 1). For example, Figure 1(a) being rated one of the safest places was justified with the presence of commercial buildings adjacently—Figure 4(c) being rated as one of the least safe alleys was because of the destination it led to.

Due to the availability of choosing more than one options, 'width of alley' was chosen 158 times. 'Vegetation'—153 times. 'Type of adjacent building'—150 times. 'Destination it leads to' in case of Figure 4(a)-(d)—75 times. 'No. of windows adjacent'—14 times. These variables make up to more than 50% of the responses, of each image in *Figure 1–5*, and thus are the only ones highlighted.

There was an option to write extra observations. For Figure 1(a) one mentioned how the open space (parking) on the opposite side was uncomfortable. "Only because there are commercial spaces below, the space looks safe; it they weren't there, the heights would be scary", said another. For Figure 4(c) one participant said how the area seemed so dry, and hence added to the discomfort—whereas one person stated how the nets and fencing links the scene to recent human activity, making it seem safe. These were in line with physical attributes, hence hinting a direct link of built environment to the fear of crime.

Stage 3: Crime Scene Predictions

The third stage evaluates the predictions of the different age groups—ranges: 12–18 years; 19–25 years; 26–55 years—where all four images of Figure 1–5 are placed adjacent to each other, and they are asked to guess the crime scene(s).



Flowchart 2: Stage 3: Overall Responses

Source: Author.

Table 2: Stage 3: Cells Highlighted in Red Show which Images Gained the Maximum Votes

Age Group	*No. of Responses*	*Fig. 1*	*Fig. 2*	*Fig. 3*	*Fig. 4*	*Fig. 5*
12–18	**a:** Actual Crime Scene	3	4	5	6	9
	b	8	4	1	4	3
	c	3	7	8	5	6
	d	5	1	6	6	3
19–25	**a:** Actual Crime Scene	9	3	11	13	12
	b	5	10	1	9	7
	c	5	10	6	4	9
	d	5	3	7	7	3
26–55	**a:** Actual Crime Scene	8	4	5	4	6
	b	3	5	1	2	3
	c	2	5	5	4	7
	d	2	2	5	6	3

Source: By the author.

The result (Table 2) reveals a pattern, where participants under the age 18 and those older than 26, have partially succeeded in identifying the crime scenes—only 2 out of 5 crime scenes were chosen by majority. Majority of the participants between 19-25 years have correctly identified most of the crime scenes—4 out of 5. In this age range were 8 architectural students out of the total 16 participants. The rest were students in miscellaneous fields of study.

Looking at the overall responses (Flowchart 2), combining all the age groups, the results state that the majority have guessed the correct alleys with the criminal past—all except one (Figure 2(a)). The one crime scene which was not guessed right, was chosen by a surprisingly low amount of participants.

Expected Outcome

Stage 1 was the first impression of the participant to a certain built environment and thus captured their feelings in a raw form. No crime scene was voted as the safest on the scale by any majority. Stage 2 highlighted 5 independent physical variables in the order of preference are ‘width of alley’, ‘vegetation’, ‘land use’, ‘destination it leads to’, ‘number of windows’. Stage 3: Considering the obliviousness to locations, the crime status and the number of crime scenes (1 out of 4), the pattern of the results achieved on the other four samplings (Figure 1, 3-5) are very close to the ideal result.

Unexpected Outcome:

Stage 1 marked a majority of crime scenes under the safer categories, making the link of the fear and actual crime weaker.

Stage 2: ‘Width’ was the constant variable of this study—4m.

Stage 3: Figure 2(a) was voted very low as the crime scene, which seems to fade the link to the ideal result expected.

Justification of Findings

Stage 1 being the agent of the first impression—never saw a crime scene rated the safest, and hence justifies how there are still factors existing, preventing it to be perceived as safe. Stage 2 highlighting ‘width of alley’ as one of the most chosen independent variables—which keeps changing—can only mean that due to the adjacent building heights, the width appears to change image to image making the alley ‘congested’ or ‘open’. Stage 3: Figure 2. can help us understand that the result might have changed due to the adjacent portrayal of all the images of the sampling data—where the alley receiving the most nominations (Figure 2(b)) seems to have a consistent pattern of chosen variables (Table 1) to that of Figure 1(a)—another crime scene—the variable being ‘land use’. Hence, it can be safely stated that if there exists an alley which does not have a criminal past, but is deemed unsafe, it automatically holds potential for criminal activities.

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CONFERENCE PROCEEDINGS

A COMPILATION OF ABSTRACTS

Cover photo: Galena Illinois View of Town, drawing by Robert Birkenes @Fine Art America

Editors: Assoc. Prof. Dr. Hourakhsh Ahmad Nia
Assoc. Prof. Dr. Rokhsaneh Rahbarianyazd

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CONFERENCE PROCEEDINGS

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Municipality of Alanya

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Applying the Phenomenological Approach to Educational Place: A Case Study Analysis of a College Experience through Time

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Abstract
Applying the phenomenological approach to architecture relies on integrating human experiences and sensory aspects into the designed space, materials, and light to create a place that has a lasting impact on the memory in the human mind. This experience can change if the person experiences the space at a different time. This case study focuses on some students' sensory experiences of the college of engineering at the university of Bahrain who attended college during their academic years and then visited it after a long detachment period. This study relies on interviews with the students focusing on their previous and actual college experience to discover the changes in the experience of the same space through different times. The results are promising and showcase that mental images have changed, and students' attachment has become more substantial due to detachment and time.

Keywords: Phenomenology; Educational Place; Case Study; Sensory Experience; Analysis.

Manuscript ID: ICCAUA2023EN0146

Using a Phenomenological Approach for the Analysis of Two Different Houses in Bahrain

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Abstract
Phenomenological practices in the design process will create the quality of spaces where the users will feel a sense of place and will last in their memory. Furthermore, it will encourage the user to revisit the place in contrast with the places not achieving a phenomenological approach. Through a phenomenological approach, this study aims to investigate the bodily and sensory experiences of the users in two different houses in the kingdom of Bahrain. The first selected house is one of the cultural heritage sites located on the String of pearl bath, specifically in the old city of Muharraq. The second house is a contemporary one, located in Sharq al Hid, designed by one of the authors. The findings of this analysis are promising.

Keywords: Sensory; Experience; Bodily; Heritage; Culture; Phenomenological; Senses.

Manuscript ID: ICCAUA2023EN0158

Evaluation of the Energy-Positive Aspects for Optimal Construction Efficiency through Material Realism

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Abstract
Developing upon the tenets of SDG 7 and SDG 11, this paper studies the relationship between materials used in 21st-century construction and their characteristic scope for energy-positive application in the housing sector against criterias of 'optimal construction efficiency through material realism' (OCEMR). On account of climate change being grossly influenced by the construction sector and both further decrementing affordability in housing, there is a need to study the optimum construction efficiency of a material by studying its many aspects to encourage a realistic reduction in energy consumption, and a realistic increase in energy generation. The proposition of a gradation (OCEMR) is analyzed and later formulated based on material choice, regionality of materials, mode of application of materials, alternative technology, material lifecycle studies, etc. The mentioned factors are deduced through case studies which show a co-variation between the factors for gradation but an informed co-relation between optimized energy efficiency.

Keywords: Energy Positive; Climate Positive; Optimum Efficiency; Construction Materials; Optimization.

Manuscript ID: ICCAUA2023EN0156

Installation of Photovoltaic Panels on Historic Buildings and Heritage Areas: Lessons to Learn and Consideration for North Cyprus

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Abstract
The preservation of heritage areas and historic buildings and the adoption of new technology to reduce energy losses in these buildings are simultaneously crucial. In different cities all over the world, the installation of photovoltaic panels (PV panels) on historic buildings has expanded recently. In this study, the standards for installation and collaboration between PV panels, historic buildings, and heritage areas are reviewed, ten famous historic monuments that use PV panels are studied, and the main impacts, effectiveness, risks, and benefits of installing PV panels in heritage areas are investigated. Finally, the possibility, risks, and benefits of installing PV panels on historic buildings and considerations for collaboration between heritage areas and PV panels in accordance with North Cyprus conditions are discounted. Some recommendations are then made to enhance a planning guide for PV panel installation regulations for historic buildings in North Cyprus.
Keywords: Heritage Areas; Historic Buildings; Installation; North Cyprus; PV Panels.

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Religious Territorialism through Architecture: Parametrizing a Dynamic Trend of the Third World

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Abstract
'Territorialism', 'Architectural Territorialism' and 'Religious Territorialism through Architecture' (RTTA), all implicate the voluntary or involuntary act of territorializing other communities, a noticeable trend for centuries. The hypothesis is explored along Warburton's principal argument on origins, spatiality, and transformative capacity of religious architecture. The discussion is most relevant to the third world scenario, especially India. The paper deals with understanding the trends on local, national, and global scales through court jurisdictions, books, official documentation, and research to plot the variety of factors that influence religious territorialism through architecture in India and the third world countries. Post-identification of the parameters, they are mapped on a thematic map, against their degrees of dependency and co-dependency to transparentize the trend. It is concluded that RTTA is dynamic by nature as a result of the parameters being influential on varying degrees, consequentially sensitizing communities in different ways.
Keywords: Territorialism; Religious Architecture; Warburton's Principles; Architectural Territorialism.

Manuscript ID: ICCAUA2023EN0165

Reflections of the Memories: A Microhistory on Konak Atatürk Square, İzmir, 1960-70s

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Abstract
The spaces can be described by the experiences of real characters who lived in that period. In this study, the spatial relations of İzmir Konak Atatürk Square and its surroundings are explained and the reflections of the social and cultural life on the urban and architectural environment are revealed. This study emphasizes the architectural and interior values of the main buildings that give the Konak Atatürk Square its identity and some important public spaces in the city in 1960-1970. The method includes a literature review, photographic examinations, and oral history studies. Spatial stories will be created based on the data obtained and the memories of the characters who lived in the city. The study, which connects people's memories and archival documents through spatial storytelling, creates a different urban story from the past to the present by focusing on microhistory.
Keywords: Urban Narrative; Social and Cultural History; Urban Memory; Konak Atatürk Square; İzmir.

Manuscript ID: ICCAUA2023EN0217

Nigerian Worship Space Based on Religion Culture in North Cyprus

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Abstract
Nigerians are greatly influenced by their cultural heritage, when Christianity came to Nigeria in 16th century continent some cultural practices like the use of herbs, African musical and instruments stopped and new religion culture took over in Nigeria which concern about simplistic in space and dance pray music mix with Christian religion till this moment. Frustration with the socio-economic conditions of the country, along with high unemployment rates, has increased emigration from Nigeria come to north Cyprus for education and have better life, most of Nigerians have strong religion believe so Nigerian follow their religion culture in north Cyprus. The aim of this paper is how Nigerian religion culture effect on worship space in north Cyprus. The study will be describing how Nigerian create worship space based on their culture. mythology compose mixed methods qualitative and quantities research and using observations, interviews with Nigerian who are members of the church and other data sources collected in the field.
Keywords: Nigerian; Religion Culture; Space; Worship.

Manuscript ID: ICCAUA2023EN0221

A Critical Review on the Effect of Gender on Architectural Spaces

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Abstract
This paper, mainly examines the effect of gender on architectural spaces with the case of collective houses, firstly appear in North European countries; Denmark, Sweden and North Germany through the history of architecture, around 18th and early 19th century. The main reasons for the birth of collective dwellings has been researched by Dune Vestbro and Dolares Hayden studies, which both academician indicated the necessity for collective dwellings came forward with the beginning of women to work in industry, and to create democracy inside the house for both women and man. The changes on social structures after industrial revolution, created a grand domestic revolution, as indicated by Dolares Hayden; at her book 'Grand Domestic Revolution' she especially expresses the functional changes in physical structures, was a result of to relocate domestic activities so as to free females from unpaid, household labor. Shared spaces created the main spatial revolution on domestic architecture at industrial revolution time.
Keywords: Collective Houses; Working Class Women; Gender & Space; Spatial Transformations.

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Evaluation of Existing Slum Dwellings in Urban Settings to Meet the UN SDG Goals

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Abstract
Over the past two decades, urban environmental quality has declined, and slums are seen as the primary concern. Despite numerous slum upgrading strategies to address urban poverty in developing countries, the issue is only projected to get worse. The lack of sustainable slum redevelopment guidelines in India is a policy gap that needs to be addressed. To make sure that the upcoming LIG housing stocks are sustainable, a logical design and planning approach is required to address climate change and the Sustainable Development Goals. This paper focuses on the study and analysis of existing slum dwellings and their living conditions, and from the observations of the study, it aims to propose recommendations for creating sustainable and sensitive redevelopment. As part of a new approach for slum upgrading projects to meet SDG objectives, it will also investigate the criteria required to construct climate-responsive urban dwellings that are closer to Net-Zero Buildings.
Keywords: Sustainable Development; Slum Redevelopment; UN SDG; Climate Responsive; Urbanization.

Alanya University

14-16 June 2023

6th INTERNATIONAL CONFERENCE OF CONTEMPORARY AFFAIRS IN ARCHITECTURE AND URBANISM

CONFERENCE PROCEEDINGS

A COMPILATION OF ABSTRACTS

Cover photo: Galena Illinois View of Town, drawing by Robert Birkenes @Fine Art America

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INTERNATIONAL CONFERENCE

CONFERENCE PROCEEDINGS

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Introduction

The *6th International Conference on Contemporary Affairs in Architecture and Urbanism* is organized by Alanya University with the collaboration of the International University of East Africa and the Journal of Contemporary Urban Affairs. ICCAUA 2023's mission is to bring together leading academic scientists, researchers and research scholars to exchange and share their experiences and research results about all aspects of the contemporary concerns, methods and approaches to architecture and urbanism. It also provides the premier interdisciplinary forum for researchers, practitioners and educators to present and discuss the most recent innovations, trends, concerns, practical challenges encountered and the solutions adopted in the field of Architecture and Urbanism.

Accordingly, the conference brings together all the theories, manifestos and methodologies on contemporary architecture and urban spaces to raise the understanding for the future of architectural and urban planning. Overall, the conference aimed to establish a bridge between theory and practice in the built environment. Thus, it reports on the latest research findings and innovative approaches, methodologies for creating, assessing, and understanding contemporary built environments.

A broad outline of the conference's scope includes peer-reviewed original research articles, case and technical reports, reviews and analyses, papers, and short communications. This conference proceeding is the combination of scholars, practitioners, professionals, researchers and policymakers with a common interest in the field of architecture and urban design from different disciplines, such as Art, Architecture, Landscape, Urban planning and Urban Design. The scopes of this conference include:

Architecture and Technology
Environmental Sustainability
Smart Buildings
Smart Skin, envelope, Buiding facade
Green Architecture and Urban Planning
Climate and building
Climate Change Adaptation
Interior Architecture
Architectural History and Theory
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Education
Artificial Intelligent (AI)
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Sustainable Urban Development
Smart City, Digital Age
Urban ecology
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Disaster Risk Management

Urban Sprawl
Healthy and Productive Economy
Chemicals, Waste and Air Quality
The Urban and architectural philosophy
Landscape
Social and behavioural studies
Public Places Urban Spaces

Heritage and Cultural Landscapes
Revitalization
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Cultural studies
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Urban Identity, Authenticity
Tourism Management Perspectives
Archaeology, Reconstruction and Restoration
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Computer and Digital Applications
Space and Place Studies

Habitat Studies / Infra Habitation
Infra Habitation
Emerging cities
Gated communities
Conflict and divided territories.
Slums
Affordable houses.
Resilience, Disaster and Conflicts
Pandemic and disease management
Vernacular studies
Agricultural Studies
Housing Studies
Demographic studies
Rural Studies

Salutogenic Architecture
Public Health
Beyond health Architecture
Visual Comfort
Wellbeing in architecture and built environment
Healing Environment
Aesthetic Design and Health
sustainable acoustic design system
Thermal comfort
Comprehensibility in architecture
Indoor air quality
Manageability in architecture
Meaningfulness in architecture
Sick Buildings

Civil Engineering
Theoretical and Advanced Technology of Engineering Structures
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Keynote Speakers' Self-Biography

Prof. Dr. Masi Mohammadi is an experienced scientist with a demonstrated history of working in higher education and collaborating with industry. Skilled in health architecture, smart living, and public and academic (keynote) lectures, she heads two chairs, Smart Architectural Technologies (Eindhoven University of Technology) and Architecture in Health (HAN University), in the Netherlands. Her research program, Empathic Environments, explores the basic and applied mechanisms of how socio-technological developments influence our living environment and how those are shaped by architecture. Her research has been carried out in various real-life projects throughout the Netherlands. As such, she is the Scientific Director of the DEEL Academy, a national joint venture between several universities, citizen initiatives, housing associations and care organisations in the Netherlands. She also performs as a member/chair of several (editorial) boards and research networks.

Prof. Dr. Islam El Ghonaimy did the honors of setting forth the consultation services in City Urban Planner for TEAM International office, Iraq - Kurdistan Region, 2012-2016. And as urban consultant for World Institute for Development Economics Research of the UNU-WIDER, Helsinki, Finland on 2007 & 2012 and as City Development Strategy Consultant, for World Bank projects with Arab Urban Developing Institute(AUDI), Arab Towns Organization, Riyadh, SA Academically, in 2000 he has been accredited the Doctoral of philosophy degree. Formerly, in 1995 he has been approved the M.Sc. and B.Sc. of Architect on 1988 In 2014, he was assigned to hold down a professor rank by High commission of Universities in Egypt. has been affiliated as moderator for the academic program for many universities. Since 2012, he has been affiliated with the University of Bahrain, College of Engineering, Department of Architecture and Interior Design and External reviewer in Higher Education for many universities in Gulf Region.

Prof. Dr. Aykut Karaman is graduated from Istanbul Mimar Sinan Fine Arts University, Department of Architecture in 1973. Earned PhD degree in architecture from University of Pennsylvania in 1983 specialized in Urban Design. Taught Urban Design Theories and Studios at Faculty of Architecture at Mimar Sinan Fine Arts University (MSFAU) 1984-2014. He was head of the department of City and Regional Planning and Urban Design at MSFAU. Director of the Urbanism Research Center of MSFAU. Designed several neighborhood units, university campus and won Urban Design Competition in İstanbul. He is the author of Site Management Plan of Aphrodisias Ancient City (2014 -2018) and co-author of Site Management Plan of Istanbul Historical Peninsula heritage area (2008-2012). Presently teaches at Istanbul Altınbas University Department of Architecture and postgraduate program Cyprus Near East University Department of Architecture. His areas of specialty and publications includes theories and principles of urban design, urban morphology, urban heritage management plans, urban regeneration and ecological planning and design, design methods.

Dr. Paolo De Martino is a researcher at Delft University of Technology (TU Delft) and PostDoc at Venice University IUAV. He moved to the Netherlands in 2015 where he started as a PhD candidate at the Department of Architecture at TU Delft under the supervision of prof. dr-ing. Carola Hein. He received is PhD diploma in May 2021 within a joint PhD program between the Department of Architecture of Delft University of Technology and the University of Naples Federico II. His research interest – which touches upon the complex relationship between ports, cities and regions – deals with port cities from a spatial and institutional perspective. He has investigated the port city of Naples in comparison to port city territories along the Hamburg-Le Havre range, with particular reference to the cities of Rotterdam, Antwerp and Le Havre. Since August 2021 he has teaching position at the Department of Architecture of TU Delft. In April 2022 he started as PostDoc at Venice University IUAV supporting the development of Maritime Spatial Plan for the Campania Region.

Prof. Dr. Muhammad Zahid is a Professor, Dean of the Faculty of Management Sciences, and Director of the Center for Sustainability Studies at City University of Science & Information Technology in Pakistan. He holds a Ph.D. in Management from Universiti Teknologi PETRONAS, Malaysia. With a background in banking, where he served as a branch and customer services manager for eight years, his expertise lies in corporate sustainability and financial performance. He has authored two books and published several research papers in indexed journals. Muhammad Zahid has received notable recognition for his research, including the "Award for Excellence-2016 Outstanding Journal Papers" from Emerald Group Publishing and the Best Paper Award at the International Symposium on Research in Innovation and Sustainability 2014 (ISoRIS' 14) in Malaysia. He serves as an editor for the City University Research Journal (CURJ) and as a reviewer for esteemed journals in various fields. Additionally, he has proficiency in designing sustainability reports for both business and academic sectors. He can be contacted at zahid@cusit.edu.pk and mianmz11@gmail.com.

Associate Prof. Dr. Arch. Lorenzo Capobianco is President at Ordine Architetti Pianificatori Paesaggisti Conservatori di Napoli e Provincia; Phd in Urban Design; Associate Professor of Architectural Design at the Department of Architecture and industrial Design of University of Campania "Luigi Vanvitelli"; ICAR/14, Member of the Academic Board of the PhD in Architectural and Urban Design of University of Campania "Luigi Vanvitelli"; he carries out researches on contemporary city and sustainable architecture themes. He leads project research taking part in planning competitions in which he has earned acknowledgements and prizes. In 2006 he was between the 20 guests of the Italian Pavilion of the X Architecture Biennial of Venice; in 2007 he is between the twenty guests at the exhibition "20.07 Neapolis in forum versus", promoted Architecture and City Annals Foundation in the Royal Palace in Naples, in 2009 he's part of the section "Manifesti per una metropoli che cambia" within the exhibition Dreaming Milano (april 2009) and among the protagonists of "12xMILANO. Visioni della nuova architettura italiana per una metropoli che cambia" promoted by Urban Center of Milan. Besides many articles and essays, he published: Sven Markelius – Architecture and City (Electa, Naples, 2006), Lo Spazio della Città (Il Melangolo, 2012), Correzioni, esercizi di riprogettazione della città (letteraventidue edizioni, 2022). Lorenzo Capobianco, Prof. Dr. Arch., currently holds the leading position as President c/o "Ordine Architetti Pianificatori Paesaggisti Conservatori di Napoli e Provincia", in the higher charge of executive in the jurisdiction of Napoli for this profession, by the Ministry of Justice of Italy.

Antonio Coppola is a versatile professional with extensive experience in teaching, architecture, and consultancy. He has worked as a technical consultant, architect, and project manager, handling various responsibilities such as property valuation, safety coordination, and design. Antonio has also served in senior roles for organizations providing technical assistance and monitoring services. Currently, he is a counselor for the professional order of architects in Naples, focusing on training programs and representing the views of members. With a wide range of expertise and a commitment to professional development, Antonio plays a significant role in promoting ethical practices and advancing the field. Antonio Coppola is an experienced professional involved in teaching, architecture, and consultancy. He has served as a technical consultant, architect, and project manager, handling responsibilities such as property valuation and safety coordination. Antonio is currently a counselor for the professional order of architects in Naples, focusing on training programs and representing members' views. His extensive expertise and commitment to professional development contribute to promoting ethical practices and advancing the field of architecture.

Preface by the Local Organizing Committee Chair

On behalf of the organizing committee of the 6th International Conference of Contemporary Affairs in Architecture and Urbanism at Alanya University, I am honoured and delighted to welcome you to this annual conference. Referring to the essence of this conference, I would say that this event has been organized to provide and share the latest manifestos, methodologies, and developments, to raise the understanding of the future of architecture and urban planning. Bringing together leading academic scholars to exchange and share their research results is also the main concern of this conference. We have launched this annual conference about five years ago. During organizing ICCAUA2023 based on our global advertisement, we received 416 papers from 60 countries and after doing all the review and registration process, 288 high-quality manuscripts from 45 different countries have been accepted for publication in the proceedings of the conference. So looking at the statistics we can see that the conference has reached its aims of providing a global platform to discuss contemporary affairs in architecture and urbanism. Gathering 532 highly cited scholars from 45 countries is a dream of each organizer to transfer the objectives of the conference. I hope the participants of this conference will be able to transfer recent findings presented in this conference to their own colleagues and students. Urbanization and sustainable urban development, Planning the Post-Covid Cities, Energy and Climatic Design, Sustainability and Urban Design, Design philosophy and Education, Architecture and Technology, Habitat Studies and Heritage and Cultural Landscapes are the hottest topics which will be discussed at this conference.

Our technical program for this conference is rich and varied with 5 Keynote Speeches and 288 Technical papers which have been splinted between 3 parallel onlin sessions and 3 parallee in-persone sessions to be discourse during these two days.

As the conference chair of the ICCAUA2023, I know that the success of the conference depends ultimately on the many people who have worked with us in planning and organizing the program. In particular, I thank the Rector of Alanya University, professor Prof. Dr. Mesut Güner, Professor Dr. Erol R. SAYIN and Asst. Prof. Dr. Elif Gizem Yetkin who respectively are the Dean of the faculty of architecture and Head of the department of architecture at Alanya University. I thank them for all their advice, support and partnership. I have also thank all the organizing committee members specifically Prof. Dr. José Manuel Pagés Madrigal and Dr. Rokhsaneh Rahbarianyaz who support us as conference co-chairs and all the reviewers of the Journal of Contemporary Urban Affairs for their detailed and timely reviewing of the papers.

My acknowledgement also goes to:

-Prof. Dr. Masi Mohammadi, Eindhoven University of Technology & HAN University, Netherlands

-Prof. Dr. Islam El Ghonaimy, Department Of Architecture and interior design, College of Engineering, University of Bahrain, Bahrain

-Prof. Dr. Aykut Karaman, Department of Architecture, FEA, Altinbas University, Türkiye

-Prof. Dr. Muhammad Zahid, Dean Faculty of Management Sciences, Director City University Center for Sustainability Studies (CUCSS)

-Dr. Paolo De Martino, University IUAV, Venice, Italy / Delft University of Technology, Netherlands.

- Professor. Dr. Arch. Lorenzo Capobianco, Vanvitelli university, Italy

- Antonio Coppola, Counsellor c/o “Ordine Architetti Pianificatori Paesaggisti Conservatori di Napoli e Provincia, Italy

for the delivery of their insightful keynotes, I am sure these talks will invoke profound intellectual discoveries. So, ladies and gentlemen, I hope you enjoy the excellent academic and cultural atmosphere of the ICCAUA2023 and wish you all a productive conference ahead. Only on my own personal note, I just would like to say it has been a real privilege to be the chairman of this conference and thanks for all of your amazing work and patience that I appreciate.

Dr. Hourakhsh A. Nia
Alanya University, Türkiye
June 14, 2023

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BOOK OF ABSTRACTS

ICCAUA-2023

SESSION A: Architecture and Technology

Session Chairs:

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Dr. BOUKARTA Soufiane
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Dr. Md. Asaduzzaman
Abdollah Mobaraki
Dr. Maryam Iranfar

Manuscript ID: ICCAUA2023EN0002

The Concept of Home – Liminal Experiences of Young People With a Second-Generation Migratory Background

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Abstract
Traditional normative concepts of home as a stable, settled place and identity have been unsettled through contemporary social processes such as globalisation, technological advances and increasing global, transnational movements of people. The collection of narratives and visual representations of the concept home experienced by young people with a second-generation migratory background, a systematic inquiry and methodology based on qualitative research using grounded theory, will extend existing research through the addition of new, previously unheard voices. The main research concern will be to uncover the participant group's spatial experience within their urban architectural/ built environment, and the associated material and imaginary aspects of the concept home. In conversations, participant observations and video/ photography or art workshops the participants will be encouraged to express their ideas and concepts – to understand and uncover shared fundamental themes uniting the spatial experiences of home for young second-generation migrants from diverse backgrounds and life situations.

Keywords: Home; Dwelling; Architectural Phenomenology; Space, Place; Transnational; Migration; Spatial design.

Manuscript ID: ICCAUA2023EN0022

The Bioclimatic Architecture of Algerian Ksour: Ksar El-Boukhari Case Study

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Abstract
Drawing inspiration from vernacular architecture and its bioclimatic qualities is a highly recommended approach today as part of the strategy for adapting to the effects of climate change. For instance, this paper's aim is to show how much the typical architecture of the High Plateaux ksour in Algeria may provide good inspiration nowadays though few studies compared with saharan ksour. The pre-Saharan regional climate of arid type, which results in a cold winter and a dry and hot summer. The average annual rainfall is 400mm. Ksar el-Boukhari is formulated as a demonstrative case study. It is a fortified establishment, built on a hill facing southwest. The urban center includes some facilities such as the mosque, the bath, the oven, and some shops. Traditional houses, generally with attics, are built of earth and/or stones, the thermal performance of which is well known. This urban architecture reflects an obvious climatic concern at the scale of the house, the district and the city. In these arid and dry regions, the compact urban fabric offers good protection against sand winds. For example, the siting of the houses is such that each provides shade and protects its neighbours against the effects of strong sunlight, while the materials and construction technique provides effective thermal insulation. Consequently, the objective of this article is to characterize the architecture of the ksar through that of the traditional house then to analyze the organization of the urban space on the scale of the district and the city, in relation to the assets and regional climate constraints.

Keywords: Bioclimatic Architecture; Vernacular Architecture; Climate Change; Algerian Ksour.

Manuscript ID: ICCAUA2023EN0028

Grafting Construction Thinking: An Action-Based Approach to Course Redevelopment

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Abstract
Construction courses are an essential part of architectural education as they equip students with the knowledge to realize design ideas. However, learning and appropriating construction knowledge in design thinking is a challenge for many architecture students. Having witnessed this hardship in their teaching practice, the authors of this paper developed the hypothesis that an "experiential facilitation approach," which employs and crosses back and forth among multiple modes and scales of engagement with knowledge, including full-scale building, has the potential to increase the reception of construction knowledge. To evaluate their hypothesis, the authors have designed action research that tracks, measures, and reflects on the effects of these multiple methods, scales, media, and tools through first-hand observation, short surveys, semi-structured in-depth interview questions, and reflection on course outputs such as portfolios and exam papers. The research outcome contributes to the teaching of construction courses in architecture schools.
Keywords: Construction Thinking; Architectural Pedagogy; Experiential Learning; Building.

Manuscript ID: ICCAUA2023EN0032

Critical Analysis of Design Studios Adopting a Narrative Methodology as a Means to Fragmenting Knowledge within Architectural Pedagogy

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Abstract
The purpose of this paper is to critically analyze a pedagogical approach adopted in graduation design studios at Cairo University. The methodology used is a qualitative analysis of the approach and critique of the methods of teaching and learning with application on the outcomes. The approach introduced in the before mentioned studio relies on narrative storytelling, as a means of fragmenting knowledge leading to identifiable, pluralistic and inclusive architecture. This methodology of teaching depends on “outside-in” design to create unique public buildings materializing a narrative expressed by each student and developed through layers of investigation and research in order to translate this narrative into an architectural form. This narrative is implemented additionally on the spatial experience of the interior composition. The originality of this paper lies in analyzing the outcomes of the design studio between creative and critical thinking fragmented modes of perception through the outcomes of three consecutive cycles.
Keywords: Storytelling; Architectural Pedagogy; Graduation Architectural Design Studios; Pluralism in Architecture; New Approaches in Pedagogy; Fragmenting Architectural Knowledge.

Manuscript ID: ICCAUA2023EN0037

Comparative Analysis between Egyptian and Syrian Bimaristans

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Abstract
Bimaristans are a building type emerged in the Islamic world equivalent to nowadays hospitals. Most of the Islamic architecture studies focus on mosques, then mausoleums. That make the research field open for more studies on building types like baths, wekalat …etc. Bimaristans remain within the scope of structures that need more studies through comparatives and analytical analyses. This paper introduces comparative analysis between bimaristans in Cairo and Aleppo. This comparison highlights the points of similarity between the concepts that influenced the designers that time with respect to their different locations, surrounding context and historical background. Hence, contemporary architects in the Arab world can recognize the spiritual concepts behind the architectural and planning dimensions of bimaristans’ discrete design. Also, the role of local artists in articulating such concepts using carved geometrical reliefs, in addition to the documentation role of decorating relieved texts on those structures.
Keywords: Islamic Architecture; Bimaristans; Health Institutions; Aleppo Old City; Cairo.

Manuscript ID: ICCAUA2023EN0043

Meeting Sustainability through a Bioinspired Adaptive Skin Computational Framework: Literature Review

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Abstract
The capability of adaptive building skin in optimising its form and function in real-time prioritises its importance in future design approaches to meet sustainability targets and the 2030 vision. The concept of adaptability can be traced in nature to survive extensive environmental changes. Biomimicry evolved as a leading source of inspiration for adaptive architecture, especially with the aid of computational designs. Therefore, bioinspired adaptive skin is vital in reducing energy consumption and carbon gas emissions. Considerable research proposed some bioinspired adaptive skin models and frameworks. In this context, this research aims to compare and evaluate the existing proposals to identify similarities and differences, then builds upon existing knowledge to propose a comprehensive computational approach toward designing bioinspired adaptive building skins. Moreover, it will map existing biological adaptation systems mimicked into architecture to generate a database of adaptative biological solutions for future design developments.

Keywords: Bioinspired Adaptive Skins; Sustainable Design; Computational Framework; Biological Systems Database; Literature Review.

Manuscript ID: ICCAUA2023EN0046

Exploring Mid-Journey's Outputs and Analyzing its Result for a New Design Approach in Architecture

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Abstract
In the era of Metaverse, as a concept of a persistent, online, 3D universe that combines multiple virtual spaces, the Mid-journey is an interactive bot that plays a significant role in Architecture. It is a machine tool that uses artificial intelligence to produce unique images based on the text input given by the user. It uses a machine learning algorithm trained on a massive amount of image data to create amazing images. It converts what you want to see in your mind through visuals. This research aims to explore the possibilities of Artificial Intelligent (AI) technologies and combine them with Architecture design to identify a new design approach. This will be done by reviewing some impressive designs that were generated through Mid-journey and created by different Architects, analyzing how they work and how they could be used in the architecture field. This may bring attention to a new design approach and expand the human species' imaginative powers.

Keywords: Mid journey; Artificial Intelligent (AI); Architecture; Design; Imagine.

Manuscript ID: ICCAUA2023EN0048

Energy Performance of Vernacular Architecture in Various Desert Climates

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Abstract
Summer 2022 is officially the 2nd hottest summer in France since 1900. It resulted in three episodes of heat waves over a total of thirty-three days. In France, despite new thermal standards, the thermal comfort of new housing in hot weather remains very bad. Vernacular architecture has demonstrated its perfect environmental adaptation through its empirical development. The objective of this work is to study the design strategies of four vernacular houses located in four deserts (Algerian Sahara, Arizona, Libyan desert and Yemen) to ensure summer comfort in hot environment. The behavior of these four constructions has been described with dynamic simulations developed by the software ArchiWIZARD, under the same climate conditions. The results show how vernacular architecture, sited in desert climates has tackled the issue of climatic regulation and efficiency. The impact of night ventilation on the thermal comfort of vernacular buildings under warm and arid climates is also discussed.

Keywords: Vernacular Architecture; Desert Climate; Thermal Simulations; Night Ventilation; Design Strategies.

Manuscript ID: ICCAUA2023EN0054

The Environmental Labeling of Sustainable Buildings: A Focus on International Certifications

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Abstract
The environmental labeling of sustainable buildings has become a major concern for the architectural design. Numerous building sustainability assessment methods were developed in various countries, namely the British BREEAM, the American LEED, the German DGNB, the French HQE and the United Arab Emirates ESTIDAMA. The present study aims to find the most appropriate approach that suits the Algerian context. A comparative study is conducted using an analytical procedure. The study focuses on the objectives, the evaluation procedures, the assets, and the qualitative assessment indicators for the environmental performance of the buildings. As a result, HQE of France and ESTIDAMA of the United Arab Emirates appeared to be best suited to the Algerian context.
Keywords: Environmental Labels; Building; Sustainability; Assessment; BREEAM; LEED; DGNB; HQE; ESTIDAMA.

Manuscript ID: ICCAUA2023EN0059

Architectural Space - Where to Start?

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Abstract
The Architectural teaching, like any other teachings, requires a perception of the Present. Today's architecture student has unlimited access to images and information up-to-the-minute from (almost) the entire world. When we ask to the students - who sits for the first time in a Project Studio classroom - to start them first work it is, almost, always necessary to start by "dismantling" the “preconceptions” of Architecture that they have and teach them how to create "architectural space" that could be identified by itself (for its characteristics and sensations) and not by its materiality or function. This process can be started in different ways. The important thing is that, at the end of the first year of Architectural studies, students could be able to tease “emotions” in those who moves through the Architectural Space and, thus, manage to start their journey to contribute to a more humanized territory.
Keywords: Architectural Studies; Architectural Space; Project Studio; Education; Architecture.

Manuscript ID: ICCAUA2023EN0061

Neo-Baroque Flowers in Contemporary Architecture: Hints for a New Aesthetic

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Abstract
The 17th century has always been called 'the century of flowers'. Apart from the invasion of exotic plants from the New World, the birth of the *Flower Garden* as a new type of exposition and the evolution of the art of gardening, the flower is a symbol of an era. Baroque architecture is defined precisely by the 'witty shapes' of the curved lines and the impressive 'decorative efflorescence'. This paper intends to highlight the neo-Baroque character intrinsically present in some of the greatest contemporary architects such as Paolo Portoghesi, Frank Gehry and Jean Nouvel who, in parallel with the rediscovery of the value of the Baroque period in the 20th century, have re-proposed neo-Baroque aesthetics and forms in their architecture, making their architecture "bloom" by proposing that dynamic of *folds* well described by Deleuze's philosophy. It is possible to reflect on a widespread contemporary aesthetic among the most important contemporary architects in which neo-Baroque flowers express the same qualities as the flowers found in 17th-century architecture: ephemerality and precariousness.
Keywords: New-Baroque; Flowers; Folds; Aesthetic.

Manuscript ID: ICCAUA2023EN0066

Energy Evaluation of a High Energy Performance Building: Cultural Center in the City of Bab Ezzouar as a Case Study

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Abstract
Buildings consume energy and cause more pollution when the bioclimatic potential is not taken into account. The present communication focuses on the passive strategies that allow making the best use of the climate and reducing energy demand. The method is based on the identification of the best strategies obtained from the bioclimatic analysis carried out with Climate consultant, followed by a mono-variant based-approach conducted with dynamic thermal simulation campaign performed with Ecotect analysis software. The results let to classify the parameters according to their importance with each other and identify the potential energy savings for each parameter variation. The external walls reduce energy demand by up 61.74 %, followed by windows quality, the thermal resistance of the floor and finally the orientation. The use of the best strategies reduces the energy demand of the cultural center to 32.582 KWh/m² which allowed us to certify the building with low energy consumption.

Keywords: Sustainable Environment; Passive Strategies; Numerical Simulations; Optimized Energy.

Manuscript ID: ICCAUA2023EN0068

Investigating the Socio-Economic Sustainability within The Egyptian Museums over The Last Decade

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Abstract
Over the last few decades, contemporary museums have undergone a radical change into public places that promote socio-economic sustainability by impeding recreation, commercial, and cultural activities. This shift altered public perception of museums globally and had a profound impact on today's museums, resulting in new prototypes that differed significantly from prior ones. As a consequence, the study attempts to explore how far Egyptian museums have adapted to this fundamental change. As a result, the study intends to trace the evolution of Egyptian museum design over the last decade compared with the findings of the author's previous thesis in 2012. The study used qualitative methods and comparative analysis. The findings revealed that the recent Egyptian museums adapt to this change while the old museums continue to focus exclusively on the exhibition function, ignoring the public role. The article outlines clear criteria for architects to enhance the social and economic role of museums.

Keywords: Contemporary Museums; Egyptian Museums; Museum Architecture; Museum Design Criteria; Socio-Economic Sustainability.

Manuscript ID: ICCAUA2023EN0069

Optimization of Passive Strategies in an Approach Toward Net Zero Energy Buildings under Future Climate Changes

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Abstract
Climate change has emerged as one of the most pressing issues confronting the world today. With the residential sector accounting for one-third of global energy consumption and greenhouse gas emissions, improving energy efficiency has become a primary goal in order to achieve Net Zero by 2050. Several measures will need to be implemented to achieve this goal. This article aims to study three architectural passive strategies: windows-to-wall-ratio, orientation, and shadings, in order to find their relationships and influences on energy consumption and greenhouse gas emissions in residential buildings in three different types of Algerian climates, in current time, and with future Representative Concentration Pathways (RCP), using a multi objective optimization methodology, calibrated against collected energy consumption data. The simulation results using future RCP revealed that energy consumption will rise dramatically over time. Improving these parameters has been shown to reduce residential building energy consumption and emissions by up to 20%.

Keywords: Passive Strategies; Representative Concentration Pathways; Residential Buildings; Energy Consumption; Greenhouse Gases; Net Zero Energy.

Manuscript ID: ICCAUA2023EN0076

Shopping Mall Design Features and Public Wellbeing

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Abstract
The COVID-19 pandemic has dramatically affected all aspects of public life and further stimulated awareness of public wellbeing. Yet in the realm of architectural design, shopping malls, as the type that carries the most integrated and concentrated public activities, have received little attention on this topic. To fill in the gap, this review first provides a general overview of 500 papers on mall design evaluation through bibliometric analysis, applying CiteSpace 5.0 to visualize the keyword co-occurrence and clustering timeline, illustrating key knowledge domains, research evolution, frontiers, and recent hotspots. Then, 20 studies on mall design features and public wellbeing are screened out and summarized and analyzed in-depth from five dimensions: study design, mall design metrics, public wellbeing metrics, evaluation methods, and findings. This review provides a reference for mall design development and future studies and enhances awareness of people-oriented sustainable urban construction in the post-pandemic era.
Keywords: Shopping Mall Design; Public Wellbeing.

Manuscript ID: ICCAUA2023EN0088

About the Regulatory Framework for Improving the Energy Efficiency of Buildings: An Overview of the Algerian Context

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Abstract
Algeria is initiating a green energy dynamic by launching an ambitious program to support the renewable energy sector, and energy efficiency. This support program named "*Taka Nadhifa"* is part of the strategic partnership on energy between the European Union and Algeria. The intermediate results of the program have led to the introduction of regulatory energy efficiency measures in the design and renovation of buildings. This paper reviews the inputs of the new thermal regulation related to the building sector through the examination of the produced proposals. This new vision aims on the one hand to alleviate the difficulties of implementation of the existing thermal regulation and on the other hand to integrate the attributes of the energy performance. Examples illustrating the interest of the proposals of this new building thermal regulation will also be presented. Finally, the expected results of this new regulation will be the verification of the thermal conformity of the buildings with a first attempt to establish an energy labelling.
Keywords: Energy Efficiency; Building; Thermal Regulation; Energy Labelling; Algeria.

Manuscript ID: ICCAUA2023EN0091

The Intra-Action Between Educational Space and Student´s Performance within University City School of Architecture in Mexico

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Abstract
This research aims to investigate intra-action between educational space and physical performance within the context of higher education institutions. We use the Baradian concept of intra-action to build an understanding of non-human entities as important as human ones. The hypothesis is how the physical characteristics of space such as materials, light, colour, etc., are essential for undergraduate students. The case study selected for this research is the National Autonomous University of Mexico which is an example of how materiality may influence students experience, in addition to the university's architectural significance had led it to be listed as World Heritage. The collected data will show the importance of materiality within undergraduate students. The methods to facilitate this research include 50 surveys and 5 semi-structured interviews. The possible outcomes of this study will lead to adding value to the physical aspects that are involved within a Higher Education Institution.
Keywords: Intra-Action; Educational Spaces; Higher Education Institutions.

Manuscript ID: ICCAUA2023EN0097

Defining Nearly Zero-Energy Buildings (nZEB) for Turkey in Terms of Boundary Conditions

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Abstract
The European Union has presented that the building sector is responsible for 36% of greenhouse gas emissions due to energy consumption and 40% of all energy consumption. Within the framework of the EPBD directive followed to reduce fossil energy consumption in EU countries, the commission recommendation in 2016 (2016/1318) is to ensure that by 2020 all new buildings are nZEB. The current directive has further steps. In Turkey, the Regulation on Energy Performance in Buildings follows EPBD. However, the definition of nZEB in Turkey should be reviewed within its own boundaries. There are 5 different climatic regions in Turkey with different architectural characteristics. Therefore, different ways will have to be followed in terms of meeting the heating-cooling needs. This research deals with the boundary conditions that may be encountered while developing the nZEB definition for Turkey and proposes climatic definitions, additionally with a development in sectoral operation in building sector.
Keywords: nZEB; Energy Performance; Regulation; Green Building; Climatic Design.

Manuscript ID: ICCAUA2023EN0098

Natural Intelligence: Criticizing Architecture in the Digital Age

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Abstract
We are currently living the post fourth industrial revolution era where digitalism and machine learning dominate our everyday ecology. Within architectural education, students are developing different digital techniques to express their projects in terms of plans, sections, elevations, and 3D models. Yet, with all this advanced level of information, there is a gap when it comes to critical thinking. This paper aims to put forward the foundational steps towards analyzing and criticizing architecture with an addition of human perspective to consider the natural surroundings intelligence in the design morphology, materiality and fabrication that is subject to digital infrastructure. The objective is to highlight the students' cognitive skills reinforced with digital thinking as a way to move further steps ahead of the trending market.
Keywords: Nature; Bio-Learning; Bio-Organism; Artificial Intelligence; Critical Thinking; Growth.

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Modelling the Energy Demand of a Residential Building Using an Artificial Neural Network (ANN) Approach

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Abstract
The consumption of fossil fuels accelerates and accentuates the formation and development of the climate change phenomenon. Understanding the energy demand in the early-stage design could lead to energy savings. This communication is interested in developing an energy demand prediction tool based on artificial neural network modelling ANN. For this purpose, and based on the scientific literature, a panel of parameters often used by architects at the time of architectural design was selected, which are, the thermal resistance of the external walls, the type and rate of glazing, the orientation, the prospect and the compactness. A campaign of 300 dynamic thermal simulations is then run under energy plus using the Latin Hypercube Sampling (LHS) approach. The model has a prediction potential of over 94.3%. The model also ranks each parameter according to its importance in the equation identifying the energy demand.
Keywords: Energy Demand; Artificial Neural Network; Architectural Design; Passive Approach; Modelling.

Manuscript ID: ICCAUA2023EN0109

Introducing Building Integrated Agriculture as Green/ Sustainable Building Concept in MENA Countries: Approach and Constraints

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Abstract
In recent years, the emergence of Building-Integrated-Agriculture (BIA) in developed countries has been seen as a possible solution to promoting models of sustainable and productive building in urban areas. This approach, which is based on the installation of food production systems that combine innovative technology and soil-less growing systems, permit to grow fresh fruits and vegetables in and on the building, while exploiting resources outputs from the building creating new synergies between the built environment and the food production system. In this scenario, MENA region has instituted an ambitious policy to promote and foster the concept of sustainable building construction in the coming years, but faces a variety of unique challenges. The main objective of this study is to explore and examine the possibility of implementing BIA as a new approach for sustainable building construction in the MENA region, particularly in Algeria, by presenting a future perspective of the practice, and investigate its conceptual, technological, governmental, social and economic barriers.
Keywords: Building-Integrated-Agriculture; The Middle East and North Africa (MENA); Sustainable Building; Hydroponics.

Manuscript ID: ICCAUA2023EN0116

Smart-Responsive Skins, A Valuable Strategy for Reducing Energy Consumption and Improving Indoor Thermal Comfort in Hot and Dry Climates

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Abstract
Through the definition and application of a biomimetic-computational design methodology to study and analyze natural organisms in terms of thermoregulation behavior, this research attempts to evaluate the introduction of building skins parameterization and smartness as a valuable strategy for reducing energy consumption and improving indoor thermal comfort in hot and dry climates. Furthermore, the study includes a compiled taxonomy of the biomimetic concepts investigated and studied in order to serve as a mini-data bank for architects or designers interested in this design approach to tackling thermoregulation challenges. A 1 degree of freedom bio-kinetic shading elements are developed for further application in a building skin by exploring and extracting thermoregulation mechanisms found in nature. The ongoing research is inserted in the generative technique typology of deployable structures, where we have combined biomimetics with origami paper pleat based on a parametric methodology to design a smart shading device interacting with sunlight.
Keywords: Building's Skin; Biomimicry; Energy Efficiency; Smart; Hot and Dry Climates; Kinetic Architecture; Optimization; Parametric Design; Thermoregulation.

Manuscript ID: ICCAUA2023EN0117

The Energy Efficiency of Buildings between Architectural Design and the Inhabitant Behavior, Case Study: A Residential Building Guelma (Algeria)

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Abstract
Since the implementation of the first energy saving measures after the oil crises, and then with the fight against climate change, the issue of energy efficiency in buildings has always been at the heart of energy and climate policies, whether at the European, national or local level. In this context, this article attempts to examine the energy efficiency of buildings by considering the synergy between urban design and occupant behavior. The main purpose of the paper is to highlight the relationship between occupant behavior and its implications in the design of residential buildings. This study examines a methodology that investigates energy practices in residential buildings through a survey. Energy efficiency offers governments, the private sector, and communities a cost-effective way to achieve a variety of goals, such as reduced energy consumption, lower emissions, financial savings, energy security, and positive health impacts.
Keywords: Energy Efficiency; Energy Security; Residential Building; Inhabitant Behavior; City of Guelma.

Manuscript ID: ICCAUA2023EN0118

The Design of a Psycho-Pedagogical Space for Autistic Children with Considerations of Spatial Criteria, such as Lighting and its Sensory Aspect

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Abstract
Through this research, we are aiming to provide recommendations and spatial design considerations of a psycho-pedagogical space for autistic children in order to ensure their education in the best possible conditions. This intention is achieved by guaranteeing their comfort and well-being in a healthy psycho-pedagogical space and the effectiveness and integration of the autistic child in his environment and to prepare him for the future life. The need for an adequate architectural space and an appropriate architectural environment is primordial, which aims to establish the difficult relationship of the child with his environment, to improving spatial characteristics and achieving sensory well-being through light. This research shows the conditions and criteria that ensure the well-being of the autistic child with his environment that he needs.
Keywords: Design; Psychopedagogical Space; Spatial Criteria; Lighting; Sensory Aspect; Autism.

Manuscript ID: ICCAUA2023EN0131

The Impact of the Use of Computer-Assisted Drawing Tools on the Productivity of the Architectural Design Process

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Abstract
This work falls within the empirical studies of the architectural design process. It aims to measure the impact that the use of computer-aided drawing tools (CAD tools), in the early phases of the design process, might have on the Productivity of the design activity. To achieve this goal, we use the protocol analysis method. A group of students, in third year of architecture, was asked to accomplish two design tasks. In the first, they used freehand sketches, and in the second, they employed CAD tools. A comparison of the two types of protocols shows that the use of CAD tools reduces the productivity of the process by decreasing its efficiency and effectiveness. It makes the design process longer due to hesitation and indecision of the subject and hinders ideational productivity. Furthermore, it also increases semic production, which becomes less effective and in return reduces morphic activity.
Keywords: Productivity; Architectural Design Process; Computer-Aided Drawing Tools; Design Activity; Protocol Analysis.

Manuscript ID: ICCAUA2023EN0134

Manufacturing Processes of Complex Shapes and Structures Using 3D Printing and Augmented Reality

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Abstract
The paper describes and evaluates the design and manufacturing process of complex shapes. A parametric structure is designed on the 3D-model, its shape is evaluated on the 3D-printed model, and is manufactured on a 1:1 scale using augmented-reality (AR). The following questions arise: where are the limits for 3D-printed shapes and the limits for implementation using AR? The 3D-printed model will be used to test and evaluate the structure. Using the HoloLens with Fologram software, an attempt is made to recreate the structure with high precision. This process is tested as a hypothesis based on the quantitative, practical investigation. The influence of the use of technical hardware and digital software on the precise implementation of complex forms in the design is shown, and how the influence of digitization and related handling in the field of architecture shifts the limit of feasibility and allows new approaches to the formation of forms.

Keywords: Augmented Reality (AR); 3D Printing; 3D Modeling (CAD); Computer-Aided Manufacturing (CAM); Hololens; Fologram; Parametric.

Manuscript ID: ICCAUA2023EN0136

The Appropriateness of Standing Kitchen in the Indian Context

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Abstract
Women used to sit and cook in the traditional Indian kitchen, which had floor-mounted fuel stoves. After the invention of gas cylinders, there was a significant change in the cooking position, which went from sitting to standing. Since Indian women spend the most hours cooking in the kitchen in the entire world (MUKHERJEE, 2015), standing while cooking is uncomfortable and might have negative health effects. Additionally, it makes older women dependent on other people. The objectives of this study include comparing standing and sitting cooking techniques and determining if a standing kitchen would be appropriate in an Indian setting. The paper adopts secondary data analysis, first-hand observation, and focus group discussion as part of the methodology. The paper brings out a need to reevaluate the design of Indian kitchens so that women of all ages can work independently and comfortably.

Keywords: Cooking Styles; Health Issues; Sitting Kitchen; Standing Kitchen; Indian Traditional Kitchen.

Manuscript ID: ICCAUA2023EN0144

Architectural Design with A Phenomenological Approach: A Case of Museum Sensory Experience

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Abstract
The role of the phenomenological Approach is to implement human perceptions where humans exist by perceiving and observing the surrounding in a body relation with the built environment and world surroundings, as addressed by Ponty's philosophy. Furthermore, architecture is the overall image of emerging human life aspects connected with all human sensations that reflects perceptions, experiences, and ideas. Significantly, attributes of daily experiences exist through architecture and social aspects. The purpose of the study stands in understanding bodily experience through phenomenological approaches in a museum. For instance, surrounded built environment and designed atmosphere in architectural design and human sensation concerning phenomenological characteristics. In addition, phenomenological methodology through focus groups is properly considered while practicing the museum's journey that attracts the user's sensory experience and perceptions. Moreover, the study analysis results are promising concerning human sensations and design aspects in a museum experience.

Keywords: Museum; Phenomenology; Experience; Perception and Senses; Phenomenological Characteristics.

Manuscript ID: ICCAUA2023EN0145

Applying the Phenomenological Approach to Educational Place: A Case Study Analysis of a College Experience through Time

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Abstract
Applying the phenomenological approach to architecture relies on integrating human experiences and sensory aspects into the designed space, materials, and light to create a place that has a lasting impact on the memory in the human mind. This experience can change if the person experiences the space at a different time. This case study focuses on some students' sensory experiences of the college of engineering at the university of Bahrain who attended college during their academic years and then visited it after a long detachment period. This study relies on interviews with the students focusing on their previous and actual college experience to discover the changes in the experience of the same space through different times. The results are promising and showcase that mental images have changed, and students' attachment has become more substantial due to detachment and time.

Keywords: Phenomenology; Educational Place; Case Study; Sensory Experience; Analysis.

Manuscript ID: ICCAUA2023EN0146

Using a Phenomenological Approach for the Analysis of Two Different Houses in Bahrain

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Abstract
Phenomenological practices in the design process will create the quality of spaces where the users will feel a sense of place and will last in their memory. Furthermore, it will encourage the user to revisit the place in contrast with the places not achieving a phenomenological approach. Through a phenomenological approach, this study aims to investigate the bodily and sensory experiences of the users in two different houses in the kingdom of Bahrain. The first selected house is one of the cultural heritage sites located on the String of pearl bath, specifically in the old city of Muharraq. The second house is a contemporary one, located in Sharq al Hid, designed by one of the authors. The findings of this analysis are promising.

Keywords: Sensory; Experience; Bodily; Heritage; Culture; Phenomenological; Senses.

Manuscript ID: ICCAUA2023EN0158

Evaluation of the Energy-Positive Aspects for Optimal Construction Efficiency through Material Realism

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Abstract
Developing upon the tenets of SDG 7 and SDG 11, this paper studies the relationship between materials used in 21st-century construction and their characteristic scope for energy-positive application in the housing sector against criterias of 'optimal construction efficiency through material realism' (OCEMR). On account of climate change being grossly influenced by the construction sector and both further decrementing affordability in housing, there is a need to study the optimum construction efficiency of a material by studying its many aspects to encourage a realistic reduction in energy consumption, and a realistic increase in energy generation. The proposition of a gradation (OCEMR) is analyzed and later formulated based on material choice, regionality of materials, mode of application of materials, alternative technology, material lifecycle studies, etc. The mentioned factors are deduced through case studies which show a co-variation between the factors for gradation but an informed co-relation between optimized energy efficiency.

Keywords: Energy Positive; Climate Positive; Optimum Efficiency; Construction Materials; Optimization.

Manuscript ID: ICCAUA2023EN0164

Building Assessment Tool to Create Islamic Geometric Patterns Applications in Contemporary Designs

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Abstract
Islamic geometric patterns (IGPs) represent one of the most substantial design elements in the Islamic heritage. The last few decades have witnessed a great appeal in social sustainability so, several endeavors have been made to preserve Islamic heritage through contemporary design and art. This paper attempts to answer the debate on how the IGPs are defined in contemporary applications, and how far they evolved thanks to technology. Therefore, the paper's purpose is to build an assessment tool to create contemporary IGPs applications in architecture and art adhering to sustainable strategies. The paper follows a qualitative methodology and case study to analyze worldwide-recognized cases of architectural designs and art applications implementing IGPs in the last decade. The findings provide clear criteria derived from the analytical results, for designers and artists to consider in applying IGPs in contemporary applications. The paper contributes to promoting the use of IGPs creatively in a sustainable manner.

Keywords: Islamic Geometric Patterns; Contemporary Applications; Art Application; Social Sustainability; Digital Technology.

Manuscript ID: ICCAUA2023EN0168

The Transition to Integrated Renewable Energy: A Framework for Low Energy Building Design

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Abstract
Following the Paris Agreement in 2015, global attention to global warming countermeasures has intensified, as climate change is a major threat to human societies, fundamentally linked to energy consumption and greenhouse gas emissions. Given the huge impact of buildings on energy consumption, changes must take place towards a sustainable energy transition by using renewable energies such as solar energy in order to push buildings to near zero energy consumption. In this context, our work consists of clarifying the nearly zero energy building (NZEB) concept and of reviewing research articles focusing on the use of renewable energy sources (RES) in an efficient way, based on solar energy.

Keywords: Energy Consumption; Greenhouse Gas Emissions; Impact Of Buildings; Renewable Energies; Solar Energy; Nearly Zero Energy Building.

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Energy Performance and Sustainability of High-Rise Buildings

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Abstract
This study is to examine methods of enhancing energy efficiency and self-sustainability of tall buildings. The current levels of energy consumption of high-rise buildings were investigated. The alternative methods of producing onsite energy that can be harnessed from tall buildings were reviewed. Comparing the quantities of renewable energy produced from and the energy demand of a test-bed building, the energy self-sufficiency of the building was analyzed. It was found that, with current technology, renewable building systems can meet only a small fraction, less than 8%, of the building's energy demand and 10% of its electricity demand. From this study, it was concluded that energy self-sufficiency of tall buildings must be approached by enhancing the energy efficiency of various building systems of tall buildings.

Keywords: Building Energy Performance; Renewable Energy Technology; Solar Energy; Energy Self-Sufficiency.

Manuscript ID: ICCAUA2023EN0210

A Novel Kinetic Shading Using Threefold Symmetrical Bricard 6R Mechanism: Investigating the Daylighting Performance and Lighting Efficiency

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Abstract
This paper aims to introduce a novel kinetic façade shading using the threefold symmetrical Bricard 6R mechanism and reveal its environmental performance at different daylight conditions. To arrive at this aim, first, the main design principles of the proposed kinetic shading system have been introduced, kinematic analysis has been performed, and the construction details have been explained. Then, a parametric model of the proposed system has been created in Grasshopper®, a visual programming language that runs in Rhinoceros®. This parametric model allows the simulation of geometric transformations of the system simultaneously. Finally, using this parametric model, the lighting performance of the different geometric configurations of the proposed system has been tested and simulated in Climate Studio® in different daylight conditions. The results obtained from the analyses have been compared with other existing shading systems in the literature and the advantages and shortcomings of the proposed system have been revealed.
Keywords: Kinetic Architecture; Façade Design; Parametric Design; Bricard Mechanism; Daylight Analysis.

Manuscript ID: ICCAUA2023EN0211

Exploring Inclusivity of Storytelling Museums in Cairo through Developing an Educational Adventure in the Built Environment

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Abstract
Storytelling museums in Cairo play a crucial role in preserving memory, culture, and heritage values. This typology selectively has been chosen to create an adventure for young architecture students to explore the built environment associated with the inclusivity of various user groups. Interesting stories experienced by the architecture students reflect the reality of whether storytelling museums play their intended roles or not, in addition to whether they are inclusive for various user groups. The paper aims to unveil the experiences witnessed by the students in their attempts to explore how architectural design promotes the preservation of collective memory and addresses various user groups. The selected case studies vary from museums preserving the memory of late public figures or national events or museums preserving antiquities that behold unique myths. The methodology used is qualitatively assessing the theory bonding the spatial experience of the museum with the story it beholds through the adventures of exploration held by the groups of students. The paper concludes with recommendations to enhance the experience of this typology to play a more effective role in cross-cultural values exchange.
Keywords: Built Environment Education; Story-Telling Museums; Inclusivity; User-Groups; Interactive learning.

Manuscript ID: ICCAUA2023EN0215

A New Life for 'Repudiate' Architecture

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Abstract
The research, promoted by the Green & Innovation REACT EU project, focuses its analysis on the international situation of incomplete private architecture. In particular, in addition to an observation of the literature that has been interested in the phenomenon of unfinished architecture for years, this work is based on the possibility of granting to buildings considered ordinary -and which haven't completed their construction process- a second chance. «Therefore, to eliminate the unexpected», wrote Michel de Certeau, «or to expunge it from calculation as an illegitimate accident and subverter of rationality, means to prevent a living and "mythical" practice of the city. […]. Accidental time is what is told in the effective discourse of the city: an indeterminate fable, better articulated on metaphorical practices and stratified places with respect to the empire of evidence in functionalist technocracy» (de Certeau, 2001). In the plots of "indeterminate fairy tale", this work tries to categorize the possible actions which, aiming at the zero demolition, have delivered good practices that can become a project method on the existing.
Keywords: Architectural Design; Reuse; Upcycling; Second Life.

Manuscript ID: ICCAUA2023EN0218

Comparative Study of Indoor Environmental Performance of Church Buildings in Northeast Nigeria

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Abstract
Today, Christianity in Nigeria has increased in churches in large cities. As a result, there is an increasing demand for church buildings, to the point where Nigeria now has the highest number of churches per capita globally. The seating capacity of Nigeria's most recently constructed churches ranges from 3000 to 550,000 worshippers at any given time. As good as that is, the concern of this thesis was whether building professionals consider indoor environmental indices performance about worshippers' comfort and well-being. This thesis aimed to compare the indoor environmental performance of church buildings to develop design guidelines for improved environmental indices performance of churches in northeastern Nigeria. Ten church buildings were purposefully chosen, and the effects of temperature, CO, CO2, RH, PMs, HCHO, TVOCs, Radon, Sound, Ventilation, Moisture, Dewpoint, and Lighting were investigated using a questionnaire, observation schedule, and indoor environmental detectors. A case study evaluation was used to evaluate this pragmatic approach. The study found that seven out of fourteen parameters had low performance, one had a medium performance, and six had a high performance on church members in northeastern Nigeria. As a result, it became necessary to create a design guideline to improve worshippers' comfort and well-being.
Keywords: Comfort; Comparative; Design; Environmental Indices; Performance.

Manuscript ID: ICCAUA2023EN0241

Greening Healthcare Spaces to Stimulate Healing: Biophilic Design in Hospital Spaces

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Abstract
Biophilic Design is a concept used in the interior design sector to increase the connection of users to the natural environment. Used at both the building and city levels, this technique is claimed to have health, environmental and economic benefits for space occupants and urban environments. The biophilic design focuses on human well-being to improve physical and mental health, performance and wellness. All this opens the way to an understanding of the solutions that the use of biophilic design in healthcare spaces could bring. Indeed, through this research and based on the analysis of health spaces whose use of biophilic design has been ubiquitous, we will develop the notion of biophilic health care design and how this new way of space design will affect positively mental health, and subsequently, physical health of the person concerned by the health care in these health centres, hence its impact on the acceleration of healing.
Keywords: Biophilic Design; Health Care; Mental Health; Physical Health; Healing.

Manuscript ID: ICCAUA2023EN0247

Learning for Changing our World: FAR "Methodological Approach in Architectural Education

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Abstract
Architectural education is a topic constantly under investigation by researchers who believe the advancement of the built environment will not be implemented unless future architects are subjected to the necessary knowledge and experiences. Alongside this, the architectural design studio is presented via educators as a real-life simulation for career expertise. However, the various disciplines necessary to inter-twine with the design process are usually taught in stand-alone islands. This already a complex process, but future challenges are different from any previous era, and need a perspective from future architects. The research aims to explore a design methodology introduced for six cycles of design studio, applied to allow future architects to react in unprecedented ways to complex problem-solving. Results will be critically analyzed exposing the criteria of comprehending and responding to futuristic issues, then highlighting the strengths and weaknesses of previous cycles. The results are enhanced framework for developing the educational process.
Keywords: Built Environment Education; Future Architects; Design Studio; Futuristic Architecture.

Manuscript ID: ICCAUA2023EN0255

Service Life Prediction of Paint Coating of Algiers Building Envelopes by Applying a Multiple Linear Regression Analysis

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Abstract
The durability of a building is strongly related to the service life of its various components, including the coatings of its envelope. The paint on the building envelope is the first protective layer exposed to the harmful effects of the climate and environmental conditions. These effects are manifested over time by degradations such as color change, cracking, peeling, etc. In this contribution, a predictive model of the service life of paints coating, applied on cementitious materials of building envelopes located in Algiers, is proposed. The model is based on a multiple linear regression analysis of descriptive results of visual investigations combined with in situ tests on the degradation of the facade paints of 45 buildings sample, selected according to their age, their distance to the coast as well as their orientation with respect to the climatic factor exposures. The proposed predictive model satisfactorily reproduces the field results.
Keywords: Paint Coating; Degradation; Service Life Prediction.

Manuscript ID: ICCAUA2023EN0258

Analytical Assessment of the Dynamic Thermal Performance of Building Flat Roofs in Semi-Arid Climates of Algeria

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Abstract
The work aims at the description of an analytical model, which allows the prediction of the thermal performance of the most commonly used buildings with flat roofs in the hot and arid climates of Algeria. The effect of an insulating layer in the flat roofs is addressed, by varying both its position and thickness. For this purpose, four insulation materials including expanded polystyrene, Glass wool, foamed polyurethane and foamed Palm Fiberboard are analyzed. Different thermal parameters, which are the time lag, decrement factor, factor surface, admittance and transmittance thermal, are investigated. Base on the results, it was determined that the best insulating performance was achieved in the case where three insulations of similar thickness were applied one on the roof's outside surface, the second was placed in the middle, and the third on the interior surface. These roof systems revealed a highest time lag point associated a lower decrement factor.
Keywords: Thermal Insulation; Flat Roofs; Dynamic Thermal Properties; Decrement Factor; Time Lag.

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Living Space Needs of an Elderly Person: Towards a Healthcare Design

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Abstract
In the past, medicine has not been interested in artistic practices and design. These disciplines converge towards the same interest, which is the improvement of the quality of life of the users. This article will be a collaboration between a doctor and a designer to study the living space of an elderly subject to improve his quality of life, preserve his autonomy and avoid his institutionalization as much as possible. This research proposes the analytical study of an existing living space of an elderly person to study the experience of the user about his new needs. Based on this analysis and the previous scientific research, we will propose a professional guide for the rehabilitation of an elderly person's living space, based on a standardized geriatric examination, to maintain his or her autonomy as long as possible.
Keywords: Design Thinking; Healthcare Design; Geriatric; Elderly; Rehabilitation.

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Urban Building Energy Modeling (UBEM) and Analysis

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Abstract
Today, all countries need to offer solutions to the effective use of energy in terms of the negative environmental impacts of the resources used in energy supply and energy self-sufficiency. To this end, energy-efficient design needs to be added to the main framework of the urban planning discipline. In order to produce solutions to these headings, modeling urban structures that have a great contribution to energy consumption and simulating energy demand on an urban scale are of great importance for the effective use of energy. In this study, a modeling framework for UBEM (Urban Building Energy Modeling) production has been established to provide solutions to the factors mentioned. Through this, it is aimed to create a practical model framework for analysing energy consumption on an urban scale, with realistic results.
Keywords: Urban Building Energy Modeling; UBEM; UBEM Approaches; Urban Energy Modeling; Energy Efficiency.

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Paper-Based Structures & Pop-Up Architecture: Challenges and Opportunities

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Abstract
Pop-up architecture encompasses ephemeral structures, built to be disassembled and reassembled. Among several available materials, paper is extensively used to build these temporary structures due to fabrication and sustainable reasons. Although by applying adequate production techniques paper can be used as a load-bearing component, its strength and durability might be compromised when exposed to environmental conditions. This paper aims at identifying the challenges of designing and implementing paper-based structures, as well as at unveiling the design potentials of using paper in pop-up architecture. In the first part, related literature and examples are reviewed to evaluate how rapid assembly, convenience of transportation, low-cost, less specialized labour in the production of components and in the assembly process, are parameters weighing in the choice of paper as structural material. The second part discusses selected case-studies, to show how paper-based components, connections, envelope insulation, transportation and assembly constraints are addressed to shape these temporary structures, thus becoming a source of inspiration for pop-up architecture.
Keywords: Pop-Up Architecture; Paper-Based Architecture; Paper Structures; Cardboard Construction.

Manuscript ID: ICCAUA2023EN0275

Quasi-Material and Quasi-Things as Elements in the Making of Atmosphere in Architecture

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Abstract
This paper discusses two important elements of material that construct atmospheric architecture, namely quasi-material and quasi-thing. This paper aims to explore the existence of quasi-materials and quasi-things in affecting the human sense and forming the atmosphere. It is argued that the existence of quasi-materials and quasi-things is important as both elements could shift focus in designing material from form-based into amorphic, immateriality. This study utilized cases as precedents of atmospheric architecture, which is analyzed for every quasi-material and quasi-thing that plays role in the construction of the atmosphere. The findings from the precedent analysis revealed that some quasi-materials such as light can be manipulated either by using casual types of media or through sophisticated instrumentations to produce specific quasi-things. This research proves that the materiality of architecture could be pursued through immateriality with the appearances of quasi-materials and quasi-things in the making of the atmosphere.
Keywords: Atmospheric Architecture; Materiality; Quasi-Material; Quasi-Thing; Human Sensory; Immateriality.

Manuscript ID: ICCAUA2023EN0277

Spatial-Functional Organization of A Contemporary Apartment in Serbia

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Abstract

The expansion of residential construction has marked the last two decades in Serbia. Contemporary housing construction is popularly called “investor construction”, and it is based on the investor’s influence on achieving the greatest possible capacity in relation to the area of the plot, the largest possible area for sale, as many apartments as possible per floor, the largest possible dimensions of the building on the plot, and the largest possible number of rooms within the smallest possible total square footage. The research’s aim is to discover how the aforementioned effects manifest themselves in the spatial-functional organization of the units. The analysis is performed on the case studies of residential construction in the largest urban areas of Belgrade, Novi Sad, and Nis. The findings of this research show that different authors repeat the same functional organization regardless of the location where they are constructed.

Keywords: Contemporary Apatment; Spatial-Functional Organization; Housing Unit Development; Housing Typology.

Manuscript ID: ICCAUA2023EN0282

The Process of Telling the Brand Story through Space Design in Interior-Brand Interaction: The Case of Decovita Etiler Showroom Store

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Abstract

The design of spaces that create an interaction area with the brand concept that makes an organization visible and unique plays an essential role in brand success. Especially in showrooms where human interaction is at the maximum, the design of the space-brand connection is critical. The process of telling the brand story through space requires analysis and research to understand the brand's values, history, culture, and vision to be reflected in the space. The stages of designing the brand-space interaction were analyzed through Decovita Showroom Store. As a result, the examined design stages start with evaluating the brand's story and the concept development phases. Then, the concept idea is designed by focusing on the brand's abstract representations, which leads to the color-texture choices and detailed decisions to be made through the space fiction.

Keywords: Interior Architecture; Branding Design; Story Telling; Concept Development.

Manuscript ID: ICCAUA2023EN0284

An Evaluation of Luxury Fashion Brands' Collection Promotion through Threshold Space: The Case of ‘Yayoi Kusama and Louis Vuitton Collaboration’

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Abstract

The designed showcases and facades of Fashion Stores have the function of threshold filters that can create the perception of shopping. For shopping, it is important that these filters give an understandable impression of the store as well as its attractive designs. In this study, the definition of "threshold space" is used for the storefront, storefront, and store window, which establish the relationship between interior and exterior through threshold filters. The threshold, which is a part of the space, can generally be specified as the entrance or the front of that space. The subject of this study is an evaluation of the striking threshold space usage in the promotion of the new collection of the Louis Vuitton brand in collaboration with artist Yayoi Kusama in 2023. The aim of the study is to remind space and art through threshold spaces through architectural discipline by saving them from the purely visible.

Keywords: Threshold Space; Stores; Storefronts; Facades; Display Windows; Threshold Filter; Perception.

Manuscript ID: ICCAUA2023EN0289

3D Modeling the Work Space with a Lidar Sensor-Supported Camera and Designing the Designs with Genius Loci Concept in Design Programs

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Abstract
Furniture, colors and designs used in work spaces affect working performance and quality of working life. This study works with the Genius Loci concept, which expresses the original atmosphere and air of the work space. The work space was scanned with a lidar sensor-supported camera as part of the study. The obtained scanning file was transferred to a computer platform and made usable with the relevant design program. The relevant design program made it easy to adjust and see the positive effects of the changes in the re-designed work space on work performance and the person using the work space after the changes in the re-designed work space were implemented. By referencing this study, the positive direct effect on performance increase in work space can be seen in the re-designed work space.
Keywords: Genius Loci; Lidar Sensor; 3D Designing; Architecture and Technology; Work Space.

Manuscript ID: ICCAUA2023EN0306

Architecture as Images: Using Collage as Space Construction Method

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Abstract
This research investigates architecture as images, using collage as a method of constructing space. It argues that architecture based on images perceive space as an overlapping and multilayered fragment of spatial and material elements. This study is conducted through a case study by analyzing six collage images of utopian architectural projects, breaking down layers that overlaps and constructed the images. The findings in this study demonstrate how space is having different narrative meanings which appear as foreground-background layers. The foreground layers appear as the main argument that has a larger scale which is positioned as the top layer, while the background layers appear on a smaller scale and are positioned as supporting elements. The study concludes that these findings can be used as a method in architectural design to create the meaningful narrative of space that exist in smaller diverse parts rather than as a generic whole.
Keywords: Architecture as Images; Collage Drawing; Narrative; Multilayer Fragments.

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Study and Analysis on the Maintenance Planning of Architectural Public Works, Built in the City of Azogues, Cañar Province – Ecuador

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Abstract:
The useful life of a work is conceived from the exploitation of the resources for the generation of materials, the design, the construction, the use and operation, the deterioration or demolition and possibly the recycling of elements; which is why at present there is an inherent need to plan the maintenance and conservation of the executed constructions, especially those destined for public equipment, granting a longer service time to the architectural and urban buildings built by public entities in the city of Quicksilver, criteria that contribute to sustainability with the proper use of materials at the time of construction and later a correct execution and maintenance plan to obtain a longer service time; planned actions that reduce construction costs in the long term and avoid deterioration that is sometimes irreversible and implies a high expense in repairs or the loss of the building.
Keywords: Planning; Maintenance; Public Works; Useful Life; Sustainability.

Manuscript ID: ICCAUA2023EN0321

Tabic Vaults: Tradition and Modernity, Jaoul Houses by Le Corbusier

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Abstract
This review article aims to analyze the constructive system of tabbed vaults in the Jaoul House of Le Corbusier through form recognition in order to understand the project's design process. A general overview is presented of tabbed vaults, from its possible origin to the early 20s where a sort of fusion between modernity and tradition begins to emerge, until the late 1950s when Le Corbusier would project the Jaoul houses in Paris, after a process of knowledge related to the experience of others and the recognition of formal values of architecture through his travels from the Mediterranean to America. The obtained bibliographical information as well as the digital reconstruction method allowed for an understanding and drawing of conclusions in relation to the design decisions in the Jaoul houses. The research revealed that after several operations and inherent conditions to the project, Jeanneret managed to settle for the tabbed vault system, in a time where he was able to have the criteria and experience to tackle this constructive method.
Keywords: Architectural Design; Vaults; Reinforced Ceramics; Architecture; Le Corbusier, Vaulted Ceilings; Detail; Modern; Tradition.

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Louis Kahn and his Architectural Principles: Influence on the Work of the Architect Barragán Doumet

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Abstract
The general objective is to compare the architectural criteria used by Louis Kahn in projects by Milton Barragán D., based on the analysis and identification of projects developed with these arguments, allowing to establish the criteria of the modern movement in the composition of the project, from case studies. With the antecedent of the Modern Movement in the 60s and 80s in Ecuador the architectural influence of Louis Kahn through the designs of Artigas and Ciespal Buildings projected by Milton Barragán, adopt principles of modernity present in their materiality and universality. Helio Piñón describes in this way, the task "given a building to look for. The methodology is based on the book The Modern Project by Cristina Gastón and Teresa Rovira, facilitates the process to the researcher, indicating paths, surveying procedures, systematizing results, with a descriptive analysis through bibliographic reviews and a graphic analysis will allow to understand the architectural criteria used in the project.
Keywords: Louis I. Kahn; Architecture; Modern Movement; Milton Barragan D.

Manuscript ID: ICCAUA2023EN0330

Homeowners' Willingness to Install Green Roofs in Existing Residential Buildings – An Empirical Study in Hong Kong

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Abstract
Green roof installation is regarded as one of the urban nature-based solutions to multiple challenges facing contemporary cities. In spite of the active promotion by the government, green roof installations seem to be not popular among owners of existing buildings in Hong Kong. This study aims to explore the factors affecting homeowners' willingness to install green roofs in their residential buildings, and identify the barriers to the promotion of green roof installation in the city. Mixed approach, encompassing a structured questionnaire survey on homeowners and in-depth semi-structured interviews with representatives of owners' associations and property management agents, was adopted for data collection. The results reveal that homeowners are less motivated to install green roofs due to the lack of environmental awareness. Inadequate financial incentives and building safety concerns also deter homeowners' willingness. Policy and practical implications of the research findings will be discussed.
Keywords: Green Roofs; Nature-Based Solutions; Willingness; Building Safety; Incentives; Green Buildings.

Manuscript ID: ICCAUA2023EN0337

Origami Inspired Deployable Structures: Future Mobile Healthcare for Low Resource Settings

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Abstract
Deployable structures may be defined as systems that can be packed, stored, transported, and then deployed or assembled into functional configurations. The potential applications of deployable structures include portable or modular buildings, scaffolding, bridges for construction sites and stages for events, spacecrafts with deployable solar panels, antennas, etc., tent systems for disaster relief shelters, and medical equipment such as collapsible hospital beds, examinations tables. The literature suggests many more applications but there is a gap of how to achieve such systems from a design perspective. This paper takes deployable mobile clinics as an example to delve deep into the product design, development and deployment inspired by the ancient art of origami.

Keywords: Architectural Design; Origami; Mobile Primary Health Center; Healthcare Delivery Model; Healthcare System; Low Resource Settings.

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Deployable Structures: A State of the Art Review

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Abstract
Deployable structures are structures that can be easily transported, assembled, and disassembled, making them ideal for use in a variety of settings, including disaster zones, outdoor events, construction sites, and remote locations. These structures range from small, lightweight pop-up tents and inflatable structures, to large, metal folding containers and modular buildings. To design effective deployable structures, engineers must consider factors such as ease of assembly, durability, and cost-effectiveness, as well as incorporating design elements such as the principles of origami or other folding patterns. With the increasing demand for flexible, portable structures, the field of deployable structures continues to evolve, offering new and innovative solutions for a wide range of challenges. This article discusses literature on deployable structures taking examples from different domains and applications. The findings of this study in term of approach to design deployable structures based on the context of use will serve as a library for future innovations.

Keywords: Deployable Structures; Origami; Mobile Primary Health Center; Healthcare Delivery Model; Healthcare System; Low Resource Settings.

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Designing Mobile Primary Health Center: Does the Form Follows Function?

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Abstract
A late 19th century principle of design “Form follows function” states that the form of an object must primarily relate to its intended function, is still a debate. As Víctor Papanek, an industrial designer of 20th century and a proponent of “form follows function” once said - “Design must be innovative, highly creative, cross disciplinary which makes it responsive to the needs of the user and this can be achieved with a more research-oriented mindset.” This article synthesizes several mobile health units design and architecture through the lens of form follows function. The findings of the study states that there is a mix of both form follows function and vice versa and both has different impacts on the efficiency of the system designed. Thus, we propose the best ways to follow depending on the sub systems to be designed for a mobile Primary Health Center for far flung regions.

Keywords: Form; Function; Mobile Primary Health Center; Healthcare Delivery Model; Healthcare System; Healthcare Infrastructure Design.

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Creating Polysemic Spaces: The Domotic Model

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Abstract
Polysemic spaces are concerned with the size and scope of approved services to ensure functionality and ease of use. Through smart buildings that integrate communication systems, information technology, comfort and security together according to user needs and adapt to external conditions and environmental requirements, using the latest technology the buildings are automated, accommodate the surrounding environment, respond and interactive environment, it monitors external and internal changes and user requirements, through groups of cells, after extrapolating variables and identifying the user's wishes, such data is sent via local networks to the database for decision-making in accordance with their advance feeding. Through smart buildings, air quality, heating and lighting costs can be managed optimally according to the number of individuals.As a result, we try to think tightly about product design and provide inherent readings in technological innovation by following a small design philosophy. This study constitutes a reflective approval derived from the interactive devices' experience in the development of responsible and ethical products. In addition to trying to show the contribution of polysemic spaces through some modifications to current technology, we may be able to broadcast interactive and multi-meaningful spaces. In the social dimension so that it is a vector of harmony inside the house. How do digital and new technologies contribute to the evolution of the creative process in smart buildings?
Keywords: Polysemic Spaces; Functional; Working Environment; Modern Technology.

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Technological Innovation in Earth Constructions: Prefabrication and 3D Printing

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Abstract
This article focuses on the use and application of innovative technologies and tools in earth construction processes. It reviews the evolution of the rammed earth construction system towards prefabrication and the use of 3D printing technology for the production of pilot housing prototypes. In order to validate earth construction as a modern and viable material, several recognized and award-winning works and prototypes at a global scale are collected and analyzed. These case studies utilize earth as the initial raw material for prefabrication and 3D printing, thereby identifying the best technique that can be transferred to a developing country such as Ecuador. The results of this research serve to highlight earth construction as a modern, alternative, and viable material that responds to current demands for sustainability, energy efficiency, and housing deficits.
Keywords: Earth Construction; Architecture on Earth; Clay; 3D Printing with Earth; Prefabrication with Rammed Earth.

Manuscript ID: ICCAUA2023EN0343

How Can Buildings be Restored and Renovated Using Biophilic Architecture

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Abstract
Is there more to "restoration and rehabilitation in design" than just hospitals and healing gardens ? Can those healing spaces be incorporated into the working and living spaces to treat the psychological issue at its root? In order to attain sustainability in terms of quality of life within the immediate built environment, the major goal of this study is to examine the techniques and advancements of biophilic design with respect to therapy and restoration. This study examines mental health difficulties within the built environment .Biophilic design has attracted attention and is now viewed as a tool for bridging the gap between people and nature. Biophilic design is considered to be an amplifier of innovation in the framework of job efficiency and effectiveness inside the indoor environment. The goal of the study is to incorporate biophilic design and retrofitting techniques that can enhance cognitive function and promote mental calmness in the building sector.
Keywords: Biophilia; Biophilic Design; Built Environment; Restorative Environment; Sustainability; Sustainable Architecture; Well-Being.

Manuscript ID: ICCAUA2023EN0348

Comparison of The Behavior of the Thermal Envelope in Single-Family Homes with Concrete Block Masonry, Carried out in the City of Gualaceo, Azuay-Ecuador

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Abstract
In Gualaceo, residential construction maintains constant growth. With construction systems, varied in their materiality, the concrete block, brick, bahareque and tapial, determine comfort within each home, thus the average ambient temperature of 16 ° C, can vary at certain times of the year. In order to understand the behavior of the thermal envelope in single-family homes, seven-bedroom samples with similar characteristics have been taken in one day, to meet the standards in accordance with the Ecuadorian Construction Standard (NEC). The values reached, in hours of higher temperatures, the mud walls showed only an excess of 3.5% with respect to the acceptable thermal comfort, unlike the concrete block that showed an increase of 32.10%. Which allows us to conclude, the need for new construction systems and policies that help to obtain an adequate thermal comfort inside the dwelling.
Keywords: Materiality; Comfort; Thermal Envelope; Concrete Block.

Manuscript ID: ICCAUA2023EN0354

Application Research of the "Undefined Blank Space Design Method" in Residential Interior Design - A Case Study of Interior Space Design in a Residential Community in Wuhan

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Abstract
In China's intensive urban development and the post-pandemic era, the value of residential housing is increasingly emphasized. However, capital constraints limit the spatial requirements of residential interiors, leading to repetitive constructions lacking individual value and spatial flexibility. This study intervenes in space by expanding the traditional concept of "blank space" through empirical design research on the interior of a residential community in Wuhan. We propose a compact residential space design method based on the "undefined blank space" concept, aiming to coordinate the interior space hierarchy of commodity housing and diverse individual demands. Results highlight that the removal of non-load-bearing walls maximizes the individuality and flexibility of space. Variable combined blank interfaces enable the space to fit multiple usage scenarios. The use of transparent materials can blur spatial boundaries to make it more open. Physical blank spaces and spiritual needs must be combined to truly achieve individual demands.
Keywords: Blank Space; Undefined Blank Space; Residential Interior Design; Individual Value; Spatial Flexibility.

Manuscript ID: ICCAUA2023EN0367

Assessing the Impacts of Climate Change on Industrial Building Energy Performance

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Abstract
Buildings are responsible for a significant portion of global greenhouse gas emissions and are a critical component in achieving climate neutrality. Researchers have focused on finding energy-efficient building envelope designs to reduce the energy consumption of buildings. However, the majority of studies did not take climate change into consideration. It is clear that more studies should be carried out to investigate the energy performance of buildings under climate change conditions. This paper provides a brief review of relevant studies and highlights the need for further investigation. Specifically, this study analyzes the energy performance of a prefabricated industrial building, considering climate change conditions, using EnergyPlus simulation software. The results of the study demonstrate that, due to climate change, the heating energy demand of buildings is predicted to significantly decrease. The results of this study are expected to inform strategies for reducing the carbon footprint of industrial buildings in a changing climate.
Keywords: Climate Change; Industrial Buildings; Heating Energy; Energy Performance.

Manuscript ID: ICCAUA2023EN0382

Aesthetics of Architectural Taste in the 21st Century: A Review of Award-Winning Projects in the Context of Environmental Aesthetics

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Abstract
Since the nineteenth century, the world of architecture has evolved into a new dimension along with the developments and changes in science, technology, and philosophical systems. The ever–changing perspectives of architects and associated forms may be indicative of a novel aesthetic taste especially in the last few decades. There is a limited number of studies with clear statements on architectural aesthetics in the literature. It proves to be difficult to reach a consensus because aesthetic judgments are highly diverse and particular. Nevertheless, Arthur Earl Stamps, a leading expert in environmental aesthetics, introduced a new perspective towards this issue. In his approach, which is based on elimination of ambiguous and obscure concepts in the assessment of the aesthetic aspect of architectural design, Stamps suggests new concepts, i.e., the "clear concept", where the visual aesthetic aspect can be more clearly understood and expressed. The present study aims to understand the aesthetics of architectural taste in the 21st Century based on Stamps' theory. Accordingly, 12 projects that received the Riba Stirling Award between the years 2010 and 2022 were reviewed using the concepts introduced by Stamps. The results are indicative of the fact that subtle and elegant lines, modular layouts, more comprehensible forms instead of complex and chaotic forms were preferred, and openings are attached an increased importance in proportional terms to strengthen interior-exterior relations.

Keywords: Aesthetic; Architectural Design; 21st Century; Award-Winning Projects.

Manuscript ID: ICCAUA2023EN0387

The Implication of Shading Passive Strategies in Buildings of Hot and Humid Climates for Energy Optimization: Lessons from Traditional and Vernacular Dwellings in Nigeria

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Abstract
The contemporary designs of multi-story buildings in Nigeria borrow from different climates and adapt to Nigeria's hot and humid climate. Shading is an effective strategy for reducing solar heat gain and improving cooling condition in hot and humid climates. This study tries to explore the most effective shading elements in the study area to be implicit in a contemporary design of multi-story residency. The aim of this research is to minimize energy consumption in residential buildings in (Nigeria). Therefore, the research investigates the most effective shading strategies in the traditional and vernacular buildings that can be utilized as design criteria in future buildings. The findings led to identifying the appropriate shading strategies found in traditional and vernacular architecture, which can be utilized in contemporary multi-story residential building in Nigeria for energy optimization. Finally, the research suggests guidelines to support architects to reduce energy usage in multi-story buildings in Nigeria

Keywords: Shading in Building; Building Energy Optimization; Traditional and Vernacular Architecture; Hot and Humid Climate; Nigeria.

Manuscript ID: ICCAUA2023EN0391

Salutogenic Architecture Design Criteria for Healthcare Centres in Kenya

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Abstract
This paper aims to look into the significance of salutogenic theory in architectural design. Healthcare centers have been selected not only because of being the most prone area for spreading the infection but also because of the psychological effects of diseases on the human being. There is a strong correlation between the patient and his environment. The paper analyses the architectural elements that may influence patient health, using salutogenic architectural design theory. This paper looks at various salutogenic design models and extracted factors that can be applied to design. Successful case studies were used to analyze the strength of these design factors. Case study methodology has been approached to determine salutogenic factors that are applicable in Kenya. The results of this paper can be used as a guideline for designers of healthcare facilities in Kenya, and the finding can be extrapolated.

Keywords: Salutogenic Architecture; Healthcare Centers; Architectural Design; Kenya.

Manuscript ID: ICCAUA2023EN0393

Arguing Faux Biophilia Concepts in F&B Interior Design; A Case Study Applied in Duhok City in Kurdistan Region of Iraq

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Abstract:
Implementing biophilic design became a challenge yet a visual/commercial trend and is sometimes used as a style in interior design. In contrast, the field is constantly growing and driven by a desire to improve life and living qualities in human interior spaces. This paper aims to investigate the effectiveness of biophilic design in promoting well-being. The study assesses the psychological impact of actual versus faux biophilic interior design on user experience by surveying 150 customers from six restaurants and coffee shops. By examining user perceptions of biophilic design, this study provides valuable insights into the implementation and misuse of this concept in interior design. Specifically, this research seeks to answer the question: What is the psychological impact of actual versus faux biophilic spaces on users' well-being? The findings of this study contribute to the ongoing discourse on biophilic design and its role in promoting well-being in interior design, providing recommendations from the collected and analyzed data.

Keywords: Biophilic Design; Well-being; Interior Design; Design Psychology.

Manuscript ID: ICCAUA2023EN0122

Exporting China's Architectural Aid to the Global South: Types, Distribution, and Drivers

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Abstract:
After World War Two, modern architecture was disseminated worldwide by western architects. However, the role of China's architectural aid to the Global South has been largely overlooked. This paper explores the facts of China's architectural aid from three aspects: types, distribution, and primary drivers, based on a dataset of 766 relevant projects since 1949. Through quantitative and descriptive analysis by inductive reasoning, the results argue that China's architectural aid is mainly composed of five types: buildings for education, conferences, healthcare, sports, and public culture. Most of China's architectural aid is in Africa and Asia, with Oceania and Latin America as the rising focus. Regarding drivers, China's policy is validated to be the stronger determiner through the spatiotemporal dynamics and the achievements in diplomatic relations. Besides, inspired by development geography, China's architectural aid has a significant correlation with the development needs of the recipients in the Global South, which can be measured by the Human Development Indicator (HDI), Gross Development Product (GDP), and Global Quality Infrastructure Index (GQII) through linear regressions. Constructing a comprehensive and systematic picture of China's aided buildings can give designers, researchers, and policymakers fresh insight into the impacts and further tendencies of China's overseas architecture.

Keywords: China's architectural aid; Global South; Architectural types; spatiotemporal distribution; diplomatic policy; the development ability.

Manuscript ID: ICCAUA2023EN0392

The Relationship Between the Visual Identity of Graphic and Interior Design and the Place-Making of Interior Spaces

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Abstract:
The place arises as a result of the relationship between the elements of the surrounding natural and artificial environment, and to realize the place requires spatial boundaries and a visual identity that arises from the interaction of the individual with this environment. The aim of the study was to reach the principles of placemaking and the impact of the visual identity of interior and graphic design on interior spaces. The research problem was illustrated by the lack of clarity of interior and graphic design strategies that should be taken when designing the visual identity of interior spaces. The study followed the descriptive analytical approach by analyzing different models to achieve visual identity when making the place for the interior spaces, and the result of the research was to develop strategies to design the visual identity of the different internal spaces derived from the surrounding environment, which achieves the manufacture of the place.
Keywords: Placemaking; Visual Identity; Graphic Design; Interior Design.

Manuscript ID: ICCAUA2023TR0016

Investigation of Passive Design Criteria in terms of Thermal Comfort and Energy Consumption for Mosques: Istanbul Case

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Abstract
The thermal comfort level of the mosques affects the prayer efficiency, the activity duration and the health of the users. Also, it is an important parameter to keep energy consumption at a minimum level while providing acceptable thermal comfort in the indoor environment. In order to ensure thermal comfort and to use energy effectively, it is necessary to pay attention to passive design criteria in the design process of mosques. Within the scope of this study, design criteria such as location, environment variables, building form, plan scheme, etc. were investigated according to the regulations and standards, manuscripts in the literature. This paper will be a base for researchers in future studies on mosques.
Keywords: Thermal Comfort; Mosque; Religious Building; Building Envelope; Building Type.

Camilerin Isıl Konfor ve Enerji Tüketimi açısından Pasif Tasarım Ölçütlerinin İncelenmesi: İstanbul Örneği

Özet
Camilerin ısıl konfor düzeyi kullanıcıların ibadet verimini, aktivite süresini ve sağlığını etkilemektedir. Ayrıca, iç mekanda kabul edilebilir ısıl konfor sağlanırken enerji tüketimini en az düzeyde tutmak önemli bir parametredir. Isıl konfor sağlamak ve enerji tüketiminin etkin şekilde kullanmak için camilerin tasarım sürecinde pasif tasarım ölçütlerine dikkat edilmesi gerekmektedir. Bu çalışma kapsamında konum, çevre değişkenleri, bina biçimi, plan şeması gibi tasarım ölçütleri literatürdeki makaleler, standartlar ve yönetmeliklere göre incelenmiştir. Bu çalışma camiler üzerine yapılacak gelecek çalışmalar ve araştırmacılar için bir altlık oluşturacaktır.
Anahtar Kelimeler: Isıl Konfor; Cami; Dini Yapı; Yapı Kabuğu; Bina Türü.

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BOOK OF ABSTRACTS
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SESSION B: Sustainability and Urban Design

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LULC geospatial OLI/Landsat -7 -8 -9 analysis of Sitakunda Container Depot: MLE and Kappa accuracy for Coastal Urban Sprawl and Infrastructure Change

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Abstract:
This research has studied the Land Use/Land Cover (LULC) change over a coastal-industrial area of Sitakunda, Bangladesh from 2009 to 2022. Using Landsat/OLI programs and 117 ground points, the LULC was supervised by a Maximum Likelihood Classifier. Six drivers were identified: Built Up (BU) Terminal, BU Infrastructure, BU Other Deports, BU Ancillary/Generic, Vegetation/Barren Land and Forest. The LULC change was measured through Kappa (K) coefficients, and Overall Accuracy (OA) $q_{1/4}$- $q_{1/3}$ thresholds [47.59, 94.54 %], which showed an increase in BU Infrastructure, BU Other Deports and BU Ancillary, and a decrease in Vegetation/Barren Land and Forest. The accuracy of the LULC was tested through Pearson correlation, which highlighted inconsistencies, particularly in BU Ancillary. Unsupervised Classification clustering was used to compare the pre- and post-fire LULC datasets. The inter-class spectral separability was analyzed through Maximum Likelihood Classification (MLE) Composite bands classification and its electromagnetic signatures, together with related linear regression.

Keywords: International Safety Management Code; Digital forensics; LULC; Remote sensing; Fire Risk; Life Cycle Assessment (LCA); Environmental Impact Assessment (EIA); Strategic Environmental Assessment (SEA): Port area; Logistics; Coastal settlements; Habitat II United Nations.

Manuscript ID: ICCAUA2023EN0018

Hosting Mega-Events in Developing Countries: A Way to Greening Cities

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Abstract
Organizing large-scale urban events have become part of a deliberate urban policy strategy to promote local economic growth and put the host city on the world agenda. Mega-event strategies have an effective impact on host cities and have drawn an increasing interest. Thus, the paper addresses the strategies that can produce a catalyst effect in cities and lead to sustainable development to balance economic, social and environmental approaches on the long term. The main problem is that Egypt, as a country, has several potentials to host large-scale mega events and to benefit from these events by developing its cities to be sustainable. However, this cannot be achieved due to the slowdown of action plans for development and consequently, the event is delayed or cancelled. The main aim of the study is to explore the positive issues associated with mega-events in cities environmentally, socially, economically and how these principles could be adopted on the local scale to transform the image of the Egyptian cities to be a powerful instrument on the global agenda.

Keywords: Mega-Event; Economic; Environmental; Social; Sustainable Development; Green Cities.

Manuscript ID: ICCAUA2023EN0025

A Manual for Reducing Heat in Jeddah's Urban Parks to Enhance Elderly's Experience

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Abstract
This thesis focuses on improving urban parks to enhance elderly experience. It analyzes their physical and emotional needs and delves into ways to enhance their experience in Jeddah's parks. The target users were both the elderly, aged 65 and above, and their companions. Using qualitative and quantitative methods, needed information was gathered from both groups. Statistics were analyzed and showed that heat was a common factor affecting the user experience in parks. To acquire solutions, precedent studies were analyzed. The aim of this research is to fill an existing local gap by researching thermal comfort, and ways to combat heat in parks. This research will provide stakeholders with a manual that serves the aforementioned aim. According to the case study, implementing better shading systems, misting systems and increasing vegetation are keys for enhancement. The changes proposed will aid in improving the quality of life for citizens and encourage healthy living.
Keywords: Elderly; Exhaustion; Urban Parks; Heat; Vegetation; Manual.

Manuscript ID: ICCAUA2023EN0027

Urban Spread and Land Issues. What Challenge For Algerian Cities? Example of The Oran Agglomeration

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Abstract
In this contribution, our objective is to highlight some land consumption strategies through urban sprawl and new reassignments of land use planned around Algerian cities. Through the example of Oran, our goal is to understand the new forms and new functionalities of the urban spaces produced around this metropolis. After an observation in the field and a targeted bibliography research, we will establish spatiotemporal reconstruction of the urbanized plots in the peri-urban spaces of Oran based on graphic planning documents and satellite images. A field survey with semi- structured interviews will be carried out in order to highlight the land logics of urban extension. In Oran, urban sprawl is accelerated, land issues call for land grabbing strategies resulting in a functional incompatibility between planned spaces and produced spaces in newly urbanized areas.
Keywords: Urban Extensions; Land Strategies; Peri-Urban Land; Planned Spaces; Product Area; Algeria.

Manuscript ID: ICCAUA2023EN0029

Algorithmic Design for City Metabolism: A Holistic Approach towards Sustainable Neighborhoods; Urban Para-cell

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Abstract
City Growth through urban sprawl will reach 68% by 2050 as estimated by the UN. Addressing SDG 11, Sustainable cities and communities, this research undertakes the concept of 'divide & conquer' starting with the city cell; the neighborhood, in order to enhance dealing with various and ever-changing urban variables or parameters. The study consolidates three main perspectives of a sustainable city. The first, is "holistic city" approach that considers intangible factors to be presented in culture and technological advances serving a livable city. The second, is "city metabolism" to quantify the inputs and outputs of resources in terms of sustainable neighborhood LEED certification criteria. Third, is "algorithms" to enhance neighborhood sustainability through parametric patterns and strategies demonstrated with "Force-field" as a Pattern for maximizing open view to a central green area and "Voronoi Tessellation" as a strategy for articulating blocks design while promoting a unique identity to each block and enhancing ventilation for a comprehensive optimization. Simultaneously, metabolic neighborhood inputs and outputs are refined to establish a holistic ecological integration through measuring tangible parameters.
Keywords: Urban Paracell; Sustainable Cities; City Metabolism; Algorithmic Design; SDG's.

Manuscript ID: ICCAUA2023EN0039

Towards an Economic Efficiency of the Space of the Public Place: Case of the Public Places of City of Biskra/ Algeria

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Abstract
The public place is not just a simple public outdoor space for the circulation and meeting of townspeople, it is to create a set of psychological reactions and to grow the notion of urbanity. The use of the public place relates to the entire life cycle of townspeople. It concerns the practices and uses implemented by all parties in the public place. This communication seeks to find out how and by what means to optimize the economic efficiency of the public place space from its landside. That is to say, to account in the medium and long term for the land reserved and consecrated for public place in a city or town in general. Through this research, we will try to see the different possible forms of optimization relating to activities, land and the form of the public place, while looking for the appropriate form of optimization for the public place of the city of Biskra / Algeria, a city in a semi-arid zone.
Keywords: Public Place; Use; Efficiency; Optimization; Economic Efficiency; Arid Zone.

Manuscript ID: ICCAUA2023EN0047

Phenomenology Theories' Contribution in Succeeding the Landscape Architecture Design for Bahraini Reserve: Dohat Arad Ecological Reserve as a Case Study

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Abstract
On different occasions, many ecologists and landscape architecture designers believe that using Phenomenology theories in contemporary design ideas will create a unique ecological design. While talking about the ecological reserve parks, many voices call for the high care of such parks. Dohat Arad, a Bahraini ecological reserve, is a proper witness to such a dilemma as a case study. In the pilot study, it was found that there are conflicts while designing and applying. The dilemma becomes serious while examining the Phenomenology theories' in selecting the materials in terms of cost and suitability. The research discusses the Phenomenology theories' contribution using contemporary design ideas to attract economic, social, and civic activities for the parks. Moreover, using the proper landscape architecture elements that determine the Phenomenology theories' will produce a more sustainable environment matching the 2030 Bahraini strategic master plan.
Keywords: Landscape Architectural Design; Preserved Parks; Phenomenology; Ecology.

Manuscript ID: ICCAUA2023EN0057

An Essay on Past, Present, and Future Approaches to the Change in Public Life

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Abstract
This study examines how public life has evolved in past, present, and future. The study aims to reveal the evolution of public life through the changing concepts of literature. After describing the literature as a chronological and comparative study, the critical sources for each period were preferred. Word frequencies were detected using Python programming language. It concentrates on the sociology of daily life for the past period, the information age for the present, future cities, and urban utopias for the future. Within these three axes, everyday life and public space are ordinary concepts. Sources were chosen based on the number of citations in WOS and Google Scholar. In the sources reviewed from the past, the conceptions of time, alienation, and individualization were attained. While the network society, Technological Revolution, capitalism, innovation, and artificial intelligence revolution stand out in today's analysis, sustainability, novelty, utopia, and dystopias were reached for the future.
Keywords: Everyday Life; Public Space; Word Frequencies; Conceptual Review.

Manuscript ID: ICCAUA2023EN0058

Discussion on The Future of Public Life via Cinema

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Abstract
This study is based on the question of how the daily relations in the public space will be in future cities and aims to make inferences about future life and assess utopian and dystopian studies on this topic. The methodology of the study is a sociological analysis of movies. In this study, prepared with an interdisciplinary approach, an issue at the intersection of space science and sociology is discussed through cinema movies. The study delves into films about the future and community life in terms of genres, subjects, and fiction. Human and space technologies, human relations and basic social concerns impressed in the fundamental fiction with an interpretive and critical approach. Although various utopian or dystopian subjects are addressed in these films on the future, in most of them, life and technology are intertwined. In fundamental fiction, alienation in human relationships and differing perceptions of time and speed emerged.
Keywords: Everyday Life; Public Space; Urban Life in Movies; The Future of Everyday Relationships.

Manuscript ID: ICCAUA2023EN0071

City Sediments in Beirut: An Urban Ecology Perspective

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Abstract
Cities are products of urbanization processes, economic changes, technology and climate change. Adversely, in specific contexts, they are affected by wars' enduring physical effect, long after armed conflicts are over. Hence cities are perceived as dynamic organisms, in continuous change of spatial abandonment, neglect and regeneration process, unfolding a continuum of space and time. In tandem between urban ecology and the urban history specificities, this paper addresses Beirut as a case study in its actual condition, and the different representations of the informal resurgence of green areas. It follows a methodology of identification, mapping and categorization of the different urban sediments which constituted over time potential reservoirs for urban ecology. These include previous war demarcation line, train tracks traces, cemeteries, destroyed wheat silos following the 2020 port explosion and other liminal spaces. This approach brings in a new perspective for approaching urban ecology differently according to the urban contexts historiography.
Keywords: Urban Ecology; Beirut; Urban Sediments; Dynamic Organism.

Manuscript ID: ICCAUA2023EN0073

The Landscape and Biophilic Perspectives of the New City of Guelma Hdjar El Mangoub

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Abstract
Biophilic design is a human-centered approach that seeks to strengthen our connection to natural processes within the urban space. The new city of Guelma: Hdjar EL Mangoub is characterized by breathtaking landscapes, beautiful mountains and strong vegetation. In this sense, it is a question of researching and showing the extent to which natural elements are taken into consideration in the development of this new city as essential elements of its urban design. The adopted methodology serves to define the key frameworks of urban design according to a biophilic approach. The results obtained show the presence of a biophilic design defined by the first experience of nature.
Keywords: Biophilic Design; Nature; Public Spaces; Building; Landscape; Algeria.

Manuscript ID: ICCAUA2023EN0080

Urban Design Impact on Local Climate And its Consequences on Building Energy Demand in Morocco

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Abstract
Urban design has a profound impact on the local climate, which can result in changes in temperature distribution and energy demand. The Urban Heat Island (UHI) effect, a well-documented phenomenon where urban areas experience higher temperatures compared to their rural surroundings, is closely tied to urban design and the form and layout of buildings and streets. This increase in temperature can lead to increased energy consumption, particularly for air conditioning, as populations strive to maintain thermal comfort. To better understand the impact of urban design on the UHI effect and building energy demand in Morocco, this study employs the use of the Urban Weather Generator (UWG) and Energyplus, a building energy simulation software. The results will provide valuable insights into the most effective urban design strategies for different climate zones in Morocco and contribute to a growing body of literature on the subject. The UWG was used to generate synthetic weather data for each of the different urban design scenarios, including building height and geometry, street layout, and green spaces. The resulting weather data was then used as input for the building energy simulation software. The simulation software was run for different climate zones in Morocco, including hot and dry, warm and humid, and temperate climates. The results of the simulation provided information on the UHI effect in different urban settings and the impact on building energy demand. The results were analyzed to determine the most effective urban design strategies for reducing the UHI effect and building energy demand in different climate zones in Morocco. The study's results contribute to a growing body of literature on the relationship between urban design and the local climate, and the impact on building energy demand.

Keywords: Urban Forms; Urban Design; Urban Heat Island; Building Energy Simulation; Urban Weather Generator.

Manuscript ID: ICCAUA2023EN0081

A Shift towards E-Mobility in India: Challenges and Innovations

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Abstract
The shift towards electric mobility (e-mobility) in India is driven by the need to mitigate the significant environmental impact on the road sector caused by extensive rise in urbanization and commuter traffic. This accounts for 80% of total emissions, including 60% of greenhouse gas emissions only from vehicles. To address this problem, the paper gives an overview of current e-mobility trends, practices, and innovations, as well as the policy imperatives required to encourage the growth of sustainable transportation options in India. The study argues for the need to adopt a strategic approach to energy and mobility systems, with an emphasis on affordability and availability, and highlights significant obstacles and potential for e-mobility solution implementation in India.

Keywords: E-Mobility; Policy Imperatives; Sustainability; Affordability; Availability.

Manuscript ID: ICCAUA2023EN0084

Place Attachment of Shoppers: A Study of Palms Mall, Ibadan, Nigeria

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Abstract
The shopping mall has emerged in the city of Ibadan. This development is expected to evoke certain meanings in the minds of the users. Yet, no studies have examined its impact. This article reports an empirical study of the first mall in the city. It aims to model the relationship between the physical characteristics of the mall, the activities of shoppers, and place attachment. Quantitative data from 350 useable questionnaires were analyzed using descriptive statistics, and categorical regression, while qualitative data from 20 adult shoppers were analyzed using content analysis. The results of the study show that both activities and physical attributes of the mall significantly predicted attachment to the mall. Aesthetics and mall consumption were the most important dimensions of the physical attributes and activities of shoppers respectively. Qualitative results corroborated these findings. This study has implications on future designs of malls that will respond adequately to user needs.

Keywords: Place; Physical Characteristics; Activities; Place Attachment; Shopping Mall; Meaning.

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The De-Sealing Plan as a Tool for Adaptation to Climate Change: The Case Study of Brescia (IT)

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Abstract
Progressive climate change is transforming our space: urban heat waves and extreme weather events are increasingly frequent and damaging to infrastructure and settlements. Cities are the key actors in reducing climate change's causes and impact. How can local urban planning contribute to this? This paper aims to propose a de-sealing plan for the city of Brescia (Italy). The plan's goal is to identify areas of the city most suitable for de-sealing interventions that will help solve critical urban hydraulic problems, decrease urban heat islands, and improve the urban landscape by creating new open and green spaces. Suitability levels are identified through the analysis of risk from heat waves and hydraulic criticalities identified in the area. The map returns four areas with very high suitability levels that will later be further investigated for the identification of sites on which to apply nature-based solutions.
Keywords: Climate Change; Urban Heat Waves; De-Sealing; Nature-Based Solution.

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Analyzing Modern Public Interiors through Passages and Bazaars in Kemeraltı, İzmir

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Abstract
Passages and bazaars, examples of public interiors, are the building types where many functions coexist as well as social and economic needs are met. The study aims to analyze the urban, architectural, social and cultural patterns through the modern public interior spaces with special reference to passages and bazaars built after the 1960s. Within the scope of the research, the characteristic commercial buildings of the period, Havuzlubey Bazaar (1961), Şan Passage (1968) and Salepçioğlu Foundation Bazaar and Office Building (1971) located in the historical Kemeraltı Bazaar in Izmir, were considered as case studies. The method of this study includes a literature review, on-site observation, photography shooting, and analysis of the architectural and interior characteristics of the buildings. Thus, the study will raise awareness about the importance of passage and bazaar structures, which can be defined as modern public interiors in urban memory.
Keywords: Modern Heritage; Modern Public Interiors; Passages and Bazaars; Kemeraltı Bazaar; İzmir.

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Evaluating the Role of City Improvement Trusts or Boards in Shaping Salutogenic Character of Urban Areas: Case of Bangalore City

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Abstract
The city of Bangalore sprawls over 741 sqm and is likely to grow consistently in the coming decades with approximately 100 million USD in investments committed in 2022. With climate changes and post Pandemic regulations- the city of 13 Million people is facing a challenging situation where the quality of life-particularly health, needs to be balanced for all its residents. This paper aims to examine the role and scope of the City's Improvement Trust in shaping its salutogenic character. This paper reviews the framework from which the Trust derives authority, the models of operation, its criticism from the public domain, and its ability to meet future challenges. This research uses Case Study method to understand- the diverse parameters defining the role of City Improvement Trust, its limitations, and to develop a matrix for the same. The paper concludes with guidelines for the future of such bodies in metropolitan Indian cities.
Keywords: Urban Design; City Improvement Trusts ; Post-Covid City; Salutogenic Urban Design; Bye Laws; Climate Change.

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The Sprawling Tales of Two Cities: Kolkata, India and Dhaka, Bangladesh

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Abstract
The two megacities Kolkata, India and Dhaka, Bangladesh are analogous in terms of their riverine genesis, tropical climate and location in the deltaic plains created by River Ganges and Brahmaputra. For more than three hundred years, both the cities have urbanised to megacities due to strategic locations and patronage from reigning authorities. The research investigates facets of the urban sprawl and compares the evolving pattern till date, through primary and secondary investigations, to understand factors that have rendered the present status to each of these two cities. It is seen that such classical and organic cities are still breathing because of some inherent good planning practices. The wider implications of the research are to formulate directions from these good planning practices and learn from the adverse ones so that many more historical cities can imbibe these sustainable praxes in the management of urban sprawl.
Keywords: Megacities; Urban Sprawls; Urbanisation; Historical; Organic; Sustainable Growth.

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Influence of Urban Street Vending on Pedestrian Experience and Behaviour: A Systematic Quantitative Review

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Abstract
Street vending is an integral part of everyday public life and can contribute to vibrant and lively streets. Yet, globally, only few cities integrate street vending into public space design. This is partly because they are perceived as impediments to the smooth functioning of more essential activities such as walking, thereby creating negative experiences. Therefore, to improve walkability, there is a need to understand how street vending influences the experience and behaviour of pedestrians. Consequently, a systematic review of academic literature was undertaken to provide a quantitative assessment of the disciplinary scope of published research, geographic extent, timeline of publications, theories and concepts cited and applied and methods used. Finally, possible directions for future research are highlighted. This paper can inform researchers of gaps in research and identifies potential areas where they may expand and influence the knowledge domain.
Keywords: Street Vending; Pedestrian Experience; Pedestrian Behaviour; Systematic Quantitative Review.

Manuscript ID: ICCAUA2023EN0103

Reframing Development with Living Infrastructure: A Case Study of the South Essex Green and Blue Infrastructure (SEGBI) Strategy

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Abstract
We are headed towards a global crisis: climate change, ecological collapse, and population expansion are threatening planetary boundaries as never before. We must urgently tackle these issues together. Entire ecosystems must be regenerated rather than trying to tackle issues in isolation. In the 70,000-hectare region of South Essex - a place threatened with sea-level rise, flooding, and significant growth pressures - we were tasked with creating a green and blue infrastructure strategy. A 'land-based' methodology was applied, and a co-design approach was undertaken with community stakeholders, to create a spatial framework based on living biophysical systems and ecological infrastructures that can reshape and drive future planning and development. The resulting SEGBI Study provided a ground-breaking model for the delivery of sustainable growth and demonstrated how the application of living infrastructure has the capacity to address climate change and ecological collapse, while also supporting sustainable housing, resilient communities, and regenerative infrastructures.
Keywords: Landscape; Living Infrastructure; Green Blue; Climate Change; Ecological Collapse; Regenerative Design; Sustainable Growth.

Manuscript ID: ICCAUA2023EN0108

The 3Rs (Reduce, Reuse, Recycle) of Waste Management – An Effective and Sustainable Approach for Managing Municipal Solid Waste in Developing Countries

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Abstract
As the population of the world increases, more and more places are becoming urbanized; production and consumption rates are on a speedy rise. The inevitable consequence of high consumption rate in urban areas around the world is the high volume of solid waste generated. The developing countries are at high risk of environmental degradation because of the way their solid waste is been handled due to lack of waste management infrastructures, policy framework and orientation. This results into green-house effect, health and environment hazard. This research is based on a systematic review of relevant scholarly written literatures for an in-depth understanding of the concept of waste, it sources, composition, treatment, disposal, and general management of MSW(municipal solid waste) in countries around the world. In addition, this research investigates the current culture of waste management in developing countries, and re-emphasizes the impact of waste on the environment. Hence, to mitigate the ongoing damaging effects of wastes in developing countries, this study introduces the 3Rs(reduce, reuse, recycle) of waste management as a tangible approach to sustainability in terms of solid waste coming from urban municipality in developing countries. With the approach and framework brought forward by this study, it aims to meet environmental and economic obligations.

Keywords: Waste Management; Sustainability; 3Rs (Reduce, Reuse, Recycle); Municipal Solid Waste; Developing Countries.

Manuscript ID: ICCAUA2023EN0119

A Risk Assessment of Socio-Economic Factors Affecting the Urban Heat Island Effects on the Vulnerable Communities in Melbourne

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Abstract
The urban heat island poses a great threat to human health and wellbeing as more population growth in urban areas is observed. One of the most effective strategies is urban green infrastructure planning and the selection of suitable building materials that can reduce heat stress. However, the accessibility and affordability of green space and efficient materials are not the same among citizens. In such cases, the local government may contribute to the development process to protect vulnerable communities. This paper aims to identify the socio-economic characteristics of vulnerable communities under the local conditions of Victoria. The analytic hierarchy process is used to correlate the socio-economic characteristics to building density, green coverage, and building materials which directly influence the urban heat island and extreme heat weather events. This study will provide information for the local city council to identify the most critical factors that should be tackled in future.

Keywords: Urban Heat Island (UHI); Analytic Hierarchy Process (AHP); Socioeconomic.

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Transforming Roof Top Terraces to Third Spaces in Urban India

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Abstract
This research explores the potential of residential rooftop terraces as a 'third' place for community activities in urban India, where increasing density has throttled access to open spaces. During COVID lockdown, usage of shared and private terraces saw a surge and was being used for various purposes. An online survey was conducted to assess the types of usage and to understand potential preferences for taking advantage of this largely under-used resource. Response from across India within varied age groups and types of terrace users indicated opportunities for more than socialising, amidst passively cooled roofs. Almost all who had access to a roof terrace wanted to use the space in a manner that is inclusive and engaging for the residential community. Formulation of recommendations, based on this community aspiration and sharing with building permit authorities, is one of the outcomes of this study.

Keywords: Urban Residential Design; Lockdown; Roof Top; Terraces; Community Space; Third place.

Manuscript ID: ICCAUA2023EN0132

Understanding the Urban Structure of the Algerian Cities Using Emerging Data: Case Study of Algiers

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Abstract
Despite the identification of urban structure and urban centers being crucial for effective policy making (transport policies, urban risk management policies etc.) there is a serious lack of studies covering developing countries urban structure changes, especially north African cities. This is mainly due to the unavailability of the necessary data for urban structure identification. In this contribution we investigate the polycentric development in the Algerian capital, Algiers, using innovative data resources such as LandScanTM High Resolution Global Population Dataset and the POI approach, and spatial statistics. The findings suggest that the structure of Algiers is indeed developing into a polycentric city. The emerging data helped us overcome a serious methodological problem and objectively identify the city structure for better planning.
Keywords: Urban form; Polycentric Development; Emerging Data; Urban Structure.

Manuscript ID: ICCAUA2023EN0135

Agricultural and Historical Origins of an Urban Green Infrastructure: Madrid-Rio

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Abstract
Madrid Río, the recently built green infrastructure project (a linear park) tries to connect its historic centre with the less socio-economically favoured southern neighbourhoods. The integration of multiple leisure functions looks for bringing spatially closer those unfavoured areas to the city core. The purpose of the paper is to follow the traces of the original agricultural uses associated to the river Manzanares, organized along this new urban space. Historical settlements and landmarks, such as the royal possession of Casa de Campo, ancient bridges, or the promenade of Virgen del Puerto, have also been integrated in the new project. The methodology used would combine an analysis of historic cartography and archive data, together with new analytical plans. The findings would be to detect relevant vantagepoints and the agricultural traces remaining in the existing park, as well as its general functional assessment as a green infrastructure.
Keywords: Cultural Heritage Landscape; Adaptive Re-Use; Urban Identity; Landscape Architecture and Urbanism; Madrid.

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The Aesthetics of the Contemporary Urban Landscape and its Implications for Well-Being

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Abstract
In an increasingly urban world, more citizens are exposed to urban environments, including their aesthetics. Despite psychological research supporting the existence of a positive relationship between environmental aesthetics and well-being, the aesthetics of contemporary urban landscapes (UL) are subordinated to variables such as functionality and economic redeeming. The purpose was to study how citizens perceive contemporary UL in terms of aesthetics and how this relates to well-being. Using photographs of UL in an online questionnaire, quantitative and qualitative ratings of aesthetics and well-being were obtained of 63 participants. Results showed that contemporary UL were perceived as less aesthetic than traditional UL and associated with words suggesting a negative connotation. Analyses could not confirm a positive relationship between UL aesthetics and well-being. A qualitative analysis revealed a tendency to evaluate well-being negatively in relation to contemporary urban landscapes. As these findings suggest that aesthetics should be considered in urban planning, further research should focus on the possible relation between UL aesthetics and well-being.
Keywords: Aesthetics; Urbanism; Well-Being; Urban Landscape; Contemporary Urban Development; Capitalism.

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Effects of the Visual Quality of Street-level Greenness on Residentials' Movement Experience and Mental Health

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Abstract
Urban greenness is generally regarded as one of the most important factors for improving residential mental health and walking experience in cities. However, the existing research on perceived greenness is mainly based on static images and ignores actual walking experience on the street. Therefore, this study suggests exploring a new methodology of measuring greenness as a dynamic visual quality. The method is based on the perceived physical characteristic of greenness (visual amount) and visual-spatial parameters (visual volume) thus allowing to quantify the dynamic walking experience. By conducting behavioural experiments concluded by questionnaires, the link between the visual quality of greenness at street level, mental health and walking experience is explored. The results indicate that the visual quality of street-level greenness influences people's mental health and walking experience through both visual amount and visual volume, and highlight to what degree the dynamic visual quality participates in maximizing relaxation for walking people.
Keywords: Visual Quality; Movement Experience; Mental Health; Greenness.

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Wind Simulation for Urban Planning Design

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Abstract
Summer comfort in a Mediterranean climate is strongly conditioned by access to natural ventilation, whether for outdoor or indoor spaces. Thus, considering the flow of the wind in the layout of the buildings becomes significant in order to adapt new development areas to climate change. In preliminary design, predictive numerical simulations become therefore an essential tool to guarantee a good flow of wind through the urban form. The objective of this study is first to validate a simulation model, by comparing simulation results starting from weather station data with in situ measurements. This simulation model will be then applied to different forms and layouts of an urban development project. This project, Ode to the Sea, located on the same territory, has the same geographical characteristics. This work will allow us to set up a design project methodology considering wind flow.
Keywords: Architectural and Environmental Sustainability; Urban Morphology; Urban Design; Wind Flow; Outdoor Thermal Comfort; Mediterranean Climate.

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Effects of Built Environment of Urban Park on Cognitive Health of Older People

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Abstract
Many older people are facing various risks of cognitive impairment. Doing outdoor activities may be helpful for their cognitive health, while urban parks are the most popular outdoor space for them to do activities. This study identified three major components of the built environment of urban parks, namely, architecture, supporting facilities, and building services. It aims to establish a model based on the relationships between the cognitive health of older people and the built environment of urban parks. A questionnaire survey to older people aged 60 and above in Hong Kong was conducted. Results revealed that plants, nature light, signage, pathway, artificial light of sitting area, park size, etc. in the park significantly influence the cognitive health of older people. Several recommendations such as not-so-large size, diverse plants with vivid color and signages with big fonts, etc. were proposed to support their declining cognitive health.
Keywords: Built Environment; Urban Park; Cognitive Health; Older People.

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Biophilic Design as an Approach to Ecological Sustainability

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Abstract
The majority of the world's population now resides in urban cities that are expanding and interconnected. Urban life is becoming faster, more computerized, and more urbanized than ever before. However, the urban environment is deteriorating rapidly due to pressing climate concerns and unplanned, inadequate urban development. This degradation, along with social, ecological, and cultural issues, is endangering the essential connection that has existed between humans and nature. As a result, our pre-existing interactions and connection with nature are being destroyed. The concept of a sustainable city has long been envisioned but is yet to be widely implemented, thus becoming utopic. One of the main concerns of our cities is that they are becoming increasingly disconnected from nature, which is leading to a wide range of physiological, psychological, social, emotional, and cognitive problems. To address this issue, it is crucial to consider major sustainable strategies that can support humans' profound and instinctive connection with nature. One experimental and fundamental approach is biophilic design, which recognizes the connection between humans and nature. Biophilic design is a novel strategy that aims to preserve, enhance, and restore great experiences involving nature in the built environment. This study used a mixed-methods approach, including qualitative, quantitative, and comparative methods, to explore the experiences and characteristics of biophilic design, with a focus on practical, analytical, and case-study analysis. The study emphasized biophilic planning and design, which can improve residents' environmental attitudes and understanding and therefore promote greener lifestyles among citizens. Ultimately, this can lead to environmental sustainability and a renewed connection between nature and humans.

Keywords: Biophilic Design; Sustainable Architecture; Ecological Sustainability; Nature; Humans.

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Improve Pedestrian Environment to Enhance Walkability Through 5c's Concept in a Smart Way: A Case of Rajshahi Metropolitan Area

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Abstract
In the current world, walkability is a prominent feature of a planned city. People nowadays are more conscious about their lifestyle and that's why they want to have a walking-friendly environment to stay fit. A study in Vancouver, Canada, shows that adults in walkable cities are 31% less likely to be overweight or obese than people living in car-dependent areas. Recently a pedestrian street is being constructed in Rajshahi, Bangladesh but it is not walking-friendly due to a lack of proper shading, and interactive spaces for pedestrians. The city needs more smart facilities to encourage people to walk. This research aims to improve the walking environment by providing smart solutions based on the 5Cs concept for future generations to encourage walkability in Rajshahi city. It is anticipated that through this concept, the problems in pedestrian facilities will decline and people will be encouraged to use pedestrians for a better life.

Keywords: Walkability; Pedestrian Environment; Pedestrian Facilities; Smart Solutions; Technology.

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The Evolving Fringe as Future Prime Movers of Sustainable Cities – Case Studies around Kolkata, India

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Abstract
In a rapidly urbanising world, fringes of cities are in constant flux, in response to inherent socio-economic and environmental changes. It is observed that, facilities for livelihood are being generated in these peri-urban areas which then undergo sporadic and variegated physical modifications. In case study of Kolkata, India it can be seen that ground reality of development in periphery of city did not follow perspective vision plans. Through field research and grassroots level identification, this research looks at deep understanding of peri-urban transformations in order to gauge the vital role of such areas as prime movers for sustainably evolving cities.

Keywords: Fringe; Peri-Urban; Socio-Economic; Livelihood; Ground Reality.

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Simulation Study of Urban Ventilation of Residential Streets and Impact of Building form Variation in Summer under Humid Climate

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Abstract
In this work, we approached the interactions between the geometry of the urban space and the urban ventilation in a humid context in hot period where the wind is an essential data with which it is necessary to compose. The study was conducted on a case study in the city of Jijel (Algeria) containing a variety of spatial configurations (bar, L and U) offering different prospects (H/w). The microclimatic evaluation was made by investigation and numerical simulation with ENVI-met. The discussion of the results indicates that the H/w prospect is the main geometric parameter that has a significant effect on urban ventilation. The geometry of the urban space has conditioned the level of permeability, porosity, or wind deflection. It is therefore the existing spacing between buildings that is responsible for the degree of ventilation, shelter or exposure. This was remarkable in the profiles having the geometry in U, L.
Keywords: Urban Ventilation; Ratio H/w; Urban Space; Building Form; Simulation; ENVI-met.

Manuscript ID: ICCAUA2023EN0203

Urban Lived Experience of Iconic Architecture in the Kingdom of Bahrain

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Abstract
Architecture, of all art forms, is bound to influence people's daily lives. The 20th century witnessed brisk urban developments. SKYSCRAPERS have become a new dialect of urbanism, tied to the ideologies of tall buildings, generating a so-called 'ICON" that stands tall and twisted several times, backed with design principles. This paper examines the perception and sensory experience of the people living among the extraordinary superstructures and the factors that leave an impression on their minds and impact their bodily experience, addressing the grandeur, the scale, the place where its located, and the technology or materials that have been used.
Keywords: Sky Scrapper; Sensory Experience; Urban ICON; People Perception; Bahrain.

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The Vanishing Waters: Analyzing the Encroachment Patterns of Urban Waterbodies in Bangalore

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Abstract
Water is the most essential criteria for any settlement to initiate, flourish or even perish. Communities associate with water uniquely, which gives a character to the settlement. The city of Bangalore has evolved along with its multiple lakes. These manmade lakes have been constructed by the creation of bunds along the city's natural topography. The lakes and its nalas (stormwater drains) are an integral part of Bangalore, which structure the city. The lake systems are complimented by greenspaces, creating an image of "Garden City" for Bangalore. The growing city, pressed by urbanization trends, has a negative impact on its ecological counterpart. The city is in a continuous process of losing its blue-cover and its buffering greens, which once lent an identity to the city. The loss of this hydrological layer can be attributed to various processes and stakeholders. This study aims to analyze the encroachment patterns of these lakes.
Keywords: Lakes; Encroachment; Greenspaces; Topography; Urbanization; Nalas; Water.

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Examining Relationships between Spatial Pattern of Green Infrastructure and Urban Heat Island (Case Study: Tehran Metropolis)

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Abstract
The relationships between spatial pattern (composition/configuration) of Green Infrastructure (GI) and urban heat island have shown contradictory results. Today, the Tehran metropolis has faced a wide range of changes, accordingly, there have been changes in the spatial pattern of GI, as well as changes in the Land Surface Temperature (LST). The method is based on Local Climate Zone (LCZ) classification, measuring the landscape metrics, and analyzing the relationships through Pearson correlation and partial Pearson correlation. The results show: (1) Areas with tree cover have negative effect on LST in A/B green space types, (2) The Mean Patch Size (MPS) and Largest Patch Index (LPI) of type A are important factors in reducing LST, (3) The amount of Edge Density (ED) in GI, including type B/C, has positive effects on the LST. These results provide the possibility of influencing the reduction of LST by planning suitable spatial patterns of GI.
Keywords: Spatial Pattern; Green Infrastructure; Urban Heat Islands; Tehran Metropolis.

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Enhancing Fiscal Outcomes through Human-Centered Design: The Economic Benefits of Salutogenic Architecture in Public Health Care Facilities

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Abstract
The purpose of this study is to investigate the economic benefits of salutogenic architecture in public health care facilities. The study will use a mixed-methods approach that combines both qualitative and quantitative research methods, including in-depth interviews, a case study, statistical analysis and cost-benefit analysis. The study aims to evaluate the economic benefits of incorporating salutogenic design principles, such as natural light, access to nature, and a sense of control over one's environment, into the construction and renovation of public health care facilities. The results of this study provide valuable insights into how the design of public health care facilities affects the overall patient experience, staff productivity, and the cost of care. It will also provide data to support the findings of the study and help healthcare providers and architects make informed decisions when designing or renovating a public health care facility.
Keywords: Economic Benefits; Salutogenic Architecture; Public Health; Healthcare Facilities; Human-Centered Design.

Manuscript ID: ICCAUA2023EN0227

Technology, Mobility, and Security. Elements to Introduce in an App Mobile as a Strategy to Survive in Vulnerable Areas

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Abstract
In Mexican and Latin American cities, the increase in insecurity in urban, intra-urban, and peripheral areas is alarming. In a context in which the use of information and communication technologies is essential in practically all socioeconomic strata and ages. Do we wonder if a mobile application could be a strategy to survive in this climate of insecurity in cities? The problem was analyzed using a methodology based on security urban perception and social cohesion indicators, comparative analysis of main apps used in secure mobility, and interviews with a focus on women´s daily journeys from 3 socio-spatially segregated neighborhoods of Guadalajara, Mexico as study cases. The results highlight the importance of daily security in cities, furthermore allowed to us to identify the main elements to integrate into the design of a mobile application with parameters in security and sustainable mobility as a key strategy to create and reinforce networks of social cohesion.
Keywords: Technology; Mobility; Security; App Mobile; Vulnerable Areas.

Manuscript ID: ICCAUA2023EN0232

Urban Form and Real Estate Value in Msheireb Downtown Doha

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Abstract
In the late 20th century, Doha's rapid urbanization and globalization led to losing housing and traditional urban fabric in the old city center. Msheireb Downtown Doha aims to bring urban living back in a contemporary interpretation of the traditional urban fabric with the conveniences of modern life. In this paper, we examine morphological characteristics of this project related to real estate variables, i.e., location, floor area, number of bedrooms/bathrooms, and ask price. Residential units' layout and adjacent streets' morphological characteristics clearly define targeted user groups. Larger residential units target Qatari families via more bedrooms/bathrooms in layouts and private settings emphasizing cultural values. Smaller units target ex-pat workers (especially Westerners) using open-plan layouts in more lively urban settings. Price per square meter also increases for residential units closer to the Doha Metro station. We conclude that the design, planning, and economics of Msheireb Downtown Doha are well-suited to achieve its aim.

Keywords: Economics; Morphology; Real Estate; Regeneration; Urban Studies.

Manuscript ID: ICCAUA2023EN0237

Geometric Form Effect on Wind Comfort for Pedestrian Tunnels of Highrise Buildings

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Abstract
The need for high-rise buildings is increased by urbanization, economic expansion, land shortages, technology advancements, lifestyle preferences, and government policies. Due to their bigger footprints and the need for greater space for building support systems such as foundations, elevators, and stairwells, high-rise buildings often require larger construction areas than low-rise buildings. This causes requirement to design a passenger tunnel crossing the building to access two sided roads and walkways. The geometric form and the shape factor of the tunnel, also known as the aspect ratio, is the ratio of the width of a pedestrian tunnel to its height. In this study a calibrated and validated numerical model was used to define the form and shape factor of a passenger tunnel that promotes pedestrian comfort. Various geometric forms (i.e., rectangular, square, and circular) and shape factor (various aspect ratio for rectangular), and analyze the resulting wind conditions, and ventilation within the tunnel.

Keywords: Architectural Design; Pedestrian Comfort; CFD; High-Rise Buildings; Passenger Tunnel.

Manuscript ID: ICCAUA2023EN0240

Technical Land-Sea Spaces: Impacts of the Port Clusterization Phenomenon on Coasts, Cities and Architectures

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Abstract
Land-sea interactions, extending inland and towards the marine spaces, are affected by major management and design transformations. Globalization, port expansion projects and extensive energy transition needs have recently led port institutions to demand more land, engaging with logistics platforms and restructuring forms of port governance. In this competitive context, the phenomenon of Port Clusterisation, i.e. the administrative aggregation whereby two or more ports are merged to form port clusters, is heavily impacting the institutional sphere. Yet, not only does this phenomenon have no control over cities, but its spatial component is being overlooked. As a result, port and city institutions lack design tools to tackle urgent challenges such as coastal consumption, the need for resilient port-city infrastructures and the renewal of the port-city architectural heritage. The article addresses the spatial products of Port Clusterisation, i.e. those technical spaces whose study contributes to developing a spatial and design approach to port clusters.

Keywords: Port Clusters; Technical Spaces; Land-Sea Interactions & Management; Coastal and Marine Environments; Port-City Architectures.

Manuscript ID: ICCAUA2023EN0242

The Impact of Urbanization on CO_2 Emissions: Evidence from BRICS Countries

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Abstract
As the world continues to move towards sustainability across different disciplines, it is important to determine the contributing factors to environmental degradation or factors mitigating it. With the application of econometric tools, this study will investigate the impact of urbanization on CO_2 emissions in BRICS–T (Brazil, Russia, India, China, South Africa, and Turkey) countries from 1971–2014. BRICS–T countries are regarded as the foremost emerging economies of the world. They are large in terms of population, area, and GDP. These countries contribute meaningfully to global CO_2 emissions. The variables that will be employed include CO_2 emissions (metric tons per capita), urban population (% of the total population), energy use (kg of oil equivalent per capita), and real gross domestic product per capita (constant 2015 US$) (RGDP). The outcome of this study will be used to provide policy implications for BRICS–T countries.
Keywords: Urbanization; Energy Use; RGDP; CO_2 Emissions; BRICS–T Countries.

Manuscript ID: ICCAUA2023EN0243

A New Context for Urban Design: The Role of Drawing in the Design Process

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Abstract:
The composition of urban space today seems to be considered a less important issue in the practice of city development. The impoverishment process of the formal and compositional components of the urban spaces is more evident when the several and necessary knowledges in planning are contemplated and understood. These aspects imply a reflection on essential aspects of urban concerns which are mainly related to formal composition, based on the experimentation and on the individual creativity of the designer. This paper pretends an approach to the relevance of this subject for the urban planning, through its various phases from XV century until now, focusing on the role of the free drawing in the urban design process, concluding with its importance at several levels for the urban planning and cities development.
Keywords: Urban Design; Urban Space; Urban Process; City Development.

Manuscript ID: ICCAUA2023EN0253

Mitigating the Effects of Infrastructure Development on the Environment

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Abstract
Infrastructure is closely linked to socio-economic development and research based on historical data has shown a significant positive association between economic growth and infrastructure in the long run. Infrastructure developments come with a range of social and economic benefits; however, it is not a panacea without side effects, having a range of negative effects on the environment owing to the fact that it is embedded in the natural system. Using the deductive approach to qualitative analysis, an extensive review of the literature was conducted. The research determines several factors that can be considered in mitigating the adverse effects of infrastructure development on the environment such as the use of green building and low carbon infrastructure, sustainable building practices, renewable energy, waste management during construction and environmental legislation. Decision-making should therefore be guided by these factors established and incorporated into public policies necessary to promote sustainable economic development and environmental protection.
Keywords: Green Building; Infrastructure; Mitigation; Environment; Sustainable Economic Development.

Manuscript ID: ICCAUA2023EN0259

Smart Growth and the Decolonization of Urban Policy: Towards a New Model of Municipally Guided Growth in Egyptian Desert Areas

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Abstract
This article investigates the association between Smart Growth and the decolonization of urban growth management in terms of urban policy and practice. It draws on lessons learned from the urbanization of Egyptian desert areas pre- and post-Egypt's New Urban Communities Program (NUCP) and questions how colonialism induced adverse socio-economic impacts through its ideological underpinnings and rationale. The research argues that the mono-institutional development of urban growth is rooted in Egypt's colonial history preceding the NUCP. The method applied in this research adopts a descriptive qualitative approach in investigating the development of Egypt's new cities based on the Smart Growth principles, and a quantitative approach in analyzing the population numbers decongested by the NUCP. The research suggests a new model of municipally guided growth to generate indigenous and locally verified urban growth model.
Keywords: Decolonization; NUCP; Urban Policy; Smart Growth; Urban Governance.

Manuscript ID: ICCAUA2023EN0260

Evaluating a Proposed Traffic Management Policy: The Case of Baquba City

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Abstract
This paper discusses the possibility of applying a traffic management policy that can be applied in Baquba city in Iraq and measuring the extent of its effectiveness in reducing congestion and improving LOS for a selected network in the city consisting of Al-Mustafa, and Al-Balda intersections linked by Zain Al-Qaws Street, using the trip interchange model based on finding the impedance value for both modes of travel (private cars and buses) in the city using the Quick Response System (QRS) method, and simulating its effectiveness using Synchro11 software. The study found that the proposed traffic management policy can give acceptable results in the short and medium - terms while taking less time and money to implement. It can also reduce traffic congestion, and intersections delays in the city, improve the level of service for both Al-Mustafa, and Al-Balda intersections from F to D, save fuel and reduce CO emissions.
Keywords: Traffic Management; Congestion; QRS; LOS.

Manuscript ID: ICCAUA2023EN0266

The Walkability of Alvalade Neighbourhood for Young People: An Agent-based Model of Daily Commutes to School

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Abstract
The Alvalade neighborhood in Lisbon, Portugal was built in the mid-XX century as low-cost housing for workers, but it has become inhabited by the middle and upper classes. The neighborhood is home to a large population of young people, including children and teenagers who attend the schools located in the area. We present an agent-based model which aims to investigate the walkability of the neighborhood for these young people, focusing on the mobility patterns of children and teenagers as they navigate their daily routines of going to school. We simulate the pedestrian movement of these young people, taking into account factors such as the availability of sidewalks, crosswalks, distance to schools, and the presence of other amenities. Our research reveals the mobility patterns emerging in this area and compares them across the different schools of the area. These results inform both urban policies and interventions that promote safe and accessible routes to school.

Keywords: Urban Design; Walkability; Mobility; Agent-Based Model; Pedestrian Movement; School Accessibility.

Manuscript ID: ICCAUA2023EN0267

Parametric Architectural Design for a New City Identity: Materials, Environments and New Applications

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Abstract
In contemporary architectural Design, we speak of a parametric structural design. A design that integrates new functionalities crossed with the spatial geometry of objects. It is been considered structured because it optimizes combinations that integrate a minimum of materials and data in order to respond to functions, uses and needs more adapted to a society in perpetual evolution. Parametric modeling allows the usability of new materials and the integration of new structures in a variety of design environments. This transdisciplinary research first exposes the aspects of parametric modeling while focusing on the material and immaterial plurality of the designed space. Then, from a position that redefines the city as both a "medium" and an "object" city, we attempt to define the fields of application and the novelties that invest the fields of architectural construction. Our research findings come at the end to identify the role of parametric modeling as a design process in the generation of viable, sustainable and versatile spaces.

Keywords: Parametric Design; Architectural Modeling; Environments; Materials; City Identity.

Manuscript ID: ICCAUA2023EN0272

Rururban, Rurban and Periurban: Conceptual Difference and Scope in the Transformation of the Territory

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Abstract
The study of the interstices between the urban and the rural, has given rise to concerns such as border dynamics, the so-called urban-rural studies, usually focus on issues such as segregation, and environmental problems among other imbalances of inequities or inequalities (Cabeza I. 2022), urban growth implies the incorporation of new territories in the complex system that includes a space in mutation as a result of these problems, the terms periurban, rurban and rururban arise, a theoretical-conceptual analysis is made through the atlas tool you In search of understanding the differences and similarities of the concepts based on Kenbel, C., Galimberti S. & Demarchi P. (2022), Márquez, Y. (2022) and Mercedes M. (2022), to mention a few, In such way, it allows us to identify what is the difference and scope of these concepts and what implications do they have in the territory, taking Latin American cities as a case?

Keywords: Rururban; Periurban; Rurban; Urban Growth.

Manuscript ID: ICCAUA2023EN0274

Perceived Urban Design Across Urban Typologies in Hanoi

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Abstract
In light of the rapid global urbanization, urban design has been shown to contribute largely to promoting the health and wellbeing of urban citizens. However, studies of urban design are underrepresented in low- and middle-income countries (LMICs) in Asia, where urban forms are traditionally compact and complex with multiple layers. Hanoi, a typical city in a LMIC, exhibits five unique urban typologies (UTs) generated through both official planning, unregulated development, and historical fluctuations. This study examines the perceived urban design across UTs in Hanoi using an established scale. The findings suggest that perceived urban design is significantly influenced by UTs. Old UTs tend to report higher scores of land use mix and access to services but lower scores of walking facilities and street connectivity than modern UTs. The study contributes to our understanding of urban design in Hanoi, providing policymakers and urban designers with essential insights for sustainable urban development.
Keywords: Urban Form; Perceived Urban Design; Urban Typology; Hanoi.

Manuscript ID: ICCAUA2023EN0286

Sustainable Brownfield Redevelopment: A Solution to Control Urban Sprawl

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Abstract
With the expansion of cities, meeting the requirement of increase in population has always been a concern for the environment. As a consequence of urbanization, surge in tenancy, need for recreational spaces and increased congestion within the cities, its boundaries are expanding rapidly, occupying the outskirts of the same for new infrastructural development. This causes problems such as uncontrolled urban sprawl. This paper intends to highlight the impact of urban sprawl on a city and how it can be mitigated by implementing strategies like brownfield redevelopment, retrofitting and revitalization of existing structures for mixed use developments which will not only allow us to retain the natural habitats surrounding the city but will also prove to be a suitable sustainable approach towards urban development.
Keywords: Urbanization; Urban Sprawl; Brownfield Redevelopment; Sustainable.

Manuscript ID: ICCAUA2023EN0300

The Co-Construction of Cross-Sectoral Policies in Coastal and Marine Spaces. Mediterranean Case Studies of Integrated Processes

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Abstract
The governance of coastal territories and the marine environments is one of the most relevant issues at the moment. While competence over these territorial areas is fragmented across a number of sectors and institutions, involving public bodies at different levels on the basis of various directives and procedural rules, the policies affecting them require the sharing and cooperation of other actors involved in implementation and management. This contribution explores cross-sectoral Blue Economy related policy approaches and initiatives adopted in the co-construction processes involving actors with different roles (institutions, researchers, stakeholders and citizens) by analysing two cases of approaches in different Mediterranean contexts - Italy and Cyprus - through a methodology based on a comparison matrix. The results outline design, cultural, knowledge and relationships tools supporting collaborative governance of land-sea interaction areas, in order to steer integrated spatial policies that are effective in addressing contemporary challenges related to water and its multiple values.
Keywords: Land-Sea Interaction; Integrated Coastal Management; Collaborative Governance; Co-Creation Design Culture; Cross-Sectoral Policies.

Manuscript ID: ICCAUA2023EN0325

Experiencing Spaces and Places through Human Senses with the Presence of Nature

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Abstract
The concept of "Percept, Affect, Concept" by Gilles Deleuze will be the methodology of discovering the impact and the presence of nature on experiencing spaces, into some chosen iconic architectures such as Villa Savoye by Le Corbusier, Falling Water by Frank Lloyd Wright and Swiss Sound Box by Peter Zumthor, going from modern to contemporary architectures. How can the presence of nature lead to a multisensory unique experience of Space? A committed, integrated, or convoked nature will form the main topic of the architectural multisensory experience of spaces, of atmospheres, experiences and memories of place, of what was learned, of what was lived and memories of places as well as Genius Loci, to have such a unique experience.

Keywords: Singular Experience; Atmospheres; Commitment; Integration; Convocation; Percept; Affect; Concept; Memory of Places; Learned; Lived; Senses; Multisensory Experience.

Manuscript ID: ICCAUA2023EN0327

Quantifying the Effect of the Built Environment on Surface Runoff Using GIS and Remote Sensing: A Case Study of Ibex Hill-Lusaka

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Abstract
Flash floods are short-period floods with a high peak discharge. Flash floods may be brought about by an increase in rainfall coupled with the rise of impervious surfaces. Accurate estimation of surface runoff and flood depth is therefore a vital task in coming up with ways to intercept and manage excess surface runoff. The study was carried out in Salama Park – Ibex Hill of Lusaka City with a total area of 1,074,822m^2. The research focused on quantifying the surface runoff for the years 2019 to 2021 using the Soil Conservation Curve Number (SCS-CN) method, Remote Sensing and GIS. The excess runoff was calculated to range between 306.787mm to 600.419mm and the flood depth computed ranged between 1.665m to 3.260m. The relevance of this study is to understand the mechanisms and examine the impact of excess surface runoff on the built environment as well as its associated consequences.

Keywords: Flash Floods; Impervious Surfaces; Surface Runoff; SCS-CN Method; Remote Sensing; GIS.

Manuscript ID: ICCAUA2023EN0328

Spatial Analysis of the Islands of Kaveri and their Thematic Classification

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Abstract
Every river's islands allow a variety of uses, assigned to them by the primary stakeholders over centuries of habitation. Identification of these islands based on thematic classification would aid in the decision making process. Kaveri is a significant river from the south of India, also one of the seven holy rivers. Besides creating a host of unique landscapes, several of its islands are inhabited and also culturally significant. This paper will document and study islands of river Kaveri using parameters such as land use, demography, heritage components and narratives from popular media. Some of these islands are known for their exceptional cultural and natural significance. GIS will be used to map and analyze these islands and its attributes. Thematic classification will be arrived at using indicators of placemaking. This paper will set a precedent to look at river islands and provide a tool kit to classify island landscapes.

Keywords: Placemaking; Island; Kaveri; Culture; Spatial Analysis.

Manuscript ID: ICCAUA2023EN0331

House Under the Threat of Disaster on the Island of Java

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Abstract
Java Island is the highest risk of all types of disasters in Indonesia. Low-cost houses are the largest population and the most vulnerable. Yet, there is not much study focus on it. The objective is to have a better understanding of it concerning various natural risks through observation, mapping, and referring to documents. The results shows that self-development houses are more vulnerable. Incomplete building structure is the main basic problem found both in industrial or natural materials. Choosing smooth roof material is significant in facing volcano eruption, a complete interconnection of building structure is a must for tornado, avoiding natural material is recommended to high risk of forest fire, and elevating floor is basically need it in flooding area. Compared with tsunami and earthquake disaster, there is still less studies providing architecture solution for other type of disaster while flooding and landslide are two of the most frequent one.
Keywords: Low-Cost Houses; Disaster; Vulnerable; Java Island.

Manuscript ID: ICCAUA2023EN0345

Morphological and Anthropic Vulnerabilities. Mapping Integrated Risks: Messina as a Case Study

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Abstract
In the city of Messina, the taxonomy of vulnerable situations is peculiar. Critical residential tissues are part of an extensive geography made by altered natural resources, abandoned infrastructures, brownfields, unregulated quarries and landfills, etc. To these are added the conditions of seismic and hydro-geo-morphological vulnerability. The process aimed to map this critical condition was based on the interaction of some analytical-specialist readings from different sources using multiple GIS tools. The process results are represented in a system of integrated maps that, provide, a working document for the interdisciplinary group drafting the Urban General Plan. These maps, providing a cognitive framework about vulnerability condition of Messina useful for Plan strategic choices, including: pollution, ecological degradation, land consumption and the consequent hydro-geo-morphological fragility, failure to manage waste and water cycles, industrial supply chains partially or totally abandoned, seismic vulnerability, energy inefficiency of built heritage, etc.
Keywords: Urban Metabolism; Vulnerability; Environment; Integrated Risks; Urban and Social Regeneration.

Manuscript ID: ICCAUA2023EN0346

Networks, Cycles and Urban Metabolism. Mapping Critical Environment: Giugliano (NA) as a Case Study

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Abstract
The waste areas in Giugliano intercept the continuity of infrastructure networks and the reticular dimension of ecological connections, returning a porous structure which crosses the urbanized areas. This condition inevitably overlaps the processes of land consumption still in progress. The process aimed to map this critical condition was based on the interaction of some analytical-specialist readings from different sources using multiple GIS tools. The process results are represented in a system of integrated maps that provide data relating to the crisis of five life cycles (ecosystems, production cycle, waste cycle, infrastructure and urban fabrics). These dynamics give us a heritage of socially, ecologically and economically disadvantaged landscapes, but which have immense potential for adaptation, reuse and recycling project.
Keywords: Urban Metabolism; Waste; Environment; Recycle; Urban End Social Regeneration.

Manuscript ID: ICCAUA2023EN0350

Determining Domestic Waste Carrying Capacity (DWCC) of Bejaia City

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Abstract
Like most cities in Algeria, in Bejaia, domestic solid waste management is challenging. Domestic wastes are collected and stored in wild dumps scattered over the whole territory. This situation has led to an increase in air pollution generated by open burning in wild dumps. To deal with this issue, the urban development Master Plan 2033, is giving landfill disposal as waste treatment solution. Literature reports that the choice of method to treat and eliminate waste is very important because it directly affects the quality of the environment. In this respect, DWCC concept constitutes a means to understand the capacity of ecosystems to assimilate the generated pollutants, given the used process. In this study, we consider emissions of GHG from waste treatment to determine DWCC. The results show that the DWCC of landfill disposal is much higher than of wild dumps.
Keywords: Domestic Waste Carrying Capacity; Bejaia; Waste Management; Landfill Disposal; Wild Dumps; Air Pollution.

Manuscript ID: ICCAUA2023EN0352

The Landscape Urban Planning Approach for Improving Urban Air Quality, Case Study of Algiers, ALGERIA

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Abstract
Gardens and urban parks are areas of great importance for the support of the urban ecosystem, in addition to their psychological and therapeutic values, they provide the urban environment with a large amount of oxygen. Trees produce oxygen through the operation of photosynthesis, one hectare of eucalyptus tree annually produces oxygen for 37 to 80 people, and absorbs 25,000 kg of carbon dioxide for the same period of time. Wooded zone in urban areas significantly improve and purify the quality of the air that we breathe and make living environments healthier. A recent study carried out by the World Health Organization (WHO) revealed that the MENA region (Middle East and North Africa) is one of the most polluted in the world, air polluted by particulate matter smaller than 2.5µm (PM2.5). For the case of Algiers, measurements were taken during the first two months of the year 2023 by the station of the United States Embassy in Algiers, showed that daily averages of 14 µm/m3 for particulate matter less than 2.5 µm/m3 and a daily average of 50 for the IQA, air quality index. According to the US EPA's NAAQS, any measurement above 12.0 µg/m 3 (US AQI 50) may be hazardous to human health. Several factors of an exogenous and endogenous nature act directly on the quality of the air in large urban concentrations, CO2 emissions, modes and nature of urban mobility, uncontrolled urban sprawl, high population densities, urban forms and morphology, the size of cities which getting larger and larger, the choice of urbanization models, the surface of wooded areas, all are factors responsible for air quality. This study will be particularly interested in the contribution of gardens, parks and wooded areas in improving air quality, and consequently on the quality of the living environment in urban areas, in this respect and in order to better understand the situation we take the city of Algiers as a case study, the field work will allow us to understand in a qualitative and quantitative way the contribution of the tree and the choice of tree species , understanding co-relation between landscape architecture decision and results obtained on the urban air quality , and try to research on how it would possible to improve air quality in urban areas by using trees new essence. For future urbanization, the landscape urban planning approach will have to take into account new considerations related to urban issues focused on air quality and the sustainability of urban ecosystems.
Keywords: Air Quality; Urban Quality of Life; Urban Ecosystem; Landscape Architecture; Algiers.

Manuscript ID: ICCAUA2023EN0356

Effect of Morphological and Microclimatic Parameters interaction on Particles Concentration inside the Urban Canyon Street: A Case Study in Algiers Capital City, Algeria

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Abstract
Like many cities worldwide, Algiers is suffering from air pollution problems. This phenomenon depends on the effects of various parameters related to urban canyon geometry. Our study aims to assess particles concentration in street canyons located in 19-20th century fabrics specific to the city using daily in-situ measurements in the summer season. The results show that the particles concentrations on working days (118ug/m^3, 116ug/m^3) are higher than those on holidays (106ug/m3, 100ug/m3) for DES FRERES BELAGOUNE and KHELAFI KHEIREDDINE streets respectively, and that a simultaneous increase in temperature, humidity, and atmospheric pressure due to the decrease in air speed, lack of vegetation and impermeability of the canyon is accompanied by a significant increase in the particles concentrations and vice versa. Particulate matter concentration values for Short Canyon (L/H<3) were higher than for Long Canyon (L/H<7). These results could enrich our knowledge about the determinants of air quality data for Algiers.

Keywords: Particle Concentration; Morphological Parameters; Microclimatic Parameters; Canyon Street; Algiers.

Manuscript ID: ICCAUA2023EN0358

Viability of Non-Motorized Transport for Vijayawada, Andhra Pradesh

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Abstract
The research focuses on current state of non-motorized transportation in Vijayawada, a rapidly growing city in India. As Coined by Fred Kent, "If you plan cities for cars and traffic, you get cars and traffic. If you plan for people and places, you get people and places''. The objective is to analyze the existing infrastructure, policies related to different forms of NMT and their viability to the present scenario by examining Land use, average trip length and the climate conditions of the city. The research specifies the challenges and opportunities for promoting non-motorized transportation from the perspective of infrastructure, road safety, public awareness. The research is conducted based on primary surveys and secondary data on land use survey, origin destination surveys for selected major roads in the city. The paper also explores the opportunities and solutions for improvised usage of non-motorized transportation for Vijayawada in terms of policy proposals and design solutions.

Keywords: Non-Motorized Transport; Vijayawada; Infrastructure; Sustainability; Policy Making.

Manuscript ID: ICCAUA2023EN0362

The Role of Tactical Urbanism and Participatory Design in Shaping Healthier Neighborhoods: Cairo as a Case Study

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Abstract
In the last few decades, housing has proven to stand beyond a physical infrastructure, but rather a social setting for inhabitants to engage in long-term interactions. The crisis is profound in residential blocks of minimal to no integration with the unbuilt environment and intermediate spaces leaving a negative impact on the quality of living spaces, on both community and human scales. A methodology based on psychological, urban and architectural indicators was applied on several typologies to analyze this issue in the Greater Cairo Region. The results from these analyses raised several concerns about national policies and planning in housing: the social segregation and planning injustice; the neglect of integrating semi-public and open or green spaces with housing; the lack of community participation in the planning process; and last but not least, prototyping the spatial organization of residential blocks and limiting the odds for the private sector only.

Keywords: Tactical Housing; Participatory Design; Community Integration; Intermediate Spaces.

Manuscript ID: ICCAUA2023EN0366

Rethinking Urban Design in the Digital Age: A Critical Reflection

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Abstract
In recent years, the changing pattern of human activities, increasing data regarding the spatial environment, and the possibility of collecting and processing this data allow us to rethink the urban design process from a digital-oriented and data-driven perspective. In this paper, we examine the effect of computational design tools and technologies on the urban design process and how they challenge the frontiers of traditional spatial design and how they change design practices, the role and agency of actors, users, and designers, and their involvement in spatial design. In this study, we focus on tracing the changing pattern of the urban design process in terms of: (1) the role of designers and (2) citizen empowerment by reviewing the literature and conducting semi-structured interviews with computational design experts. This study concludes that using technology-driven urban design solutions changes designers' relationship with data, opening new avenues for objective, data-driven, and informed decision-making. However, there are nearly any essential differences between traditional and computational design practices regarding user empowerment and participation of users. It is concluded that technology-driven urban design tools and methods are still nascent and rarely employed in actual projects.
Keywords: Design Process; Computational Design; Design Tools and Technologies; Participatory Design; Urban Design.

Manuscript ID: ICCAUA2023EN0368

A threshold on the fringe: Investigation of the spatial transformation in the case of Beytepe Village

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Abstract
Rural settlements have their authentic architectural and urban characters producing and preserving local identity, culture, and activity patterns. The rapid urban sprawl towards the peripheries of Ankara threatens the socio-spatial characteristics of the rural settlements around the city. Beytepe Village in Ankara is a transition zone that is about to disappear its own rural characteristics due to the initial steps of urban transformation in the area. Accordingly, the existing spatial and morphological features of the area will be investigated through an inter-scalar perspective. The study will also dwell on revealing the potential of the area through the production of diversified ways of living; simultaneously, the urgent need for urban politics to be conducted will also be discussed. Moreover, this study emphasizes the need for a shift of understanding in urban development in order to protect the identity and architectural quality of the villages on the edge of urbanization.
Keywords: Urban Sprawl; Urban Politics; Rural Settlements; Rurbanization; Beytepe Village.

Manuscript ID: ICCAUA2023EN0376

The Development Status and Trends of Urban Lighting Masterplans in China - A Qualitative Study Using NVivo Software

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Abstract
In recent years, with the development of nighttime economy, the rising demand for characteristic city image, and the emergence of advanced and intelligent lighting technologies, the construction of urban night landscapes in China has entered a new period. Chinese municipal governments have started to introduce new urban lighting masterplans to meet the new demands of urban development. This paper takes the latest urban lighting masterplan texts released by 20 Chinese cities since 2017 as the research object, and uses Nvivo software to conduct coding visual analysis, matrix analysis and cluster analysis on the masterplan texts to summarize the principles, objectives, construction contents, implementation and guarantee policies of these new urban lighting masterplans, and compare them with the previous lighting masterplans. Finally, extracting the focus of China's urban lighting construction and its future development direction, providing a basis for the formulation of urban night landscape policies and industry standard systems.
Keywords: Urban Lighting; Lighting Masterplan; Content Analysis; NVivo; Light Landscape.

Manuscript ID: ICCAUA2023EN0380

The Resilient City: What Urban Form Characteristics to Adapt to Flood Risks? (Case of the City of Skikda-Algeria)

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Abstract
Disaster risk reduction has become a global consensus and an integral part of sustainable development. The built environment can mitigate or exacerbate the spread of flood risks and help to achieve resilience. This paper questions the characteristics of resilient urban forms to adapt to flood risks in urban areas. This concern was analysed using a methodology based on urban morphological indicators, applied to the city of Skikda in north-eastern Algeria. The results identify five key factors of resilient urban form which are: connectivity, diversity, redundancy, modularity and finally efficiency; their potential is to identify gaps and uncertainties to establish possible links between geometric parameters characterizing urban forms and key indicators of urban flood severity.

Keywords: Urban Form; Flood Risk; Resilient City; Adapting; Indicators; Skikda.

Manuscript ID: ICCAUA2023EN0384

Analyzing The Trend of Urban Growth Pattern Using Shannon's Entropy: The Case Of Kaduna Metropolitan Area

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Abstract
In urban planning, development control plays a crucial role in ensuring urbanization takes place in a convenient, functional, and aesthetically pleasing manner while maintaining security. However, this study sought to examine the extent of development control violations in the Badawa area using geospatial techniques. By analyzing Google Earth imagery from 2016, the study uncovered that back setbacks were the most significant form of violation in the low-density areas, accounting for approximately 78%. Meanwhile, in the medium-density areas, front setback violations were the most prevalent, resulting in about 73%, followed closely by building line setback violations at 71%. Finally, in high-density areas, the most common violation was front setback, accounting for 72%. This study recommends that development control boards in cities adopt geospatial techniques to help identify violators promptly and curb future violations. Ultimately, this approach will foster a healthy and scamper city for residents.

Keywords: Urban Growth; Development Control; Geospatial; Remote Sensing; GIS.

Manuscript ID: ICCAUA2023EN0385

The Effects of Flyovers on Urban Travel Behavior: The Case Study of Heliopolis, Cairo

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Abstract
Egypt's current mobility approaches focuses on expanding road infrastructure between and within cities, particularly through the construction of flyovers. The purpose of these elevated structures is to improve traffic flow and enhance mobility for citizens. Their impact on various dimensions of the urban environment, including mobility, remains unclear. To address this issue, this study was conducted in Heliopolis district of Cairo to determine the effects of flyovers on urban travel behavior. The study employed an online survey analysing travel behavior descriptors, such as travel time, trip frequency, and mode choice, to compare them before and after flyover construction. The statistically analyzed results showed that flyovers had both positive and negative effects on mobility, including faster and shorter trips but also negative impacts on mode choice and active travel safety. More research is needed to assess the impact of flyovers on other urban dimensions and their effectiveness in addressing mobility problems.

Keywords: Flyovers; Mobility; Urban Travel Behavior; Travel Behavior Survey; Cairo - Heliopolis.

Manuscript ID: ICCAUA2023EN0386

Lighting Design for Public Spaces Using Innovative Luminescent Technologies

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Abstract
For several years, urban lighting has been regarded as a functional tool that can only guarantee safety and orientation for citizens. In addition to safety and light pollution, a phenomenon that has been at the centre of numerous debates for several years now, there is everything to do with saving energy and reducing the costs of urban lighting. Reducing even some of the considerable consumption of energy resources would benefit both economically and ecologically. Research led to the identification of space in the Abruzzo region. After analysing the park's current state, the question was asked: how can the garden be redeveloped by paying attention to ecological aspects and new technologies? The project aims to intervene in specific areas of the park to redevelop the context under analysis through new technologies, stimulating a new awareness of the lighting culture of spaces.
Keywords: Design; Lighting Design; Photoluminescence; Energy Saving; Sustainability.

Manuscript ID: ICCAUA2023EN0249

City Perception

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Abstract
The idea we have about a city and its design is often distorted when compared to reality, on one hand due to the excess of images circulating in social networks and the reason why those images were created, which leads to the manipulation of reality. On the other hand, the use of new technologies that transform the city into real machines, in which all its elements are interrelated, including the inhabitants, leading to a state of automatism, in which we all participate. Technology will make cities smarter, more efficient, and more liveable in the future. Prominent topics among the contributions of technology to cities in the future: Smart city technologies, such as IoT (Internet of Things) and artificial intelligence, can increase the efficiency, safety, and comfort of cities. The idea we have about a city is now different. Heritage has become part of the urban landscape, which supports the idea of the city as a brand, as a product, and Technology is nowadays directly linked with the way how we live and perceive the city.
Keywords: City; Smart City; Urban Perception; Technology.
Acknowledgement: *This work is financed by National Funds through FCT - Fundação para a Ciência e a Tecnologia, I.P., within the scope of Project "UIDB/04026/2020" of CITAD - Research Centre in Territory, Architecture and Design, and the Lusíada University of Lisbon, Portugal.*

Manuscript ID: ICCAUA2023EN0390

Contemporary Challenges of Urbanization and the Role of Sustainable Urban Development: A Case of Lagos City, Nigeria

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Abstract:
Lagos, the largest metropolitan city in Nigeria, has become the central hub for economic activities in Nigeria due to its commercial and industrial significance. The city's rapid urbanization has contributed immensely to Nigeria's socio-economic growth and development. However, despite this advantage, Lagos city's population growth and urban development have led to several contemporary challenges in recent years. These challenges include and are not limited to the growth of slums and informal settlements, housing problems, problems of urban mobility, and environmental pollution. Therefore, it is imperative to study Lagos city's urban development and provide solutions to the challenges of urbanization. The present study examines the present state of urbanization in Lagos and its implications for the metropolitan city. The study concluded by recommending sustainable and feasible urban development strategies geared towards having an integrated city of infrastructural development that boost economic opportunities and enhances the standard of living of its residents.
Keywords: Economic Hub; Lagos City; Population Growth; Urbanization; Urban Development.

Manuscript ID: ICCAUA2023EN0396

The Erosion of City Identity: Unraveling the Negative Effects of Urban Sprawl

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Abstract:
Urban sprawl, characterized by the uncontrolled expansion of urban areas, has become a pressing issue for cities worldwide. This study aims to investigate the negative effects of urban sprawl on city identity, focusing on the hypothesis that unregulated growth leads to a loss of cultural and historical distinctiveness. To assess this hypothesis, this study implemented a mixed-methods approach, combining quantitative data on urban expansion with qualitative case studies of cities experiencing significant sprawl. Our findings indicate that the rapid, unplanned growth resulting from urban sprawl leads to the dilution of city identity in several ways. Firstly, it fosters the development of homogenized built environments, as global architectural styles and standardized urban design replace local and historical elements. Secondly, urban sprawl contributes to the fragmentation of communities, as traditional neighborhoods are dispersed and replaced by sprawling suburban developments. Finally, the loss of natural and cultural landmarks due to urban expansion further undermines the uniqueness of a city's identity. Based on these outcomes, the study propose strategies for urban planning and policy that prioritize the preservation of city identity while accommodating growth. These strategies include the implementation of strict zoning regulations, the promotion of context-sensitive design principles, and the integration of historical preservation measures into urban development plans. By taking these measures, cities can strike a balance between progress and identity, ensuring that the adverse effects of urban sprawl are mitigated and the distinctiveness of urban landscapes is preserved.
Keywords: City Identity; Urban Sprawl; Rasht; Urban Expansion.

Manuscript ID: ICCAUA2023EN0399

Impact of Urban Heat Island on Formation of Precipitation in Indian Western Coastal Cities

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Abstract:
Rapid urbanization is leading to a drastic hike in anthropogenic activities and urban surface alterations. As a result, there are many repercussions, one of them being higher temperatures in urban areas when compared to rural areas. This phenomenon is termed Urban Heat Island (UHI). The impacts of urban surface characteristics, climate, and population density on UHI have been extensively studied. However, the influence of UHI on the local climate remains elusive. Relatively few studies demonstrate the interrelation between UHI, population density, and precipitation. Therefore, it is important to comprehend this connection as it can impact extreme temperature events like heat waves and unexpected precipitation events like flash flooding. This paper exhibits the analysis of Indian Western coastal cities with respect to UHI, population, and unexpected precipitation events in the summer and winter seasons.
Keywords: Urban Heat Island, Population Density, Precipitation, Western Coastal Cities

Manuscript ID: ICCAUA2023EN0115

Adaptable Public Space, An Essential Parameter of a Resilient City and of Risk Prevention and Management, Case of Blida City- Algeria

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Abstract
With population growth, climate change and increasing risks, cities are becoming more vulnerable. Therefore, strengthening their resilience requires a strategic exploitation of public open spaces, beyond its traditional role, through its important potential for adaptability and mitigation. Our contribution aims to explore the role of public open spaces in the prevention and management strategies of major risks in Algeria (Blida). We proceed by evaluating the capacity of public open spaces to respond to risks situations through a reading of the proposed strategies by the Algerian rescue plan; Accompanied by an international case study which examines the strategies of the use of public open spaces in case of major risks. Finally, a fieldwork survey completes this reading. The conclusions of this research reveal an under-exploitation of public open spaces, that must be integrated into an emergency intervention scheme, while also identifying choice indicators for selecting adaptable public open spaces.
Keywords: Public Open Spaces; Adaptability; Disaster; Urban Resilience.

Manuscript ID: ICCAUA2023TR0005

Exploring the Characteristics of the Creativity in Metropolitan Areas of Developed and Developing Countries

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Abstract
A social environment that is open to all kinds of creativity and diversity, and attractive art and cultural areas, makes metropolitan areas successful in attracting creative people and thereby promoting economic growth. This study examines metropolitan areas in developing countries and developed countries in terms of talent, technology, tolerance, and creative professions, and also analyzes the creative class characteristics that best explain the creativity of different metropolitan areas. Using a literature review, the concepts of creativity are identified, and the characteristics of metropolitan areas at different socio-economic levels are analyzed in detail by comparing them with quantitative research methods. As a result, metropolitan areas in developed countries stand out in terms of talent, technology, and tolerance in creativity, while metropolitan areas in developing countries are effective in terms of lifestyle and originality.
Keywords: Creativity; Creative Class; Economic Development; Metropolitan Areas.

Gelişmiş ve Gelişmekte Olan Ülkelerin Metropoliten Alanlarındaki Yaratıcılık Özelliklerinin İncelenmesi

Özet
Her türlü yaratıcılığa ve çeşitliliğe açık sosyal çevre, sanat ve kültür alanlarında yaratıcı insanları cezbetme ve böylece ekonomik büyümeyi teşvik etme metropoliten alanları başarılı kılmaktadır. Bu araştırmada gelişmekte olan ülkelerin metropoliten alanları ve gelişmiş ülkelerin metropoliten alanları yetenek, teknoloji, tolerans ve yaratıcı meslekler açısından incelenmekte ve aynı zamanda farklı metropoliten alanların yaratıcılığı en iyi açıklayan yaratıcı sınıf karakteristikleri analiz edilmektedir. Literatür taramasından yararlanılarak yaratıcılık kavramları belirlenmiş ve bu kavramların farklı sosyoekonomik düzeyde metropoliten alanlardaki özellikleri nicel araştırma yöntemleri ile karşılaştırılarak detaylı bir şekilde analiz edilmiştir. Sonuç olarak, gelişmiş ülkelerdeki metropoliten alanların yaratıcılıkta yetenek, teknoloji ve hoşgörüde öne çıktığı; gelişmekte olan ülkelerin metropoliten alanlarının ise yaşam tarzı ve özgünlük ile etkili olduğu ortaya çıkmıştır.
Anahtar Kelimeler: Yaratıcılık; Yaratıcı Sınıf; Ekonomik Gelişme; Metropoliten Alanlar.

Manuscript ID: ICCAUA2023EN0401

A Conceptual Framework for Improving Urban Image in Two Similar Mediterranean Cities

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Abstract:
City branding aids in elevating a location's status as a tourist destination, residential area, or commercial hub. Urban tourism is one of the fastest growing segments of the global tourism market. The aim of this paper is to explore the essence of city branding in terms of tourism, image and inhabitants in two Mediterranean similar cities. One of the main drivers for this study was the demand for evaluation standards for urban perceptions in Mediterranean cities. The requirement to maintain spatial uniqueness and enhance the urban image was also a driving force behind the decision to focus on these two similar coastal cities. The goal of the methodology in this paper is to develop a thorough understanding of the concepts of urban image and identity, as well as their significance to cities, using the Kevin Lynch mapping method. Visual preference survey was the second research tool to rate city images and identifying areas in need of urban development. The final stage is to design and propose a conceptual model for developing the urban image while maintaining its identity. Building a good city image is an important mixture of activity and structure. Because successful brands give benefit beyond the physical aspects of cities, there is also a big necessity to process the visual image into a unique brand image through clear marketing strategies.
Keywords: City branding; Urban tourism; Urban image; Mediterranean cities; Conceptual framework.

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Consideration of the Position and Effects of Sacred Places in Urban Morphology in the Context of the Kaaba and its Surroundings

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Abstract
The aim of this research is to explain the effects of holy places on the morphology of the city through the examples of holy places in the world, after giving meaning to the place by starting from the meaning of the holy places arising from the needs of different beliefs and by examining the discourses on "sacred place". After mentioning the concepts of sacred space and morphology, the relationship between urban morphology and sacred space is revealed by including the city in the process. The existence of different holy places in the world and their existence in the city are discussed by supporting them with necessary maps and drawings. After these data obtained, the changes that have occurred in the individual space and the urban space, starting from the first construction of the Kaaba in the city of Mecca in the Hejaz region of Saudi Arabia, and the effects of these changes on the morphology of the city are examined. While making this study, "the factors that shape the urban morphology" are put forward with reference to the studies on urban morphology, and the change in the urban morphology of the Kaaba and its surroundings is discussed through these factors. It is expected that the study will contribute to the literature by considering the concepts of sacred space and morphology through a concrete sacred space.
Keywords: Holy Place; Morphology; Urban Morphology; Kaaba.

Kutsal Mekânların Kent Morfolojisindeki Konumunun Ve Etkilerinin Kâbe Ve Çevresi Özelinde Ele Alınması

Özet
Bu araştırmanın amacı farklı inanışların ihtiyaçlarından doğan kutsal mekânların anlamından yola çıkarak ve "kutsal mekân" üzerine söylemleri inceleyerek mekânı anlamlandırdıktan sonra kutsal mekânların kent morfolojisindeki etkilerini dünyadaki kutsal mekân örnekleri üzerinden ele alarak açıklamaktır. Kutsal mekân ve morfoloji kavramlarına değinilmesi sonrasında kentin de sürece dâhil edilmesiyle kent morfolojisi ve kutsal mekân arasındaki ilişki ortaya konulmaktadır. Dünyadaki konumları farklı kutsal mekânların kent içindeki var oluşları gerekli harita ve çizimlerle desteklenerek ele alınmaktadır. Elde edilen bu verilerden sonra Suudi Arabistan'ın Hicaz bölgesinde yer alan Mekke şehrinde bulunan Kâbe'nin ilk inşasından başlayarak günümüze kadar var olan süreçte bireysel mekânında ve kent mekânında meydana gelen değişiklikler ve kent morfolojisine etkileri incelenmektedir. Bu inceleme yapılırken kent morfolojisi üzerine yapılan çalışmalar referans alınarak "kent morfolojisini biçimlendiren etkenler" ortaya konulmaktadır. Kâbe ve çevresinin kent morfolojisindeki değişimi bu etkenler aracılığıyla ele alınmaktadır. Çalışmanın kutsal mekân ve morfoloji kavramlarının somut bir kutsal mekân üzerinden ele alarak literatüre katkı sunması beklenmektedir.
Anahtar Kelimeler: Kutsal Mekân; Morfoloji; Kent Morfolojisi; Kâbe.

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Change From A Residential Area to a Tourist Area: Eskisehir-Odunpazari

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Abstract
Because of the neoliberal economy: with the private sector dominating the market and providing private capital with all kinds of opportunities, the existing spaces and their belonging are regulated according to the free market conditions. With the increasing influence of neoliberalism, various policies are implemented in favor of strengthening the urban competition environment and cultural activities are planned strategically. Thus, cities take their place in the competition in the global market by feeding their economic infrastructure through culture. Different practices, such as the construction of iconic structures that will increase the visibility of cities in the neoliberal system and provide benefits and the gentrification of urban areas are carried out. With the practices made, the city is becoming attractive for economic entrepreneurs, tourists, and even local people. In this study, the Eskişehir-Odunpazarı Urban Protected Area, which has changed and transformed because of the dynamics caused by neoliberalism/capitalism, will be discussed. Odunpazarı's desire to be on the map, with the effect of economic policies such as competition and branding, the transformation from a residential area to a tourist area with places such as museums, cafes, and accommodation such as Wax Museum (2012), Urban Memory (2012) is supported by about the evaluation of the literature review situation will be done.
Keywords: Eskişehir; Odunpazarı; Tourism Genealogy; Neoliberalism.

Yerleşim Alanindan Turistik Alana Doğru Değişim: Eskişehir-Odunpazari

Özet
Neoliberal ekonominin sonucu olarak: özel sektörün piyasaya hâkim olması ve özel sermayeye her türlü imkânın sağlanması ile var olan mekân türleri ve aidiyetleri serbest piyasa koşullarına göre düzenlenmektedir. Neoliberalizmin giderek artan etkisiyle beraber kentsel rekabet ortamını güçlendirme lehine çeşitli politikalar uygulanmakta, kültür ve sanat etkinlikleri stratejik olarak planlamaktadır. Böylece kentler, ekonomik altyapılarını kültür sayesinde besleyerek, küresel pazardaki rekabette yerini almaktadır. Kentlerin, neoliberal sistemde görünürlüğünü arttıracak ve fayda sağlayacak ikonik yapıların inşa edilmesi, kentsel alanların soylulaştırılması gibi farklı uygulamalar yapılmaktadır. Yapılan uygulamalarla kent; ekonomik girişimciler, turistler ve hatta yerel halk için çekici hale gelmektedir. Bu çalışmada, neoliberalizm/kapitalizmin doğurduğu dinamikler sonucunda değişen ve dönüşen Eskişehir- Odunpazarı Kentsel Sit Alanı ele alınacaktır. Odunpazarı'nın haritada yer alma isteği, rekabet, markalaşma gibi ekonomik politikaların etkisiyle Balmumu Müzesi (2012), Kent Belleği (2012) gibi müzeler, kafe, konaklama gibi mekanlarla konut alanından turistik bir alana doğru dönüşümü hakkında literatür taramasının, durum değerlendirilmesi ile desteklenerek yapılacaktır.
Anahtar Kelimeler: Eskişehir; Odunpazarı; Turizm Soylulaştırması; Neoliberalizm.

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The Investigation of Emergency Assembly Areas in Çankırı City Center within the Scope of Disaster and Risk Management *

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Abstract
The constant change of the meaning of the physical environment for the individual and society during the experience of space in daily life detract the spatial perception from cultural values. The formation of valuable/important perceptions regarding the physical space elements that are disconnected from the interaction of space, society and culture causes place attachment status to change and negatively affects the preservation of cultural heritage values. In other words, it increases the problem of preserving cultural heritage values by losing the meaning of cultural values that are a part of the physical environment in the relationship between space and society. In this context, in Beşiktaş, which has been settled for many years and has traces of different cultures, as a result of the differentiation of the relationship between the space and the individual due to technological and economic developments, the interaction with cultural values is gradually decreasing during the experience of space. In this study, using the questionnaire method, the status of place attachment is examined through interviews with daily users of Beşiktaş by using open-ended and 5-likert scale questions. The aim of the research is to analyze the cultural heritage values in the context of the relationship between society and space in Beşiktaş.
Keywords: Disaster and Risk Management; Emergency Assembly Areas; Çankırı; Turkey.

**This paper is based on the post graduate thesis entitled "Suggestions for Emergency Assembly Areas in Çankırı City Center within the Scope of Disaster and Risk Management", has been written by Sinem Pelin Kaynar in 2023 under the supervision of Asst. Prof. Fulya Sınacı Özfındık, in Erciyes University Graduate School of Natural and Applied Sciences, City and Regional Planning Program.*

Çankırı Kent Merkezindeki Acil Toplanma Alanlarının Afet ve Risk Yönetimi Kapsamında İncelenmesi*

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Özet
Afet riski altındaki yerleşimlerde afet öncesini, sırasını ve sonrasını dikkate alan bir planlamanın yapılmamış olması, çevresel, toplumsal ve ekonomik olarak kayıplara yol açmaktadır. Bu kayıpları önleyebilmek ve kentsel dayanıklılığı arttırabilmek adına afet ve risk yönetimi günümüzde birçok ülke için öncelikli hale gelmiştir. Konumu ve jeolojik yapısı nedeniyle sıklıkla doğal afet yaşanan Türkiye'de de özellikle 2000'li yıllardan sonra afet yönetimi ile ilgili yasal ve kurumsal düzenlemelere daha fazla yer verilmiş, ulusal strateji ve eylem planlarında konu daha kapsamlı ele alınmıştır. Kentsel düzeyde ise acil toplanma alanları, geçici barınma alanları gibi düzenlemeler öne çıkmaya başlamıştır. Bu çalışmada, sınırları içinden Kuzey Anadolu Fay Hattı ve tali fay sistemleri geçen Çankırı kenti örnek alan olarak belirlenmiştir. Kent merkezindeki acil toplanma alanlarının standartlara uygunluğu ve yeterliliği, literatür taraması ile tanımlanan değişkenler kapsamında incelenmiştir. Saha çalışması neticesinde toplanma alanlarından yalnızca birinin kriterleri sağladığı, diğer alanların standartlara göre eksikliklerinin olduğu ve mekânsal müdahaleler gerektiği sonucuna ulaşılmıştır.
Anahtar kelimeler: Afet ve Risk Yönetimi; Acil Toplanma Alanları; Çankırı; Türkiye.

**Bu bildiri, 2023 yılında Erciyes Üniversitesi Fen Bilimleri Enstitüsü Şehir ve Bölge Planlama Anabilim Dalı'nda Dr.Öğr.Üyesi Fulya Sınacı Özfındık danışmanlığında devam eden Sinem Pelin Kaynar tarafından yazılan "Çankırı Kent Merkezinde Afet ve Risk Yönetimi Kapsamında Acil Toplanma Alanlarına Yönelik Öneriler" adlı yüksek lisans tezine dayandırılarak hazırlanmıştır*.

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Reading Landscape Designs through Lefebvre's Spatial Triad

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Abstract
Landscape architects should benefit from space theories in social sciences in order to comprehend the reflections of their designs on space production processes. Lefebvre's theory of space provides a crucial foundation for research in the field of social sciences. According to Lefebvre, the trio of perceived, conceived and lived space is based on three interrelated aspects of space; spatial practice, representations of space and representation spaces. The spaces produced with these three dimensions are social products. In this context, it is aimed to read and evaluate the landscape designs produced by eminent landscape designers in the world through Lefebvre's spatial triad and to comprehend the prominent criteria in the production of space. Based on the findings, this study reflects how knowledge of space production can make an important contribution to the discipline of landscape design.
Keywords: Space Production; Henri Lefebvre; Spatial Triad; Landscape Architecture.

Peyzaj Tasarımlarını Lefebvre’nin Mekan Üçlüsü Üzerinden Okumak

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Özet
Peyzaj mimarları, tasarımlarının mekan üretim süreçlerine yansımalarını kavrayabilmek için sosyal bilimler alanındaki mekan kuramlarından faydalanmalıdır. Sosyal bilimler alanında yapılan çalışmalar içerisinde Lefebvre'in mekân ve mekânın üretimi kuramı önemli bir zemin oluşturduğu görülmektedir. Lefebvre'ye göre algılanan, tasarlanan ve yaşanan mekan üçlüsü, mekanın birbiriyle ilişkili üç yönüne dayanmaktadır; mekansal pratik, mekan temsilleri ve temsil mekanları. Bu üç boyut ile üretilen mekanlar toplumsal ürünlerdir. Bu bağlamda, Dünyada öne çıkan peyzaj tasarımcılarının ürettikleri peyzaj tasarımlarının Lefebvre'nin mekansal üçlüsü üzerinden okunarak değerlendirilmesi ve mekan üretiminde öne çıkan kriterlerin kavranması amaçlanmaktadır. Bulgulara dayanarak, bu çalışma, mekan üretimi bilgisinin peyzaj tasarımı disiplinine nasıl önemli bir katkı sağlayabileceğini yansıtmaktadır.
Anahtar Kelimeler: Mekan Üretimi; Henri Lefebvre; Mekan Üçlemesi; Peyzaj Mimarlığı.

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The Potentials of Blockchain Technology in Accessibility Management in Architecture

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Abstract
Advances in technology affect the discipline of architecture. Blockchain technology is at the forefront of these developments. It has a distributed, decentralized, and transparent structure in which society is a part of the whole system. Although commonly being known with the financial dimension, it has recently started to be discussed in the field of architecture. Since its infrastructure is open to *participatory, transparent,* and *reliable* process, it might contribute to the accessibility management during the entire building life cycle covering design, construction, use, and control of spaces. It, therefore, can facilitate the formation of inclusive built environments, which is one of the prerequisites for the provision of basic human rights. This study aims to evaluate potentials of blockchain technology in accessibility management for creating an inclusive city. In conclusion, the contributions of blockchain in accessibility management are summarized under mainly three aspects: (1) participatory design& planning, (2) continuous monitoring& supervision, (3) collaborative work.
Keywords: Architectural Design; Blockchain; Accessibility Management; Building Construction.

Mimarlıkta Erişilebilirlik Yönetiminde Blokzincir (Blockchain) Teknolojisinin Potansiyelleri

Özet
Teknolojideki gelişmeler, mimarlık disiplinine yön vermektedir. Son yıllarda büyük bir ilgi odağı olan blokzincir (blockchain) teknolojisi bu gelişmelerin başında yer almaktadır. Blockzincir, geleneksel ve merkezi finansal sistem yapısının dışında halkın da sistemin bir parçası olduğu dağıtık, merkezi olmayan ve şeffaf bir yapıya sahiptir. Bu yönüyle, katılımcı, şeffaf ve güvenilir bir temel üzerine kuruludur. Bilinirliği finansal boyutla birlikte olmuş olsa da mimari tasarım ve uygulama alanında blokzincir teknolojisinin sunduğu potansiyellerin tartışılmasına ve değerlendirilmesine ihtiyaç vardır. Teknolojinin katılımcı, şeffaf ve güvenilir olması özellikle mimari denetim alanında fayda sağlayacak alt yapıya sahiptir. Bu yönüyle blockzincir, temel insan hakkının sağlanmasında ön koşullardan birisi olan herkes için eşit erişilebilir yapılı çevrelerin oluşumuna katkı verebilecektir. Bu çalışmanın amacı, blockzincir teknolojisinin kapsayıcı kent oluşumu için mimari erişilebilirlik denetimine vereceği katkıyı değerlendirmektir. Çalışmanın sonucunda, teknolojinin bina yaşam döngüsü boyunca, tasarım-uygulama-kullanım-denetim alanında sunacağı katkılar üç ana başlıkta özetlenmiştir: (1) katılımcı tasarım& planlama, (2) sürekli izleme& denetleme, (3) koordineli çalışma.
Anahtar Kelimeler: Mimari Tasarım; Blokzincir (Blockchain); Erişilebilirlik Yönetimi; Bina inşaatı.

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Evolution of Roof Systems in Ancient Coptic Churches: form 4th to 9th Centuries

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Abstract
Few roof structures remain unscathed from the 4th to 9th centuries in the history of Egyptian architecture generally. The relatively large amount of well-preserved early roof structures in churches in Egypt is used as a point of departure to structurally define medieval Egyptian roof structures. Investigations of actual roof structures along with study of written sources provide the basis for the study, beside site visits if the structure still exists. The structures are defined according to inherited known systems, economics, politics, building materials and semiotics. We can grope an occurring evolution in the design of the churches' roofs. The medieval roof structures of Coptic churches can generally and concisely be described by tracing them and put them in a chronological order. This study completes the constructed mental image about that period, and provide architects with simple architectural solutions within communities that enjoy the exitance of multicultures.
Keywords: Mediterranean Architecture; Coptic Churches; Roof Systems; Multiculturalism.

Manuscript ID: ICCAUA2023EN0014

A Discourse on How Abandoned Heritage Can Be Valued- A Case of Sidhpur

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Abstract
Sidhpur is a multifaceted municipal town with a very rich historical background. The most significant layer to the town is the Bohras Muslim community who came to the city more than 100 years ago. The Bohrawads are the neighborhoods of the Dawoodi Bohras, and their unique havelis have been the most despised identity markers of the city. In recent years, the impact of diasporas and exile of the indigenous Bohra population has been enormous, leading to the abandonment of these wads. The discourse is how can the existing heritage be understood, valued, and utilized? As these havelis are owned privately, the stakeholders have different takes on the maintenance and conservation of the insignia of tangible heritage. Any intervention for resurgences requires the analysis of all the metaphysical and physical layers of these wads. The paper further plunges into deciphering how the capitalist transformation of the town allowed the creation of Bohrawads, and later, how these significant manifestations of grandeur are turning into debris.
Keywords: Diasporas; Identity; Heritage; Abandonment; Exile.

Manuscript ID: ICCAUA2023EN0015

Spirit of Cities: The Significance of the Old Cities Spirit Existence within the New Urban Settlements in Bahrain

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Abstract
Nowadays with all the continuous and rapid development in our urban areas, miss- understanding happens between our spirit and our city spirit. This gap is creating a serious problem that affects all human life aspects. The spirit of urbanism is the identity of each city; it is what connects us with our cities. Our spirit will integrate with our city spirit through our memories, history, and our social life. That issue was analyzed using qualitative research methodology with several methods such as interviews, observations, focus groups, and case studies. The study results highlighted how can the spirit of the old cities appears in the new urban settlements, and how the spirit of the old cities develops and improve the quality of life in the new urban settlements in Bahrain.
Keywords: City Spirit; Urbanism Spirit; Identity; Old City; New Urban Settlements.

Manuscript ID: ICCAUA2023EN0024

Analyzing the Divine Proportion or the Golden Ratio on the Plan and Façade of the Churches in Famagusta Walled City, North Cyprus

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Abstract
Religion had an important role in people's culture during the Middle Ages. In Christian communities, churches are God's houses and the symbol of earthly heaven. As God creates the world and human beings with proportions, the churches should have proportions too. It is a question to the author if the plan and Façade of the churches have the divine proportion or not. There is a research gap in the analysis of the proportions of churches in Famagusta Walled City. This research aims to find out if the proportions of the remained churches in Famagusta Walled City are built according to the divine proportion. The methodology of this historical research is qualitative, quantitative and comparative. The data collection techniques are based on literature review and observation. The result of this research is expected to be in new perspectives for understanding the proportions of the churches for architects, historical researchers and conservationists.
Keywords: Divine Proportion; Golden Ratio; Fibonacci Numbers; Vitruvian Man; Churches; Famagusta Walled City; North Cyprus.

Manuscript ID: ICCAUA2023EN0033

Short-Term Burn Severity Sentinel-2 in Segesta: LR16/96 Mediterranean Heritage Vegetation NDVI/NDRE/NBR/BAI/MIRBI/NBRSWIR differenced AHP analysis

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Abstract:
In the last decade, research has been conducted to identify targeted searches and electromagnetic and aerial applications applied to landscape heritage and ecosystems. Italy has progressed its jurisdictional authority by introducing normatives, e.g., from "*Carta Italiana del Restauro*" (1932) to "*art.10 D.gls. 42/2004*", of archaeological sites and parks, such as Segestae Park in Sicily. To this end, research has been conducted to detect the reintroduction of autochthonous Mediterranean shrubs using Sentinel 2-A fire index-based methods. Cadastral data of forestry and agricultural usage are incorporated, along with Normalized Difference Vegetation Index (NDVI), Burned Area Index (dBAI), Mid-infrared Burn Index (dMIRBI) and Relativized Burn Ratio (RBR). A topological subdivision based on digital elevation model (DEM) is implemented, while a deterrence fire model and Environmental Analysis Hierarchy Process (AHP) pre-feasibility provide a fine-tuned health framework for Mapping and Assessment of Ecosystems and their Services, with Environmental Impact Assessment and Strategic Environmental Assessment.
Keywords: Comparative Analysis; Topology; Remote sensing; Archaeology; EU Habitats Directive 92/43/CEE; Heritage Vegetation; AHP analysis; Life Cycle Assessment (LCA); Environmental Impact Assessment (EIA); Strategic Environmental Assessment (SEA); Mapping and Assessment of Ecosystems and their Services (MAES); Siti di Importanza Comunitaria (SIC); Habitat II United Nations.

Manuscript ID: ICCAUA2023EN0035

Protection Area Boundary Development by Using AHP and GIS in Historic/ Cultural Heritage Areas

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Abstract
It is challenging to develop a protection area plan and its boundaries for historic and cultural heritage areas. What is more, in setting up such boundaries, a myriad of involved parties, stakeholders, and users are often involved that can influence the process. Accordingly, the participation process after the decision step should be successfully managed. The Analytic Hierarchy Process (AHP) is a multi-criteria decision-making method that has the potential to address the intrinsic complexities of the problem. AHP supported by Geographic Information System (GIS) models has been excessively used for different site selection studies in many different fields and areas. The use of AHP and GIS to create a more comprehensive architectural protection plan can help to improve strategies for preserving urban heritage sites for future sustainable development. From this point of view, this study aims to implement GIS analysis for the definition of protection area boundaries by using the AHP model framework in terms of sustainable protection of historic and cultural heritage.
Keywords: AHP; GIS; Historical Heritage; Alsancak.

Manuscript ID: ICCAUA2023EN0038

Urban Space between Sprawl and Compactness, Which Urban Form is Adequate for a Better Growth of Cities?

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Abstract
The development of the contemporary city in all its dimensions has affected its urban space through transformations and poorly managed sprawl. The city, with its modernity and its progress in civilization, has lost its cachet to embody discomfort, insecurity and all kinds of nuisances, an essential characteristic of the city. Many environmental problems present in the consumption of natural resources, especially energy, and water, faster than nature can replace them. Urbanization is a global phenomenon; it affects both developed and developing countries. Almost every city is experiencing a rapid and accelerating pace of growth, even the urban population across the world is increasing. It is necessary to seek the appropriate urban form for our urban life where we can solve our problems. On the other hand, sustainability cannot exist without sustainable cities. The city has a key role to play in ensuring the production of comfort with all its dimensions and consumption, without destroying environmental structures. An urban analysis, study and diagnosis have been developed on the cities of Algeria; to see the problems: the deterioration of the living environment and equipment, the failure of public spaces, etc. then consider the appropriate solution for the sustainable form of the urban space.
Keywords: Urban Form; Sustainability; Urban Sprawl; Growth; Compact City; Scattered City; Sustainable Development.

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Libya's Cultural Heritage Sites at Risk: Problems, Challenges and Risks Following the 2011 Revolution

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Abstract
Libya has numerous heritage sites dating back to different historical eras in many regions, of which five are included in the World Heritage List. These sites suffer from a wide range of human threats, which increased after the Libyan revolution in 2011. The UNESCO urgently called for protecting several sites in Libya. This paper will focus on the increased human risks to heritage sites in Libya after its liberation. We aim to determine the damage caused to Libyan heritage sites and to what extent the war contributed to the emergence of these risks. This research builds on first-hand data gathered from governmental and institutional reports concerned with Antiquities in Libya and published reports of international organisations that worked in Libya during and after the war. The paper concludes that the lack of a comprehensive legislation system and human dangers are some of the challenges facing heritage sites in Libya.
Keywords: Cultural Heritage Sites; Human Risks; Post-War; Libya.

Manuscript ID: ICCAUA2023EN0060

Revitalization Strategies for Small Historic Towns in Asia: Focus on Shekhawati Region, Rajasthan, India

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Abstract
Vernacular heritage especially in the small historic towns across Asia is undergoing rapid transformation leading to loss of lands, biodiversity, building materials and traditional knowledge. In order to test the above argument this research adopts an evidence-based methodology in critically examining historic towns in Shekhawati region of Rajasthan, India these fresco painted towns which were once the centres of economy and creativity are now in shambles due to pitfall at three levels: a. Policy level: There is lack of provision of any legal framework for protections of these vernacular heritage resources, neither they are featured in the government scheme of policies. b. Planning level: The harsh climatic conditions coupled with unplanned developmental activities has led to the loss c. Investment level - There is a complete disinvestment by both private or public sector. The discussion from this research will help in formulating practical strategies for cultural revival of small historic towns not only in India but across Asia.
Keywords: Revitalization; Small Historic Towns; Shekhawati; Asia.

Manuscript ID: ICCAUA2023EN0070

Regeneration Problems: Reconciling the Planet with the Human Settlement

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Abstract
The human activities of the last two hundred years have unsettled the natural balance of the planet so much so that the term Anthropocene has defined the current geological era, so conditioned by human action that its effects on the planet are considered equivalent to those produced by the geophysical forces that shaped the Earth over millions of years. This scenario leads to the current disorientation towards any intervention to implement the planetary utopia of a culturally and economically developed world in which communities complete and integrate one another. The depletion of resources and the upheaval of the natural balance are the conditions and challenges with which humanity and architects must measure themselves, making an enormous effort to preserve the utopian qualities of the planet. Today those qualities may be pursued through two main strategies: leaving behind the Ecumene, searching for sheltered kind of existence, or aiming for its regeneration.
Keywords: Sustainability; Regeneration; Urban Renewal; Anthropocene; Gentrification; Constantinos Doxiadis; Ecumenopolis; Jane Jacobs; Ernst Schumacher.

Manuscript ID: ICCAUA2023EN0074

Modern Architecture of the Second Half of the XX Century in Local Contexts: Comparative Approach on Examples of Housing Estates in İzmir, Turkey and Tychy, Poland

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Abstract
Twentieth-century modernist architecture, commonly labeled as the International Style, that emerged at the same time in different contexts and local conditions, adopted different urban forms and layouts. This paradox of the International Style is analyzed in this paper using examples of the architecture of selected housing estates, multi-story houses, and urban layouts in Izmir and Tychy, which were built in successive time periods during the second half of the 20th century. The work considers these examples through their historical, political, economic, and social background. The main purpose of this study is to enrich the information on the architectural heritage of 20th-century modernism and comparative analysis that will contribute to a rethinking of the architectural heritage by revealing similarities and differences in urban forms associated with local and radical modernity while demonstrating the potential and complexity of modernist housing estates and can set guidelines for their preservation.
Keywords: XX Century Modern Architecture; Architectural Heritage; Local Modernism, Housing Estates; Comparative Analysis.

Manuscript ID: ICCAUA2023EN0078

What Lies beneath Naples?

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Abstract
The underground might be largely hidden, but it is far from being an empty space. Full of history and myths, passages and infrastructures, it is also the site of sedimented histories and archaeological fragments. The underground is also full of imaginaries, beliefs, and beings, that exist on their own but that can be powered by those who continue to explore these spaces, imagining them as a potential expansion of the above city. The main goal is to reinterpret the underground space in Naples as an urban, exploded museum able to cross the city below. The research is based on the places' knowledge through a global approach and provides for a specific field of investigation, the center of Naples, deepening new ideas of the underground museum path. The result is to define possible configurations to offer realistic solutions for Neapolitan programs, aimed at connecting the archaeological hypogeums with the emerging city.
Keywords: Underground Archaeology; Architectural and Urban Design; Underground Exploded Museum; Naples.

Manuscript ID: ICCAUA2023EN0083

A Green, Self-Financing Model of Council Housing Estate Regeneration: The Case of Woodberry Down, London

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Abstract
The UK government's underfunding of council housing over the last four decades has favoured the rise of new financial avenues of estate regeneration, notably through partnerships between local authorities and private capital. Such profit-oriented models have been widely contested for their tendency to encourage the displacement of low-income residents and their replacement with more affluent households. I investigate the redevelopment of Woodberry Down in London, a self-financing redevelopment scheme in which increased density and the delivery of market-rate housing units are meant to cross-subsidize the full re-provision of housing at social rent, along with crucial infrastructure improvements. I document the planning toolkit in use (including energy-efficient building design, greening strategies and social management measures) and address the development partners' capitalization on the adjacent wetlands as a pivot of their design and marketing strategies; based on interviews with longstanding residents and newcomers in the estate, I finally assess the community's reception of the regeneration plan.
Keywords: Social Housing; Council Housing; Regeneration; Gentrification; Greening; Energy Transition; Public-Private Partnerships.

Manuscript ID: ICCAUA2023EN0085

Heritage Building Information Modeling (HBIM) of the Ruined and Damaged Architectural Heritage in Upper Kama Region (Russia)

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Abstract
Building Information Modeling is a tool for the disappearing architectural heritage and environment recreation in 3D virtual reality. The article presents the information modeling experience of ruined and damaged architectural heritage, located north of the Perm Region (Russia) in the Upper Kama region. The Scan to HBIM technology applied for modeling: information modeling based on laser scanning and a photogrammetric survey. The challenges of the work process are specified. Using the collected data (archival documents and engineering survey results), the parameters of each building's elements are supplemented with information about the history, damage, transformation, and condition of structures and architectural elements. Historic photographs helped to restore the buildings' 3D appearance. Archival descriptions provide the color and coating materials' characteristics. Full-fledged virtual copies of ruined Orthodox churches of the Upper Kama region were created. The article proposes further work using obtained 3D-information models, including gamification, and virtual and augmented reality.
Keywords: Architectural Heritage; Heritage Building Information Modeling; Laser Scanning; Virtual Reconstruction.

Manuscript ID: ICCAUA2023EN0089

Architectural Production of Shanghai in Modern Times

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Abstract
The research was mainly focused on Shanghai's architectural production in the 1920s and 1930s. At that time, Shanghai was once called "the Paris of the East" and "the New York of the West", which is easy to take credit for foreign architects who came to Shanghai with the colonists, and the first generation of foreign-trained Chinese architects. However, there is little discussion of how the political and economic climate affected architectural production, especially the interaction between international and local factors. Through the exploration of the historical materials and using qualitative and quantitative analytical methods, the paper would examine how international and local political-economic actors synergistically produced the architecture and urban landscape at that time, as well as how they stimulated the boom of the Shanghai construction industry and real estate appreciation. This study also has significant implications for reflection on the contemporary transnational architecture and urbanism of Shanghai.
Keywords: Architectural Production; International and Local Interactions; Modern Times; Shanghai.

Manuscript ID: ICCAUA2023EN0092

Reconstruction and Restoration of Monuments as a Part of City Identity Formation: Case Study of Teuku Umar's Kupiah Meuketop Monument in Meulaboh City, Indonesia

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Abstract
Teuku Umar's Kupiah Meuketop Monument is the structure endorsed by the Meulaboh City government to represent the city as the land of Teuku Umar. Initially, the Dutch colonizers built the monument to celebrate the killing of Teuku Umar, a hero of the independence rebellion in Aceh. However, after Indonesia's independence, it was structurally and conceptually reconstructed by the local government and an NGO to foster the formation of city identity. How did the process change the monumentality of the structures? To answer this inquiry, semi-structured interviews and field observation was conducted to perform an analysis of the responses by the Meulaboh City residents and government officials toward the monument. As a result, the responses from the residents showed positive recognition and integration towards the reconstructed and restored monument as intended by the government officials. The study significantly contributes to the scholarship of identity formation boosted by monument construction in Indonesia.
Keywords: City Identity; Monuments; Reconstruction; Restoration; Teuku Umar; Meulaboh City.

Manuscript ID: ICCAUA2023EN0094

Significance of Cultural Heritage of a Sacred Place – A Value Based Assessment

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Abstract
The practice of pilgrimage and worship to sacred places is deeply embedded in the cultural psyche and holds immense cultural significance in India. Indian culture has developed a fascinating collection of religious beliefs and customs in connection with sacred places. This paper uses Value Assessment approach to examine the various values associated with any cultural heritage based on the review of various International Charters dedicated to heritage conservation. This research attempts to explore the heritage values associated with Sree Mahavishnu Temple at Thirunelli, one of the most ancient temples in Kerala. Thirunelli was an important town and pilgrimage centre and is considered to be as sacred as many other renowned pilgrim centres in India. This assessment helps us to frame an appropriate guiding principle for conservation approaches in planning and heritage management. The role of these values is widely accepted to be critical to understanding and planning for heritage conservation.
Keywords: Cultural Heritage, Value Based Approach, Pilgrimage, Heritage Values, Thirunelli.

Manuscript ID: ICCAUA2023EN0107

Image of a Sacred City: Portraying Sacred Values of Historic Urban Landscape of Sylhet City, Bangladesh

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Abstract
The Historic Urban Landscape Approach by UNESCO presents a new perspective on urban conservation by visualizing cities as a living cultural landscape, changing the traditional idea of the "Historic city" concept. Like many Indian subcontinental cities, the cultural-religious spaces have continuously shaped the urban morphology of Sylhet over time and given it an identity as a sacred city. The purpose of this study is to identify Sylhet's spiritual layers through cultural mapping and attempt a critical assessment of the sacredscapes' connectivity to the city's historic urban landscape. This mapping method consists of four methodological steps: proper identification, data collection, documentation, and digital mapping of cultural resources. This research will give heritage scholars better insight into the sacred roots of the historic urban landscape process. The spatial layers of religious heritage sites can be used as an essential instrument for urban planning and to develop a heritage-led vision for the city.

Keywords: Sacred City; Historic Urban Landscape; Digital Mapping; Urban Conservation.

Manuscript ID: ICCAUA2023EN0112

Localization of New Design Principles in Historic Environments for Sustainable Conservation to Curb Forgery Design Expressions

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Abstract
This study aims to source for and develop unified additional tools that would support the design of multiple new layers in heterogenic historic environments. Over the past decades, interventions like preservation, restoration, and adaptive reuse are insufficient to provide the optimal solution for the problems of static development and obsolescence in cultural heritage places. Because such schemes follow a predetermined structure, which can restrict innovation and creativity to end as unhealthy repetitions. The further effect is the reduction of the historical layers' periodic traces. This study engages evidence-based strategy from critical literature review and situational observation tools from the Nicosia Walled City as a case example with different evidential phases of cultural and design expressions which in the northern part are now dangling. The study formulated five conceptual tools with the acronym 'SEBAS'—Specimen, Engaging, Balancing, Adoption, and Selecting as extra toolkits for regulators and designers for cultural inclusion, and environmental robustness within the pillars of sustainable conservation.

Keywords: Cultural Heritage; New Design Principles; Forgery Design; Historic Environment; Sustainable Conservation.

Manuscript ID: ICCAUA2023EN0113

Discovering the Current Situation, Future Possibilities, and Challenges of Parki Beach, Chittagong: A Center for Sustainable Tourism Opportunities

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Abstract
Parki Beach situated in Anowara, Chittagong, is a well-known tourist destination in Bangladesh that beautifully frames the country with its natural enchantments. The research study identifies the variables that will enable this virgin beach to become one of the country's most popular tourist destinations in the near future. The single most pressing issue confronting nature-based tourism today is how to effectively manage tourism destinations so that the resources that visitors come to experience are not depleted. In light of this, the study includes an understanding of the current state, as well as the sociocultural, economic, and environmental effects of tourism development in the area. The paper will compare other similar tourist destinations and evaluate them using SWOT analysis. Finally, the findings of this study will suggest a method for better understanding tourist expectations and developing improved strategies, regional policy, and comprehensive approach to sustainable tourism growth within the Parki beach region.

Keywords: Tourism Impact; Parki Beach Tourism; SWOT Analysis; Development Factors; Sustainable Tourism Development.

Manuscript ID: ICCAUA2023EN0120

Sustainability Impact of Tall Buildings on Low-Rise Residential Environments: Analyzing the Case of Yenişehir (Neapolis), Nicosia, Cyprus

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Abstract
Tall buildings are structures that are the dominant symbol of the city and they become increasingly widespread in all cities in the World. Recently increasing number of tall buildings are taking place of the low-rise residential buildings and creating sustainable development problems. This study is focusing on the Yenişehir (Neapolis) district, which is one of the first settlements where the construction started to grew out of the historic walled city of Nicosia. Region has a unique plan, consisting of traditional architecture examples that are environmentally and physically sustainable, and ensure the continuity of social and cultural life by the residents. The aim of this paper is to examine the socio-cultural, physical and environmental impact of tall buildings on urban texture and low-rise houses' residents in the Yenişehir/ Neapolis neighborhood in Nicosia through the perspective of sustainable development.

Keywords: Impact; Sustainability; Tall Buildings; Residential Environment; Yenişehir.

Manuscript ID: ICCAUA2023EN0124

The Irreplaceable Construct of a Place in History: Dhanyakuria, India

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Abstract
The rich annals of history are illuminated by stories of great civilizations. However, Dhanyakuria, West Bengal, India flourished little known, concurrent with rise of the most powerful empire in the world at the time with its capital in neighbouring Kolkata. The study looks at identification of this place that nurtures socio-cultural processes from its inception, through analysis of socio-political and resultant economic circumstances leading to creation of a unique arrangement of physical spaces. While establishing pointers towards reasons for creation of this built asset it traces relationships and connections with authorities, occupants and larger community. It is realised that a sense of awe in the present day lingers because the soul of the place is enshrined within and without the tangible, reaching much wider realms of consciousness. This acknowledgement of spiritual and cultural resilience provides great impetus to the dynamic circularity and protective transmission of the spirit of a place.

Keywords: Socio-Cultural; Socio-Political; Spaces; Resilience; Spirit.

Manuscript ID: ICCAUA2023EN0139

Architectural Decoding and Analysis of the Krishnabai Temple in Mahabaleshwar, India: A Comprehensive Documentation Study

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Abstract
This research paper represents a detailed documentation study and architectural analysis of Krishnabai temple, located in Mahabaleshwar, India. The temple is built in the Hemadpanti style of Architecture, which celebrates the origin of River Krishna and hence gets its name from. The paper focuses on the architectural nuances of this ancient monument like its form, spatial order, built character, construction systems, details etc. The paper investigates the historic and physical features of this structure through a systematic survey and detailed architectural documentation. Inspite of being an ASI -protected monument, the structure is under the threat of decay and anthropogenic destruction without an effort of conservation and less maintenance. Moreover, this research will lay a foundation for future conservation work for the monument and also will contribute to the study of the historic temple architecture of India.
Keywords: Temple Architecture; Hemadpanti Style; Krishnabai Temple; Stone Construction System; Architectural Documentation.

Manuscript ID: ICCAUA2023EN0141

Exploring Gentrification in the Global South: A Case Study on Bangalore Urban Agglomeration

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Abstract
Gentrification is a global and inevitable phenomenon. It affects urban growth by changing neighborhoods' physical, social, and economic character. Whilst there is a growing field of scholarship in European and American settings, research on the gentrification of urban space for the global south, especially India, is limited. As the pattern of development and governance setup varies widely in Asian cities due to diverse demographic and socio-economic factors, there is a significant gap in the study of gentrification and displacement in Indian urban agglomerations. The paper maps and analyses the micro-level changes in Bangalore through spatio-temporal and quantitative methods using Geographic Information Systems (GIS) tools. The findings reveal the increasing inequalities and spatial disparities owing to exclusionary urban development. The study provides empirical evidence of the gentrification process in the context of a developing Indian city. The study concludes by outlining the implications of this gentrification process on citizen's access to urban infrastructures.
Keywords: Gentrification; Displacement; Neolibralism; Spatio-Temporal Analysis; Global South; Bangalore.

Manuscript ID: ICCAUA2023EN0154

Use of Photogrammetry and Terrestrial Laser Scanning to Measure Superficial Weathering Damage on the Façades of Hanfelden Castle/ Austria

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Abstract
Hanfelden Castle is one of the few Renaissance castles in Austria, which were subsequently hardly redesigned and changed since the tower building from the 14th century, and the extension in the 16th century to the today's appearance. This includes the facade from the 16th century on the south and west side. With regard to the determination of mostly conservation measures- the facade should be preserved - it is important to check the facades made of plaster, natural stone or brick for the extent of superficial damage - such as weathering, flaking, bulging or bending. Non-contact 3D measuring systems are available as an alternative to visual inspection using standard cherry pickers or scaffolding. These include terrestrial photogrammetry, UAV assisted photogrammetry, and terrestrial laser scanning (TLS). The results of the multitemporal and -sensoral recording of the facade are presented using the facade example through a methodical comparison of used methods.
Keywords: Digital Cultural Heritage; Facade Inspection; Photogrammetry; Terrestrial Laser Scanning.

Manuscript ID: ICCAUA2023EN0156

Installation of Photovoltaic Panels on Historic Buildings and Heritage Areas: Lessons to Learn and Consideration for North Cyprus

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Abstract
The preservation of heritage areas and historic buildings and the adoption of new technology to reduce energy losses in these buildings are simultaneously crucial. In different cities all over the world, the installation of photovoltaic panels (PV panels) on historic buildings has expanded recently. In this study, the standards for installation and collaboration between PV panels, historic buildings, and heritage areas are reviewed, ten famous historic monuments that use PV panels are studied, and the main impacts, effectiveness, risks, and benefits of installing PV panels in heritage areas are investigated. Finally, the possibility, risks, and benefits of installing PV panels on historic buildings and considerations for collaboration between heritage areas and PV panels in accordance with North Cyprus conditions are discounted. Some recommendations are then made to enhance a planning guide for PV panel installation regulations for historic buildings in North Cyprus.
Keywords: Heritage Areas; Historic Buildings; Installation; North Cyprus; PV Panels.

Manuscript ID: ICCAUA2023EN0160

Religious Territorialism through Architecture: Parametrizing a Dynamic Trend of the Third World

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Abstract
'Territorialism', 'Architectural Territorialism' and 'Religious Territorialism through Architecture' (RTTA), all implicate the voluntary or involuntary act of territorializing other communities, a noticeable trend for centuries. The hypothesis is explored along Warburton's principal argument on origins, spatiality, and transformative capacity of religious architecture. The discussion is most relevant to the third world scenario, especially India. The paper deals with understanding the trends on local, national, and global scales through court jurisdictions, books, official documentation, and research to plot the variety of factors that influence religious territorialism through architecture in India and the third world countries. Post-identification of the parameters, they are mapped on a thematic map, against their degrees of dependency and co-dependency to transparentize the trend. It is concluded that RTTA is dynamic by nature as a result of the parameters being influential on varying degrees, consequentially sensitizing communities in different ways.
Keywords: Territorialism; Religious Architecture; Warburton's Principles; Architectural Territorialism.

Manuscript ID: ICCAUA2023EN0165

Reflections of the Memories: A Microhistory on Konak Atatürk Square, İzmir, 1960-70s

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Abstract
The spaces can be described by the experiences of real characters who lived in that period. In this study, the spatial relations of İzmir Konak Atatürk Square and its surroundings are explained and the reflections of the social and cultural life on the urban and architectural environment are revealed. This study emphasizes the architectural and interior values of the main buildings that give the Konak Atatürk Square its identity and some important public spaces in the city in 1960-1970. The method includes a literature review, photographic examinations, and oral history studies. Spatial stories will be created based on the data obtained and the memories of the characters who lived in the city. The study, which connects people's memories and archival documents through spatial storytelling, creates a different urban story from the past to the present by focusing on microhistory.
Keywords: Urban Narrative; Social and Cultural History; Urban Memory; Konak Atatürk Square; İzmir.

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Adaptive Reuse of Abandoned Jute Mills along the Hooghly River in Bengal: A Sustainable Approach

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Abstract
Heritage structures presently in dilapidated state, abandoned due to social, cultural, or demographic shifts are experiencing unprecedented revitalization as they are being used as anchors for redevelopment. Today we can build energy efficient structures that require almost no carbon footprint to operate annually but still require plenty of resources and energy to build them. Thus, preserving, and repurposing old structures into new, mixed-usedevelopments becomes a more sustainable option. Parts of the Bengal region of India were once colonial settlements of Europe and therefore, the colorful heritage of the Europeans continues to be visible in towns along the Hooghly River. This paper aims to explore the possibilities of adaptive reuse of the abandoned Jute Mills along the Hooghly River with the objective of historic preservation and sustainable design to create functionally efficient spaces.

Keywords: Adaptive Reuse; Preservation; Heritage; Sustainable; Jute Mills.

Manuscript ID: ICCAUA2023EN0167

Investigating the Role of a Mosque in a Society: A Residential Neighborhood in Rajshahi City

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Abstract
From early days in Islamic practice, the mosque as the principle religious institution has played a central role in developing the social interaction. As the religion has spread around the globe, the role of mosque has evolved from its original concept. In today's Bangladesh, the access to mosque is vastly limited to male part of the society and furthermore the scope of social interaction has almost come to a halt due to activities being limited to only praying. This paper attempts to investigate the present scenario in a residential neighborhood, Upashahar in Rajshahi city by conducting a survey on the residents belonging to different age group, gender, occupation and academic qualification. The outcome of this research will help us to identify the key factors leading to the difference between Islamic values and human perception; therefore, direct us to practise the teachings of Islam more consciously in a society.

Keywords: Religious Institution; Social Interaction; Residential Neighborhood; Islamic Vales; Human Perception; Practise.

Manuscript ID: ICCAUA2023EN0172

A Study on the Morphology of Large-Sized Handicraft Streets: The Cases from China

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Abstract
China has long been a major crafts country, with a number of city blocks that are well-known for the production, display and trade of handicrafts. Among them, the large-sized handicraft streets, represented by stone and wood carvings, are particularly notable in the urban landscape. The size of the handicrafts referred to here should be larger than or equal to the scale of common furniture. For the morphology of these craft streets, the study used multiple case studies with a combination of satellite map, urban traffic and architectural analysis to find common and distinctive patterns in the morphology of large-sized craft streets. The results show that these streets are mostly located in the outskirts of the city, but are more accessible to cars, and have large scale of space; differ in their streetscape, urban block pattern, and architectural spatial form, can be grouped into separate categories.

Keywords: Handicraft Street; Large-Sized; Streetscape; Urban Block Pattern; Spatial Form.

Manuscript ID: ICCAUA2023EN0177

Identifying Challenges and Solutions in the Architectural Conservation of 'Zamindar Houses': Insight from Chattogram, Bangladesh

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Abstract
The traditional Zamindar houses of East Bengal are witnesses to the rising of the merchant class between the eighteenth and nineteenth centuries and the vanishing cultural history. After the abolition of the Zamindari system, many of these historic buildings have undergone years of neglect as well as suffered the damaging effects of war and natural disasters. Initiatives taken for conservation and management after the independence of the country have been proved ineffective and further contributed to the poor state of these centuries-old buildings. The study explores the practices and challenges in safeguarding the structures using in-depth data from three such houses in Chattogram city, Bangladesh. The paper evaluates past studies on conservation challenges, carries documentation and analysis of the architectural features of the selected houses, and gathers data through one-to-one interviews, focus group discussions, questionnaires, and field surveys in the chosen historic sites. It concludes by proposing solutions for future practice and emphasizing the importance of implementing them.

Keywords: Zamindar Houses; Conservation; Cultural Heritage; Architectural Styles, Historical Area.

Manuscript ID: ICCAUA2023EN0182

Preserving the Shoreline: A Potential Approach of Eco-Architecture on The Seacoast of Bay of Bengal

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Abstract
The natural beauty of the coastline of the Bay of Bengal is undoubtedly heavily scenic, with the sea on one side and green hills on the other. To preserve this mesmerizing beauty of the remote area of Inani, the project aimed to establish an eco-friendly tourism hub following an eco-architecture approach without creating any visual disruptions to nature and featuring the ecological, social, cultural, and socio-economic aspects. The methodology involved designing and implementing lightweight structures using sustainable and recycled materials on the site to ensure a full panoramic view from every level of design so that the tourists can enjoy every drop of connection with nature. This successful eco-friendly design has created a sense of environmental awareness among the locals of this remote area, who came to know a different aspect of architecture that focuses more on the environment's potentiality rather than designing a concrete jungle.

Keywords: Eco-Architecture; Eco-Friendly; Beach Resort; Recycling; Sustainability; Hospitality.

Manuscript ID: ICCAUA2023EN0186

Smart Access to the Past: Studying Digital Applications for Interaction with Cultural Heritage

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Abstract
Last decades witnessed an amalgamation between cultural heritage practices and digital/smart technology resulting of new heritage experience. The presented research addresses the problem of lacking in specific guidelines or frameworks for generating memorable experience for heritage sites using digital technologies (like VR and AR). Subsequently, the presented study aims to identify a framework addressing the impact of applying novel digital immersive technologies in heritage preservation and its impacts on different users. The study answers two question; How new immersive technologies enhances the attractiveness of cultural heritage sites? And how does new technologies integration with heritage sites communicate cultural significance of tangible and intangible heritage? In doing so, the study focuses on theoretical and empirical aspects of users' engagement in digital heritage applications. This results in developing a conceptual model for developing an interactive digital experience for heritage sites to facilitate the analysis and evaluation of the presented digital heritage projects.

Keywords: Cultural Heritage; Digital Heritage; Virtual Reality; Mixed Reality; Interactive Experience.

Manuscript ID: ICCAUA2023EN0190

Genius Loci on the Case Study of the Restoration of the Old Matlapana Bridge at Maun, Botswana

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Abstract
The paper is analysing interaction between architectural object and Genius Loci, the pervading spirit of a place. The restoration project of the Old Matlapana Bridge, at Maun, Botswana was used as case study. The old bridge is under government protection as the national monument due to its historical, architectural and cultural values. The paper is analysing not only the significance of the old bridge, but also the approach to restoration, with an emphasis on its historical, artistic and cultural features. The main problem was conflict of the original construction with the today's expectation from the bridge, including engineering and safety requirements. The local government authorities fully understand and accepted proposed solution. The paper explains and provides solutions to several problems of the installation and synergy of the old elements in a newly built environment, as answers of time in correlation with space and with accent on the genius loci.
Keywords: Architectural Restauration; Genius Loci; Built Heritage; Reconstruction; Architectural History.

Manuscript ID: ICCAUA2023EN0192

Popular Genius and its Role in the Reconstruction of the Algerian City: Images and Reflections, "The Case of the North Algerian"

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Abstract
Large socio-spatial changes have manifested throughout Algerian territory in the last two decades, especially at the Northern part, rebuilding the configuration of cities and campaigns in a global or partial manner and imposing new modes of production and consumption of the space. The objective sought through this communication is to give elements of answer to the following question: what role of Algerian citizens in the reconstruction of their cities? In this attempt to answer, we are based on a method that meets: Photo-interpretation to individualize the different forms of spatial production; The sociological survey, developed in order to identify actors having a role in the reconstruction of the cities in question (actors); Using SIG as a tool for processing, analyzing and scanning results. which is summed up in new forms of space production, and therefore new images, transmitting a message of identity!
Keywords: Popular Genius; Reconstruction; Image and Landscape; Identity.

Manuscript ID: ICCAUA2023EN0194

The Place and the Project. The Fornace Morandi Park along the Brenta River in Noventa Padovana, Italy

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Abstract
Noventa Padovana is a town in the province of Padua, located a short distance from Venice. This contribution considers the wide area, today in degraded conditions, including the ruins of a kiln for the production of tiles and bricks which was built at the end of the 19th century by the Morandi family. The furnace was definitively closed in the 1960s and the area remained abandoned for several years. In 2006, the property was acquired by the Municipality of Noventa Padovana and this enabled some essential maintenance work, providing the basis for a project that will enable the population to fully enjoy this large green area. This subject has been recently investigated by our students at the 'Architectural and Urban Composition 2' course taught on the master's degree in Architectural Engineering at the Department of Civil, Environmental and Architectural Engineering of the University of Padua.
Keywords: Regeneration; Public Space; Environmental Values; Industrial Archaeology; Noventa Padovana; Brenta River.

Manuscript ID: ICCAUA2023EN0199

Integrating Natural and Cultural Heritage for Sustainable Small Cities: Network of Eco-Cultural Routes in the Danube Region, Serbia

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Abstract

The paper represents a part of the research conducted through the EU Interreg project DANUrB+ (Danube Urban Brand), which gathered six European countries including Serbia around the common goal: to foster the development of small cities along the Danube region through sustainable and heritage-based tourism and cross-border cooperation. One of the main outcomes of the project was the development of Action plans, defined by the set of goals and specific methodology, which included: analysis of strategic regional and local planning documents; field study; meetings, workshops and surveys with local stakeholders; research through participation, and thematic exhibitions. The Action plan for Golubac, the city with a declining population in the Eastern part of Serbia, represents a model for shaping new authentic tourist products and routes by combining natural and cultural heritage, and it could serve as a knowledge base and unique methodological model for action planning and building self-sustaining communities.

Keywords: Action Plans; Natural and Cultural Heritage; Eco-Cultural Routes; Danube Region; Participation; Golubac; DANUrB+.

Manuscript ID: ICCAUA2023EN0207

Land Uses Integration in Revitalization of Heritage Urban Sites : Foah City as a Case Study

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Abstract

heritage areas considered an asset within the city urban context, its value on the socio-economic body of urban city mechanism is important for land uses planning in the revitalization process. despite that fact, heritage sites in Foah city are neglected and no involved in any kind of planning process. this paper highlights the importance of heritage site integration in the urban planning process to maximize the socio-economic and role of land-uses planning aspects in heritage cities. Foah city ranked third of the most important heritage cities in Egypt after Cairo city and Rasheed city. it has around 26 historical buildings that form an important heritage action area in the heart of the city. the results highlight the role of land-uses planning and revitalization approaches that ensure the benifits of integrating these 26 hestorical building in the socio-economic process of Foah City.

Keywords: Revitalization; Action Area Planning; Heritage Sites; Land-Uses Planning.

Manuscript ID: ICCAUA2023EN0209

Harmonizing Modern Japanese Architecture with Historic Environment: Case Study Higashi Chaya District in Japan

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Abstract

Japanese architecture used the word harmonizing as an aesthetic term to describe the value of creating by correcting two or more elements. Modern Japanese architects today also pull references from older styles that were successful and incorporate them into the design and planning of their structures with harmonizing where one essential neither separates nor excludes the other and all become one object. This knowledge of Japanese harmonizing architecture is evident in the Higashi Chaya district in Japan a long history back, new architecture combined with a historical environment. This paper focuses on how Japanese architecture harmonizes with Higashi Chaya. Furthermore, the paper aims to examine the essentials of modern Japanese architecture in a historic environment. The methods comprise secondary data from documentaries, books and journals related to Japanese architecture.

Keywords: Harmonizing; Japanese Architecture; Modern Architecture; Historic Environment.

Manuscript ID: ICCAUA2023EN0213

Revitalization Approaches to Maximize Heritage Urban DNA Characteristics in Declined Cities: Foah City as a Case Study

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Abstract
Revitalization process is important in action areas planning specially in conservation of heritage sites that located within urban area context. the process varied in techniques and tools that are dealing with various spatial level, some techniques deal with urban context and others deal with architectural building. in the journey of maximizing the urban DNA chrematistics of heritage sites, sometimes the visual and physical urban DNA is lost in the process. this paper encapsulates the most important Urban DNA of heritage sites that needs to be considered in in the revitalization process of Heritage urban location to maximize the visual and physical impacts on the overall declined cities socio-economic aspects to sustain the urban life quality. the results are discussing the suitable tools and approaches to deal with heritage area in Foah City, one of the declined cities in Egypt, despite the importance of the city as a ranked third of heritage cities in the country.
Keywords: Revitalization; Action Area Planning; Heritage Sites; Urban DNA; Land-Uses Planning.

Manuscript ID: ICCAUA2023EN0224

Ritual Void in the Sacred Architecture of Montenegro

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Abstract
Sacral architecture has always aimed at the ritualization of space, which gained its spatial form by making the *void*. Common to all religions is the need to create a grandiose space with a *"sacred void",* which achieves mystification, sublimity, as a special experience of the religious space. Historical examples show that religion has demonstrated its power precisely through volumetrics that exceeded expected proportions. However, contemporary realizations of sacral architecture point to the need for a redefinition of the "sacred void". In this sense, the goal of this work is analysis the smaller scale of the sacral void, which is present in numerous examples of sacral architecture in the Balkans. In this paper, several relevant examples in the territory of Montenegro will be processed, whose idea of emptiness remains as a consequence of religious, cultural, but also contextual conditions, where the wall - the beginning, as a building element of emptiness, plays an important role.
Keywords: Ritual Void; Sacred Architecture; Religious Space; Poche; Montenegro.

Manuscript ID: ICCAUA2023EN0238

Investigating the Flow Conditions of an Ancient Drainage Channel in Alanya

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Abstract
Alanya (Alaiye) is a historical city that has taken its place in the status of a port city, capital, and imperative city by various civilizations throughout history. This situation ensures the existence of ancient infrastructures, especially in the old city center and neighborhood. Some of the infrastructures that have served this historic city have been preserved today. One of these ancient infrastructures is the Meyyit drainage channel was built in the 13th century and was restored in 2011. Fluid dynamics science is used better to understand the usage and functions of such historical buildings. In particular, the CFD method helps us understand the hydrodynamics of flow conditions in historical structures by fluid dynamics calculations of the functions of historic structures. Flow conditions at the Meyyit drainage system service were investigated using the CFD tools. The findings on the drainage capacity of this drainage system and flood risks were evaluated.
Keywords: Ancient Infrastructures; Numerical Modelling; Architectural Design; Drainage Channel; CFD.

Manuscript ID: ICCAUA2023EN0250

Walkability as a Criterion for Demarcating the Area of Urban Heritage Regeneration: Maadi as a Case Study

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Abstract
In Egypt, recently dealing with urban heritage has lacked a comprehensively integral vision and strategy, which is vital while selecting the area of intervention in the historic neighborhoods, especially the 20th-century neighborhoods. This has led to the disappearance of some distinctive cultural values in these areas, as well as wasting precious opportunities for adequate conservation, unlike the case in developed countries. The problem was analyzed using a methodology that is based on investigating new urbanism theories, such as walkability theories adopted in developed countries as an integrated approach for demarcating the area of intervention. The walkability approach successfully raised awareness of the value of the built heritage and enhanced the urban regeneration process. The results include an integrated strategy that acts as a tool kit and criteria for selecting the area of intervention to be applied to the Maadi neighborhood as an example of the 20th-century neighborhood.

Keywords: Walkability; Heritage Regeneration; 20th Century Neighborhoods; New Urbanism; Sense of Belonging; Maadi Neighborhood.

Manuscript ID: ICCAUA2023EN0251

A Qualitative Approach to Investigate Stakeholders' Perceptions of Heritage in Tourist-Centric Colonial Hill Town of Mussoorie, India

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Abstract
The colonial hill towns in India inherited the predominant architectural style and cultural mannerisms from a mother country, before undergoing transformations that reshaped their authentic cultural landscapes. In developing countries like India, the negligence of colonial tourism concerning stakeholder involvement is a perpetual phenomenon. Stakeholders, being the primary custodians of heritage, have a significant role in the tourism management plans. Thus, the present study comprehends the stakeholders' perceptions of heritage in the colonial hill town of Mussoorie, India, through Focus group surveys. The qualitative Inductive research approach is implemented for data synthesis. Findings elucidate that involvement of the stakeholders in Mussoorie's tourism and heritage management can provide a remedial impact to the large–scale destruction imposed on the colonial lineage for decades. The research will inform practitioners and researchers about a methodological approach to developing the relationships between the heritage's tangible and intangible aspects for preparing holistic development plans.

Keywords: Cultural Landscape; Tourism Management; Stakeholder Perceptions; Qualitative Approach.

Manuscript ID: ICCAUA2023EN0254

The Governance of Minor Ports in Italy: MSP as an Enabler to Better-Integrated Management

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Abstract
The over 700 ports of the Italian coast differ in type, role, and relationship to surrounding regions. The high fragmentation both in terms of space and governance processes is among the main critical issues affecting Italian port systems, especially minor ports such as marinas and docks, which today are excluded from national and regional planning. This contribution argues that minor ports can play a significant role in integrating economic, social, and cultural values. The article, through three parts, presents the state-of-art of existing legislation on ports and whether this includes minor ports; discusses interactions between the two strategic instruments of MSP and ICZM and their role in connecting minor ports to the regional and national scenario; and, finally, explores the case of the Adriatic Sea and in particular the marinas and canal ports of Rimini and Cesenatico as emblematic examples for understanding the challenges and potential that minor ports are facing.

Keywords: Integrated Planning; Maritime Spatial Planning; Governance; Port Cooperation; Land-Sea Interaction.

Manuscript ID: ICCAUA2023EN0256

Research on Traditional Performing Places in Wuling Mountain Area of China

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Abstract
From the perspective of architecture, this paper discusses the historical culture and architectural functional attributes of traditional performance places in Wuling Mountain Area, China, and holds that the development of traditional drama and sacrificial activities in Wuling Mountain depends on the traditional performance places and complement each other. Influenced by Chinese traditional etiquette, patriarchal clan system, water transportation and other historical cultures, as well as natural and geographical factors such as mountains, forests and rich water systems, the traditional performance venues in Wuling Mountain area are widely distributed, with various kinds and various shapes, which show strong regional characteristics. By analyzing their spatial pattern and decorative characteristics, the material skills and spiritual connotations contained in them are summarized, and the present situation and development prospect are combined to provide reference for the current protection of ancient Chinese buildings and the revival of traditional culture.
Keywords: Wuling Mountains; Performance Place; Culture; Spatial Pattern; Decorative Features.

Manuscript ID: ICCAUA2023EN0257

Living Heritage Approach for Sustainability of Agraharams in Palakkad, Kerala, India

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Abstract
Palakkad, a town in the central part of Kerala, has witnessed a plethora of historic events in the past. Today, the reminiscence of this past is still visible in the constantly evolving fabric of the town. Agraharams, a typology of settlement where the Brahmin community resides, is a physical manifestation of such a past that occurred due to an exodus from Tamilnadu, between the 14th and 15th centuries. With globalization becoming a major threat to the sustainability of these settlements, there is a need to assess the conservation approaches for the same. A value-based approach might not work for this typology. In this paper, the author discusses how a living heritage approach is the right direction for the sustainability of Agraharams. The research would contribute to the creation of a framework for the sustainability of Agraharams, multitudinous of which is seen in Palakkad, and other parts of Kerala.
Keywords: Living Heritage; Cultural Heritage; Continuity; Living Heritage Approach; Agraharams of Palakkad.

Manuscript ID: ICCAUA2023EN0263

The Spatial Narrative of Island Cultural Landscapes: A Case of Lakshadweep Group of Islands, India

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Abstract
Islands, with their unique landscapes, have played a significant role in shaping the cultures and societies of the individuals who have inhabited them. The Isolation inherent to island environments leads to distinct customs and traditions heavily influenced by the ocean and environment. The cultural landscapes of islands manifest in land use, agriculture, and architecture. It also encompasses intangible heritage such as myths, stories, and rituals. This paper aims to understand the Lakshadweep group of Islands within the cultural landscape framework, examining both tangible and intangible resources of island contexts. The study will use inventory formats and in-depth interviews of both key informants and the local community to document the characterizing components of the cultural landscape of Lakshadweep. The study concludes upon by defining the cultural landscape of the islands from a spatial discourse and community perspective.
Keywords: Islands; Landscape; Cultural Landscape; Lakshadweep.

Manuscript ID: ICCAUA2023EN0269

Community Based Tourism for Economic Growth: A Case of Mawlyngot the Urlong Tea Village in Meghalaya, India

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Abstract
The significance of Tourism and more specifically the Community Based Tourism was realized in the wake of global pandemic situation. The growing trends towards the popularity of niche tourism such as the Community Based Tourism was a notable change. Tourism is today recognized as one of the fastest growing industries in the world. The question however remains, should the benefits of the industry be limited to select few. Is the industry benefiting local communities who deserve their fair share? The research paper attempts to answer this, citing the example of Mawlyngot village which was a sleepy village full of social evils. The village has seen transformation after promotion of local tea through community-based efforts and promoting Tourism. Based on the structured interactions with the key stakeholders and the local community the paper examines the key factors leading to such transformation.

Keywords: Community Based Tourism; Niche Tourism; Rural Tourism.

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Categorization of Heritage and Landscape Values in the Conservation of the Historical Environment: The Case of Algiers City

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Abstract
The historic urban environment remains a field of exploration for determining the spatial context of heritage sites and properties. The question of spatial scales interacts to preserve all the values contributing to the historicity of places and buildings; starting with imposing the 500-metre perimeter around the historic monument; then introducing the notion of context to claim actually the historic landscape. This paper leads as a first step to a careful analysis of the different recommendations and charters emanating from UNESCO and ICOMOS to distinguish the meanings of values in conservation. This results in levels of attribution of landscape values and levels of attribution of heritage values, of which nineteen levels correspond to landscape conservation values and fourteen levels relate to heritage values. The confrontation of these values by their application in the diachronic reading of the historic urban area of Algiers gives different implications where the landscape representations qualify immensely these historic places. The significance of the interdependencies between heritage values and landscape values is crucial in determining the spatial extent of the historic urban area of Algiers to be conserved. The spatial scope of conservation allows for the management of natural and built elements and the prevention of risks and threats to the variety of recognised and unrecognised architectural heritage and to the natural and built landscape of the historic urban area.

Keywords: Historical Urban Area; Spatial Scale; Diachronic Reading; Heritage Values; Landscape Values; Recognised and Unrecognized Architectural Heritage.

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Regenerating Lost Urban Spaces for Sustainable Cities: A Case Study of Lucknow's Core Areas

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Abstract

The growth and development of cities and countries has led to concerns about sustainability. The focus on sustainability has brought attention to the importance of sustainable city planning, including city policies, planning principles, and stakeholder perspectives. Land as a key resource has led to discussions about its unjust utilization and loss of potential use, which is a result of crude and unregulated city growth, resource abuse, and spatial imbalance. This paper focuses on the concept of "lost urban spaces," which exclaims the Planning Lost Spaces and Social Lost spaces jointly due to multiple overlaps and similar constructs, which are lost, without human connect, vitality, unutilized or underutilized spaces in cities that are a result of the abuse of land or wrongly designated uses under changing paradigms of the urbanism. Various studies conducted across the globe have reparetedly brought to the fore the concerns for urban public areas and green spaces which are experiencing deterioration and neglect in the changing patters of city development. However, a knowledge gap exists in the identification of these spaces, their current construct and vitality under lost spaces. This is further not even included as part of planning for the cities which require immediate actions to mitigate the loss of this landuse in the rapid urbanization race and changing needs and spatial identities in a city. The paper considers the evolution of these spaces and the mindset of different stakeholders towards them, and tries to identify the spaces that are lost or misused in urban human settlements. In view of the same, this study presents the issue of such lost spaces in the core high potential zones of Lucknow, historically exclaimed and identified as a rich heritage city with important and high valued core area. Based on the existing literature review, the study validates the evolution of these spaces, their comparisons with pre existent knowledge bank to identify and parameters of lost spaces, their reasons further complimented by the series of surveys and stakeholder perception and their analysis. Further more the analysis is done under four constructs of the stakeholder typology, namely, user, neighbour, concerned agencies and passerby. Qualitative research methodology through questionaires surveys and interviews followed by statistical quantative information analysis with series of cheks for normalcy, correlations and Indexing have been done for the analysis of the collecting information and responses. Study sample comprised of people and respondents from different neighbourhoods and adjoining area with radius of approx. 300 mts around each site typology under considerations, each possessing different socio-economic and perceptional characteristics. Data was compiled through extensive mapping activity and superimpositions and cross analysis with existing government policies and provisions. The findigs of the study suggest that the spaces under considerations had been designated with landuses which have not be re analysed for their use, feasibility and stakeholder requirements and have least connect with the growing city requirements further derogated through non participatory approach of planning bodies for use appropriateness check of these apaces. The study concludes with the finding and recommendations of preparing a indexing mechanism as part of Inclusive Planjing technique to just and incorporate rather assign landuses to spaces on their feasible, use appropriateness and inclusive planning parameters through stakeholder analysis and should be reevaluated on periodicity under due to the changed idea and definitions of urbanism with which a city grows. This study will further held the planners and designers to look at a space in the core areas of the city, which are high potentitial zone and cannot afford to have wasted or lost spaces, to work out the mitigational regulations to avoid their occurrence in the very first phase.It will also help the planning community to work out novel solutions for amplifying the inclusive planning approach usage for green open spaces and parks of a city, thus boosting the judicious use and utilization of the non renewable and scarce resource like land.

Keywords: Sustainable Cities, Open Spaces; Lost Spaces; Liminal Spaces; Inclusive Planning.

Manuscript ID: ICCAUA2023EN0301

Another Chance: Adaptive Reuse of the Built Heritage as a Tool for Sustainable Circular Creativity

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Abstract
In recent years, adaptive reuse of the built heritage become an established discipline in which the potential transformation of existing buildings can be considered as a tool for sustainable urban development, given the rising of knowledge economies and European and international policies based on transformative action strategies. On this framework, the paper analyses, through a multiple case study methodology, based on qualitative 'transformative attitudes schemes', recent transformations of historical sites to host public and creative related facilities. The objective is to present a method of investigation of case studies in the field of adaptive reuse architectural projects that highlight "reuse attitudes" and innovative processes towards the existing building stock. The study provides insights for future research on adaptive reuse strategies for the public and creative fields, and on innovative ways to transform the city's public unused or abandoned building stock.
Keywords: Architecture; Adaptive Reuse; Public Buildings; Urban Regeneration; Heritage.

Manuscript ID: ICCAUA2023EN0302

Cultural Heritage as a Potential for Connecting Settlements along the Danube River - Case Study

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Abstract
The aim of the research is to identify potential that cultural heritage (both tangible and intangible) has on the connection of different settlements and countries along the Danube River. It is considered that the same historic and cultural backgrounds are not always necessary to develop great connections among people and to provide visitors to recognize local values of different locations. Recognition and preservation of cultural heritage can be generating elements to connect different places and cultures in a unique framework that can include tourist attractiveness and distinctiveness. With improvements of the visibility of cultural heritage and creation of comprehensive spatial and cultural network, connection of communities along the river Danube could bring benefit not just on local level, but also to the whole region.
Keywords: Cultural Heritage; Settlements; Cultural Network; Spatial Network; Danube.

Manuscript ID: ICCAUA2023EN0303

Heritage in (Trans)Formation: The Built Vernacular as a Case of Adaptive Reuse for Architecture

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Abstract
The continuous reinterpretation of the various conceptual perspectives on *vernacular* construction, combined with the progressive transformations of rural areas and the consequent awakening of nostalgia for a heritage in constant obsolescence, have accentuated the ambiguity of the term and, weakening the boundaries of "*what is or is not vernacular*", have led to a new and controversial architectural expression. The forms that for years were considered disruptive to the vernacular heritage have become the closest reality that exists to the vernacular and have progressively invaded the places that remain faithful to rurality itself. The concept of vernacular, until then consecrated, becomes insufficient to incorporate and characterize the architectural heritage that constitute the villages. Starting from two opposite realities inserted by the Romanesque Route – Village of Quintandona and Village of Ordins, - the present research aims at showing the typological variety of the architectures that constitute these contemporary villages in order to underline, on one hand, the continuity and adaptive reuse of a (disappearing) *know-how* properly adjusted and in dialogue with techniques and forms interpreted as *disruptive* and away from rurality and, consequently, the need to rethink the vernacular architectural heritage in face of the values and meanings associated with it.
Keywords: Vernacular Built Heritage; Adaptive Reuse; Transformation.

Manuscript ID: ICCAUA2023EN0305

Between Plain Architecture and the Baroque: A Facade Model of the Churches of São Miguel in the Azores

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Abstract
There is a post-Kublerlian historiography that has been refined over the last few years by various authors. George Kubler (1912-1996) played a key role in developing the concept of "Plain architecture" and drawing attention to its design and morphology. For many years various examples of architecture were ignored by European historiography, as they did not fit into the Renaissance, Mannerist and Baroque styles, corresponding to what Kubler called " Plain architecture". Azorean religious architecture remains on the fringes of this reading. This article presents an analysis of the design of the main façades of churches in the Azores, built in the 18th and 19th centuries, highlighting the existence of a façade typology. It concludes that there is a disarticulation between the design of the churches in plan and in façade, corresponding the plan to an ideology of "plain architecture" and the facades to a baroque language.
Keywords: Plain Architecture; Azores; Typology; Facade; Synthesis Drawings.

Manuscript ID: ICCAUA2023EN0316

The Aestheticization of the Real Estate Market as a Gentrifier in the City: A Case Study of Roberto Crespo Toral Avenue, Cuenca, Ecuador

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Abstract
Architectural intervention has the ability to increase the value of buildings through commercial interventions that provide greater profitability to the owners of the properties or their tenants. This behavior was analyzed along Roberto Crespo Avenue in the city of Cuenca, Ecuador. The analysis shows how the houses located along the avenue, some of them of heritage character, which have been remodeled or restored, demonstrate greater profitability, with the possibility of renting their spaces for local businesses. These architectural interventions, the use of setbacks in some areas, and in others, the use of commercial ground floors, allow for an increase in the value of buildings, making their study important for zoning commercial axes in city planning that benefit citizens.
Keywords: Gentrifier; Aestheticization; Value; Urban Gentrification; Urban Planning; Urban Renewal.

Manuscript ID: ICCAUA2023EN0324

Influence of PUOGS on the Loss of Cultural Heritage: Macaji-Riobamba

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Abstract
The Cultural Heritage in all its types are important for the development of the towns. The site called Macaji-Riobamba was studied by the historian Jacinto Jijon y Caamaño, where he found vestiges of the Puruha Culture dating from 700 BC. This site has been considered archaeological and at the same time has allowed the approval of developments that have influenced the disappearance of Cultural Heritage. The research is an analysis of the influence of these Land Use and Management Plans in the loss of vestiges of the Puruhá Culture in the last 30 years. An analysis of the DEMDUR 1992, Urban Code 2017 and Urban Code Update 2020 plans was carried out, the same ones that assign the Macaji site as an Archaeological Heritage Protection area, evidencing that this land use is not applied, which results in the Heritage Puruhá Archaeological miss.
Keywords: Archaeology; Cultural Heritage; PUOGS; Puruha.

Manuscript ID: ICCAUA2023EN0335

The Ottoman Architecture in Algeria, State and Perspective for a More Contemporary Function

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Abstract
Despite the various definitions that researchers around the world give to architectural space, each definition refers to the epistemological positionings that the researcher will make from the start of his research. As a result, we have observed three types of space: thought space, lived space, and perceived space, which can sometimes be the same space with the same configuration. The Ottoman architecture in Algeria remains a diverse heritage architecture, with habitats, administrations, places of worship and culture, and so on. In light of this diversity, the authorities are currently attempting to breathe new life into some buildings that are considered to be local Ottoman heritage, with mixed results. We hope to produce a report on this architectural typology as a result of this research, to determine whether the reconversion truly breathes new life into this architecture or simply accelerates its demise.
Keywords: Architectural Configuration; Space Syntax; Ottoman Architecture; Perception; Ambiences.

Manuscript ID: ICCAUA2023EN0336

Globalization and the Challenge of Urban Identity

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Abstract
Globalization has challenged the traditional notion of urban identity by exposing cities to a constant flow of people, ideas, and cultural influences. This qualitative study systematically reviews the existing literature to examine the ways in which globalization has impacted the formation and maintenance of urban identity. The study considers the role of globalization in shaping the cultural, social, and architectural characteristics of cities, as well as the challenges cities face in preserving their unique identities in the face of global homogenization. The findings suggest that while globalization has had a significant impact on urban identity, cities are also actively resisting these changes through the preservation of traditional cultural practices, the promotion of local arts and culture, and the design of public spaces that reflect the city's unique character. This study contributes to a better understanding of the complex relationship between globalization and urban identity and provides insights into how cities can maintain their unique character in a rapidly changing world.
Keywords: Globalization; Urban Identity; Global Homogenization; Stematic Review.

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A Morphological Study of the Ancient Buddhist Monasteries of Bengal

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Abstract
Vajrayana, or Bengali Buddhism, was a significant derivation from traditional Buddhist schools of ancient India. This Buddhist school was erected in ancient Bengal, adopting the prevailing esoteric tantric practices, and reigned every corner of Bengal from around the 7th to the 13th century. This morphological research focuses on the spatial layout of five Bengal Buddhist monasteries constructed between the 5th and 12th centuries and tries to find the underlying pattern of evolution through the lens of the philosophical development of Buddhism in Bengal. The findings show a significant shift in the morphological character of the Bengal Buddhist monastery after the 8th century ad. The introduction and growth of tantra-oriented Buddhist schools, primarily the Vajrayana school, played a vital role in the spatial evolution and transformation of the Buddhist monasteries of Bengal. This study tries to unveil how religion's intrinsic and extrinsic forces shaped forms and spatial patterns of Buddhist architecture in Ancient Bengal.
Keywords: Morphology; Buddhism; Spatial Organization; Ancient; Monastery.

Manuscript ID: ICCAUA2023EN0351

Evaluating Adaptive Reuse of Historic Buildings in North Nicosia through Universal Design Parameters

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Abstract
The most important elements of the urban heritage are historical buildings. Preservation of historical buildings is directly related to the preservation of urban heritage and its transfer to future generations. The most appropriate way to provide preservation for historic structures is to restore and re-function. Today, many historical buildings in the North Nicosia city are being restored for new functions. The aim of this study is to evaluate restored buildings experimentally selected in North Nicosia in terms of universal design. Within the scope of the study, observational researches were made on the buildings depending on the literature review in the field of universal design and reuse. The new functions and universal design criteria of the restored buildings were evaluated and their weaknesses and strengths were determined. As a result, the compliance of the restoration works with the universal design criteria was determined and suggestions were made to contribute to the future studies.

Keywords: Urban Heritage; Historic Buildings; Universal Design; Adaptive Reuse; North Nicosia.

Manuscript ID: ICCAUA2023EN0359

Adaptive Multicultural Cities and Planning Policies in the Mediterranean Region

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Abstract
Multicultural urban development is a strategy to provide reasonable accommodations to diverse cultural groups within a certain community, by identifying the needs of minorities on the one hand and rebuilding the common ground underlying policies and programs on the other. As the quality of life may shape the structure and form of urban areas, the multiplicity of communities in the Mediterranean region with distinct cultures living in the same place has become a prominent feature of many cities. Drawing on a series of quantitative studies and qualitative surveys, the study examines the challenge of Mediterranean multiculturalism, to build adaptable socio-infrastructure that reflects the concerns and interests of specific groups, while preserving cultural differences. The study discusses that achieving the special service needs of immigrants requires developing guidelines that suit different groups, and therefore recommends a set of policies to achieve comprehensive adaptive development to meet the challenges of the various forces that affect the stability of multicultural values.

Keywords: Multiculturalism; Cultural Value; Adaptive Planning; Mediterranean Cities.

Manuscript ID: ICCAUA2023EN0360

Preservation of Islamic Urban Heritage to Enhance the Users' Expectations in the Holy City of Makkah

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Abstract
Enhancing the Urban Heritage's urban environment to suit religion-tourism expectations and return the cityscape to Islamic urban planning and design is one strategy to improve public space in the Holy City of Makkah (HCOM). This paper aims to offer historical context for the foundation of the holy City, highlight key moments in the City's urban fabric revolution chronology up to the present day, and outline plans for the City's future growth. This will be achieved by looking through the literature on the history of the Urban Development of the HCOM. Also, this paper used descriptive methods to examine the City's Urban fabric evolution over the last century. The findings light how the "Sharia" Islamic norms, both permitted and forbidden activities inside Makkah's limits, impacted the City's urban fabric. This paper provides a comprehensive understanding of the rules of designing public space and highlights the sustaining Islamic Urban Heritage.

Keywords: Urban Heritage; Holy City of Makkah (HCOM); Grand House.

Manuscript ID: ICCAUA2023EN0363

The Aesthetic of Arabic Calligraphy and Islamic Ornamentation in the Door of the Holy Kaaba in the Saudi Era: An Analytical Study

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Abstract
This article aims to identify the aesthetic of Arabic calligraphy and the Islamic ornamentation units embodied in the honorable door of the Kaaba in the Saudi era, according to a systematic analytical perspective, to reveal the effectiveness of the principles of artistic design that enhance the aesthetic of the Kaaba's door. The honorable Kaaba section contains many artistic and aesthetic values that added to its visual rhythmic beauty and luxury and enhanced the sense of aesthetic and spiritual artistic value for Arabic calligraphy and Islamic ornamentation units. In this study, the researcher will use the structural content analysis approach because this approach aims to study and analyze based on an external perspective. The researchers conclude that the aesthetic of Arabic calligraphy stems from the use of the apparent Thuluth style among the linear configurations of geometrical shapes in the door of the Kaaba.

Keywords: Aesthetic; Arabic Calligraphy; Islamic Ornamentation; The Door of the Holy Kaaba; Saudi Era.

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Heritage Building Conservation Projects Decision-Making Processes

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Abstract
Restoration projects of historical buildings involve decision-making processes that require researchers from different fields of expertise to work together. One of the most challenging stages of conservation projects is making decisions. Scientific committees need information about the entire life of the buildings to decide on conservation strategies. In addition, communication and information exchange between stakeholders are critical issues in restoration projects. This research examines restoration projects from a project management perspective with a systematic literature review. In this study, firstly, a literature review was conducted to see the decision-making processes in historical heritage research. Then, by using the content analysis method, the main themes of the current research were determined. The problems experienced in the field are mostly project management based. Some of the important research themes are determined as, special laws for conservation projects, collaborative planning, risk management, resource management, and interdisciplinary work environments.

Keywords: Heritage Conservation Projects; Decision-Making Processes; Project-Management; Collaborative Work Environments.

Manuscript ID: ICCAUA2023EN0374

Revitalizing Cities through Restorative Urbanism: Prioritizing Experience-Focused Design for Parks in the Post-Pandemic Era

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Abstract
Urban parks have become increasingly crucial in the post-pandemic era due to their documented physical and mental health benefits, as well as their environmental advantages, such as mitigating heat-island effects, enhancing biodiversity, and managing flooding and stormwater. However, while many studies have focused on equitable access to parks, providing easy access does not necessarily ensure a positive experience for urban residents. A study in the City of Camden—a post-industrial, environmental justice community in New Jersey, USA, including geospatial modeling, surveys, and focus groups, revealed that mental health components and restorative design elements were largely absent in park planning and design processes. Therefore, prioritizing experience-focused design principles rooted in restorative urbanism is essential. The goal should be to provide high-quality, restorative experiences for park visitors, instead of solely focusing on proximity to city residents. Cities must recognize the importance of this approach in promoting equitable access to high-quality parks.

Keywords: Park Equity; Mental Health; Restorative Design; Post-Industrial Landscapes; Environmental Justice.

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Place Identity Translating into Culture: The Town of Rajapur in the Cultural Region of Konkan

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Abstract
This paper deals in defining the place identity of cultural town of Rajapur, located in the Konkan region. Rajapur is the valley situated at the confluence of the 'Arjuna' and 'Godi' river. Artistic temples, attractive mosques, Peshwa period structures at Jawahar Chowk and Varchi Peth are all adorning the town. The settlements of Rajapur that are the subject of this study have historical and cultural values with structures of regional culture, natural patterns, and traditions. Today, some parts of these settlements are totally neglected due to changing lifestyles, socio-economic conditions, and approaches towards rural areas. Paradoxically, Konkan is known for the coast and is the main magnet for a day's tourist destination. The heritage is losing its identity due to unsustainable tourism, development pressure, social, economic and political issues. However, Rajapur consists rich history, cultural background, traditional housing, geology, and other factors that make it an important town in South Konkan.

Keywords: Konkan; Rajapur; Heritage; Culture; Kuldevata; Laterite.

Manuscript ID: ICCAUA2023EN0378

Acoustical Characterization of Taramati Baradari

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Abstract
India has a very rich and diverse cultural heritage and when studying from one built form to another, it can be observed that each plan and architectural form has a very close association with the purpose it was built for. The use of daylight in these structures is very well documented and studied, the acoustics of the structure are hidden, especially for a place of worship and performance. It needs special attention and should be addressed subjectively. The effect of architectural form and elements on the acoustics of the structure needs to be documented and studied. It should be documented using acoustical instruments like omnidirectional sound source and handheld analyzers and ODEON and EASE 4.3, a simulation of the space should be done to understand the original setting of that structure. Taramati Baradari in Hyderabad will be used as a case study.

Keywords: ODEON; EASE 4.3; Conservation; Acoustics; Worship; Taramati Baradari; Performance Structure.

Manuscript ID: ICCAUA2023EN0379

The Role of Traditional Craft in Shaping the Historic City: Case of Moradabad, Uttar Pradesh, India

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Abstract
Moradabad is known as the Brass City of India. The paper would cover the study of the tangible heritage of Moradabad including the understanding of the historic city and identifying the historic structures of the old city. The second one would be to study the Intangible Heritage of Moradabad focusing on identifying the traditional brass making areas. This aspect would also focus on documenting the '*karkhanas*' where they make brass items and the traditional knowledge system involved in the craft. This study would be based on primary on-site surveys. After studying both the layers, the paper would also try and find the connection between the traditional craft and the historic city. Artisans from the major backbone of the city. The conditions in which they are working has a direct implication on their health, the paper would aim to study these issues and give design solutions/ proposals for the same.

Keywords: Traditional Craft; Brass City; Tangible Heritage; Intangible Heritage.

Manuscript ID: ICCAUA2023EN0381

Indicators for Assessing the Economic Potential of Post-Industrial Sites: A Case Study of Mitrovica

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Abstract
This study aims to address the challenge of transforming post-industrial sites into productive social and economic assets by developing a set of indicators to assess their potential. The case study focuses on Mitrovica, a city that reached a significant level of industrial and economic development in the 1980s but suffered a decline in the 1990s due to political conflict. As a result, Mitrovica inherited many unused industrial areas that are now degraded and abandoned. Using a mixed methods approach that includes a literature review and data analysis, this study identifies physical, economic, and social indicators for evaluating the economic potential of post-industrial sites. The results of the study suggest that these sites can be repurposed and adapted for sustainable urban development, opening up opportunities for reuse and adaptive rehabilitation.
Keywords: Industrial Areas; Urban Regeneration; Post-Industrial Sites; Mitrovica; Abandoned; Urban Development.

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Requalification of Urban Identity According to the History of the Place: The Kasbah of Algiers

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Abstract
In 1992, the Kasbah of Algiers was proclaimed as a world cultural heritage, and in 2012, it benefited from a safeguard plan. These legal measures have raised the question of the methods of intervention in the protected sectors, in particular the integration of contemporary architecture into historic sites. This contribution is part of the process of making the city in the city and from the city, which is based on the recognition of urban structures that have disappeared. These structures will become elements for architectural and urban compositions, hence the reinterpretation of the memory of the place in a contemporary expression ensuring the preservation of its identity and authenticity. Through our experimentation, Bastion 23, which is today a fragment isolated from the rest of the urban fabric of the old town, has become an urban component restoring the city/sea relationship, a relationship interrupted since the demolitions of the 20th century.
Keywords: Kasbah of Algiers; Cultural Heritage Site; The Memory of the Place; Contemporary Architecture.

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Detecting Urban Growth Patterns and Conversion Processes of East Kolkata Wetlands

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Abstract:
The East Kolkata wetlands are an important Ramsar site and the kidney of the city, providing vital ecosystem services. However, recent human encroachment, land reclamation for agriculture and aquaculture, and urban growth in and around east Kolkata have negatively impacted the wetlands. This study will examine the spatiotemporal land use and land cover changes, the process of urban expansion, and the shrinking of wetland areas in East Kolkata using remote sensing, GIS, Growth Rate Index, and Compactness Index. In addition, the wetland shrinkage monitoring (WSM) model will be used to determine wetland contraction. The multi-temporal data for the built-up area, a crucial indicator to quantify urban growth, collected over the decades will be utilized to find out the changes in the Kolkata Metropolitan Area. The study will ascertain the decent functioning of the local authorities for comprehensive land use planning that is indispensable to curb wetland degradation.
Keywords: Urban Growth; Land use/Land cover; Remote Sensing and GIS; Wetland Shrinkages; East Kolkata Wetland.

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Unraveling Urban Gentrification: A Comprehensive Analysis

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Abstract:
Gentrification, a process that has garnered considerable attention, profoundly impacts urban spaces and communities. This study aims to comprehensively analyze the phenomenon, drawing from empirical research, theoretical frameworks, and case studies. We define gentrification as the arrival of affluent individuals, businesses, and investments into marginalized neighborhoods. We explore the socioeconomic and spatial transformations associated with gentrification, including rising property values, displacement of lower-income residents, altered land use patterns, and changing community dynamics. The study investigates the drivers of gentrification, encompassing economic and sociocultural factors such as shifting housing markets, urban policies, cultural influences, and lifestyle preferences. The role of various stakeholders, including developers, policymakers, residents, and community organizations, is examined in shaping and responding to the process. Additionally, the impacts of gentrification on housing affordability, social cohesion, community identity, local businesses, and public spaces are assessed. The study recognizes both positive aspects, such as increased economic investment and cultural revitalization, and negative consequences, including loss of diversity, displacement, and social inequality. In conclusion, this analysis contributes to the existing knowledge on gentrification, enabling policymakers, urban planners, and community stakeholders to develop informed strategies. By understanding the dynamics of gentrification, it is possible to mitigate negative impacts and maximize positive outcomes. The abstract recommends future research directions to promote inclusive and sustainable urban development in the face of gentrification.

Keywords: Gentrification, Urban Spaces, Socioeconomic Transformation, Displacement, Urban Policy, Community Dynamics.

Manuscript ID: ICCAUA2023TR0001

Historical Analysis of the Sümerbank Factories Established in Accordance with the First Five-Year Industrialization Plan

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Abstract
In its foundation years, The Republic of Turkey has adopted a development model based on modernization, innovation and the principle of statism in its economic policies. In this respect, the First Five-Year Industrial Plan, which includes the priority needs of Turkey, was prepared and the state started to build new factories in the 1930s. These factories not only brought employment and innovation to the city where they were located, but they also played an important role in shaping the life style of the Early Republican Period. Among the factories built in accordance with the First Five-Year Industrial Plan, this study aims to focus on Sümerbank factories, where the foundations of economic and social development were laid, and examine their transformation in the historical process. Firstly, an extensive literature review was conducted on the Sümerbank factories established between 1933 and 1938. Following that, the site selection criteria of Sümerbank factories located in different regions of Turkey and their physical aspects during the establishment phase were examined. Finally, by documenting the existing features of these industrial heritage places, a general assessment was made on the transformation from the 1930s to the present.

Keywords: Early Republican Period Architecture; The First Five-Year Industrialization Plan; Sümerbank Factories; Industrial Heritage; Transformation.

Birinci Beş Yıllık Sanayi Planı Uyarınca Kurulan Sümerbank Fabrikalarının Tarihsel Süreçte İncelenmesi

Özet
Türkiye Cumhuriyeti kuruluş yıllarında, çağdaşlaşmayı, yenilikçiliği ve ekonomi politikalarında devletçilik ilkesini temel alan bir kalkınma modelini benimsemiştir. Bu doğrultuda, Türkiye'nin öncelikli ihtiyaçlarının yer aldığı Birinci Beş Yıllık Sanayi Planı hazırlanmış ve devlet 1930'lu yıllarda devlet yeni fabrikalar inşa etmeye başlamıştır. Bu fabrikalar yalnızca bulundukları kente istihdam ve yenilik getirmekle kalmamış, Erken Cumhuriyet Dönemi hayat biçiminin de şekillenmesinde önemli rol oynamıştır. Bu çalışmada Birinci Beş Yıllık Sanayi Planı uyarınca gerçekleştirilen fabrikalar içinden, ekonomik ve sosyal kalkınmanın temelinin atıldığı Sümerbank fabrikalarına odaklanmayı ve bu fabrikaların tarihsel süreç içinde yaşadığı dönüşümü incelenmeyi amaçlamaktadır. Öncelikle, 1933-1938 yılları arasında kurulan Sümerbank fabrikaları üzerine geniş bir literatür taraması yapılmıştır. Sonrasında, Türkiye'nin farklı bölgelerinde bulunan Sümerbank fabrikalarının yer seçim kriterleri ve kuruluş aşamasındaki fiziksel özellikleri incelenmiştir. Son olarak, endüstri mirası olan bu fabrikaların mevcut özellikleri belgelenerek, 1930'lardan günümüze dönüşüm üzerine genel bir değerlendirme yapılmıştır.

Anahtar Kelimeler: Erken Cumhuriyet Dönemi Mimarlığı; Birinci Beş Yıllık Sanayi Planı; Sümerbank Fabrikaları; Endüstri Mirası; Dönüşüm.

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Identification of Risks in Restoration Projects of Immovable Cultural Heritage

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Abstract
Activities for the conservation of cultural heritage around the world are gaining importance day by day. Restoration of immovable cultural heritage has an important place among conservation activities. Restoration projects have different dynamics from standard construction projects. This causes restoration projects to have inherent risks. For a successful restoration project to be realized, these risks must be systematically addressed within the framework of a comprehensive risk management plan. The research aims to determine the risks in the restoration projects of immovable cultural heritage and to prepare the basis for a comprehensive risk management system. After the research topic and the literature review, the risk management process and risks in restoration projects were classified based on the existing literature, and risks were defined for each category. The significance levels of the identified risks were determined as a result of the Delphi questionnaires, which consisted of three stages in which a group of experts participated, using the Delphi Analysis Technique. The most critical risk categories and risks that experts agreed on were determined. The findings obtained as a result of the research will contribute to the efficiency of the process by supporting a planned risk management process for the stakeholders involved in restoration projects.
Keywords: Immovable Cultural Heritage; Restoration Projects; Risk Management; Delphi Technique.

Taşınmaz Kültür Varlıklarının Restorasyon Projelerinde Risklerin Belirlenmesi

Özet
Dünyada kültür varlıklarının korunmasına yönelik faaliyetler gün geçtikçe önem kazanmaktadır. Taşınmaz kültür varlıklarının restorasyonu ise koruma faaliyetleri arasında önemli bir yer tutmaktadır. Restorasyon projeleri, standart yapım projelerinden farklı dinamiklere sahiptir. Bu durum, restorasyon projelerinin bünyesinde kendine özgü riskler barındırmasına neden olmaktadır. Başarılı bir restorasyon projesinin gerçekleştirilebilmesi için bu risklerin kapsamlı bir risk yönetim planı çerçevesinde sistematik olarak ele alınması gerekmektedir. Araştırmanın amacı, taşınmaz kültür varlıklarının restorasyon projelerinde riskleri belirleyerek kapsamlı bir risk yönetim sistemine altlık hazırlamaktır. Araştırma konusu ile literatür araştırmasının ardından, mevcut literatür üzerinden restorasyon projelerinde risk yönetim süreci ve riskler sınıflandırılmış, her bir kategori için riskler tanımlanmıştır. Tanımlanan risklerin önem dereceleri ise, Delphi Analiz Tekniği kullanılarak bir grup uzmanın katıldığı üç aşamadan oluşan Delphi anketleri sonucunda belirlenmiştir. Uzmanların uzlaşı sağladığı en kritik risk kategorileri ve riskler belirlenmiştir. Araştırma sonucunda elde edilen bulgular, restorasyon projelerinde yer alan paydaşlar için planlı bir risk yönetim sürecini destekleyerek sürecin verimliliğine katkı sağlayacaktır.
Anahtar Kelimeler: Taşınmaz Kültür Varlıkları; Restorasyon Projeleri; Risk Yönetimi; Delphi Tekniği.

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Synchronic Phenomenological Analysis Urban Identity Buildings

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Abstract

In today's architectural design, besides the expectation of function, the meaning of the design in human perception is important. From the past to the present, the relationship between "urban and identity" has come to the fore more in design. Especially in Modernism, with the effect of globalization-global capitalism, competition between cities has increased and architectural products have become a country promotion tool. The concepts of place and space have changed in architecture; a process in the universalist style consisting of typified buildings that have no connection with the place has begun. Contrary to this attitude, it is seen that the buildings that can be the symbol of the country-city and aim to present the image of different cities are intensified. As one of the ways to give an identity to a city; symbolic buildings, which give information about the place, are the current approach in architecture. In this study, examples of buildings, which are considered as urban symbols, have been examined in diachronic and synchronic. As a phenomenological analysis method, building samples were analyzed in the context of C. Norberg-Schulz's "Genius Loci" concept and Roland Barthes's “Semiological” principles. As a result, the urban symbol buildings which analyzed diachronically and synchronously, either as its context to the place increases or when it exists with its unique qualities, it is seen that the promotional effect of the urban identity to the world also increases.

Keywords: Urban Identity; Iconic Building; Genius Loci; Semiotics.

Kent Kimliği Oluşturan Yapıların Eşzamanlı Fenomenolojik Analizi

Özet

Günümüzde mimari tasarımda fonksiyon beklentisinin yanı sıra, tasarımın insan algısında oluşturduğu anlam önem taşımaktadır. Geçmiş dönemlerden günümüze “kent ve kimlik” ilişkisi tasarımda daha fazla ön plana çıkmıştır. Özellikle Modernizmde küreselleşme-global kapitalizm etkisi ile, kentler arasındaki rekabet artmış, mimari ürünler bir ülke tanıtım aracı haline gelmiştir. Mimarlıkta yer ve mekan kavramları değişerek; yerle bağlantının koptuğu tipleşen binalardan oluşan üniversalist üslupta bir süreç yaşanmaktadır. Buna karşıt olarak, ülke-kent sembolü olabilecek, farklı kentlerin imajını sunabilmek amaçlı yapıların yoğunlaştığı görülmektedir. Bir kente kimlik kazandırabilmenin yollarından biri olarak; yeri hakkında bilgi veren, sembolik yapılar mimarlıkta güncel yaklaşım olmaktadır. Bu çalışmada kent sembolü olarak değerlendirilen bina örnekleri tarihsel süreç içerisinde (diakronik) ve farklı ülkelerde eş zamanlı (senkronik) ele alınmıştır. Bina örnekleri fenomenolojik analiz yöntemi olarak; C. Norberg-Schulz’un “Genius Loci (yerin ruhu)” kavramı ile Roland Barthes’ın “Semantik (göstergebilim)” ilkeleri bağlamında analiz edilmiştir. Sonuç olarak, tarihsel süreç ve eşzamanlı ele alınan kent sembolü binaların ya yere bağlamsallığı arttıkça ya da özgün nitelikleri ile var olduğunda, kent kimliğinin dünyaya tanıtım etkisinin arttığı görülmektedir.

Anahtar Kelimeler: Kent Kimliği; Sembolik Yapılar; Yerin Ruhu; Göstergebilim.

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Considering the Cultural Heritage Sites in the Context of Valuation

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Abstract
In Turkey, which is located at a strategic transition point with its location and has witnessed important historical events, the potential of historical cultural assets cannot be used effectively for sustainable national development goals. In the study; It is aimed to bring a new perspective to the preservation of historical monuments, to reveal its value correctly and to contribute to the sustainability of conservation practices by bringing new expansions to existing conservation policies, strategies and practices. Literature review and face-to-face interviews were used as methods and conservation approaches at national and international level were examined comparatively. It has been concluded that it is important for national development to determine the real value of the cultural heritage, which is the national capital and resource, to give the right functions and to reconsider the strategies in the "Area Management" plans in this context, taking into account the value of the protected area.

Keywords: Valuation; Cultural Heritage; Sustainable Urban Conservation; Renewable Energy; UNESCO World Heritage Site Management Plan; Sustainability.

Kültürel Miras Alanları ve Değerleme İlişkisi

Özet
Konumuyla stratejik bir geçiş noktasında bulunan ve önemli tarihi olaylara şahit olmuş olan Türkiye'de, tarihi kültür varlığı potansiyeli sürdürülebilir ulusal kalkınma hedeflerine yönelik olarak etkin bir şekilde kullanılamamaktadır. Çalışmada; tarihi eser korumasına yeni bir bakış açısı kazandırmak, değerini doğru bir şekilde ortaya çıkarmak ve mevcut koruma politikalarına, stratejilerine ve uygulamalarına yeni açılımlar getirerek, koruma uygulamalarının sürdürülebilir olmasına katkı sağlamak amaçlanmıştır. Literatür taraması ve yüz yüze görüşmeler yöntem olarak kullanılmış ve ulusal ve uluslararası düzeyde koruma yaklaşımları karşılaştırmalı olarak incelenmiştir. Milli sermaye ve kaynak olan kültürel mirasın gerçek değerinin tespit edilmesi, doğru fonksiyonların verilmesinin ve bu bağlamda "Alan Yönetimi" planlarındaki stratejilerin koruma alanı değeri gözetilerek, yeniden ele alınmasının ulusal kalkınma açısından önemli olduğu sonucuna varılmıştır.

Anahtar Kelimeler: Değerleme; Kültürel Miras; Sürdürülebilir Kentsel Koruma; Yenilenebilir Enerji; UNESCO Dünya Miras Alanı Yönetim Planı.

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Evaluation of Cultural Heritage Conservation in the Context of Low-Carbon Urban Development

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Abstract
The problem of climate change threatens the destruction of urban identity by negatively affecting the structure of cities. There is no strategy determined for 'urban protected areas' in the arrangements made for the solution. Contributing to the national 'sustainable development' goals, within the framework of energy efficiency, it is aimed to contribute to the evaluation of innovative application approaches and the determination of strategies for the current renewal methods of cultural assets. Literature review and face-to-face interviews were used as methods. A comparative analysis of the application differences between the repair of a national historical building and the repair of an international historical building was made. As a result; In order to increase the quality of urban life in protected areas, the basic principles of urban renewal should be considered integrated with all strategies and a climate action plan should be made from the national level to the local level.

Keywords: Climate Change; Low Carbon Urban Development; Sustainable Urban Conservation; Renewable Energy; UNESCO World Heritage Site Management Plan.

Düşük Karbonlu Kentsel Gelişme Çerçevesinde Korunacak Kültür Varlıklarının Değerlendirilmesi

Özet
İklim değişikliği sorunu, kentlerin yapısını olumsuz etkileyerek kentsel kimliğin yok edilmesini tehdit etmektedir. Çözüme yönelik yapılan düzenlemelerde 'kentsel sit alanları' için belirlenmiş bir strateji bulunmamaktadır. Ulusal ‘sürdürülebilir kalkınma’ hedeflerine katkı olarak, enerji verimliliği çerçevesinde, kültür varlıklarının güncel yenileme yöntemlerine yönelik yenilikçi uygulama yaklaşımlarının değerlendirilmesi ve stratejilerinin belirlenmesine katkıda bulunmak amaçlanmaktadır. Literatür taraması ve yüz yüze görüşmeler yöntem olarak kullanılmıştır. Ulusal tarihi bir yapı onarımı ile uluslararası düzeyde tarihi bina onarım yöntemleri arasındaki uygulama farklılıklarının karşılaştırmalı analizi yapılmıştır. Sonuç olarak; koruma alanlarında kentsel yaşam kalitesinin arttırılması için kentsel yenileme temel prensipleri tüm stratejiler ile birlikte bütünleşik olarak ele alınmalı ve ulusal düzeyden yerel düzeye iklim değişikliği eylem planı yapılmalıdır.

Anahtar kelimeler: İklim Değişikliği; Düşük Karbonlu Kentsel Gelişme; Sürdürülebilir Kentsel Koruma; Yenilenebilir Enerji; UNESCO Dünya Miras Alanı Yönetim Planı.

Prof. Dr. **Hatice Arzu Kocabaş Diren** anısına…

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The Sense of Smell and Its Effects on the Construction of Urban Identity

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Abstract
People smell thousands of times in a day, and each sniff creates a new experience. Every place has its own unique smell due to both the material produced, the landscape it has, and the functions performed there. However, for many years, the odors of the spaces have been taken into consideration only in a negative way so its relation to the individual is ignored. Ignoring the sense of smell, which is an important means of direct connection between space, moment and individual, prevents the formation of a common olfactory identity and memory. The aim of this study; To investigate the effects of the sense of smell on the perception of urban space, on the formation of urban identity and spatial memory, and to reveal the importance of including the sense of smell in urban design studies. During the research, related sources were scanned, field work was carried out with the volunteers and interviews were conducted. A quantitative study was conducted with the spatial analyzes to be carried out in the field, and a qualitative study was carried out with the data to be obtained with the participation of volunteers. As a result of the study, it was aimed to determine the interaction between the concepts of smell, space perception and urban identity.
Keywords: Urban Identity; Space Perception; Sense of Smell.

Kent Kimliğinin İnşasında Koku Duyusu ve Etkileri

Özet
İnsanlar günde binlerce kez koku alır ve her bir koklama yeni bir deneyim oluşturmaktadır. Her mekânın hem üretilen malzemeden hem sahip olduğu peyzajdan hem de orada gerçekleştirilen işlevlerden kaynaklı olarak kendine has bir kokusu vardır. Ancak uzun yıllar mekân kokuları yalnızca olumsuz yönden ele alınmış ve bireyle olan ilişkisi göz ardı edilmiştir. Mekân, an ve birey arasında doğrudan bağlantının önemli bir aracı olan koku duyusunun görmezden gelinmesi ortak bir koku kimliğinin ve belleğinin oluşmasına engel olmaktadır. Bu çalışmanın amacı; koku duyusunun kentsel mekânın algılanmasında, kent kimliğinin ve mekânsal belleğin oluşmasındaki etkilerini araştırmak ve kentsel tasarım çalışmalarına koku duyusunun dahil edilmesinin önemini ortaya koymaktır. Araştırma süresince; konuyla ilgili kaynaklar taranmış, gönüllülerle saha çalışması gerçekleştirilerek derinlemesine mülakat yapılmıştır. Sahada gerçekleştirilecek mekânsal analizlerle nicel, gönüllülerin katılımıyla elde edilecek verilerle de nitel bir çalışma yürütülmüştür. Çalışmanın sonucunda koku, mekân algısı ve kentsel kimlik kavramları arasındaki etkileşimin saptanması hedeflenmiştir.
Anahtar Kelimeler: Kent Kimliği; Mekân Algısı; Koku Duyusu.

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Informal Clients' Patronage Of Quantity Surveyors Services For Building Projects In Bauchi Metropolis, Nigeria

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Abstract
Studies have shown that patronage of Quantity Surveyors (QSs) by the public clients in Nigeria is discouraging in spite of the role they play in regulating professional services. This resulted in the Quantity Surveying (QS) services in building projects in the country not fully appreciated. Hence, this study investigates how to enhance informal clients' patronage of QS services for building projects in Bauchi metropolis, Nigeria. The study used the sample frame of 443 informal clients that got approval for their residential building projects from planning authority to arrive at a sample size of 205. Subsequently respondents were surveyed using questionnaires through convenience and simple random sample techniques respectively. Data obtained were analysed using descriptive (frequency, percentage, mean and cross-tabulation with Chi-square). Findings revealed that QS service patronage for building projects in Bauchi is very low. The implication of this finding is that low patronage of QS services would deprive informal clients in getting value for money in their building project procurement. The study recommends the application of effective marketing strategy.
Keywords: Quantity Surveying; Informal Clients; Patronage; Bauchi Metropolis.

Manuscript ID: ICCAUA2023EN0011

The Meaning of Home: Spatial Practice and The Process of 'Home-Making' in Multi-Ethnic Settings

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Abstract
The phenomenon of mass row housing is a strategy imposed by the ruling parties to accommodate the rapid growth in the multi-ethnic urban populations. There is a lack of understanding about home dwellers' spatial practices in modern row housing schemes, produced by developers and governments which leads to excessive home modification by dwellers. This paper argues that the creation of a 'home' is a process of appropriation. It builds on De Certeau's theory of practice and Lefebvre's theory of production of space to better understand how people perceived space in modern row houses. A conceptual framework is developed, and phenomenology research methods are used to delve into participants' home experiences since the start of their occupancy, as well as the act of appropriating and modifying a home to facilitate their dynamic spatial practices. It provides a newer modern housing guideline to produce a sustainable and longer-term home occupancy in a multi-ethnic setting.
Keywords: Homes; Multi-Ethnic; Households; Spatial Practice; Interpretation.

Manuscript ID: ICCAUA2023EN0013

Flexible Architectural Interventions for Housing Issues in Bahrain

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Abstract
Houses are considered the center of our universe and our safe haven. Recently having a home that fulfills our desires became a challenge due to lack of space and overpopulation in the world. This pushed most governments to start producing social houses with design limitations and bulk production. This paper aims to identify the problems related to social housings in Bahrain and seeks the possibility of using flexible architectural interventions to solve these issues. A questioner is conducted for Bahraini families living in social housing projects to identify their issues and their thoughts about flexible solutions. The results show that almost all social housing occupants are not satisfied with their houses spatial design and have made costly modifications. They also lack the knowledge of flexible interventions and refused it as a solution while encouraging the idea of vertical housings. This study emphasizes on the need to improve occupants' satisfaction in Bahraini social by using efficient architectural interventions.
Keywords: Social Housings; Over Population; Residents Satisfaction; Flexibility; Architecture; Bahrain.

Manuscript ID: ICCAUA2023EN0023

Affordable Housing' Challenges. Cost, Price and Sustainability Energy Nexus

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Abstract
In developed and developing countries, affordable housing represents one of the key challenges of the decade. Whether the criticalities derive from the constant growth of real estate values, or from the phenomena of new urbanization resulting from rural-urban movements, AHs must be placed at the center of the actions of urban stakeholders and practitioners. Nowadays, the achievement of SDG 11 imply that affordability is dealt in a more innovative and comprehensive way. The global energy crisis generated by the war in Ukraine showed that energy costs may became unsustainable for medium-low-income families. In order to makes houses affordable in long-term, cost, price and sustainability energy nexus must be investigated based on a life-cycle cost perspective. In this context, this paper aims at stimulating a discussion on affordable housing in terms of costs of construction, carbon-foot print, selling prices, energy efficiency and consumption, as well as ownership' sustainability.

Keywords: Affordable Housing; Real Estate Development; Energy Efficiency; SDGs; Urban Growth; Sustainable Urban Planning.

Manuscript ID: ICCAUA2023EN0031

Liveability Considerations: Towards Designing Sustainable Public Housing in Niger State, Nigeria

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Abstract
Indicators of liveability have been linked in the literature to socioeconomic determinants of health, with environmental sustainability serving as an underpinning factor. Thus liveability is a sub-set of sustainability and no feature of liveability is opposing to sustainability. The study identified liveability indicators which can be utilised in designing sustainable public housing. Multi-stage cluster, random, and systematic random sampling were employed to select study locations, housing estates and units respectively. 910 Questionnaires containing 102 questions on liveability variables were administered. Hierarchical Cluster Analysis, Factor Analysis and Multiple Regression Analysis were used to respectively group, reduce number of variables, and validate and measure how well identified variables predicted Resident Perceived Satisfaction Index. Result identified 21 variables within components of Internal & External Building Environment, Building Finishes & Services, Associated Costs & Utilities, and Accessibility. These variables can achieve 92.9% satisfaction of residents if applied in the design of sustainable public housing.

Keywords: Environmental Sustainability; Liveability; Public Housing; Resident Satisfaction; Sustainable Housing.

Manuscript ID: ICCAUA2023EN0062

Urban and Architectural Dis-Identity in Development Areas of Vernacular Rural Settlements: Behramkale, Türkiye

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Abstract
Sustainable rural development is a challenging issue, considering the pressure of change that has been brought by the demands of globalization and intensified tourism activities in rural vernacular settlements. Studies in the field of different disciplines concentrate on mostly historical centers. However, research on the distinctive urban and architectural identity of the new development areas in rural vernacular settlements is very few. A field study in vernacular rural settlement Behramkale has been conducted to discuss environmental, socio-cultural, and socio-economic continuities and changes, inadequacies of planning policies, and the consequences of top-bottom decisions in vernacular rural Türkiye. Primary data is based on comprehensive household surveys, open-ended interview questions, architectural surveys, and archival documents. The key finding of that study is the need for a more participatory and site-specific approach to sustainable development. Therefore, this paper also proposes a human-centered and identity-based approach to identify well-adopted solutions for local communities in Türkiye.

Keywords: Vernacular Rural Heritage; Sustainable Development; Identity-Based Design; Human-Centered Design.

Manuscript ID: ICCAUA2023EN0079

Rethinking the Public Loggia to Improve Urban Resilience to Climate Change

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Abstract
Microclimates within *loggia* spaces near public walkways and building entrances are potentially strategic for resilience to extreme weather conditions. However, the public *loggia* may also be a space of conflict of appropriation and vulnerability, resulting in obsolete voids problematic for buildings and cities. This raises questions about its morphology and essential requirements to improve its functional performance. Therefore, a transdisciplinary study based on qualitative research was developed combining spatial experiences of experts and users. The results suggest that a public *loggia* needs to consider local climate, social behaviour, usability, urban cleaning, visibility and connections, as far as possible, with the main urban walkways. The findings also suggest that the public *loggia* only contributes toward urban resilience if its architectural details approach affordances and diversity within its users.

Keywords: Climate Change; Inclusive Architecture; Public Health; Resilient Cities; Spatial Justice; Urban Loggia.

Manuscript ID: ICCAUA2023EN0082

Rural Vernacular Heritage and Strategic Design: Matmata as an Example of Sustainable Development

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Abstract
This paper examines the sustainable design strategies of Matmata mountains' vernacular architecture. Hence, the small town is located in southeastern Tunisia and it represents a perfect example of the Berber architectural heritage, offering the opportunity to analyze and discuss the building strategies of the past which are still nowadays considered relevant. Hence, the great potential of this Berber originality manifests itself in the troglodytic (underground) architecture. This article aims to showcase Matamata's originality and to present the underground living as a cultural heritage recently witnessing a massive decline due to the socio-economic changes the region has undergone. The article also aims to depict the development of hotels. The initial phase of the research consists of an interpretation of the basic theoretical and methodological concepts of sustainable design. Then, we will introduce a geo-historical study of the region. Afterwards, an analytical study researching the troglodytic architecture of Matmata will take place.

Keywords: Matmata; Rural Vernacular Heritage; Troglodyte; Strategic Design; Integrated Tourism; Sustainable Development.

Manuscript ID: ICCAUA2023EN0101

Systematic Ecological Resilience Strategies & Practices in China's National Land Space

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Abstract
In the context of global climate change and rapid urbanization, faced with a series of ecological degradation problems, the Chinese government has continuously deepened the strategic deployment of ecological restoration in the past 20 years, explored and promoted the transformation of ecological restoration from partial and single-factor restoration to comprehensive, multi-scale and multi-factor integrated protection and restoration and comprehensive management. China focus on measures in three aspects: first, control territorial ecological space, delineate and strictly observe the national ecological protection red line, and ensure and safeguard the national ecological security bottom line; Second, research and practice on the localization of Nature-based Solutions in China to strengthen the natural resilience of the ecosystem; Finally, a major ecological protection and restoration project integrating mountains, water, forests, fields, lakes, grass and sand has been implemented, and the function of ecosystem services has been gradually enhanced.

Keywords: Ecological Protection Red Line; NbS Localization; Systematic Resilience of Multi-Scale & Multi-Factor.

Manuscript ID: ICCAUA2023EN0389

Slum Upgrading of Bariga District Lagos: A Social Sustainability Approach In The African Context

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Abstract
The issue of Slums is a problem that plagues many developing countries. This is especially evident in cities across Africa, where the proliferation of Slums poses a significant urban challenge. Slum upgrading as an approach, is the most common strategy adopted for tackling this problem. This paper examines social sustainability slum upgrading projects in Africa, and the effectiveness of one of such projects implemented in Bariga, a district in Lagos, Nigeria. The study employed a mixed methods research approach to collate and analyse qualitative primary and secondary data through semi-structured interviews, and a review of existing literature. The findings show that prioritizing social sustainability and direct community participation can lead to sustainable slum upgrading interventions. The paper seeks to contribute to the knowledge base on social sustainability in slum upgrading projects, and provide insights and recommendations to policy makers, researchers and practitioners working on slum upgrading projects in Africa.

Keywords: Slums; Slum Upgrading; Social Sustainability; Community Participation; Urban Development.

Manuscript ID: ICCAUA2023EN0121

The Role of The Indonesian Army in Fulfilling Low Income Housing Need: A Case Study of The Magelang City Scavenger Community with Bank Jateng's Corporate Social Responsibility

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Abstract
Overcoming the housing construction stagnation of the Gumuk Sepiring Scavenger Community in Magelang City - Indonesia for several years, Magelang Municipality as local government collaborated with the Indonesian Army for solving the construction process by utilizing Bank Jateng's Corporate Social Responsibility budget. This research was intended to find out the role of the Indonesian Army in giving assistance for the housing construction implementation, especially for Low-Income Community in Gumuk Sepiring. The research used qualitative research method with persuasive writing. This study found that the existence of the Indonesian Army accelerated the implementation of house construction with several actions and steps facing unplanned situation and difficult terrain. The Indonesian Army also established the unexplored skills of the scavenger community members. Therefore, the Indonesian Army existence will be able to fulfil Indonesian low-income community housing need.

Keywords: Indonesian Army; CSR - Corporate Social Responsibility; Low-Income Community; Scavenger Community; Housing.

Manuscript ID: ICCAUA2023EN0125

Transitions in the Rural Built Environment of India: A Case Study Approach

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Abstract
Rural India is rapidly transitioning to contemporary building materials. This transition is damaging rural India's culture, identity, and environmental sustainability. According to the Ministry of Rural Development, over 70% of targeted dwellings are completed under the housing scheme, which uses contemporary materials. However, houses not eligible for subsidies are also updating to contemporary construction, suggesting that schemes are not the only factor. Many factors, including social, environmental, economic, governance and policies, lead to this transition. These rural transformation factors have been explored globally, but in India, it is limited. Exploring the factors causing this transition can assist in developing solutions for conserving rural India's culture, identity, and sustainability. The author undertook a systematic documentary review of five villages in Maharashtra. Ban on forest commodities, availability of contemporary materials, occupation change, people's perception of houses, desire to modernize, and government subsidies are among the factors that lead to these transitions.
Keywords: Vernacular Architecture; Contemporary Construction; Transition Factors; Built Environment; Rural Transformation.

Manuscript ID: ICCAUA2023EN0130

Potentials of Constructing Sustainable Rammed Earth Buildings in Hot-Arid Regions: Structural and Environmental Challenges

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Abstract
The continuous increasing in the price of cement is one of the major challenges facing the construction industry. Moreover, concrete mixtures are main sources of CO2 emissions. On the other hand, rammed earth material could be a good alternative to reduce costs and amounts of emissions. In addition, it is appropriate to be used in hot-arid regions due to its thermal mass properties. Yet, such a material has limitations in terms of durability and strength. This research aims firstly to test the suitability of rammed earth as urban modern construction material, through examining characteristics and specifications of soil, sand, and other stabilizers to improve the resistance to frost attack and avoid deterioration. Secondly, to explore the efficiency in terms of indoor environmental conditions. The research was implemented by constructing an experimental building within a university campus in Jordan, to conclude the best solutions in terms of environmental and structural challenges.
Keywords: Rammed Earth; Stabilizer; Compressive Strength; Water Content; Sustainability; Thermal Comfort.

Manuscript ID: ICCAUA2023EN0138

Assessment of Spatial Sustainability of Settlement Layouts Prescribed in Vaastu Shastra Using Space Syntax

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Abstract
The concept of spatial sustainability focuses on the physical form of a city resulting from planning and development. Vaastu Shastra, the ancient Indian treatise on architecture, prescribes settlement planning concepts based on several layers of form, scale, mandala divisions, street patterns, sites' natural features, and inhabitants' zoning. These combinations result in thousands of layouts of different scales and shapes. The Space syntax approach is applied to quantitatively analyze and compare the spatial layouts of eight selected settlement types of similar scales prescribed in Vaastu Shastra. This syntactic approach critically analyzes the spatial configuration of these settlements to explore the interrelation of those ancient recommendations and contemporary theories of spatial sustainability. This assessment reveals the vital concepts underlying the planning of several cities of ancient India. At the same time, study promotes Vaastu Shastra's contemporary application for planning settlements of varied scales and presents it as a potent theory of planning.
Keywords: Vaastu Shastra; Settlement Planning; Street Patterns; Spatial Configuration; Spatial Sustainability; Space Syntax.

Manuscript ID: ICCAUA2023EN0148

Mixed Perspective Mixed-Income Housing in Nigeria and South Africa: A Comparative Literature Review

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Abstract
Low-cost The importance of affordable housing worldwide cannot be over-emphasized as it forms part of the right to an adequate standard of living. With recent urbanization and demographic growth, there has been an increased need for affordable housing worldwide. Housing delivery remains a major challenge for both the government of Nigeria and South Africa. Although both governments have been involved in different initiatives and interventions aimed at providing succour to housing problems, the current state of housing particularly for low-income residents remains insufficient. Given the daunting task of delivering low-cost housing, research into various models of delivery and how this impacts the lives of citizens is crucial. One model that proposes to impact positively on sustainable housing development is the mixed-housing model. It aims to ensure affordability, social integration, and sustainability. In South Africa, this model is currently used in what is known as Mega-human settlements where the government provides housing for mixed-income groupings. This paper offers an extensive comparative literature review that explores mixed-income housing in Nigeria and South- Africa. It examines how mega-human settlements attempt to make more efficient and sustainable housing environments. The key findings reveal that mixed-income housing developments have been instrumental to a more sustainable approach to low-cost housing delivery, in the countries explored.
Keywords: Low-Cost Housing; Mixed-Income Housing; Sustainable Human Settlement; Nigeria; South Africa.

Manuscript ID: ICCAUA2023EN0170

Urban Livelihoods and Rural Landholdings: Inter-related Regional Labor and Land Markets in China

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Abstract
Existing literature on China's social transformation has focused on the role of urban areas in driving rural citizens to move across the country and up the social ladder. Participation in the urban economy promotes social mobility, while rural landholdings are often expropriated at low compensation rates to provide a "hidden subsidy" for urban growth. Nevertheless, as investment capital frenetically acquires rural land for development and centralized agricultural production, rural communities are also motivated to capitalize on the potential of their landholdings. Against this backdrop, this research proposes a new conceptual framework to understand the mechanism of rural–urban migration and social mobility through the prism of rural landholdings. Urban opportunities and rural landholdings are treated as integral components of the complex process of transregional class formation and reproduction. Findings from this research inform sustainable urban development that better facilitates the inter-related nature of regional labor and land markets.
Keywords: Urbanization; Migration; Sustainable Urban Development; Livelihoods; Landholdings; Urban-Rural Divide.

Manuscript ID: ICCAUA2023EN0181

Reviving Surface Water Bodies with Ecological Resilience through Water-Sensitive Urban Design Approach: A Case of Rajshahi City, Bangladesh

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Abstract
Ecological resilience is a measure of an ecosystem's ability to recover rapidly from disruption. Human interventions and urbanization dramatically affect surface water bodies over land, which are integral parts of the ecosystem. There were approximately 729 ponds and canals in 2002, but only 393 remain in 2011, which increases temperatures, water logging, and drought conditions. As pollutants enter water bodies through rainwater, they disrupt the ecosystem and ecology. This paper provides an overview of the research and implementation, focused on Water-Sensitive Urban Design toward ecological resilience. In line with the theory, the outcomes are impressive, and fruitful, in addition to improving ecological resilience. These can provide direction on future water body preservation process in city like Rajshahi due to climate change adaptation. As the method provides a relative assessment of resilience and makes some basic assumptions, additional research is needed to explore assessment methods that account for this effect.

Keywords: Water-Sensitive Urban Design; Ecological Resilience; Surface Pollutants; Climate Change; Rajshahi City.

Manuscript ID: ICCAUA2023EN0185

Socio-Spatial Inequalities in Algerian Cities: Guelma As a Case Study

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Abstract
Guelma, like a large majority of the Algerian cities, continues to experience a very high demographic growth, which results in a persistent housing crisis. To face this problem, new housing programs have been recommended and a new financing formula integrating the participation of society has been proposed. The concretization of these new policies has resulted in urban extensions towards the periphery of the city center and the creation of new urban neighborhoods with remarkable social inequality. The objective of this work is to analyze and measure the evolution of these inequalities from the 1990s to the present day, focusing on the new neighborhoods of the southern POS of the city of Guelma where the phenomenon observed is more obvious than in the inherited center.

Keywords: Socio-Spatial Inequalities; Urban Extensions; Socio-Spatial Structures; Urban Policy; Guelma.

Manuscript ID: ICCAUA2023EN0202

Collaborative Design for Resilient Kampong Upgrading: Evaluative Configurational Approach for Safe Emergency Evacuation in Urban Riverbank Kampongs of Yogyakarta, Indonesia

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Abstract
In case of flood/lahar flood disasters in informal kampong (settlement) in Indonesia, emergency evacuation creates significant challenges owing to multiple risk factors from the informal built space and vulnerability of its populations. The objective of this paper is two-fold: first, to describe design and planning strategies for scenarios development of kampong upgrading plan by soliciting the stakeholders' vision and ideas. Second, the ex-ante evaluation of kampong's scenario plans by means of space syntax technique. We employed a collaborative design workshop with a map to harness knowledge related to design/planning ideas and as dialog to develop scenarios. Accordingly, four scenarios (baseline, disruptive event, and two proposals) were developed and supported with analytical evidence based on the space syntax and contextual narrative from the stakeholders. This research suggests that design workshop can effectively generate valid ideas and balance the stakeholder's interest to conceptualize the design/planning proposal. Additionally, collaborative workshop can bridge the power gaps among stakeholders to obtain design/planning consensus, and therefore, build a resilient and sustainable kampong.

Keywords: Emergency Resilience System; Kampong Upgrading Plan; Space Syntax; Collaborative Design Workshop; Scenario Planning; Emergency Evacuation Plan.

Manuscript ID: ICCAUA2023EN0217

Nigerian Worship Space Based on Religion Culture in North Cyprus

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Abstract
Nigerians are greatly influenced by their cultural heritage, when Christianity came to Nigeria in 16th century continent some cultural practices like the use of herbs, African musical and instruments stopped and new religion culture took over in Nigeria which concern about simplistic in space and dance pray music mix with Christian religion till this moment. Frustration with the socio-economic conditions of the country, along with high unemployment rates, has increased emigration from Nigeria come to north Cyprus for education and have better life, most of Nigerians have strong religion believe so Nigerian follow their religion culture in north Cyprus. The aim of this paper is how Nigerian religion culture effect on worship space in north Cyprus. The study will be describing how Nigerian create worship space based on their culture. mythology compose mixed methods qualitative and quantities research and using observations, interviews with Nigerian who are members of the church and other data sources collected in the field.
Keywords: Nigerian; Religion Culture; Space; Worship.

Manuscript ID: ICCAUA2023EN0221

A Critical Review on the Effect of Gender on Architectural Spaces

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Abstract
This paper, mainly examines the effect of gender on architectural spaces with the case of collective houses, firstly appear in North European countries; Denmark, Sweden and North Germany through the history of architecture, around 18th and early 19th century. The main reasons for the birth of collective dwellings has been researched by Dune Vestbro and Dolares Hayden studies, which both academician indicated the necessity for collective dwellings came forward with the beginning of women to work in industry, and to create democracy inside the house for both women and man. The changes on social structures after industrial revolution, created a grand domestic revolution, as indicated by Dolares Hayden; at her book 'Grand Domestic Revolution' she especially expresses the functional changes in physical structures, was a result of to relocate domestic activities so as to free females from unpaid, household labor. Shared spaces created the main spatial revolution on domestic architecture at industrial revolution time.
Keywords: Collective Houses; Working Class Women; Gender & Space; Spatial Transformations.

Manuscript ID: ICCAUA2023EN0228

Evaluation of Existing Slum Dwellings in Urban Settings to Meet the UN SDG Goals

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Abstract
Over the past two decades, urban environmental quality has declined, and slums are seen as the primary concern. Despite numerous slum upgrading strategies to address urban poverty in developing countries, the issue is only projected to get worse. The lack of sustainable slum redevelopment guidelines in India is a policy gap that needs to be addressed. To make sure that the upcoming LIG housing stocks are sustainable, a logical design and planning approach is required to address climate change and the Sustainable Development Goals. This paper focuses on the study and analysis of existing slum dwellings and their living conditions, and from the observations of the study, it aims to propose recommendations for creating sustainable and sensitive redevelopment. As part of a new approach for slum upgrading projects to meet SDG objectives, it will also investigate the criteria required to construct climate-responsive urban dwellings that are closer to Net-Zero Buildings.
Keywords: Sustainable Development; Slum Redevelopment; UN SDG; Climate Responsive; Urbanization.

Manuscript ID: ICCAUA2023EN0233

Prospects for Introducing Medium-Density Row Housing in Jeddah City

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Abstract
Architectural researchers ensure that residential buildings in any area are appropriately planned for the landscape and meet the needs of current and future residents. Row houses are well known in residential sectors of the United States and many European countries, but the data on row housing in Saudi Arabia is very limited. As residential structures, row houses are reasonably priced and architecturally resilient. They also fill the affordable housing gap for middle-class residents – sometimes called the "missing middle" – in major urban centers such as Jeddah. Like other cities of its size, Jeddah has been slow to adopt medium-density residential structures. This research evaluates the Jeddah community's likelihood of accepting row housing, surveying a cross-section of residents seeking housing options other than the apartments currently available. Our questionnaire investigated variables such as gender, age group awareness, house size, architectural functional features, preferable cost, and other considerations. The data and resulting analysis concluded that more than 90% of the respondents would prefer row houses to current options as their primary housing choice.
Keywords: Row Houses, Jeddah Residential Types, Affordable Houses, Medium-Density Housing Types.

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The Enhancement of Resilience Built Environment Using Human Social Capital: Post Covid-19 Recovery

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Abstract
There are strong indications that the built environment intertwines consistently with the advent of COVID-19 and the need for post-disaster recovery. Efforts to combat the menace call for an integrated human social capital index; which little research has adopted over the years in the framework of people and place study in Nigeria's context. This study proposes a framework examining the impact of a resilient built environment in the wake of the Covid-19 pandemic. Multivariate data analysis of AMOS software was used to analyze and test the research hypotheses proposal; while a confirmatory factor analysis was used to evaluate the reliability and validity of each construct in the model. This study reveals that built environment capitals, disaster management indices, and awareness on the Covid-19 have indirect effects on Covid-19 pandemic indices through Human social capital. The implication of the study is useful for Post-Covid 19 recovery; which is important for future planning of the built environment in Nigeria.
Keywords: Human Social Capital; Resilience Built Environment; Covid-19 Pandemic; Disaster Management, Structural Equation Modelling, Nigeria.

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For a Sustainable Use of Agricultural Land in Constantine (Algeria)

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Abstract
Constantine's urbanization is a two-faced issue. In addition to its rapid and uncontrolled nature, the city's expansion boundaries lie entirely within the agricultural territory of the valleys of Oued El Rhumel and Oued Boumerzoug. These agricultural lands have unfortunately attracted large-scale housing, infrastructure, amenities, and services projects because of their favorable and inexpensive geological nature for urbanization. This contribution aims to assess the damage done to the region's agricultural heritage from the end of the 1980s to the year 2021, as well as the future urban development projections for the years 2030 to 2040 for a sustainable use of lands. The chosen approach entails conducting a spatiotemporal analysis of the phenomenon of urban sprawl on agricultural land using the DPSIR framework. The findings demonstrate that between 1985 and 2020, approximately 22 000 hectares of the total agricultural land were lost throughout the study area, of which approximately 50% were affected by urbanization.
Keywords: Agricultural Lands; Urbanization; Urban Sprawl; Sustainable Use.

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Cooperative Co-housing to Promote Healthy and Accompanied Ageing in Place (Co-aging). Case studies of Architectural Viability in Obsolete Neighbourhoods in Seville and Malaga

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Abstract

Spain is facing a progressive aging of its population and the inversion of its population pyramid, also inverting the income/expense balance of the Estate, and reducing its agency to control the housing market by construction. Our transdisciplinary project proposes cooperative co-housing ways of living inside the existing housing stock of obsolete and aged neighborhoods in both Seville an Málaga (south Spain). Re-densifying by sharing the use of obsolete too-big family houses, while renting the others, will provide a solution to the problems of both unwanted loneliness, active and financially independent aging, while increasing and re-activating the housing rental stock. By combining the results of focal meetings realized with inhabitants of the case study neighborhoods, and the analysis of the specific housing units via several teaching projects at different pre- and post-graduate levels and authors' design studies, we will test the architectural viability of our project by providing specific on-site solutions to the study cases.

Keywords: Architectural Design; Rental Stock; Co-living: Healthy Aging; Obsolete Neighborhoods.

Manuscript ID: ICCAUA2023EN0292

Vernacular Architecture in México: The Blue Corn Research Center in Michoacán

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Abstract

Currently, in Mexico, a large part of the population is still engaged in primary activities such as agriculture. That's why government and academic institutions have focused on encouraging the improvement and optimization of the farming of basic grains through research and technology. This work aimed to propose a building based on the Mexican vernacular architecture of Michoacán using local materials. The architectural project used the scientific method of analyzing socio-economic indicators, territory, and cultural conditions. As a result, we got a building that promotes the increase in the production of blue corn and solves part of the student lag in the rural area of Michoacán. The building contemplates open access for people of the surrounding towns through community use. Its design applies passive thermal control strategies. The project is a connection between local agricultural customs and the field of research.

Keywords: Mexican Contemporary Architecture; Vernacular Architecture; Research Center; Blue Corn Institute; Educational Architecture.

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Exploring Covid-19 Research in the Built Environment Literature: A Bibliometric Analysis

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Abstract
The disaster of "Covid-19 pandemic" which has been introducing various radical changes on the life style of people such as (1) the usage of urban spaces, (2) spatial problems, (3) the transformation of shared spaces and (4) working practices. These radical changes have been receiving an overwhelming interest from scholars from various disciplines since SARS-CoV-2 corona (i.e., Covid 19) virus set a global pandemic. As a result of this overwhelming interest, a rich but a fragment literature prevails on the radical changes caused by Covid 19 pandemic in built environment studies. The research presented herein explores this rich but fragmented literature on the effects of Covid-19 pandemic by adopting a systematic research design strategy namely bibliometric analysis. Bibliometric analysis is a research approach which enables to scholars to map the evolution of a concept, a research theme, a research stream or domain. It uses scholarly data to identify the publication patterns based on authors, research subjects, keywords, geographic locations, time and source type. A bibliometric analysis of the concept of Covid-19 pandemic presented herein is a timely response to the maturity level the research on the radical changes caused by Covid 19 evolved. The research presented herein offers bibliometric analysis of built environment studies on the disaster of Covid-19 based on 843 scholarly papers published between years 2020 and 2022. The research results reveal that the most commonly used research keywords or subject terms used in these scholarly published scholarly papers include epidemiology, risk assessment, aesthetic values, human activity, construction projects. It is also observed that research studies predominantly driven by two countries namely US and China. The results of bibliometric analysis also reveal that the main theme of the radical changes caused by Covid-19 pandemic includes housing, spatial, reorganization, neighborhood issues, city planning, and sustainable development and working practices. It is also discovered that the spatial reorganization response of countries to Covid 19 pandemic to varies from country to country mainly due to the regional characteristics of the countries.

Keywords: Covid-19; Pandemic; Spatial Reorganization; Working Conditions Bibliometric Analysis.

Manuscript ID: ICCAUA2023EN0296

A Methodology to Assess the Capacity of Neighborhoods to Accommodate Models of Active Aging Based on Sharing Housing. Málaga (Spain) as a Study Case

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Abstract
The aging of the world population, especially in Europe, and the increase in the longevity of the elderly pose a major challenge in the habitability of cities. Neighborhoods for active aging constitute socio-spatial and social relation units that are the basis of active aging in the place. Recent literature has analyzed the ideal conditions of neighborhoods and the criteria for selecting homes for the residence of the elderly, but there is a significant lack of studies that analyze the theoretical capacity of neighborhoods to accommodate coexistence initiatives among older people on a city scale. The research selects quantifiable variables and, through the use of GIS, determines the most appropriate areas of Malaga (Spain), as a case study, to promote models of coexistence based on sharing housing. The investigation concludes that the first peripheries in flat areas are the most propitious spaces. The paper concludes by discussing the keys to research that can influence public policies.

Keywords: Active Aging; Neighborhood; Ageing in Place; GIS; Healthy Cities.

Manuscript ID: ICCAUA2023EN0310

The Housing Archetype in the Work of Paulo Mendes da Rocha

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Abstract
Paulo Mendes da Rocha is a recognized Brazilian architect and winner of the Pritzker Prize in 2006. Throughout his career, he has carried out numerous works of different scales and programs, including single-family homes, residential developments, and social housing projects. Within his work, especially that of a residential nature, the frequency of certain design decisions is evident, both functional, constructive, and expressive. This reoccurrence of characteristics could be described as an archetype of residential spaces. Through a comparative process of 3 houses from different periods, it is intended to deduce what is the archetype of Mendes da Rocha's housing. A free and elevated floor plan above the sidewalk level, continuous rooms that share service cores, walls that do not completely enclose spaces are some of the characteristics that define the archetype of Mendes da Rocha's housing. Deciphering this archetype allows for a better understanding of the architect's influence within Brazilian modern architecture.
Keywords: Architectural History; Brazilian Architecture; Modern Architecture.

Manuscript ID: ICCAUA2023EN0319

Application of Rural Land Management Instruments in Ecuador's Territorial Planning

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Abstract
The management of rural land has been the subject of scarce and confusing treatment in the legal regulations and instruments of territorial planning of Ecuador, the advances of proposals have prioritized the urban. The problems inherent to the rural environment such as the high concentration of agricultural property, informality in land tenure, implementation of activities incompatible with the physical environment, affectation to natural resources, merit the deepening of the analysis of management tools applicable to rurality. A comparative analysis of the management instruments proposed in three cantonal land use and management plans was carried out, their concordance with the critical problems of rural land detected in the Development and Land Use Plans. The revised proposals address with emphasis instruments established in the current Land Use Law, which are more applicable to urban areas, and do not specify instruments for the rural territorial problems identified.
Keywords: Management Instruments; Rural Land; Rural Development.

Manuscript ID: ICCAUA2023EN0329

Multi-Purpose Plants of Essential Oils in Residential Gardens

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Abstract:
Plants have many benefits both aesthetically and healthfully. One type of plant that can be used in residential gardens is essential oil-producing plants. The content of chemical compounds in various types of essential oils have been known to have various bioactivities as well as other miscellaneous activities. This study aims to identify the role of essential oil plants in providing benefits to the environment. This study uses qualitative research methods with persuasive writing. The results of this study found that some essential oil plants include *Rosmarinus officinalis*, *Ocimum basilicum*, *Mentha arvensis, Mentha piperita*, *Foeniculum vulgare*, *Cymbopogon nardus*, *Cymbopogon citratus*, and *Cosmos caudatus*. The role of essential oil plants are antiinflammatory, flavoring, fragrance, fungitoxicity, antimicrobial, fertilizer, antidiabetic, antihypertensive, repellents, and biopesticides. In addition, essential oil plants can also be used as salad vegetables and herbs. Therefore, essential oil plants have enormous potential to be developed as multi-purpose plants for residential environments.
Keywords: Bioactivity, Chemical Compound, Essential Oils; Residential Gardens.

Manuscript ID: ICCAUA2023EN0334

Are Malaysian Young Professionals in the Urban Area Making a Housing Decision toward Sustainability?

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Abstract
The price of housing supply and demand is mismatch in Malaysia, roughly house priced MYR 250,000 desired but the bulk of newly launched approximately MYR 500,000 and above. This situation root to the affordability and residential oversupply issues, as bountiful of house buyers cannot afford to buy a house and in turn caused most houses priced MYR 500,00 and above are overhang. These issues have an impact on achieving the sustainable development goals (SDGs). The aim of the study is to explore housing decision amongst young professionals. Key factors influencing housing decision often associated with economic aspect in term of housing affordability, yet social and environment aspects will not be being evaded as result of this study. The study results were obtained through mixed method with applied embedded design as the data were concurrently obtained and triangulated during the interpretation process.
Keywords: Sustainability; Sustainable Affordable Housing; Housing Decision; Housing Affordable; Young.

Manuscript ID: ICCAUA2023EN0349

Examining the Role of New Urban Communities in Redistributing Population: Empirical Evidence from Egypt

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Abstract
Previous studies on developing New Urban Communities (NUCs) examined selected case studies from one perspective, such as housing affordability, sustainability, and development policies, using qualitative data and map analysis. This study provides an additional participatory dimension. It aims to provide quantitative evidence from the viewpoints of residents and non-residents of the New Urban Communities in Egypt to bridge the gap in the strategic approach to developing new areas. The study analyses the quality of life, independence, attractiveness, and satisfaction in the NUCs based on a sample of more than six hundred respondents in October 2022. The results show that although the priorities of residents and non-residents in developing the New Urban Communities differed, they realized that the NUCs are less effective in solving the problem of overpopulation in big cities, leading to a lower overall quality of life. The study concludes with recommendations and legislation to strategically improve the population distribution in the NUCs while keeping expectations and standards as high as possible.
Keywords: Attraction and Satisfaction; Egypt; Independency; New Urban Communities; Quality of Life; Quantitative Analysis; Residence and Non-Residence.

Manuscript ID: ICCAUA2023EN0353

A Study on Female Accessibility and Prayer Space in the Mosque Architecture of Bangladesh: A Case Study near Kafrul, Dhaka

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Abstract
The female prayer space in the mosques of Bangladesh is a bit different from what has been actually narrated in the hadith for women's prayer space at mosque. Women here are not socially allowed to enter the mosque unless there is a separate allotted prayer space for them. This paper is aimed to represent the status of female prayer space in the mosques of Dhaka, the capital city of Bangladesh. Sample mosques were selected within the walkable distance from a randomly chosen central residential area of Kafrul Thana. Data collection method includes Non-participant Complete Observation for the study of the cases. The research outcome shows none of the community mosques allow or have any separate space for women. A mosque containing a separate female zone located at the nearby cantonment area was also featured to represent the characteristics of female accessibility in a mosque where it is available.
Keywords: Architectural Design; Community Mosque; Islamic Prayer Space; Female Prayer Space.

Manuscript ID: ICCAUA2023EN0357

Public Housing Project Delivery in Nigeria: Quality vs. Quantity

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Abstract
The arrival of COVID-19 and its effects have changed how people view the supply of high-quality housing. Nigeria, the most populous nation in sub-Saharan Africa, has a teeming and expanding population, and in an effort to meet their housing needs, significant emphasis has been placed on housing quantity at the expense of housing quality. This study investigates the interplay of factors affecting the completion of high-quality public housing projects in Nigeria. A questionnaire survey (n = 351) construction industry professionals as the sample size was used to obtain quantitative data. The findings emphasise three issues that must be addressed in order to create high-quality housing: the requirement for sufficient project financing, the evaluation of suitable building materials, and the requirement for project management expertise. The study's conclusion highlights the significance of factors like using high-quality materials and involving stakeholders in the delivery of livable public housing in Nigeria.

Keywords: Public Housing; Housing Quality; Livable Housing; Nigeria.

Manuscript ID: ICCAUA2023EN0361

The Interplay between Spatial Justice and Housing Prices

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Abstract
The issue of spatial justice and housing prices are closely intertwined and have significant implications for individuals, communities, and society. Throughout Europe, much research and debate has been dedicated to understanding the relationship between these two concepts as policymakers, researchers, and advocates seek to address spatial inequality and injustice. This paper specifically investigates the interplay between spatial justice and housing prices in Prishtina, Kosovo, utilizing regression analysis to examine the relationship between apartment prices and various spatial justice variables. The study's findings indicate that socio-economic status and access to emergency services are the most significant predictors of apartment prices in Prishtina. Additionally, access to transportation and ambulance services were found to have a significant impact on apartment prices, emphasizing the importance of public services when addressing housing affordability and accessibility. The complexity of the relationship between housing prices and spatial justice is underscored, highlighting the need for policymakers and urban planners to consider multiple factors when addressing housing affordability and accessibility. This study provides valuable contributions to the literature on housing prices and spatial justice by examining the relationship between various spatial justice variables and housing prices in Prishtina, Kosovo. The findings have important implications for both research and practice, with the potential to inform policies aimed at promoting spatial justice, reducing housing inequality, and enhancing the value of housing. Policymakers and urban planners can use these findings to inform decisions regarding urban development, housing policies, and the provision of public services aimed at promoting spatial justice and enhancing housing affordability and accessibility. Further research is necessary to gain a better understanding of the complex relationship between housing prices and various spatial justice variables in different geographical areas.

Keywords: Spatial Justice; Housing Prices; Policy; Urban Development; Quality of Life.

Manuscript ID: ICCAUA2023EN0370

The safety Dilemma of Gated Communities in Turkey: How Borders Threaten Safe Space Formation in Neighbourhoods

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Abstract
The production of safe spaces in neighborhood areas is a challenge for the rapid urbanization in Turkey. The way of providing safety in housing areas has been ensured in the form of designing gated communities as clusters. However, it is possible to promote defensible spaces with the design of an urban form which increases users' impact area and sense of belonging. The urban tissue of neighborhoods in Turkey, before the transition to gated communities, has already had these characteristics by having the spatial configuration of neighborhood phenomenon. This study aims to emphasize the possibility of creating defensible spaces with planning and reveal design principles by reviewing the literature. Moreover, the study conducts a critical approach to gated communities segregated from urban tissue in terms of relationship of safety and their spatial design following the reviewed design principles.
Keywords: Gated Communities; Neighbourhood; Defensible Space; Urban Design.

Manuscript ID: ICCAUA2023EN0372

TOKİ and REITs: Dominating Housing Actors in Turkiye and their Design Approaches

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Abstract
In Turkiye, after 1950's accessible housing started to emerge as a problem and in years slum areas created a necessity for urban transformation. In addition; global wars and other natural disasters has been playing important role in Turkiye's housing market. When it comes to mass housing production for alternative income groups in Turkiye; two big parties are TOKİ and REITs in means of economic power. As a governmental agency TOKİ is responsible for large-scale housing projects to provide affordable housing and their design approach prioritizes functionality, with an emphasis on meeting the basic needs. On the other hand, REITs aim in housing market is to generate income for investors and their design approach focuses on enhancing the value of the property thru prioritizing aesthetics and amenities that appeal to buyers. The result of the comparison between TOKİ and REITs design approach is also different in social and psychological dimensions.
Keywords: Architectural Design; Mass Housing Production; TOKİ; REITs; Turkiye.

Manuscript ID: ICCAUA2023EN0383

Designing for Disaster Preparedness: Resilient Guidelines for a Smart Archive-Building of a Turkish Bank

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Abstract
In the face of disaster risks, this paper aims to discuss the role of design in disaster preparedness and examine the resilient design guidelines developed for the new archive-building of a Turkish bank. Despite the dilemma between the past and the future, between the printed and the digital, and between the conventional and the contemporary, the new archive design explores the boundaries of design and technology. As a smart building, it integrates automation and security systems that allow archiving with maximum limits, while maintaining the overall organization and actions with minimum personnel. Besides sustainable and low-consumption solutions, the nature and confidentiality of documents in the archive require preparedness for natural and man-made disasters, such as earthquakes, fires, and sabotage. Therefore, the original solutions developed in terms of location, materials, structure, accessibility, building systems, and community resilience criteria are explained in the context of disaster management strategies in architecture.
Keywords: Resilient Design; Disaster Preparedness; Smart Building Automation; Building System Solutions.

DOI: ICCAUA2023EN0400

Enhancing and Upgrading the Housing Camps and Settlements in the north of Syria

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Abstract
The conflict in Syria has been described as the largest humanitarian crisis to date. The paper highlights the evolution of the project to establish settlements for those affected by war, earthquakes, and natural disasters in the north of Syria. This paper presents by tracking the efforts to enhance and upgrade the planned humanitarian housing camps or settlements in the north of Syria, particularly emphasizing the Molham Project. Examining the experiences and outcomes of the Molham Team investigates the strategies implemented by the Molham Project to address the challenges faced by housing camps in the north of Syria. The questions raised by this paper:
1. Are these settlements temporary, or Permanent, who and how can you determine that?
2. What are the design standards, urban controls, and human requirements, and are they applied during the construction of the conflict in Syria? It has been described as the largest humanitarian crisis to date.
Keywords: Upgrading; Humanitarian Camp and Settlement; construction; Policy Recommendations.

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The Evolution of Human Habitat in the Context of Historical Turning Points and Crises

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Abstract
As a concept that has been constantly evolving since the first moment humanity acquired a permanent residence, human habitat has undergone significant transformations at turning points in the historical process and moments of crisis when the system was blocked. It has also triggered some changes in its environment. The aim of this study is to analyze the evolution of daily life during the three major milestones (Agricultural Revolution, Industrial Revolution, Information Revolution) when many social, cultural and economic consequences occur, and during crises (epidemics, mass wars) that interrupt all vital activities. It is also to discuss the spatial consequences of this evolution. In addition to daily life, the physiological conditions and needs of individuals are also revealed as important factors in the formation of a dwelling culture. The comparative historical methodology based on breaking points has been used in order to handle the research topic covering a wide period of time as a systematic process analysis. As a result of the research, it has been determined that the evolution of spaces, in particular, does not progress in a positive direction, and the changes that will be caused by the current parameters are also evaluated in this direction.

Keywords: Evolution of Human Habitats; Historical Turning Points; Crises; Life Practices.

Tarihsel Dönüm Noktaları ve Krizler Bağlamında Barınmanın Evrimi

Özet
İnsanlığın kalıcı bir ikamet edindiği ilk andan bu yana sürekli evrilen bir kavram olarak barınma, tarihsel süreçte yaşanmış dönüm noktalarında ve sistemin tıkandığı kriz anlarında önemli dönüşümler geçirmiş; yakın çevresinde de birtakım değişimleri tetiklemiştir. Bu çalışmanın amacı; sosyal, kültürel ve ekonomik çok sayıda sonucun meydana geldiği üç büyük dönüm noktasında (Tarım Devrimi, Sanayi Devrimi, Bilişim Devrimi) ve yaşamsal tüm aktiviteleri kesintiye uğratan krizler (salgın hastalıklar, kitlesel savaşlar) sırasında gündelik hayatın yaşadığı evrimi analiz etmek ve bu evrimin mekânsal sonuçlarını tartışmaktır. Gündelik hayatın yanı sıra, bireylerin içinde bulundukları fizyolojik durum ve gereksinimler de barınma kültürünün inşasında önemli etmenler olarak ortaya koyulmaktadır. Geniş bir zaman dilimini kapsayan araştırma konusunu sistematik bir süreç çözümlemesi olarak ele alabilmek için kırılma noktalarını temel alan, karşılaştırmalı tarihsel yöntem kullanılmıştır. Araştırma sonucunda, özellikle mekânların evrimi sürecinin sürekli pozitif bir yönde ilerlemediği tespit edilmiş ve güncel parametrelerin neden olacağı değişimler de bu yönde değerlendirilmiştir.

Anahtar Kelimeler: Barınmanın Evrimi; Tarihsel Dönüm Noktaları; Krizler; Yaşam Pratikleri.

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SESSION E: Civil Engineering

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Non- and Semi-Destructive Assessment Methods Used in Croatia After Recent Earthquakes

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Abstract
In recent years countries around the world had devastating consequences due to seismic events. Among them is Croatia, which was hit by strong earthquakes in 2020. After the rapid assessments which determined whether it was safe to stay in the damaged buildings, it was time for more detailed assessments. Depending on the target level of reconstruction, different approaches were used; from simple calculations and purely visual inspections for lower levels to more complex numerical models and design methods accompanied by in-situ tests for higher levels. The paper lists the most common non-destructive (NDT) and semi-destructive (SDT) methods used in post-earthquake assessment in Croatia. They are described and supplemented with photos and test results from real case studies. The pros and cons of the mentioned methods are also presented. Finally, conclusions are drawn and recommendations are made for an adequate and effective combination of various in-situ tests for post-earthquake assessment.
Keywords: Existing Structures; Croatia; Earthquake; NDT; SDT.

Manuscript ID: ICCAUA2023EN0040

Modelling and Analysis of Virtual Coupling for Increasing Service Performance in the Case of Single-Track Rail Lines

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Abstract
Smart and green mobility systems are key factors for the sustainability of our cities which are experiencing increasingly growing density conditions. The goal is to make public and sharing transport systems more attractive than private vehicles, thus reducing congestion levels as well as air and noise pollution in favour of the quality of life in our urban and suburban areas. In this context, the proposed paper presents a simulation-based methodology for increasing the efficiency level of railway operations, through the implementation of virtual coupling systems, intending to lead the modal split towards a more sustainable scenario. To show the feasibility of the proposed approach, it has been applied in the case of a real regional rail line. Results confirm the benefits of the adoption of such systems on the attractiveness levels by showing an increase in carrying capacity with a related reduction in user waiting times.
Keywords: Sustainable Mobility; Traffic Engineering; Rail Operations; Virtual Coupling; Carrying Capacity.

Manuscript ID: ICCAUA2023EN0153

Investigating AI Applications in Construction Industry: A Systematic Review

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Abstract
Artificial intelligence(AI) has become popular in all industries recently and provides numerous opportunities by simulating human intelligence processes. As a mainstream technology of an inevitable digital transformation in Industry 4.0, AI applications are hot research topics to deal with the different problems of several industries. The construction industry is no exception, but its main characteristic is resistant to new technologies and innovations. However, the construction industry has several challenges such as being a highly competitive arena, abundant participants, high financial risk, long-term periods of projects, and uniqueness of projects. Therefore, its productivity and performance growth level show relatively a poor increasing trend. This study aims to examine the contributions of AI to handling these challenges by performing both bibliometric and scientometric analysis using the PRISMA protocol. In this regard, this study presents the current state of adapting AI in the construction industry and its future directions.
Keywords: Artificial Intelligence; AI; Bibliometric Analysis; Construction Industry; Scientometric Analysis.

Manuscript ID: ICCAUA2023EN0155

Evaluation of Sport Structure's Concrete Durability: Case of the Colonel Amirouche Stadium

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Abstract
Although new materials have been invented, concrete remains the go-to material for most of stadiums. The non-destructive evaluation of this material is an important aspect of an exciting field of research that might be a critical step in the process of conserving Algeria's sporting heritage. The current study evaluates Colonel Amirouche stadium in Jijel, Algeria, using the SonReb approach, which is primarily based on the combination of two non-destructive tests: the ultrasonic pulse velocity (UPV) and the rebound index (R). This method allows not only for the control of the physical condition of the structure, but also for the collection of the necessary information to predict the future usability of this sports structure and to intervene at the appropriate time for possible repairs and reinforcements. The testing results would represent the quality of the stadium's concrete; whether it is still appropriate for usage in the near future or whether it requires renovation.
Keywords: Concrete; Stadium; Non-Destructive Tests; SonReb.

Manuscript ID: ICCAUA2023EN0297

Structural and Cost Analysis of Reinforced Concrete and Steel Frame Structures: A Comparative Study in Nicosia, Northern Cyprus

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Abstract
The development of structural systems, materials, and analytical techniques has prepared a range of options for designing different structures. It is crucial to remember that doing comparative studies of various buildings helps identify the optimum choice depending on the project's requirements and conditions, while also staying within the approved construction budget. In this study, 8-story residential structures are designed in Nicosia, Northern Cyprus by steel and reinforced concrete frames are different load-resisting systems. Building Code Requirements for Structural Concrete (ACI 318-19) and American Institute of Steel Construction (AISC-15th edition) are both followed and Response Spectrum Method (RSM) is employed while ETABS v.20 and SAP2000 are used for modeling and designing the structures. The base shear, story shear, displacement, axial forces, and bending moments are compared for different structures and finally, the total cost of the structural materials including steel, rebars, and concrete is determined.
Keywords: Steel Structure; Reinforce Concrete Structure; Response Spectrum Method; Northern Cyprus.

Manuscript ID: ICCAUA2023EN0314

Analysis of Landslide Risk Management: Los Trigales, Cuenca as a Case Study

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Abstract
The landslide risk management is a cross-cutting issue, the most densified areas in use and occupation are more vulnerable because of a greater load on the ground and the greater discharges of solid wastes and effluents that don´t have adequate treatment and conduction to public waste networks. The study of this problem was carried out using a methodology based on a socio-economic analysis of the sector, analysis of events that occurred and the analysis of determinants of land use and occupation in the Los Trigales of Cuenca. The results allow us to determine that the socio-economic factor is fundamental in the densification of the sector, the events that have produced mass movements are mainly due to the saturation of public networks, and that the lack of control of housing densification is a consequence of the inflection of the regulations and laws in the sector.

Keywords: Risk Management; Landslide Risk; Housing Densification; Saturation.

Manuscript ID: ICCAUA2023EN0373

Challenges in the Construction Mediation

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Abstract
In the construction sector, it is common to experience disputes between the parties during construction projects. The dynamics and interests-based structure of the sector necessitates the quickest resolution of these disputes. Studies in the literature show that this rapid dispute resolution method can be mediation in terms of the construction sector. Whether this complex and difficult structure of the construction sector differentiates these mediation processes from the processes of other sectors is not a subject that has been extensively researched in the literature. Therefore, in this study, it is aimed to determine the challenges and differences experienced in the construction mediation processes. Within this scope, surveys were conducted with the mediators who are experienced in the construction mediation. As a result of the study, it has been determined that the interest-based structure of the construction sector, involvement of multiple stakeholders in projects and the fact that the disputes in the sector are generally based on technical issues are among the challenges of the mediation processes in the construction sector.

Keywords: Dispute Resolution; ADR; Construction Sector; Challenges.

Manuscript ID: ICCAUA2023EN0375

On the Improvement of Physical and Mechanical Properties of High-Performance Sand Concrete by Using Silica Fume

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Abstract
This paper studies the contribution of silica fume in the improvement of the mechanical and physical properties of high-performance sand concrete (HPSC). The experiment consists of the preparation of HPSC by adding different amounts of silica fume (0%, 4%, 6% and 8%) at a constant water-to-cement ratio. The assessment of the compressive strength, flexural strength, water absorption and water capillarity are carried out in the laboratory. The results show that the optimum using of silica fume in HPSC is 6%. At that percentage of adding, the compressive strength and flexural strength increase by 6.19 and 10.03%, respectively. The adding of silica fume at amount of 8% improves marginally the mechanical properties. In addition, the use of silica fume reduced the water absorption and the capillarity.

Keywords: High-Performance Sand Concrete; Silica Fume; Mechanical Properties; Physical Properties.

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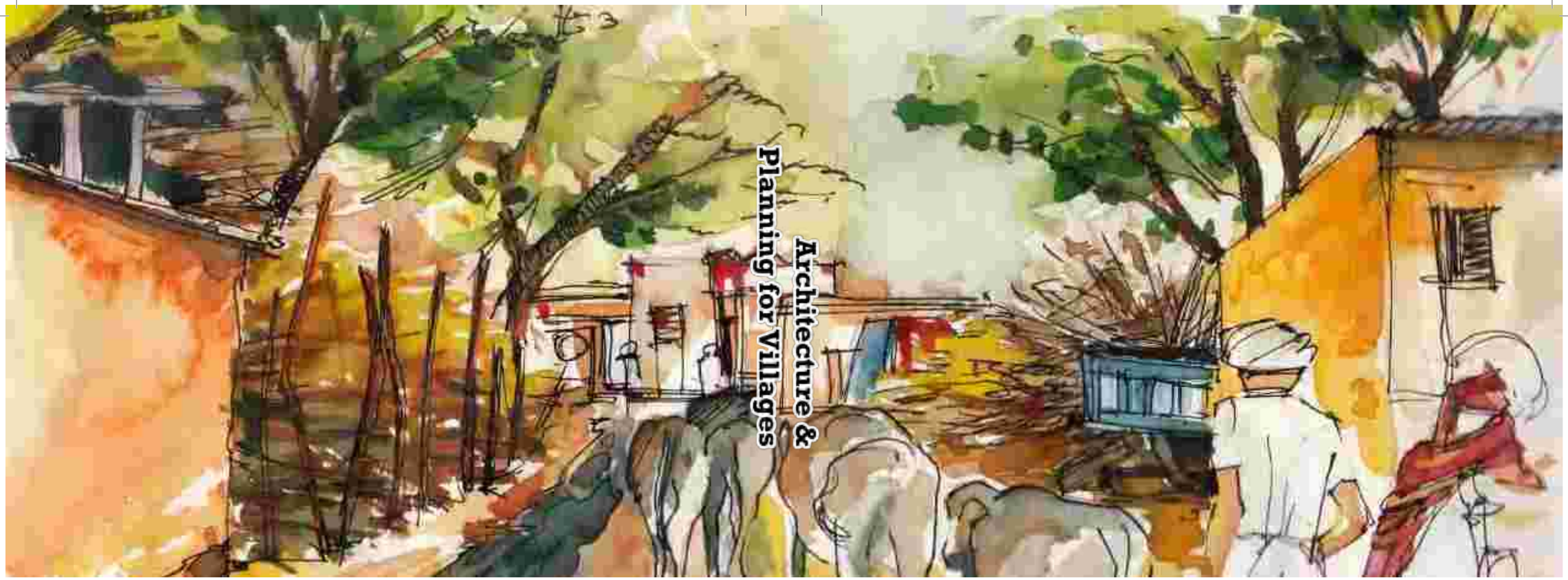

Dr. S. M. Akhtar is a man of multi-disciplinary background, his scope of studies spans over Architecture, town Planning, social Sciences and Environment. He is graduate of The Indian Institute of Architect, a Post Graduate of the Institute of Town Planners India. With a Master Degree in Public Administration and Bachelors' degree in Law, and Ph.D. on Urban Housing.

He is the first recipient of D.Litt. on thesis "'Translating Democratic Virtues into Sustainable Physical Development" is composite work on Policy Science and ekistics. He is Professor & Founder Dean Faculty of Architecture & Ekistics at Jamia Millia Islamia, New Delhi. During his four terms as the Dean, he initiated six Masters programs and Ph.D. program at the faculty.

His books entitled 'on Architecture pedagogy', 'Urban Housing – issues & strategies', 'Islamic Architecture -at crossroad'. 'Habib Rahman – The Architect of Independent India', and 'Environmental Remediation & Rejuvenation and 'Islamic Architecture: Perception & Paradox' have been published.

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WELLWORTH

S.M. Akhtar

Architecture & Planning for Villages

Ed.
S.M.Akhtar

Foreword by **Dr Radha Vallabh Tripathi**

Architecture & Planning for Villages

Ed.

S.M.Akhtar

Foreword by **Dr Radha Vallabh Tripathi**

Outline of Thought Connecting the Profession of Architecture to Villages

The case of a Village

Change has imbued Indian life and processes in the past seventy years. The original age-old agro-culture is perishing, leaving behind only the urban. Although an evolved model of the traditional communities, the new urban is full of dysfunctional societies. India by its pre-independence structure was not ready for this urbanization, which is advocated by the first world. It was on the path to a different mode of development. The urban today is concentrated in agglomerations called cities. While our villages remain the most untouched part of the country; they have existed hand in hand with agriculture which is designated as the primary sector of the economy. The unshaken presence and undisputed importance of villages in our country's agriculture and thus a promoter of its economic development is now at a threat by the unwarranted expansion of the automobile dominated world. Villages connect to agriculture, forest, nature, earth and thus it becomes a fulcrum for change or saving the change. With modernization have come secondary and tertiary economies, but none as rooted in culture as the primary. The human population in our country has for ages lived with the earth - using it for cultivation and for building their housing. With the abundance of sun's energy and fresh potable water from rains, the fertility of the soil in our country offers a brief for an urbanization, different from its nature as in the first world. Our urban growth is not on the brief provided by natural setting, and hence done not have the vital connection between history-climate-people-traditions. Virtues of our traditional knowledge systems and architecture and planning have an uncontested role in development. An approach which incorporates these factors must be undertaken. Planning must step out of the physicality of its approach. None of these can be overlooked while writing the guidelines.

The use of the word rural for villages and undernourished development and frail economies, in planning and the books of policy, has had a wide impact on their participation and inclusion within the definition of development. They have been cordoned away to make way for Greenfield development. A holistic new age can evolve only if the villages and rurban are included.

Despite their sustainable concepts, ideas of green living, garden-city-concepts, socially-awake-connectedness and self-designed settlements, villages true to geomorphological bearings are close to the vernacular. They need recognition as the new address of a true definition to development. This will be helpful in ecological and environmental imbalances.

There is a lot of emphasis on villages in the policy. The 73rd amendment act talks elaborately about the need for working on villages and defines the village. The 74th amendment act details the need for urban local bodies in the state. These two amendments imply a constitutional structure recognized by the government for necessary academic exploration and detailing at the hands of architects, planners, economists, geographers and sociologists alike. Article 243G and 243Q have indicated a probable structure to the administration of villages and urban areas, alike. Gandhian concept of urbanization was through villages, but the reality on the ground has changed between 1992 and 2021, there is thus a need to detail the policy.

The Natural State of Human Settlements and the Challenge in Our Growth

Villages are not a result of planning. They have grown over time and exhibit a natural sense of planning. They are settlements woven by a sense of community, held by common beliefs and values, are of similar aspirations and face similar challenges. Their residents give space to and recognize each other. They have an awareness of every individual through their preceeding generations. The village-built and the open in the villages are multiple-layered impressions of people and events with a memory of time. These with the uncountable years behind them, make a sensitive case. Architecture and planning, the recent tools, find themselves insufficient for commenting and consulting on villages.

Like the typification of built in the urban of today, the village-built is full of surprises. It has a strong sense of belonging which is missing in the urban. It is tactile, responsive, humanized, recollect able, relatable, organic, and is unique as art. The search for a solution for villages is complex because we have not been able to understand the vernacular built typologies of built-in villages. While we see them as forms, they are just functional interdepend spaces with intangibles entangled in their construction. Villages carry a long-lasting footprint of built relationships, derelict and ruin structures in reuse. A policy regulation or a guideline cannot assist the changes for adapting modern living to the Indian village. We must thus research the case, through dialogue, try to learn from it, and thus identify the key to manage growth.

Development - An Evolving Thought

We started centuries before 1947. Development, post-independence, although a blank slate for Indian governance, meant roads and sewer lines and electric supplies for human settlements. Enhanced consciousness of today has evolved us to a completely new era where the policy energy and the post-independence era definitions of “development” are becoming an impediment to the evolving thought on “development”. Our awareness and environment centric approaches have moved us from basic needs. While urbanization is uncontrolled, we now talk about an environment-sensitive development. This talk has not percolated into policy and legislation. Development in our legislation is still understood as its archaic definition of road building and provision of sewer lines. We must reconstruct legislative definitions of development to bring a change at the ground level.

An Irreversible Change

It is apparent that the villages are greedy for the urbanization trends, synonymous with comfort and economic progress. The final destination for village is urban. The village in its heart wants to be the city. They have not been shown the path to be better- villages. With self-run, agro-centric and self-designed typologies of houses, there has to be a design-based approach through local area plans drawns for them by architects. They understand villages and at the same time have the ability to carry out design-based research and development work, as guidelines of each area.

It is easy to build a city over a village, to substitute agriculture by other economies, but it is impossible to erase a city and create agricultural fields and more-impossible to bring the human-socio-cultural to connect to agriculture, as it exists today. With saturation in urban economies, the focus is shifting to rural. The village is seen as an easy-to-change piece of landholding. A place with more freedom, allows the settler to do almost anything. It is thus an inviting ground for the speculation and house uses not allowed within urban limits.

The loss of villages due to a rapid change, from the face of our country, is also a loss of the first footprints of our ancestors and the loss of the first impressions of agrorban. Urbanization today, is an economic function of modernization, just as its predecessor was the socio-cultural function of agriculture. A village in India is a misfit and is defined by the word rural, with an undercurrent suggestion of its incompleteness and a silent directive that it must aspire to become the urban.

While the anonymity in the directionless cities is giving out a loud cry for various changes related to the wellbeing, livelihood-centric-living, nature-leisure-green, environment and human engagements for its residents, it is not ready to acknowledge the life of the village as a solution to the misdirected urbanization today. The degenerative outcomes of life in the urban areas are the only concerns of architecture today.

Discussions on better life under the title of Green-living, Garden-city, Sustainability, Zero-carbon, Net-zero are only raising questions, they have not yet been able to reach a solution and nor are they guiding the uncivilized-urban to become the civilized-agrorban for which village-format is the only living representative. If villages start urbanizing and transform, they will lose their character. The only proto of agri-connected living will be lost. None of the village development plans or policies talks about conserving character by containing the negatives of urbanization. There are no guidelines and no policies.

Role of the Architect

Architecture is the only profession apart from poetry, literature, craft and education that can save the villages and help connect them to the world of technological change. How is working on villages possible for planners and architects, without any exposure to agrarian life? When there are no books, no researches, no deliberations on village house forms; when governance and policy see the village as a process that does not need development focus, but considers it to be a template to be erased, overtaken, over ridden, then how do we proceed?

Planning of villages; vernacular architecture; village life, customs and mores; open space-studies in villages; village house forms; village expansion patterns; village sociology are some heads under which studies have been made in the recent time. These studies need to be backed by research and with urgency, built back into policy, to change the physicality, to quench the restlessness of the village, making them progressive, technology-enabled, agri-centric and full of their original character. Architects and architecture must take responsibility, with governance support and assume its role, lest it is substituted by some other profession.

Ar. Anand Khatri
Professor at AIT SAP &
Founder Urban Village Charitable Trust

Content

Planning and Legislation in Villages

Socio Economics of Villages

Built Environment of Indian Villages: A Case Study of Coastal Village of Maharashtra

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Abstract
The built environment of the villages is characterized by the buildings, streets and the spaces within the buildings. The culture, occupation and life of the villagers remains within these spaces. Organic or human intervention, these spaces represent village life. The traditions, culture of the villages correspond to sustainability principles, and responsiveness towards the environment in a number of aspects. The village housing evolves around the traditional occupations and culture. The occupational activities are integral parts of the overall built environment. There are learnings from rural way of living, and these lessons are worth preserving for sustainability of the resources, culture and people. These characteristics of built environment, culture and traditions must be taken as base for formalizing any plan or policy for rural development. This paper is about a study done in a historical coastal village in Maharashtra. This village is one of the most scenic and ecologically important parts of the Indian Western coast. The built environment is subject to change with the tourism activities happening here because of beaches and ecology and historical character. The threats of ecological degradation and loss of architectural character are realized looking at the developments happening in the other coastal villages. With this concern it has been realized that the base of development can be prepared with the understanding of the original character of the area. This paper documents the learning from this village in terms of environment consciousness, sustainable architecture and lifestyle of people. Author has tried to create a base on which the developments and planning can be done for such kinds of villages.

Keywords: Built environment, Harihareshwar, Indian villages, Rural character, West coast

Introduction

The 720 km long coast-line of Maharashtra State, commonly known as 'Konkan' has a number of places of historical, cultural and ecological importance. The ecology of this stretch is identified by rich biodiversity (S., 2015) and attraction for researchers and nature lovers. There are landmark examples of island and hill forts and temples in these places that attract tourists. Alibag, Murud – Janjira, Harihareshwar, Srivardhan, Dapoli, Amboli, Sawantwadi, Vengurla, Malvan, Sindhudurg, Vijaydurg, Sindhudurg and Ratnagiri and Raigad districts are the places of pilgrimage, leisure, and heritage and are major attraction of tourist activities in Maharashtra State. At present the whole stretch is rural and has strong character throughout the area.

The mention of the development for this area is evident in the 20 years perspective plan of sustainable tourism in Maharashtra, prepared by Ministry of Tourism & Culture, Market Research Division, Department of Tourism of India (Dalal Mott MacDonald, 2003), the Sahyadri-Konkan corridor project (Anon., 2021), and plans of Maharashtra State Road Development Corporation (MSRDC).

The major differences between this area from the other rural parts of India are its history rich biodiversity, culture and the unique architectural character and independent attitude of the people. The farmers in Konkan live with self-esteem, and generally lead a balanced life. In the period of 2013-18 15,000 farmers have committed suicide in Vidarbha, and Marathwada regions of Maharashtra, but none of these numbers were from Konkan (Upadhyay, 2019).

This paper is based on a study about understanding the relationship between culture and environment, and their impact on the present built environment area and to create an inventory of how future development can be done in harmony with the original character of the area.

Culture, Occupation and Built Environment

The culture and built environment elements are interdependent by function. The natural character of the area and site conditions are major factors in generating the design of the built environment. In the case of traditional settlements, they organically evolve within nature. The dependency on nature for their livelihood, and affection of the place seem to be very related to the culture, where people regard and worship nature. The built environment can be considered as an outcome of culture. Once built, it becomes a major factor to shape future generations, as it serves as an active and functional medium for the transmission of norms, customs, and values (Thompson, 1980).

Amos Rapaport in his book "Culture, Architecture, and Design" discusses the relationship between culture, the built environment, and design (Rapaport, 2005). The context of this text seems very relevant in the study area. The primary occupation of the area seems to be a major factor in impacting the built form and built environment of the settlements in Konkan. The author has observed four types of villages in Konkan. One is on the relatively flat terrain where farmers communities live, have large front and back yards in their houses, e.g., Dive Agar and Shrivardhan. The second type is fishermen villages, where the organically developed settlements are seen, these are generally very near to the coast, e.g., Adgaon. The third type is the communities of Hindu priests, who

are generally involved in the temple rituals and customs of the surrounding areas too. The examples of such villages are Ganpati Pule, Harihareshwar etc. And the fourth type is a village of craftsmen communities, who are involved in craft activities as their primary occupation, e.g., Sawantwadi. Remarkably all these villages have different characteristics of built environment to accommodate their occupation and culture.

In this paper a study done in Harihareshwar has been mentioned.

Harihareshwar

Medieval village of Harihareshwar village is a holy place of the family god of Maratha Kings, Peshwas. The location of this place is unique as it makes a partially East facing landform on the West Coast that the sunrise can be observed from the beach. The identification of this site for religious function and also regarding beauty of nature at its peak seems to be a well thought plan of the Peshwas. The temple is situated at the landform creating a tip of the land on the coast and there is a linear settlement of the Gurav community (Hindu Priests). Ancestors of These people had been the employees of the Royal family.

In addition to the people of the ancient village, the people owning and working in resorts, eateries, shopkeepers of the grocery stores, the people arranging water sports activities, and travel agents and drivers etc.

In the ancient village, performing the temple customs, upkeeping of the temple complex and serving the royal families at the time of their visits had been the main function and occupation of these people. Their routine includes early morning bath, chanting, simple and delicious vegetarian diet, regular visits to temples and sustainable practices to keep surroundings neat, clean and with a holy environment. They lead a resource efficient life and

Figure1: Harihareshwar village character,
Source: Author

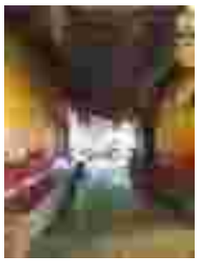
know the art of peaceful living with the limited resources. The walk through this street gives a holistic experience. Bare feet walk on rough but clean pavements makes walking interesting. Throughout the street there are various sounds coming from various spaces, like bells of temples, musical prayers in the temples, chanting from the houses of priests and people talking on the street. Fragrance of flowers, incense sticks, and in between the aroma from the traditional kitchens of the houses and restaurants. Visual experience of this place includes the colorful building facades, people interacting on multiple level plinths and stalls of local savories, flowers and pooja accessories. The shaded street, and a number of visually appealing pause points make the whole walk an interesting experience. This experience gets continued to the temple and then to the circumambulatory path of the temple. The temple is associated with a ritual called 'Pradakshina', or Circumambulation which is a combination of

trekking, and trail on the breathtaking view of sea near the temple. The bottom of this sea side hillock had been made walkable by the prime minister of Peshwas Chandrarao More (Anon., 2021). The villagers own this Circumambulation path, and do deep cleaning of algae deposits on this route and make it non-slippery. Figure 1 and 2 represent this description.

The present state is a learning and needs to be preserved as cultural heritage of the area. The contextual response on planning principles and sustainable practices, has been tabulated in Table 1.

Figure 2: Circumambulation path and its description,
Source: Author

Sr. No.	Planning/architectural principle	Present status	Threats, Challenges and Gap identification	Learning from the practice (for development)
1	Use of topography and landform in the built form	The planning and architecture of the original village has been evolved with due regard to the landform. The use of multiple plinths and placing of the buildings at multiple levels The hillside houses are on multiple plinths, whereas on the comparatively flat terrain the sea facing houses are on single plinths. 	Sensitizing the new and outsider investors towards the original architectural style and sensitivity towards landform is challenging. 	The plinths at multiple levels have sustained well even during extremities. Also, these offer interacting spaces. There are multiple plinths and a series of verandahs, frame the open and semi-enclosed streets near each other. The semi-covered verandahs function as living areas. The subsequent plinths are utilized for various activities.
2	Regard to natural resources	use of locally available materials	The newer construction happening with foreign materials.	***

3	Sustainable architecture and built environment	multiple plinths, and interactive spaces together create aesthetic appeal of the area. The expanded form of this village includes resort of MTDC (Maharashtra tourism development authority), the other upcoming resorts, hotels and home-stay facilities. The temple architecture and village architecture characterize this area. The temple structure is made at human scale and is aesthetically pleasing, and very sound structure. The ancient village houses are also built in locally available materials and are climatically responsive. The load bearing walls and well shaded small openings in timber frames. keep the interiors cool in summers and warm in winters.  	The tiled roof supported on wooden battens is the most vulnerable part of these structures, and hence the local people are switching to the longer lasting material like RCC, however it also needs well designed waterproofing system. The services added later to the original structure are the added spaces.   The village is small and the expanded form is also at the growing stage. These are buildings built in concrete with flat roofs, glazed facades and are airconditioned to satisfy the needs of tourism industry.	The present practices need to be supported with technologies without interfering with its original character. The temple architecture can be studied as reference as it has sustained in all the extremities.   
5	Physical Infrastructure			
	Water supply	for limited hours	No adequate storage and pumping facility.	Needs to be developed in harmony with the existing village
	Sewage network	The septic tanks are there at individual plot levels	-	
	Solid Waste management	The village life was neat, clean and cultured before tourist intervention and they produced only biodegradable waste, that used to get converted into manure in their own back yard.	Present village not able to deal with the waste generated by the tourists. In October 2020, there were heaps of used plastic water bottles, packets of snacks, sanitary waste and broken liquor bottles at beach.	
	Electricity	MSCB electrical connections	No enough provisions for street lighting	
	TV cable	available for few channels	The insertion of urban style entertainment through TV, Netflix will interfere with the original style of living.	The present lifestyle is fulfilling in terms of proximity to nature, adventure sports and temple rituals. People are living peaceful life with it. For the tourist to rejuvenate here, the original pattern of living needs to be carried forward.

	Telephone and internet	Only few telecom company's network is available. The temple complex and MTDC resort have BSNL landline connections	Poor connectivity of telephone	The better connectivity is needed
	Road network	Organically developed, within the village.	The existing roads need integration with all types of wet and dry services.	Segregation of pedestrian and vehicular movement is needed
	Public transport	Missing	Visitors use private vehicles. In long term there are chances of traffic congestion and air pollution because of these.	Needs to be integrated in a sustainable way.
6	Social infrastructure			
	Schools Hospital and other medical facilities and police stations	Missing and needs to be developed for the civic discipline specially for the tourists	The nearest town Mangaon, is 60 km away from the village. The people are migrating; hence the kids are less in number.	Economic strengthening is needed in synchronization with the existing living and heritage.
	Gathering spaces	The fronts of houses, the temple and small temple on the street offer gathering spaces for the villagers.	The generalization of the vocabulary for gathering spaces should not happen.	The present ways of narrow streets and interactive and small gathering spaces in front of the houses can be taken as guideline for space making exercises in the village
	Crematorium	One crematorium is present near the beach	The ashes polluting the beach	Electrical crematorium and the arrangements to prevent the beach
7	Heritage and Cultural sustainability	Temple and its rituals and Holy procession on this circumambulation path (centre, 2020). Minimalistic lifestyle of people and regard to nature. Community participation in management of the temple complex and the activities.	This culture needs to be carried forward for the future generations too, else it has threat to get disappeared. The nearest forts from Harihareshwar are Bankot, which is on the hilltop, and Murud Janjira, which is just amidst the sea. Both these forts are in ruined condition and there is very less authentic information available for both these forts. Also being the neglected places, there is threat of further degradation and misinterpretation,	The Konkani people had developed resilience to the extremities of climate and established a way of living with limited resources. The name "Konka nastha" indicates the ability of people to do farming in the rocky, unyielding land in the Ratnagiri district (Joshi, 2020). People are sustaining the cultural heritage of the state. Their practices are intangible aspects of cultural heritage and the future development must consider sustenance of these people and their practices too.
8	Social Character	The small temple hall and small front yard, used in gathering of small groups and prayers. They interact with each other in the routine activities.	With migration the societies are not functioning in the original model. The policies made for rural development have not benefitted this area.	The people of various religions and castes live with harmony and peace.
8	Environmental sustainability	This settlement is surrounded by hillock on one side and sea on the other side.	Sensitizing the outside investors towards this is a challenge. Also, the investors from the other parts of the state come with the projects in silo and it does not help in the orderly development of the area.	The development of this area, history, culture and holy character needs high respect, sensitivity towards the total environment of the area.
9	Economic Sustainability	The temple trust takes care or the employees of the temple. The rest of the villagers are completely dependent on tourism activities		Tourism activities needs to be expanded with due care of all the above-mentioned points.

Table I: Contextual response on planning principles and sustainable practices

Findings and Discussions

The place is important with its spiritual character, peaceful environment and rich natural ecosystems. This can be a center for rejuvenation and relaxation for the people leading stressful lives. The area too needs development. Sustainable tourism is the utmost need of the area. Along with the sustainable infrastructure and practices the regard for original character and considerations to address the challenges faced must be given thought. Along with total sustainability, environmental and economic resilience are the issues to be dealt with adequate provisions to safeguard the lives and properties of the people in the time of natural calamities. The stakeholders of development in this area are primarily MTDC, the outside investors and entrepreneurs. They need to be sensitized for the original character of the area, and guidelines to be formed for orderly development of the area and the carrying capacity of the area. Education and awareness also can play an important role in the overall process of sensitization towards all these matters.

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Contents

Landfill Management: An Opportunity to Resilient Future

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Abstract

Urban India generates 62 MT of municipal solid waste each year. Of this, about 43 MT is collected, and 11.9 MT is treated. About 31 MT is dumped at landfill sites. With changing consumption patterns and rapid economic growth, it is estimated that urban municipal solid waste generation will increase to 165 MT in 2030. The current scenario shows that the dumpsites are created near public resources like water bodies, along the highways, quarry sites, neighbourhood level, urban outskirts, empty vacant plots along the roads, etc. Many researchers have stated the repercussions of solid waste on natural resources, public health, flora and fauna. Awareness campaigns, NGOs, and policy level decisions have resolved solid waste management to an extent. Still, the issue of landfill sites is not addressed to its full potential yet.

The paper discusses the concept of landfill site management and tries to analyse *effective waste management systems that the city neighbourhood can adopt, which can be scalable and replicated all over India, contributing to the resilience goals of urban planning.*

The methodology with which this research is conducted is descriptive and exploratory. The data collection is done through primary and secondary resources. Primary methods are case studies of best practices with respect to landfill site management, interviews of experts and secondary through various published research. The paper also reviews the waste management policies in India and ground realities across India.

The research aims to address issues related to landfill site management and possible methods to tackle the issue of waste management efficiently and sustainably.

Keywords: Solid Waste Management, Landfill, Recycling, Waste Management Policies.

Introduction :

Most Indian cities, especially metropolitan areas, are fast developing into major urban and suburban agglomerations, with so-called "in-between cities" where rural elements are still intermingled into the urban fabric. MSW is commonly disposed of in low-lying locations without any safeguards or operational controls. It includes actions related to the generation, storage, collection, transfer, and transport of solid wastes, as well as their processing and disposal. However, the MSWM system in most cities consists of only four activities: waste generation, collection, transportation, and disposal. As a result, unmanaged solid waste is one of India's most serious environmental issues.

For all activities, MSW management necessitates sufficient infrastructure, maintenance, and improvement. Due of the constant and uncontrolled growth of metropolitan centres, this becomes increasingly expensive and complex. The inability to provide the appropriate degree of public service in metropolitan areas is frequently linked to the controlling municipal corporations' bad financial situation ([illegible]).

Landfill dumping is the most widely used solid waste management technique in the world. Municipal garbage, industrial or agricultural residues, wastewater sludge, incinerated ash, toxic debris, and occasional hazardous wastes have all been treated and disposed of in these landfills.

Cities can affect change, and there is still room for greater action in this area. Therefore, there is a huge opportunity for cities to reduce emissions through sound waste management initiatives. Local decision-makers can effectively allocate resources, pick processes and vendors, and design policies and procedures to fulfil the community's needs by knowing the benefits and drawbacks of various management technologies. With a study of excellent practices from around the country leading to better economic, social, and environmental results for cities, this Good Practice Guide focuses on the main factors critical to delivering a successful solid waste management system.

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Contents

Dynamism of urban spaces reflecting culture

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Abstract

India is a rich nation in terms of cultural heritage, hence it becomes essential to recognize and appreciate the features of a country's culture for sustainable development (Abakerli, 2012). The relation of culture with the built environment in the world has been considered under parameters like number of theatres, museums, art galleries, world heritage sites, concert halls, etc. However, there are a number of intangible aspects of the cultural activities that happen in the backdrop of the built environment. In the process of evolution of urban form, each aspect of the built environment is created to fulfill human purpose, giving space to accommodate the complex and manifold urban activities. These spaces are a reflection of the way of living and culture. Cultural activities bring vitality and vibrancy in the day to day lives. The routines are associated with the design of neighborhoods. The festivals are associated with a number of spaces in the city. In this regard, the Indian cities have a number of spaces with dynamic character, that signify changing character with respect to time and occasion. The same spaces function in a di erent way at di erent points of time. For example, the market lanes become the processional path at the time of festivals and public squares take di erent shapes at the time of ceremonies. In order to accommodate cultural activities, like processions and celebration of festivals the cities represent flexible quality. This paper explores the relationship of the spaces in the city with the culture. Pune city has been taken as a study area and various factors of the festivals are studied that bring in dynamism in the spaces. It is based on the mapping of the activities in certain parts of the city that change character during festive times. Authors have studied some major festivals and related activities around the year and tried to map the city's response to these festivals.

Keywords:- Pune Culture, Intangible heritage, built environment, Space dynamics.

1. Introduction

Historically the word culture has been always spelled with civilization. The set of values that shapes the behavior of the society at di erent levels has been called as culture, whereas civilization is a physical form of human-made environment. Cultural development has been considered as one of the important factors in Subjective well being of the people (Denzhu Ye, 2015). If culture is considered as the mind of society then civilization is the body to house it. Any society and any geographical area have both culture and civilization at the same time (Hambarde, 2013). Cities represent the spatial deliberation of the economic, social, cultural, and political activities. The ancient cities of India have been transmitting the culture of the respective regions. Development of culture can be observed at national as well as at city, town or village level. In India, there is significance of the 'imagined landscape'. These imagined landscapes are the identified routes and locations in the country that are identified as pilgrimage places (tirthas). The network of these destinations of pilgrimage have long served to create a complex sense of place—locally, regionally, and nationally (Eck. DI, 1998). This imagined landscape has been an integral part of Indian culture and has also played a role in development of spaces in the cities and generated economies in the area. The examples of these imagined landscapes are Char dham yatra of Uttarakhand (Shardul Semwal, 2019), Kawar yatra of Haridwar, Pandharpur Wari (Dehu and Alandi to Pandharpur) (Pendharkar, 2016), Dwadash (twelve) Jyotirlinga Yatra, Ashta Vinayak yatra, Shakti peethas yatra, etc. All these yatras (routes) mark entry on particular routes on a map of India, and the locations on these yatras have spaces related with this pilgrimage. At the city level, the culture is impactful, as the cultural activities generate economies with involvement of people, at multiple locations at various points of time in a year. Culture and spirituality has been interpreted as a major factor in maintaining peace in the city (Sunil Rai, 2020). Other than generation of economy, they positively impact the cities in terms of reduction of crime, educational development and well-being of the people.

The historical Indian cities have been representing the culture in their built form. Both the tangible and intangible forms of culture can be experienced in these cities. The tangible aspects of culture that can be seen in the form of built (physical) heritage such as, river ghats, auditoriums, concert halls, stadiums, places of worship and various places of celebrations and performing rituals, like marriage gardens, crematoriums, burial grounds etc. The intangible aspects of culture like customs, traditions, festivals, fairs, festive markets etc., which though not in the built form but represent culture in a vibrant manner. A number of festivals have given identity to the cities, for example Durga Pooja of Kolkata, Rathayatra of Jagannathpuri, Ganpati festival of Pune or Dahi Handi and Krishna Janmashtami of Mumbai etc. These festivals are not only the celebrations or gathering of people at one place, but are housed in the city at distinct places, and change the cityscape dramatically. Cities provide flexibility in the form of accommodation of these celebrations in their existing built forms. Some of the spaces are named or identified with these festivities. For example, in north India some grounds are named as Dashera maidans, as on the occasion of Dashera, the major public gathering happens in these

grounds and for the remaining year, various other public gatherings, major exhibitions, or sports happen on these grounds. Not only at the city level but also at the national level the cultural activities unite India in various manners.

Considering all these points, the following objectives of the study are defined

- To study the accommodative quality of Pune city in terms of culture.
- To study the major festivals where culture brings in dynamism in the spaces.
- To study the present system of institutionalization of these festivals with the help of series of practices adopted by the city to celebrate these festivals

2. Methodology

The observatory methodology has been selected for this study. The city's dynamic characteristics are studied, as a number of spaces in the city transform during festive times. Various parameters of impact of culture on tourism, economy and people's behavior and response have been considered while studying the city. Contextual analysis has been done about the changes that particular places in the city face during special events.

Detailed literature review on the text available on the relationship of culture and city, cultural industries, imagined landscape and culture of the city of Pune has been done. A comparative study of three prominent festivals in Pune city has been done and compiled in a tabular format.

3. Literature review

The culture and festivals in the cities are part of the existing spaces and locations. The built environment remains the same but the activities are changed. This dynamism is inherent in the city culture in some spaces. There are many examples like vegetable markets of early morning changing into busy tra c routes in the afternoon, or gems and jewelry markets of the day changing into eating joints in the night (Neethi P., 2019). The other form of dynamism is observed at the time of particular festivals (Singh, 2014). For example a market square gets changed into festive marquees, and market streets that are usually full with vehicular tra c, get changed into processional paths of the festivals. The artistic and economic activities related to festivals (Einarsson, 2016), festive markets, etc., start much before the festive times, and these activities also change the ambience of some locations and introduce a number of activities during this period. These changes are not only visual but give complete experience of music, sounds, fragrances, and enjoyable walks. As cultural economics is developed in this way, the government, local merchants, shopkeepers, artisans and people all are involved in such cultural activities.

Vibrancy in an urban space can be expressed as e ciency and functionality from planning point of view, and aesthetics and form from design point of view (Sintusingha, 2012). The buildings in the streets are static, however the city life in the backdrop of these buildings, network of shared open spaces, movement and activities of people add dynamism into the street life. The fixed, semi fixed, static and mobile elements all together provide temporal dimension to the space. Permeability in the space gives way for free movement of people and continuity in the activities. City is open for exchange of transactions (Hillier, 2007). Buildings, facades and their openings interact with the areas nearby them, by constant transaction, by visual connection or by interaction of people. All the spaces that are approachable to humans and human activities and the ones that could o er the visual, auditory connection and physical movement, demonstrate dynamism. This dynamism is an event of day to day activity and also occasional activities at the time of festivals. The balconies, windows that have visual connection with the streets become the locations where the dynamism is seen.

The image of an urban area enhances the quality of architectural objects to take high values by reading the urban composition by the harmony between human beings, all site elements, site functions and urban or site framework. These all together define urban spaces, configuration, and structure (Amjad Almusaed, 2016). The architecture and urban design of the city is the major respondent to this dynamic character.

Culture, governance and community vitality together comprise 12 indicators out of 33 indicators of National Happiness Index (NHI) as defined by 4th king of Bhutan (Ahtesham, 2020). Sustenance of these festivals in the space dynamics of the city may help catalytically in the sustainable development and happiness of the citizens.

During the celebration of the festivals the streets and facades get activated, whereas in the overall scenario, culture gives a boost to a number of economic activities that take place in the built environment. The cultural industries have been considered as potential

areas of the development of any country. Rimkutė A. has defined motives of cultural industries focusing on heritage, image of the country and national identity, benefit of local economy, humanities education, and innovation and creativity. The sustainability of the cultural activities is dependent on the policies too (Vitkauskaitė, 2015). And the very essential for good policy-making is to understand the nature of both the economic and the cultural value created by the cultural sector (Throsby, 2010). Lewis and Miller have considered "cultural policy" as a potential area to bring in cultured citizens and also encouragement of cultural industries, and synchronization of these two not as only their physical existence but as a series of rationales for particular types of conduct (Isar, 2009).

Vitkauskaitė Ieva has mentioned the role of the government, as the ministry of culture, to promote funding through organized sectors by the council of arts, and indirect funding through people's participation.

3. Study area: Pune City (India)

The study has been done in Pune city. The city's history dates back to 756 AD., where it has witnessed the glorious past of Maratha Kingdom. It was the capital city of Peshwa, the prime minister of the Maratha Empire. It has good physical, political, and cultural connections with the other parts of the state. The present city is known for its educational infrastructure, culture and is also emerging as a hub for the I.T industry. The city is also referred as the cultural capital of the state since it has retained the Maharashtrian culture in terms of arts including music and theatre, crafts, language, food etc. The city's culture can be well expressed through its built heritage, as well as by tradition of music, dance, performing arts, and sports, which has been well accommodated in the city's vitality. Pune's citizens, also referred as Punekars, are known for being a good audience (appreciators of art); it is because of this quality that musical events like Sawai Gandharva, Vasantotsav are organized in the city every year. The Sawai Gandharva Music Festival, started in the year 1953 is a platform where the Indian classical musicians and singers across the country visit the city to perform on the same stage. Along with the celebration of musical art, religious festivals like Gokulashtami, Ganapati, Navaratri, Christmas etc, are also celebrated publically in the city and boost up the city environment by economic activities. Punekars have added their own expressions to each festival and season for example; city's famous Ganpati, the Dagadusheth Halwai Temple is decorated with the alphonso mango during the summer season, a special thali (a full meal set in a plate) full of fasting delicacies is sold on the fasting days. Punekars take pride in celebrating and promoting Indian culture through their approach of celebrations and activities in the city. Three such prominent festivals Pandharpur Wari, Ganeshotsava, Diwali are taken as a case study for the paper.

3.1 Pandharpur Wari

Pandharpur, Wari is part of imagined landscape of Maharashtra joining three pilgrimages, i.e., the two hometowns of two devotees the Saint Dnyaneshwar (1275-1296 A.D., Alandi) and Saint Tukaram (1598-1650 A.D., Dehu) and adobe of Vitthal (Pandharpur). It is considered as a holy procession that originates from two pilgrimage towns near Pune, Alandi and Dehu and is destined to reach Pandharpur. These saints had contributed to the society in terms of spiritualism and devotion to the society. Lives of both these saints are lessons for humanity. Their wisdom of devotion has been the base of development of spiritual knowledge, art, culture and also the tradition of music in various forms. Both the saints used to visit Pandharpur every year by walking and were joined by some more devotees. The culture of Pandharpur wari has developed since then. The main pilgrimage of Vitthal being Pandharpur, there is a culture of taking the symbolic presence of these two saints by a number of devotees together in this procession. This symbolically represents that these saints travel with these devotees. This procession is 250 km long and is joined by more than 10 million people who keep on walking for almost 21 days to cover this long distance in the month of Ashadh as per Hindu calendar (July-August) every year. The Vaishnav Varkaris start their journey and walk up the distance of 20 kilometers. On the way they have some halts. Every halt of this Wari is a place, where special rituals are performed to welcome the palkhi and pay regards to the pilgrims.

3.1.1 Dynamics in the city during Wari:-

wari is a combination of a number of groups coming from di erent villages and every such group is called Dindi. Every dindi is waccompanied by a vehicle like a truck where they keep all their belongings. The Journey is carried out by singing Abhang (a type of devotional group song) in a proper sequence and playing tals which makes the environment charming and pleasant. The first halt being Pune, the temple of Palkhi Vithoba of the city, has set the tradition to do worship of the Paduka's of Saint Dyaneshwar Maharaj. The whole city of Pune respects this tradition and facilitates the holy procession by a number of means. The routes of the holy procession are defined by the city's administration. It appears like a huge force coming to the city in a linear manner, entering into its veins, and the places and streets of the city get energized by the essence of devotion with constant interaction of people and places on its route. The essence of the event can be experienced by all five senses. Whole city remains eager to see this procession and there are pause points defined in the city where people take sight of the Paduka[1]. The chariots of the saints give mesmerized experience to the citizens. Historically other than spiritual there has been an economic perspective too in terms of, moving bazaar, work distribution, promotion of products using innovative media mix, generation of economies through small, and medium scale

[1]Paduka is the symbolic presence of footsteps of the saints.

businesses and a platform that provides employment opportunities are some of the features of this pilgrimage (Kulkarni, 2019).

Figure 1 represents the circulation route of Wari outside the city and within the city.

Figure 1 Routes of Pandharpur Wari and city level changes as directed by city administration during Wari

Figure 2 Wari coming to the city and within the city. Image source: https://punebuzz.com/pandharpur-yatra-ekadashi-pandharpur-wari/

3.2 Ganeshotsava:

Traditionally celebrated Ganeshotsava was identified as a potential area of socio-political interactions by Indian freedom fighters, “Bhau Rangari” and “Lokamanya Bal Gangadhar Tilak” in 1893. These leaders saw the need to unite Indians more and realised that festivals can unite people. Tilak proposed Grand celebrations on ‘Ganesh Chaturthi’ and ‘Shivaji Jayanti’. He organised Ganesh Utsav as a social and religious function.They envisioned the united works of people through this festival and gave it a public identity. Though the festival is celebrated at every house and every street of Pune City, there are few places that are the most honored and are historical in the city. These are also called “Manache Ganapati”. These are Kasba Peth, Tambdi Jogeshwari, Guruji Talim, Tulshi Baug, and Mandai. These places have continued the tradition through the voluntarily working organizations called Ganesh Mandals.

The original essence of Pune’s Ganeshotsava lies in the core area of the city. These mandals organize festivals with beautifully decorated pandals and perform all the religious rituals.

3.1.1 Dynamics of the city during Ganeshotsava

The preparations for the festival start in the form of idol making workshops and Dhol tasha practice of various Pathaks, collection of funds and other preparations for festive markets, sweets, prasad and construction of the pandals. The practices are done by the Pathaks at various places in the city and people from all the age groups and socio-economic classes take part in these Pathaks. These activities are not limited to the city but extend beyond the city limits. A village called 'Pen' near Pune is famous for clay-based idols of Ganesha. The major base of the economy of this village is idol making. The streetscape of the city takes di erent forms during festive days. There are a number of pandals installed on every street of the city. The festive markets give employment opportunities to a number of people including artists, artisans, craftsmen, florists, fashion industry workers, photographers, etc.

Rangolis are made from household level to city level to welcome the Bappa. The welcoming and farewell ceremonies of the Ganesha are the city level events, as during these days the huge processions and also small groups of people join this event. The processions that attract the attention of common people are classically composed bands. They are dressed in uniform traditional costumes. These processions are composed of flags, di erent types of drums, and musical instruments like jhanz, tal etc. They exhibit a number of cultural sports like Barchi dance, Lezim dance, Mallakhamb etc. The whole journey of these pathaks is an experience of vitality and enthusiasm. A number of pathaks follow the same route and the viewers get this experience for the whole day of the visarjan (the day of farewell). These attract huge crowds from all over the city and also from outside the city. Figure 3 represents the major streets where dynamism of the spaces can be experienced during the Ganeshotsava.

Figure 3 Locations of Manache Ganapati and Visarjan routes (Image Source: Authors)

3.3 Diwali:-

The above mentioned two festivals display the imagined landscape in terms of the temporary transformation of spaces and a few streets they bring out. Diwali on the other hand lightens each and every corner of the city.

The city of Pune over the years has developed its own ways to celebrate the festival at urban scale. Diwali is the time when schools, colleges and o ces are closed for the celebrations. This gives an opportunity to the people to socialize at the places of historical importance and celebrate the city's culture in the form of music and lights. Numerous events are planned in the city during the festival, including Deepotsava, (celebration of lamps) musical performances, miniature fort making competitions etc. City hosts renowned classical singers and musicians from all over the country during Diwali.

3.3.1 Dynamics of the city during Diwali

Deepotsav happens at various locations in the city including Sarasbaug[2], a public park in the city, Pataleshwar temple, Magarpatta

[2]Sarasbaug is a complex with heritage temple of Ganesha, a waterbody and a public park.
[3]Shaniwar Wada is a royal residential complex of Peshwas.

City and Shaniwar Wada[3]. All the places are lit up with thousands of diyas and rangolis. On the Padwa morning, the fourth day of Diwali, people start arriving at Sarasbaug from 3:30am in the morning, dressed up in their best traditional attire to witness the Deepotsava. Apart from this, musical events are organized at various venues across the city. The programs start as early as 6:00 am in the morning. Another creative activity during the festival is the miniature 'fort making' especially by children. This activity can be observed at a number of places in the city. Children of various age groups get involved in replicating the forts built by Shivaji Maharaj. The miniature forts are built using mud and later decorated with sa ron flags, toy horses, and soldiers called Mawalas in the local language. A city level competition of the forts is held at Sambhaji Park where enthusiasts from all over the city come to participate in the competition. The lanes that are generally full of vehicular movement transform in the people's street where they can be seen interacting with each other and the ambience of the streets is further enhanced by lights and decorations.

4. Contextual analysis of the festival and spatial response of the city

Above mentioned three festivals are studied under a few parameters identified by the authors to understand the dynamism of spaces during these festivals. Table 1 analyses the impact of these festivals at various times of the year over the lives of citizens and spatial response of various places in the city. Culture evolves a number of art forms, customs, and traditions and by these means, it involves a number of people, spaces and economies and being celebrated at large scale, city's administration is also involved in various roles like designing various policies and on the spot arrangements during large gatherings of people. The table gives a comparative study of the city's response to these festivities right from the preparation stage to post festival activities.

Table 1: Contextual analysis of the festival and spatial response of the city

	Parameter	Pandharpur Wari	Ganapati	Diwali
1	Schedule, duration and spatial interaction of festive activities			
	Time of the year and duration	Ashadh month (July-August) A 21 days long procession remains in the city for 1-2days.	Bhadrapada month (August-September) Celebrated for 11 days	Kartik month (October-November) Celebrated for 4-5days
2	Pre-festival activities			
	Dynamism in Spatial character	Tra c diversion by city tra c police – one day before the arrival of Wari. Pandals and arrangements are done throughout the city for accommodation and food of the warkari	Idol making – three months in advance by the sculptors. Few workshops are also arranged for the ones who want to make their clay idol start a month in advance. Many places in the city and outskirts of the city are occupied with idol making activities. Various spaces in the city including school grounds, underpass, sport fields, abandoned bus stops become places for practice of dhol-tasha.  Image source: Author	Few heritage sites, streets, and houses get a makeover (in terms of cleaning, maintenance and decorations) as a preparatory event for the festival.

[4]Visarjan- Farewell ceremony

	Social importance	Voluntary services by medical organizations, corporate o ces, other organizations and individuals for giving on the spot services to the Warkari. Wari has been interpreted as a process generated through the reflexivity of productive castes interacting with Brahminical Hinduism, and the articulation of social ethics reflecting specific realities and aspirations of allied communities with an emphasis on worldly relationships (Koiso, 2018). Wari is a festival of inclusiveness and elimination of social disparities. This journey is arduous and regimented in nature, at the same time the music and devotion give very special energy to the warkari. This potential has been well recognized by learned people in the state and recently number of corporate is also joining the wari to get positive energy for the rest of the year	Ganesh Mandals collect funds for societal benefits and help distressed communities, and needy people. Social bonding happens through preparations of cultural events happening in most of the residential areas in the city. The funds collected for the festival are utilized for social works. These works include marriages of needy people, and di erently abled people, health camp, distribution of spectacles, grain distribution for needy people, etc. As the festival gets a public appearance, it is also used as a platform for awareness drives and debates on various matters of context.  Image Source: Yash Gore (Student at BSOA,Pune)	This festival gives opportunities for social interactions through gatherings at heritage sites, temples complexes and musical concerts, and firecracker shows.
	Cultural Economics	Many organizations donate funds for meals, accommodation and medical facilities of the warkaris. Industries and markets get engaged with arrangement and distribution of products like savories, food packaging, bedding, mobile toilets etc. As Wari becomes a point of attraction for city people, a number of street vendors find opportunities to sell their products, along the processional path.	Festival gives employment and business opportunities through small scale industries and markets that get engaged in making installations and decorative materials- one to two months in advance. Innovative designs and businesses in the area of Gems and jewelry and accessories for the household level and public Ganeshotsava also gets activated.	Diwali is an occasion of various important financial transactions including big purchases. Firecracker industries start the production two to three months in advance while the sale starts a month before the festival. Preparation and selling of Snack items called as Faraal by the food industry starts two months in advance, as these are exported across the globe too. Courier industries start functioning in these lines. Making the traditional diya (panati), lanterns - a month in advance.

<table>
<tr><td>3</td><td colspan="4">Artistic and cultural expression</td></tr>
<tr><td></td><td></td><td>This festival is a reflection of spiritualism and devotion and reflects the minimalist life of the saints with high human values.

This devotion has given birth to various literature styles and music and dance forms such as Kirtan, Abhang, Bhajan etc. which are performed in a specific manner using simple musical instruments. These performances are done in geometrical patterns.</td><td>Ganpati being god of wisdom, knowledge and art, this festival gives opportunity to various artistic expressions including creative arts and performing arts. The creative arts in the city can be observed in the form of idol making, sculpture, craftsmanship, jewelry design, floral decorations etc whereas performing arts can be observed in the form of dance, drama, music happening at neighborhood level and also at city level.

Culinary arts for this festival bring in a variety of savories prepared in a traditional manner.

 

Image Source: Author</td><td>Creative art of the festival can be seen in the form of lantern making, painting the diyas, fort making etc whereas performing arts can be seen in the musical shows called as Diwali Pahat. Indian classical music is known for its ragas that are sung at specific times of the day and citizens get the opportunity to experience the early morning ragas at the right time during this festival.

Culinary art of this festival has its own flavor and is very specific to the season of the festival.

 
Image Source: Author</td></tr>
<tr><td>4</td><td colspan="4">Space dynamics during festivals</td></tr>
</table>

	City level changes	Huge colorful rangolis, and street arts.  Image Source: Yash Gore (Student at BSOA,Pune) In the procession, the rustic costumes of Warkaries , males wearing white kurta, dhoti and white Maharashtrian style caps, and women in traditional attire, carrying tulsi sapling or idol of Vitthal Rakhumai on their head. The ornate chariot in front is followed by Warkaris in a disciplined manner. The variation in this procession is both visual and auditory and is added by musical instruments like Tal and Chipli, devotional songs and folk dance done by the Warkaris. There is aroma of the flowers and scent and perfumed incense sticks. And then on frequent pause points there are food stalls for Walkaris. Tra c movement gets altered.	Vibrancy in markets by the stalls of idols, accessories for the festival.  Image Source: Author Night time market streets are full of light. Special provisions for Visarjan[1] spots by city authorities and volunteers.	Vibrancy in markets by the sale of diyas, lanterns, accessories for the festival. Historically important spaces like Sarasbaug, Shaniwarwada get a new charm because of the Deepotsav held during the festival.  Image source: https://findtours.in/wp-content/uploads/2016/10/Shaniwar-Wada-in-Lights-%E2%80%93-Dhanatrayodashi.jpg Night time market streets are full of light. Special provisions for cracker markets as few grounds are reserved for the sale of firecrackers with adequate fire safety provisions. Auditoriums and concert halls are made ready to host the musical mornings.
	Public Squares	Public squares become pause points where Warkari perform ‘Ringan’ (folk dance form performed in a circular manner). The public squares turn into performance spaces to give a complete experience. Building facades get activated as people tend to experience the Wari from balconies, footpaths, verandas and streets. The Warkaris welcome the spectators and join their moves.	The structures of pandals are made with a framework of bamboo and numerous materials. There are themes with thoughtful messages behind the decorations of pandals.  Image source: Author	Decorations with huge lanterns, colorful lights and handmade miniature forts. Ambience created by bursting of bright and colorful Firecrackers.

	Street level changes	Few streets which are otherwise tra c streets are completely transformed into pedestrian streets for the Wari.  Image source: https://www.thebridgechronicle.com/lifestyle/art-culture/passage-pandharpur-21061 The loud vehicle honking is replaced by the soothing Abhang sung by the Warkaris. The colorful rangolis add to the atmosphere.	The approach to these pandals is demarcated by ribbons, lights, colorful decorations and advertising material of the sponsors. (Manjrekar, 2018) Tra c diversion of some specific streets for the visarjan day. Streets are adorned with traditional decorations. Central portion of the street is reserved for procession and performances while the edges are occupied by the audience and vendors selling toys, accessories etc. The two spaces are separated people's chains protecting the processional proceedings.  Image Source: Yash Gore (Student at BSOA,Pune)	The city level shopping streets are full of colorful products, lighting and people. The neighborhood level streets are adorned with lighting and rangolis in front of the buildings.  Image source: Author
5	Administrative support			
		Accommodation, tra c management, security taken care of by the local authority. Local police force contributes in the crowd and tra c management during the Wari.	Authorized festive markets and permission to the street vendors to sell the festive products. Tra c diversion and special safety measures to manage the crowd during Visarjan.	Authorized festive markets and permission to the street vendors to sell the festive products. Crowd management during the Deepotsav mornings.

5. Observations and findings

5.1 Social importance

Festivals bring in inclusiveness of various social classes for a common purpose. For example, regarding Wari, the initiatives by various organizations and o ces include, flexibility in working hours and involving the employees and students to volunteer the services for the Warkaries. There are donations by corporate o ces and organizations and on the spot timely services. Few NGOs and individuals voluntarily help the police force in crowd and tra c management.

5.2 Cultural economics

All these festivals give opportunities for direct and indirect involvement of the people in the process of preparations. The direct involvement is in terms of cultural economies in all three festivals. These festivals have an essential component of Prasad that includes various types of sweets, which involves a number of catering and dairy industries fifteen days before the festival. Demand for various types of flowers during the festival is considered by the nearby farms a few months in advance. The fashion, jewelry

and accessories industry works for most of the year to bring their products ready for market.

The contemporary form of the festival opens up the opportunities for various other businesses like make-up artists, fashion designers, rangoli makers, artists, photographers, videographers, movie makers, print media professionals etc. The broader reach of the festival to the citizens and the people outside the city (globally) is possible by impactful telecasting and it will further open up opportunities for many other professionals.

5.6 Sustainability in practices related to cultural economics

Use of a number of materials, and products is observed during these celebrations, hence there is a need for sustainable and eco-friendly practices in these operations. Cultural goods can raise economies, and it has been observed that many of these products are not produced locally. For example, the clay products, sweets etc. are made locally, however most of the electronic goods are imported. Some policies to encourage the manufacturing of these goods in the local industries with sustainable raw materials and practices are required. This study opens up scope for doing surveys of economics of local industries versus outside markets.

Regarding celebrations like Diwali, other than Saras Baug and Shaniwarwada, and neighborhoods (e.g. Magarpatta) some other public parks and heritage sites like nearby forts, etc. can be explored as potential sites for Deepotsava and musical shows. This will increase activities (generating economies) at heritage sites and will help in long term sustenance and conservation of these sites, by generation of funds. Pune is a fast-growing city, and its historical character is being lost when it comes to the growth near fringe areas. Spatial provision for such events and festivals can become policy guidelines for the upcoming developments. It will help in making a similar identity to the newer areas and bring in cultural sustainability.

5.3 Space dynamics

Many grounds, streets, are filled with Dhol-tasha Pathak practicing for their performances which adds resonance in the city. This sets the tone for the upcoming festival two to three months in advance. Traditionally Hindu calendar contains season and harvesting based festivals throughout the year where there is direct association of the farming, businesses, and economy with the festivals. Over and above Pune city as a system has given an advanced, artistic and urbanized approach to these festivals. Pandharpur Wari, Ganeshotsava and Diwali all these three festivals have significantly contributed to the cultural identity of the city. The celebration of the festivals is a function of the space and people together. These festivals are the legacy of the city and are sustained by the governance, and people. The enthusiasm of the citizens at the time of these festivals channelizes the energies of the youth and makes them more creative, productive and oriented towards humanity. The e ciency of the existing systems can be seen by flexibility of the spaces to accommodate the festivities. Instead of construction of newer spaces, the existing spaces only show potential to function in a dynamic manner. There is acceptance by people and city administration to conduct these events peacefully. The present context of the city demonstrates a very strong character of culture and active participation of people and working of various economies in its sustenance. The streets and public squares are the major sites of celebration of culture, and festivals. For Diwali, the temple complex like Saras baug becomes a public place of celebration. At present the work of city administration is limited to tra c diversion and crowd management. In addition to this, for Ganpati Visarjan (immersion of idols), the administration supports by construction of immersion tanks and waste disposal facilities at a number of locations.

Some important streets in the city like Tilak road, Bajirao road, Laxmi Road, and Fergusson College road, etc. are major viewing galleries of the festive processions, and the spatial character of these streets show design potential to accommodate people with more facilities.

5.4 Issues related with the management of crowd

For Wari and Ganeshotsav, the spaces and the crowd indicate that these events are not universally accessible. The duration of the procession is a day-long activity, and at present, there is a lack of provisions for day-long stay of such a large number of visitors. At present these processions are limited to the performers and the ones who are physically fit to be a part of a heavy crowd, and are capable to sustain whole day without basic provisions like food, toilets etc..Viewing of these processions itself is a challenging activity for the visitors, as spaces along the processional paths are congested and one needs to stand for long hrs, in extremities of weather.Because of the lack of spaces with respect to the number of visitors, a lot of control is required by city police and volunteers too. However, more than manual control of crowd, these matters of overcrowding and lack of viewing areas and provisions can be tackled with e cient space management.

Figure 4 Images showing a lack of viewing spaces along the procession path (Image Source: Authors)

5.5 Potential of urban design and planning

Authors see potential of urban design and urban planning for sustenance of the culture and development of the city. As right from the preparation of the festivals, a number of stages are involved, at every stage thoughtful approach can be given in terms of policy level initiatives for encouragement of cultural industries, development of arts and education, development of better infrastructure to accommodate cultural activities, spatial changes in the existing spaces for the same and encouragement of sustainable practices for all the involved processes.

There are a number of inactive building facades, which can function as viewing galleries. And the reforms in urban design can contribute to this issue. The urban design would involve the better design of streets to accommodate more spaces for free pedestrian movement, and pause points to accommodate the spectators of the processions. It would also include seating facilities, public toilets, drinking water infrastructure etc. The facades of the buildings on these streets become very active at festive times. Some design guidelines in terms of facade design, to accommodate people with seating and viewing facilities can be worked out. Addition of such elements on the facades will add to the aesthetic character of these spaces with necessary facilities. In the long run, the front facades and the spaces between the streets and buildings can become a source of income for the owners of the buildings by o ering these spaces as ticketed entry at festive times.

The policy level initiatives can include, the encouragement and spatial subsidies, loan facilities and design policy (with space design guidelines) to the owners of the buildings on these streets to accommodate spectators at the festive times.

6. Conclusion

This study has been done to realize the value of the existing system to sustain the culture and its potential to improvise the spatial character of the urban spaces, generation of newer economies and to recognize the value of culture as a major contributor in the development. This study triggers a thought process to realize the potential of urban design, urban planning and also the policies for long term sustenance of these festivals. It opens up the scope of urban design level initiatives to improvise the existing character of the streets and open spaces. These spaces have potential to accommodate the culture and policy level initiatives to facilitate the existence of cultural industries within the present urban system to encourage development of more economies and sustainable development.

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Discourse on Lost Pages of History: Architectural Works of Vasudev Kanitkar in Western India

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Abstract:

Ample western historiographical resources are available to understand Colonial Architecture in India. Architectural language evolved during Colonial period in India was a collaborative effort of British Royal and Local engineers from several parts. Eclectic architectural language of British India is a product of amalgamation of western models and eastern knowledge simultaneously. They worked in collaboration with Indian philanthropists, engineers, contractors and artisans. Much is available to read about royal engineers as a pride for British sovereign but contributions of local engineers who equally built colonial India lost in the pages of history.
This Paper tried to document and discuss works of local contractor Vasudev Kanitkar born in Baroda and worked at several places in Western India. With the help of archival resources and primary secondary surveys conducted this research paper compiles architectural contributions of Vasudev Kanitkar less known for his many landmark edifices he designed and built in western India.

Keywords: Eclectic Architecture; Colonial India; Local Contractors; Royal Engineers; and Public Architecture

1. Introduction and framework of study

Role of Locals in building Western part of colonial India

Western India was mostly under the presidency of Bombay during British rule in the nineteenth century. Royal engineers in collaborations with locals proposed and construct notable architectural works under Bombay presidency. Many local engineers and contractors were involved in decision-making at various levels during the actual implementation of public buildings on site. There were roadblocks in the execution process, including as opposition from locals and a lack of funds. Colonial sovereignty was built on democratic ideas to some extent. Documents such as old newspapers and municipal records may be sufficient proof that choices appear to be made democratically with the cooperation of local leaders and people. Correspondence between officers and commissioners about decisions made in the selection of appropriate sites for specific projects and its character in general can be found in municipal and PWD archives. Detailed estimates, material selections, and local community responses appear in the overall paperwork, although names of local contractors appear to be included in the files linked to public buildings completed very rarely. (**Fig. 1 and Fig. 2)** Framework shows how colonial rule was percolated and reached at grassroots levels. How the architectural vocabulary of colonial urban heritage and landscape could be interpreted in time and space. (Munasinghe, 2022)
Numerous articles published in Professional Papers on Indian Engineering by Indian local contractors such as Teekaram, who worked primarily in Lucknow, Babu Shumbhoo Dass, whose works can be seen in Bahwalpur, Pakistan, Rai Bahadur Kunhya Lal's and Sir Ganga Ram's legendary projects in Lahore, Pakistan, Muncherjee Beyzunjee at Hyderabad during the Nizam reign, are excellent resources indicating their contribution to the architectural vocabulary developed[1] [2] (Chopra, 2011) (Lavand, 2017) Researchers such as Preeti Chopra states extraordinary works of Murzbaan in Mumbai in her writings. On the other hand local engineers such as Narso Ramchandra, Vasudev Kanitkar from Pune and some other towns in Deccan were never got recognized and documented extensively for their contributions in the development

[1] Preeti Chopra in her Book *A Joint Enterprise* on the page number 76 mentions name of Sir Ganga Ram as legendary figure who worked for PWD in Lahore now in Pakistan.
[2] Lavand Vaidehi, "Public Architecture And Role Of Local Contractors In Late Nineteenth Century, Case Of Pune." In *Urban Regeneration*. Nashik, 2017

of architectural character. These are important unexplored figures in the context of Pune. Their names and associations transiently appear in the history of Pune. This chapter seeks to review account of who built Pune in colonial context on ground. Further discourse tries to detail out development of Vasudev Bapuji Kanitkar as an engineer and designer. Perhaps lack of resources and primary sources related to his own opinions for his projects he executed may lead in missing links in the few of descriptions. This is due to the negligence in documenting biographies of local engineers and exploring their influences in their social contexts.

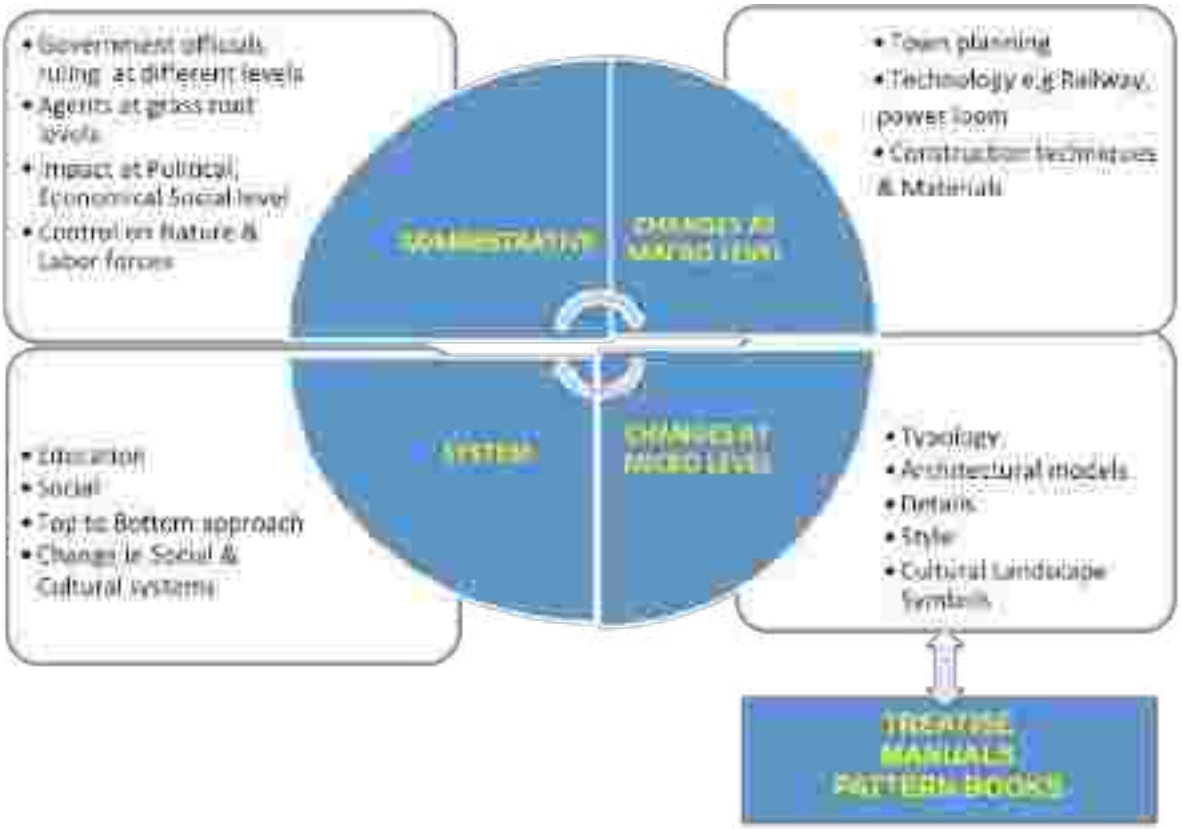

Figure 1. Structure of the Study (Developed by Author).

Figure 2 Image showing transmission of primary sources in small towns as reference to trigger construction activity, Top to Bottom approach. Source: Author

2. Early life of Vasudev Kanitkar

Figure 3. Image of Vasudev Kanitkar
Ref: Image at Reay Market

Research could uncover particulars of family and background of Vasudev Kanitkar (**Fig. 3)** perhaps his contribution as an engineer to some extent with the help of books *Kanitkar Kul Vrittant*[3] by Shankar Kanitkar published in the year 1948 and *341 Sadashiv Va* Amhi by Moreshwar Kanitkar published in 1992. (Kanitkar, 1948) As per the records mentioned in the book it had documented names and brief background of members of Kanitkar family in Maharashtra their decedents and family tree. The books refer to details about Vasudev Kanitkar and his involvement in the field of architectural landmarks in brief though he was not formally trained as an engineer or architect. Vasudev Kanitkar was born in Baroda Gujarat in the year 1829 or 1830.[4] His father was in the service of Patwardhan the then minister of the princely state of Baroda. It is indispensible to mention that he had never went through formal engineering training like Murzbaan who was trained as an engineer in Pune Engineering College. Vasudev Kanitkar (Lethbridge, 1893, reprinted 2013) completed his education till old matriculation. He had good knowledge of engineering. He stayed in Karachi now located in Pakistan for larger period of time where he worked on several construction sites and must have gained experience in the field of Architecture and Engineering. Unfortunately this part of his life couldn't be traced much, due to lack of resources.[5]

[3] *Kanitkar Kul Vrittant* the name of book suggests tidings of Kanitkar

[4] Two different years mentioned in both the books, so not very sure about exact day and year whether 1829 or 1830.

[5] Kanitkar Shankar Ramchandra, *Kanitkar Kul Vrittant,/* Tidings of Kanitkar family *(Pune, 915/1 Shivajinagar Vitthal Hari Barve, Aaryabhushan Mudranalay, 1948),* 146; Kanitkar Moreshwar, 341 Sadashiv *va amhi/* 341 Sadashiv and us, (Pune, Moreshwar Kanitkar, 1992), 89 it's a autobiography re written on Vasudev Kanitkar's step brother's son Balukaka Kanitkar. 341 Sadashiv was residential address of Balukaka Kanitkar. In the description about Vasudev Kanitkar very respectfully he mentions his kind nature and connections with several reformists and activists in Maharashtra. He raised Balukaka Kanitkar after his father's death that was a great support to the family.

3. Observations and Discussions

Architectural contributions of Vasudev Kanitkar

Figure 4 Laxmi Vilas Palace at Baroda Designed by Charles Mant in 1878 and partly executed by Vasudev Kanitkar Ref: Image by Author

Further discourse tries to highlight notable projects by Vasudev kanitkar. His works at various levels with several people enriched his experience. Vasudev Kanitkar was honored as Rao Bahadur for his proficiency in the field of architecture. The title was given to him as personal distinction on 1st January 1877, on the occasion of the Proclamation of Her Most Gracious Majesty as Empress of India.[6] (Lethbridge, 1893) Few references are available to see with for Laxmi Vilas Palace **(Fig. 4)** designed by Royal engineer Charles Mant in 1878 and partly executed by Vasudev Kanitkar. This iconic palace located in Princely state of Baroda in western India known for its unique Indo-Saracenic style.

High court at Mumbai was another structure partly worked out by Vasudev Kanitkar built in between 1871-1878. John Augustus Fuller R.E. prepared design with Massive central tower, Turrets and Basalt rock resembling much to medieval castle. The prominent central tower is covered with steeply sloped roof with number of dormer windows. Main access is through porch on western façade adjacent to which two octagonal towers of spiral staircase and pinnacles are located. Christopher London criticizes the overall composition as "exaggerated massing in the muscular neo-gothic style".[7] (Christopher, 1994) Preeti Chopra in her discourse mentions that colonel Fuller proposed Vasudev Bapuji Kanitkar, Mukund Ramchandra and Muncherji Cowasji Murzban to be designated as assistant engineer in 1869. She also states the position of local engineers in colonial hierarchy the link between rulers and local workers, which is very much relevant to Vasudev Kanitkar.

Very unique structure designed and built by Vasudev Kanitkar was Reay market (1884-1886) (**Fig. 5)**. It was the sixth market in the series of covered markets built in pre-independent India.[8] Despite a lot of opposition from local

[6] Lethbridge Sir Roper, *The Golden Book of India*, (London, Macillan and co.,1893, reprinted 2013), 566-7, https://archive.org/details/bookofindi00lethgoldenrich

[7] London Christopher W., *Bombay Gothic*…cit., 53.

[8] Before partition of 1947 Pakistan was part of India. Earlier examples of covered markets built were Lambert Market in Karachi (1864), Tollinton Market Lahore (1864) earlier built as community hall later converted in market by Rai Bahadur Gangaram well known local government engineer, Crawford market (1867) Mumbai designed by architect Sir William Emerson, Hogg Stuart Market Calcutta (1872) and Bolton Market Karachi(1883). Commencement year of Empress Market Karachi was probably same

Figure 5 Arial view of Reay Market, Pune Ref: Kimaya Pune

Communities the project was successfully raised at the heart of native town. Reay market later named as Phule Mandai was a unique design for a market in India. Spatial organization of market majorly resembles plan of a Jail. After studying various typologies and models followed in 19th century especially from *professional papers on Indian Engineering* and *Roorkee Treatise*, it could be observed that very simple plan of barrack and jail was preferred for designing this market. Its prominent central tower and rectangular flanges projecting out of eight sides indicates image of jail. Perhaps this was chosen with the concern of capturing ample light and cross ventilation in structure. Its probably expression of a bigger model of Lambert Market, Karachi detailed out with Neo-Gothic style. As Lambert market was located at the center of town at a junction of roads market accessible from all sides must have been the criteria in selection of that particular model. Unfortunately no much information is available on Lambert Market of Karachi so cant be discussed beyond certain point. Prevailing form and fine stonework mark its exceptional presence in the medieval town of Pune. Grippingly, the building is visible from long distance on the main axis of old town connecting to the fortress of *Peshwas.* Residence of Vasudev Kanitkar is located at a close distance exactly behind Vishrambag Wada.[9]

On the same axis of the street a very important public library well known as *Nagar Vachan Mandir* (1884-1890) was built to promote literature in local language. Designed and built by Vasudev Kanitkar the library contains immense archival documents, books and various resourceful materials written in Marathi and English. In all the archival documents it was named as Pune Native General Library. As a part of inculcating modern education and governance amongst locals Sir George Clark the then governor of Bombay presidency proposed establishment of a library named as Pune Native General Library in the year 1848. Initially located in Budhwar Wada. The mansion was burnt down in 1879 that boosted a need for a separate space allocated to the library. Eminent personalities such as Justice Mahadeo Govind Ranade[10], Lokhitwadi Gopalrao Hari Deshmukh[11], Krishnashastri Chiploonkar and so many have contributed in the process of establishment and running of the library. The location was selected after long discussions and the space was borrowed from Belbagkar family[12] on 15th May 1882 at the cost of Rs 4000/-. Vitthalrao Vasudev Gujar proposed initial plan and estimate for the library. Later Vasudev Kanitkar

as Reay market (1886) it was 1884. In later decade of the century Connaught or Shivaji Market (1885-1886) and Moore market Madras (1898-1900) were built.

[9] As Earlier residence of Kanitkar family was located behind Vishrambag Wada close to Pushkarni tank

[10] Ranade: Mhadev Govind Ranade was social reformer, founding member of Indian National Congress, was judge in Bombay Highcourt

[11] Lokhitwadi: Gopal Hari Deshmukh part of Freedom movement, scholar, social reformer. Taken strong stand against child marriages, dowry, caste system

[12] Belbagkar Raosaheb Mahadev Ballal Phadnis was one of the Ministers of Peshwas was one of the owners of precious land in the old town.

Figure 6 Roadside View of Aanadashram, Pune Ref: Author

reworked on design and execution of the project. Library building was started in the year of 1887 and in two years two-storied building was completed. Earlier cost of the project was assumed to be Rs 24476/- but at the end of it costed around Rs 25176/. Mumbai Government donated fund of Rs 12080/-, and Rs 12080/- collected from various philanthropists from Pune. Raja Holkar donated watch of Rs 500/- put on east façade at the entrance. Pune Municipality helped in getting service of maintenance of watch from Pendol Watch Company that was installed on front facade. Governor of Bombay Presidency Lord Reay invited for the opening of 2-storied library on 30th July 1889. Three clocks were installed on three different buildings at the same time, naming Sassoon Hospital, Reay Market and Nagar Wachan Mandir those were maintained by Pendol watch Company.[13] Symbolism of using clock as modern age and industrialization in front facades of public buildings was becoming trend in all parts of the country. This native library is considered as pioneering work in promoting local literature and had played important role as a hub during freedom movement. Various resources contributed to the overall building process of the Library. In true sense this was a public architecture in the old core of Pune city.

Institute of Anandashram[14] (**Fig. 6)** was the next important project completely designed and constructed by Vasudev Kanitkar in the year 1891. The edifice is located in the same premise close to Reay market and Shaniwarwada. Reformist and Philanthropist Mahadev Chimanaji Apte founded the institute at the heart of old town. It comprises administrative office, library, and hostel for Brahmin boys from economically weaker families from nearby towns. Along with that a large temple of *Sachchidananda* Shiva[15] is located at the center of complex. A property and trust record of institute shows Vasudev Kanitkar was one of the trustees of the center. Stone and iron building built is one of the fine works in the vicinity and credit was solely given to Vasudev Kanitkar.[16] He was

[13] http://www.punenagarvachan.org/; Dixit M. S., *Pune Nagar Vachan Mandir Didshe Varshancha Itihas 1848-1998*, (Pune, Pune Nagar Vachan Mandir Prakashan, 1998), 23,24; Shrigondekar G. N., *Pune Nagar Vachan Mandir Shambhar Varshancha Itihas 1848-1948*, (Pune, Sadashiv Keshav Nerugaonkar, nagar vachan mandir, 1949), 40,41; Mumbai, Elphinston college, Maharashtra State archives, *PWD General*, 1868-89 *Vol. 563;* Mumbai, Elphinston college, Maharashtra state archive, *Bombay public works proceedings imperial and local 1886*,135; PWD General Vol. 563, 1868-89, Elphinston college, Maharashtra State archives Mumbai; Correspondence mentioned in appendix 12,13,14 supports the details of expenditure and comments on sanctioning process of the building.

[14] As per synopsis of activities briefly mentioned by institute, "Anandashram *Sanstha*" founded in the year 1888 by late Mahadev Chimanaji Apte was advocate of Bombay High court. Institute has great collection of manuscripts and books related to Sanskrit and Indology to support researchers in world.

[15] Shiva is one of the important deities worshipped in India. *Sachchidanda* means total bliss.

[16] Schedule "A" in will by Mahadev Chimnaji Apte, , Schedule "B" written in 1891, page no. 7, 11.

involved in designing and execution of the project. Overall plan follows introvert planning. Which include typical Wada plan with central courtyard followed as a model for design. The Architectural details are Indo-western in at several levels. Construction materials such as Iron, lime concrete, colored glass, imported Minton tiles and local stone are wonderfully amalgamated in the composition. Exclusive woodwork in front façade and on temple reminds indigenous floral forms worked out by local craftsmen. Spiral staircase built in stone and finished with Marble tiles is exactly the same as one built in Reay market in wood. External façade of the whole institute resembles a Wada or royal mansion in Pune, whereas temple built in rectangular form with central nave and aisle on both sides. Minton tiles and glass windows remind old colonial structure in Bombay. Wooden arches at the joining point of columns and ceiling follows *Mahirap*/ Maratha Style cusped arch form typically used in Royal mansions of Maratha ministers. Entry point to ground floor library adorned with segmental arch covered with ornamented overlooking gallery and three-arched door. On top of the sloping roof a small scale Shikhara[17] is placed as representation of temple. It is interesting to note though Vasudev Kanitkar worked on restoration works of Tulasi Baug and Kasaba Ganpati temples he has not followed same architectural language in this Shiva temple located at the center of the institute. As it was built entirely in stone, it has a very strong presence in the complex.

Two landmark structures built during the last decade of the 19th century were residence of reformist Dr. Bahndarkar[18] was known as Sangamashram[19] (1892) and Fergusson College main building (1892-1895). Unfortunately, Sangamashram doesn't exist anymore but main building of Fergusson college still stands out in the whole campus. Both these buildings were built in local basalt rock are admired for there workmanship and character. Vasudev Kanitkar being good friend of Dr. Bhandarkar designed and built his own house in Pune at a confluence of two rivers. Perhaps Sangamashram described as one of the best amalgamation of western and oriental style in spatial arrangement by Kamalini Damale and Sulabha Panandikar in their books.[20] Various references and descriptions given by Sulabha Panandikar shows that the house was built for joint family so all arrangements and sizes of rooms such as halls, common rooms were of good enough size to accommodate all family members. Though layout wasn't explained much as per its glimpses in writings some inferences are discussed further. The model that was followed was rectangular and not a typical of Wada courtyard style. Perhaps resembling to old English house, Orientalized with the use of several elements changed the pattern of design. Kitchen and toilets were detached from main house. This was generally followed in old Indian houses. Two gable ends were adorned with rose windows at top usually used in western style structure. Central part of the structure was covered with flat roof used as terrace known as *Gacchi* in local language. Simple straight planning followed in all respect. Layout was made to catch maximum southwest wind. Study room mainly used by Dr. Bhandarkar was located on the west. In addition it had semicircular arches in front façade highlighting the entry.[21] (Kanitkar, 1948) Western comfort was seen in furniture design whereas in dinning area Indian traditional seating arrangement generally on ground was used as per number of family members. Surrounding area was developed as a garden with several trees and plants. The building had a small tank as well. This house was passed on to another owner and was finally demolished due to unknown reasons. This place had great significance in terms of associational and architectural value. Enterprise of education as an effort of the Government and Indian people resulted in dawn of new education system that could be termed as formal Indo-western style perhaps reflected in architectural style.

[17] Shikhara is an ornamental pyramidal roof adorned with sculptures located on top of temples in India.

[18] Bhandarkar: Dr. Sir Ramkrishna Gopal Bhandarkar welknown in late 19th century for his research work on Indian history and his extensive contributions in freedom movement in terms of literature, lectures he conducted in several Indian communities.

[19] Name "Sangamasham" residence of Dr. Bhandarkar suggests its picturesque location of site near the confluence of two rivers in Pune. *Sangam* is confluence and *Ashram* is a secluded building generally used as religious retreat or instruction in Hinduism.

[20] Damale Kamalini, *Shrimati Ahilyabai Bhandarkar Smriti Grantha*, (Pune, Shrimati Ahilyabai Bhandarkar Smarak Granth Prakashan Samiti Wadia College, 1966); Panandikar Sulabha, Vyakti Titkya Prakruti, (Pune, A.V. Gruha Prakashan, 1958).

[21] Kanitkar Shankar Ramchandra, *Kanitkar Kul Vrittant,/* Tidings of Kanitkar family…cit. 146; Panandikar Sulabha, *Vyakti Titkya Prakruti*/ One of the Marathi phrase referring each one his own, (Pune A.V. Griha Puublications, 1958), 199-208; http://www.fergusson.edu/upload/document/77939__History.pdf; Damale Kamalini, *Shrimati Ahilyabai Bhandarkar Smriti Grantha*, (Pune, Shrimati Ahilyabai Bhandarkar Smarak Granth Prakashan Samiti Wadia College, 1966), 6 this book particularly written as a biography of Ahilyabai Bhandarkar. She was grad daughter of Dr. Bhandarkar; Karnataki Shreenivas, *Guruvarya doctor Sir Ramkrushna Gopal Bhandarkar yanche Charitra*, (Pune, S.N. Karnataki, 1972), 67.

Figure 7 View of Fergusson College, Pune Ref: Author

Education policies initiated by British Government in India and focus was upon creating more workforces to support empowerment of colonial empire. But eventually it appeared that educational empowerment helped in increased number of reformists who fought in the freedom movement in various ways. Pune was the education hub during the 19th century. Wood's Educational Dispatch (1854)[22], the Educational Commission of 1882 and the Hunter Commission (1891) were suggestive of collective efforts of British Government and locals as enterprise of education. Several names of reformists such as Mahatma Phule, Maharshi Karve, B.G. Tilak, G.G. Agarkar and so on were associated in educational reforms focusing on philosophy of education for all despite of cast, class and gender of communities. One of the very important examples of those was Deccan Educational Society established by Vishnushastri Chiplunkar, Lokmanya Bal Gangadhar Tilak, Gopal Ganesh Agarkar, Mahadev Ballal Namjoshi, and Vaman Shivram Apte in 1880. In the year 1891 land of 37 acres was acquired at outskirts of old town on lease. Foundation stone was laid in the year 1892 was named after the then governor of Bombay James Fergusson (1880-1885). He donated Rs 1200/- for the construction of main building.[23] Fergusson College (**Fig. 7)** was one of earliest institute in Pune that was run in collaboration with Government and locals. Vasudev Kanitkar carried out design and execution of the main building.

Similar to other contemporary institutional models in India simple form of "C" shape was adapted. Porch is projected little out highlighted as entrance gateway. Semicircular arches are used throughout the structure. Rose windows are used on ground and first floor highlighted with lime plasterwork. Segmental arches are used at entrance porch. Unfortunately, as like the other structures designed by Vasudev Kanitkar original handmade drawings are not available for further research. But one of the finest works in institutional typology that is fortunately preserved well by the management of institution in good condition. English tracery is used for window

[22] Wood's Educational Dispatch (1854) speaks about right to education for all and discourse on inculcating western knowledge in "Natives". This was in order to create a class of civil servants for empire. Charles Wood was the President of the Board of Control of the East India Company.

[23] http://www.fergusson.edu/upload/document/77939__History.pdf; Sundaram M.S., "A Century of British Education in India 1857-1957", *Journal of the Royal Society of Arts*, Vol.107, No.5035, (June 1959), 491-507, Stable URL: http://www.jstor.org/stable/41368746. Author in his article mentions "There was a network of autonomous, self –supporting decentralized school system all over the land. The village priest and the village craftsmen played the role of teachers in addition to their religious and occupational pursuits." This explains the state of indigenous education system at the beginning of 19th century. Educational Commission of 1882 and the Hunter Commission (1891) gave emphasis on primary secondary education of masses in India. Wiliam Wilson Hunter was one of the members of the Indian Civil Service well known as statistician, later he was Vice President of Royal Asiatic Society.

details and façade treatment. Decorative wrought Iron and wooden railing are used for upper floors adorning the elevation. Decorative elements such as windows arches and overall composition in elevation are very similar to the Reay market building.

5. Conclusions

Despite of not being architect or engineer Vasudev Kanitkar worked on landmark structures those represented urban public spaces in Bombay and Pune. While looking at the typology of projects built by Vasudev Kanitkar mainly he has contributed in public oriented projects working in association with the government and local philanthropists. Reay market in Pune being a first of its kind stands out in whole series of his works, which marked its presence predominantly in old town of Pune that later triggered further extension of town towards south. Its design and actual construction on ground was a great collaborative effort of R.E.[24] Walter Ducat and Vasudev Kanitkar. This structure has importance in the context of urban landscape of Pune, as it changed the skyline and brought covered market as an important typology for citizens in the context.

Looking at the graph of all architectural landmarks built by Vasudev Kanitkar it is clearly observed that he had practiced with western models modifying it in local context of important Indian towns under Bombay presidency. Bombay is considered as starting point of Neo-Gothic style as well as Indo-Saracenic style Architecture. Similar style, features and detailing were carry forwarded and modified by him while constructing in the case Pune that was then Monsoon capital under Bombay presidency. Perhaps in his designs in Pune to mention few as Reay market, Fergusson College, followed extensively Bombay Gothic models. Architectural elements, material and techniques, Anandashram widely shows his proficiency in rigorous workmanship. He might have borrowed elements such as prominent central tower with dormer windows, finials at top and use of polychromatic scheme from High court and Secretariat for the model of Reay Market built in Pune. Both of these examples mark their significance metaphorically as supremacy of sovereign. Being purely colonial structure built at the heart of the old town Reay Market followed similar language of prominence.[25]

Names of Walter Ducat and Vasudev Kanitkar mentioned in Bombay University Calendar[26] under the list of faculty of civil engineering in the year 1868 and 1874 simultaneously. Unfortunate demised of both Walter Ducat (1902) and Vasudev Kanitkar (1905) occurred during the same decade. Ascending graphs of the works of both are noteworthy in the Bombay Presidency those are important cultural heritage sites in the context. It is worth noticing that that Vasudev Kanitkar was well associated with Colonial ruling agents as well as local philanthropists and reformists that progressed in executing pioneering projects in a very conservative historic core of Pune. Precise knowledge of construction and extensive experience of local materials and craft helped him in quite successful execution of projects during late 19th century. Scant original resources and correspondence between the designer and Vasudev Kanitkar are missing links in understanding many of the architectural development accomplished by him. All these important landmarks still retain their character and tells the story of this very noteworthy self learnt, experienced, dedicating designer and engineer in the Indian context.

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Conflict of Interests

The authors declare no conflict of interest.

[24] R.E. refers to royal engineers

[25] Kanitkar Shankar Ramchandra, *Kanitkar Kul Vrittant (Pune, 915/1 Shivajinagar Vitthal Hari Barve, Aaryabhushan Mudranalay, 1948),* 146; Mehrotra Rahul and Dwivedi Sharada, *The Bombay Highcourt The story of the building 1878-2003*, (Bombay, Eminence Designs Pvt. Ltd., 2004), 39.

[26] The Bombay University Calendar for the year 1874-75, (Bombay, Thacker Vining & co., 1874)

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Rethinking Heritage Site of Pateshwar in Today's Context

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Abstract

Pateshwar is a unique and significant heritage site located near Satara city in Maharashtra. The site o ers an incredible visual experience to visitors. The secluded location of the site contributes to the mystic character to the site and it leaves the audience in a sense of awe, respect, and intrigue. It is therefore necessary to explore the secrets of Pateshwar with scientific inquiry by the experts of various disciplines. The history of the site goes back approximately by eight centuries in the past. The research paper tries to identify, understand and document diverse typology of architectural elements and remains on site. Research is compiled with the help of primary and secondary surveys. Using photographic documentation, GIS mapping, and interviews of locals help to ascertain di erent architectural layers of history in this unique heritage site.

Discussion underlines the importance of the small but unique site of Pateshwar in the context of the Satara region's multifaceted cultural identity. The previous researches conducted for the site provide anecdotal informal and description of some iconographic details. The site needs to be studied and analyzed beyond its mysterious character and few iconographic depictions. The paper tries to document its significance from heritage point of view.

This unique heritage site is undergoing many threats that it is essential to look at the site from a conservation management point of view. It is imperative to rethink this heritage site as a potential place to develop sensitive heritage tourism and open it for further research. Paper tries to identify issues related to the site and discusses what might serve as future guidelines for the site. This study can be a first step towards bringing Pateshwar under heritage listing and seeking to secure its protection in collaboration with the locals.

Keywords:Heritage; Conservation management; Religious Typology; Restoration; Cultural tourism

1. Introduction

It is quintessential to address at the beginning, what is meant by a "heritage" site. To understand its literal meaning, heritage site is a site displaying the history and culture of the place with its tangible and intangible attributes. While defining it in the Indian context we have more elements to define heritage with its history, art, culture, architecture, and oral traditions. In addition to the physical attributes, any heritage site has to be looked at from its cultural context in Indian cases. Heritage site of Pateshwar can thus be appreciated as heritage in its cultural context. As mentioned in Nara Document "Cultural Heritage is understood to include monuments, groups of buildings and sites of cultural value as defined in article one of the World Heritage Convention". (Nara document, 1994) From a broader perspective understanding the term beyond built it is articulated well in this statement "The cultural heritage may be defined as the entire corpus of material signs - either artistic or symbolic - handed on by the past to each culture and, therefore, to the whole of humankind." Living heritage comprises heritage sites that have continued in use and are changing due to current use that needs extra protection and a scientific approach to care holistically in our fast-running world. The term 'cultural property' includes not only the established and scheduled architectural, archaeological and historic sites and structures, but also the unscheduled or unclassified vestiges of the past as well as artistically or historically important recent sites and structures. (Jokilehto, 2005) Despite its long history and artistic excellence, the Pateshwar temple is a place where history goes many centuries back and reflects the peak of cultural representations that have not been listed and protected yet from a preservation point of view.

Figure 1: Location of Pateshwar in the context of Satara

Figure 2: Shivlinga in Varhad Ghar

In the context of Satara, Pateshwar cannot be considered in isolation but has to be considered as part of the cultural landscape in relation with other heritage sites. The history of the Satara district and its geographic context needs to be deliberated while talking about a site having historic significance such as Pateshwar. Historical references show that the history of Satara region goes back to the 2nd century BCE (Gazetteer, 2021). Currently, Satara is well known due to its UNESCO world heritage status for its outstanding natural heritage that includes Kas Plateau famous for its endemic species and abundant diversity of flora at one place. Kas is part of the Sahyadri ranges and Deccan Plateau, the oldest ranges formed in India that is known for its rich biodiversity. (https://whc.unesco.org/en/list/1342/)

Geographically, Satara district is situated in the Krishna and Bhima rivers basin surrounded by the dense forest of Koynanagar and Javali on the western side whereas the dry region of Khatav and Maan Taluka on the East. There are certainly many tourist attractions around Satara such as Panchgani, Mahabaleshwar, Vai, Chalakewadi, Thoseghar, Pratapgad, Vasota, Bamnoli, and the Sahyadri Tiger reserve (at Koynannagar and Chandoli) well known for its natural beauty. Bird sanctuary at Mayani witnesses migrating birds coming from many parts of the world. Apart from heritage sites knone for their historical & cultural importance such as Pratapgad, Gondavale, Shikharshinganapur, Aundh princely state with Yamai temple and Chaphal, Sajjangad are foremost pilgrimage sites. (Rajashri, 2013)Satara city itself has many tourist attractions, being surrounded by Sahyadri ranges on the west just as opening hands with its high peak of Yavateshwar on the west and Ajinkyatara fort on the southwest. Char Bhinti[1] is a walkable hill for all localities and Shiva temples such as Yavateshwar, Jarandeshwar is well known in city limits. But the secluded location of the Pateshwar site has been away from public eye and researchers' scrutiny in spite of a wealth of unique style of art and architecture, still awaiting true appreciation and concern. (Figure 1 and 2) Though various cultural references and scattered evidence have hinted at Pateshwar being a unique site with connections to di erent sects, it has never been explored much. It has been termed as a site Associated with black magic, but has never been given importance as an imperative landmark point in the history of Satara's architecture and art tradition. Pateshwar can be studied from a living heritage point of view as it's still in use; tourists visit the site frequently throughout the year, too. It retains its long-lasting impression upon every visitor with its natural setup, iconographic and

architectural manifestations.

Figure 3:Pateshwar Temple complex

Monuments having a history of more than 100 years can be designated as a monument of state or national level importance as per "Ancient Monuments and Archaeological Sites and Remains Act,1958" by the Archaeological Survey of India. The antiquity and archaeological importance of the site has not recognized by ASI, state Archeology department or as part of heritage listing done by INTACH for Satara. In addition, there is a long formal process for recognizing the site for protection and inclusion in heritage listing of the region. Systematic study and documentation for the site had not been undertaken yet. INTACH and heritage lists cover heritage structures that are within municipal limits. Pateshwar being 16 KM away from Satara town it's not yet documented under the Heritage list compiled by Heritage Conservation Committee of Satara. It is unfortunate that the site with history of around 800 years is presently under severe threats due to lack of systematic studies, conservation measures, ownership issues, lack of facilities and general neglect at the location.

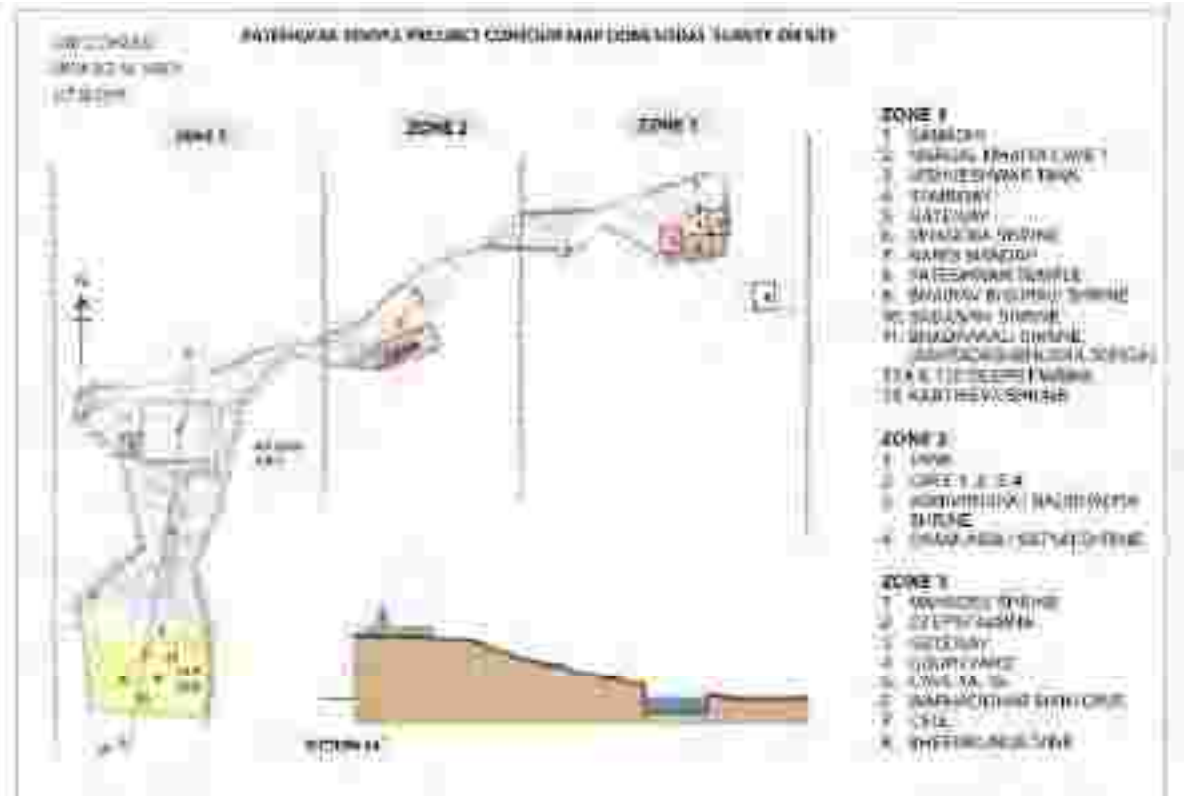
1

As mentioned in INTACH guidelines three important attributes decide if property is worth listing as a heritage site and those are Historic significance, Historic Integrity and Historic context. (INTACH, 2021) Further discourse talks about these three aspects in detail and proceeds with establishing the importance of the site with the help of documentation conducted on the field. Accordingly, field visits were conducted to carry out thorough documentation at the sites which includes, site topographical survey, measured drawings of the monuments including various views, photographic documentation of art and architectural aspects and interviews with locals. With this background, research has also been carried out utilizing secondary sources available as gazetteers, books, and published newspaper articles.

The research paper tries to mark the significance of the Pateshwar site from a cultural heritage point of view. (Figure 3) In addition, it wishes to highlight the compelling need to relook and evaluate the site as a potential heritage site in today's context. This study is undertaken with the help of primary & secondary resources and observations are documented in the form of photographic documentation as well as measured drawing is prepared to document the site. This discourse would help open new avenues to look at the site as a potential living cultural heritage site in the context of Satara. This discussion emphasizes the need for regional or district-level heritage mapping and listing that should be prepared for the entire Satara district.

1.1 Historic Significance

As per local legends, the name Pateshwar perhaps could have been derived from one of the sculptures having Shivalinga[2] placed on back of Nandi[3] present at the site. Nandi, mount of Shiva with Shivling rested on its back is evident from few places such as Naikba in Satara district, Ramalinga hill near Alate village in the district of Sagali, Amarkantak, and Ujjain. "Pat" refers to the back or platform whereas "Ishwar" refers to Shiva. In a way, this explains the site having shivalinga on its back. (Sontakke, 2018). Though this explanation could not be confimed, the unique sculpture of Nandi is iconic and underlines Shaiva association of the site. Presence of exceptionally high number of Shivlingas is important paramenter to recognise the heritage value of Pateshwar. Based on iconographical analysis of sculptures and architectural elements, three prominent historic layers are evident on site belonging to 12th century, 15-16th century and 18th century. Location of Rock cut caves and sculptures on top of the hill facing north are significant. The caves which are curiously known as Warhadghar / Warhad Ghar due to presence of large number of human sculptures, form the very first layer of human intervention on-site. They are located at the peaceful corner of the hill facing north direction allowing



di use light to enter inside caves. (Figure 4)

Figure 4:Key plan for di erent zones at Pateshwar including temple complex and 2 caves

2

3

As per the guidelines set by INTACH, historical significance refers to the history, architecture, and archaeology of a particular site. Nonetheless, there are certainly many aspect been examined so far, out of those three significant ones need to be seen in details in the case of Pateshwar. One is association with events, activities, or patterns. Being a living heritage site Pateshwar still retains its importance as a pilgrimage site visited by several people primarily during festival of Mahashivratri and the holy season of Shravan during monsoon. In addition, the place represents architectural and iconographic artifacts dating back to the 12th century CE. The Temple complex was restored and rebuilt during the 18th century by Angal family. They are the philanthropists contributed in many sites in and around Satara.

As we look at the third factor, which is distinctive physical characteristics of design, construction, or form, representing the work of a master craftsperson site could be segregated into three zones. The oldest zone is belongs to the 12th century CE is prominently seen at Varhadghar. A cave complex, the courtyard at the center full of unveiled mysteries about iconographic exhibits on the floor, walls, and every corner of the complex. Among all depictions, the most prominent of all is two Kundalini demarcating associations of the site with Shaiva-Shakta traditions. The cave on the south and west has many Shivlinga carved in di erent shapes and sizes. The symbolism of all these Shivlingas needs further exploration in the future. Indeed, every panel on walls and nitches in caves is a piece of art and master craftsmanship. The front wall to the cave is a later addition that may be easily identified by its distinctive masonry construction style. Caves' having a flat roof on top is another element of surprise that denotes it has undergone partial restoration and rebuilt that belong to the later period.

Second zone belongs with 12th century CE and 18th century CE with prominent Agnivrisha temple and surrounding caves with front exterior walls. These caves consist of number of Shivlinga and panels kept loosely besides walls. These could have been displaced from other parts of the site. Agnivrisha sculpture itself is unique composite having front view as a human and lateral body of a bull. This is unique at the place not seen anywhere at other heritage sites around Satara. Natural stone available on site is used as dry masonry, which dates back to 15th-16th century.

Zone three is later addition from 18th century restored and added by Narayan Parshuram Angal, noble philantropist during Peshwa period had contributed to many construction activities during the period. This zone known as Pateshwar temple complex. 18th century construction represents Panchaytana planning with small shrines around main Shiva temple and two Deepmala[4]. A Temple style is a masterpiece in Maratha style of temple architecture. Shikhara having storeys and aedicule resembling to surface decoration utilizing Islamic construction style. (Sohoni, 1998) (Mate, 2008)

Many of the artifacts, sculptures are relocated in the complex and spread across the site. The access stairway itself is a transitional space with niches and pause points excavated through the slope of hill with surrounding tree roots at eye level that is an excellent journey to the temple. It is a most respectful response to the site conditions and natural setup around. This transitional stairway takes visitor to another level at the end and opens up with surprising open court of Pateshwar temple complex. Many finer aspects of history are still veiled and need more exploration.

1.2 Historic Integrity

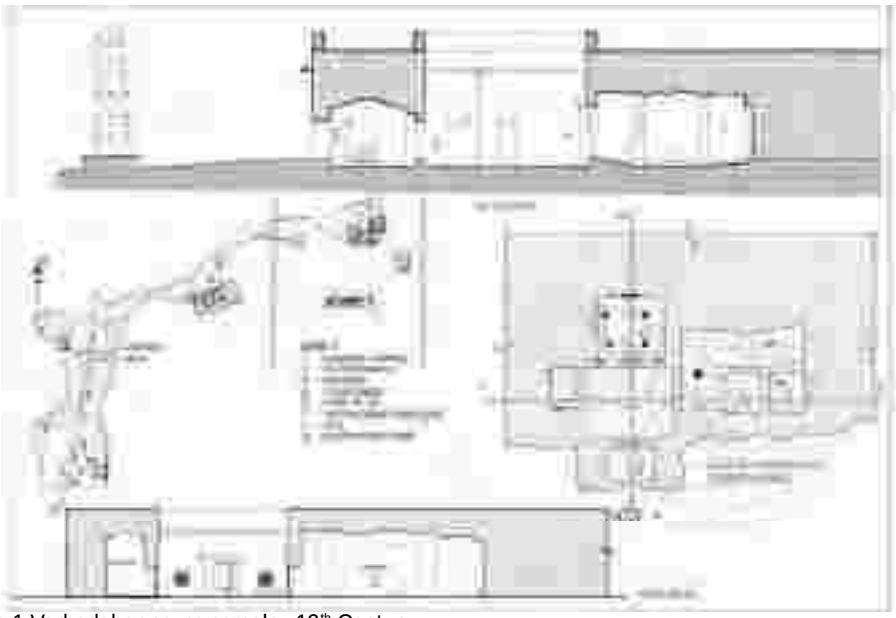


Figure 5: Zone 1 Varhadghar caves complex 12th Century

4 Deepmala literally means light poles usually observed in temple complexes.

Historic integrity perceived as original identity retained as it is and understanding of cultural associations of the site in today's context. Mahashivratri and Shravani Somvar[5] are the most occupied days in the entire year. Thousands of pilgrims and tourists visit the site on both occasions. Being in the remote natural setup and significant living heritage site there are a number of tourists who visit the place during monsoon and other seasons as well. The site is home to many endemic species of Western Ghats. Species such as Ipomoea ochracea and blue algae (Lyngbya cryptovaginata, L. chaetomorphae, L subtilis and Microcoleus paludosus), crucial foraquatic habitats have been reported from Pateshwar hills.

Despite historical additions and building restoration activities, the site retains its character and shows so many layers from history. Site has strong cultural associations and traditions still followed at Zone 1 and Zone 3. Following are the typologies observed on site, which are considerably important tools of history.

At zone 1 Caves complex with an open courtyard with unique iconographic representations, Deepmaal, numerous Shivlingas with various typologies, inscriptions on wall panels are documented. (Figure 5)

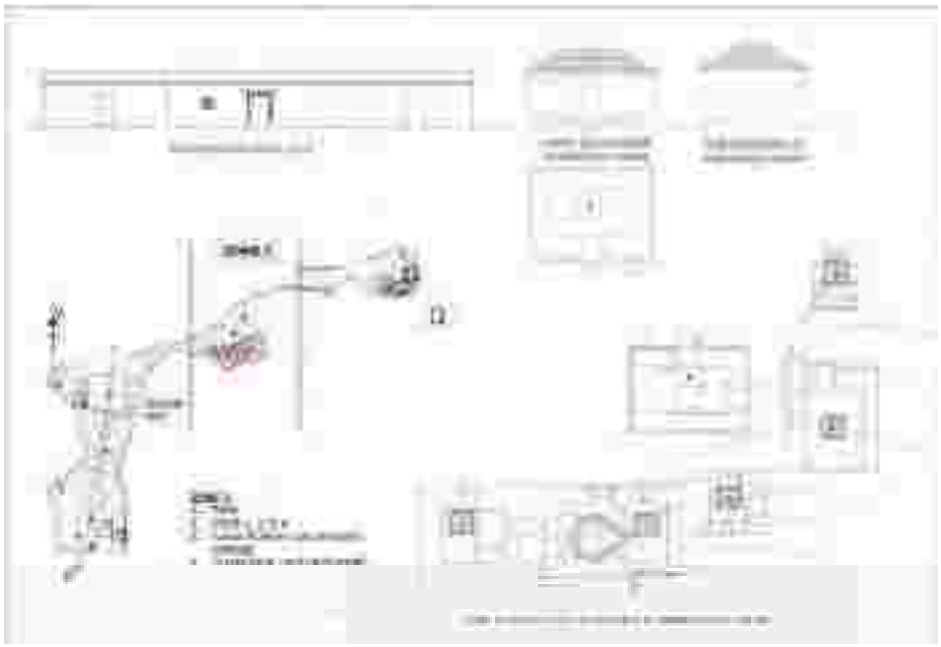


Figure 6: Zone 2 Agnivrusha Caves and Temple complex 14-15th Century

Whereas Zone 2 has four caves and two independent shrines with sculptures of Agnivrusha, goddess Chamunda and Satvai(Figure 6)

Figure 7: Zone 3 Pateshwar Temple Complex 17th -18th century

5 Shravani Somvar are considered as holy days during Monsoon season known for worshiping Shiva.

Figure 8 : Zone 2 Idol of Bhadrakali with Eighteen hands

Figure 9 : Zone 2 Idol of Agnivrudha

Zone 3 has Maratha style of Panchayatana Temple with scattered sculptures incorporated at di erent shrines and nitches in walls. Temple complex is surrounded with high fortification wall. Access stairway to hill top binds the presincts together. (Figure 7)

Along with the architectural and sculptural interventions, iconographic representations are unique at site. To mention a few are Kundalini sculptures in Zone 3 and Bhadrakali, Agnivrisha in Zone 2. (Figure 8 and 9) Number of water bodies of various size are seen. These are distributed at di erent zones with indoor and outdoor water bodies used for various utilities. Outdoor water bodies are mostly used for utility purposes whereas indoor small water bodies are meant for ritual purpose. Vishweshwar tank at Zone 3 is the biggest amongst all with idols placed in niches along its side walls. Site is full of indigenous trees and plants endemic to the place retaining its biodiversity and ecosystem.

1.3 Historic context

Temple complex was built and restored by the then minister of Peshwas, Angal, well known in the region. Angal had contributed in constructing many temples around Satara such as Kashi Vishweshwar temple at Mahuli and Krishnamai temple at Mahabaleshwar. This patronage seems important in the context of who has contributed to temple construction activity in the region. Pateshwar Temple is one of this range.

History of the site goes back to the 12th century CE. Shaiva and Shakta iconographic traditions are prominently seen at the site, especially in Zone 1. Caves in Zone 2 and the temple in Zone 1 consist of some sculptures showing its connections with Nath tradition. Similar traditions could be observed at Panhalekaji near Dapoli and Agashiv caves near Karad. (Barge, 2003) (Phadake, 2015) Natural setup and connecting threads of ancient trade routes is the key element in understanding the history and context of the site. This place is a midway stop between Shirval caves and Agashiv caves near Karad.

2. Heritage site under turmoil

Despite having such a significant historic context, the site is under major threat not being listed and protected under any heritage listing at city and regional level. The fourth layer on site has been occupied by a Ashram built around 60 years back. This new construction and devotees from Ashram has occupied a major part of the site with its very out of context architectural interventions. Site needs major care in terms of consolidation and restoration. Considering its living heritage character and being a pilgrimage site there is a strong need for a conservation management plan.

Looking at all three zones, the independent structure is in dilapidated condition. Many sculptures and carvings are in ruin and need immediate consolidation measures to be implemented. As mentioned by ICCROM guidelines 'prevention of risks', 'risk coverage' refers to movable cultural properties from a site which is very much at risk at Pateshwar. Sensitive approach towards cultural tourism and awareness among all visitors and pilgrims is much needed at the moment.

3. Conclusion

Site indeed has extraordinary potential to be studied from various perspectives by establishing its context and its connections with Shaiva, Shakta, Vaishnavaite traditions and Nath sect. Site is an important magnet to relook from a cultural tourism point of view. Local awareness and dissemination of scientific information among visitors is much needed. As per INTACH guidelines, the site needs to be listed as a significant heritage site in the context of Satara. Another aspect of study could be iconographic craft traditions and the unique sculptures at the site. Architectural language, which developed over a thousand years, shows a variety of layers and traditions influenced upon it. There is the possibility and multiple probabilities to unveil this site from various points of view.

Acknowledgements

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Nature and Conflict: Case of Tilari Bio Region

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Abstract

Tilari region is well-known for its rich biodiversity that is part of Western Ghats1 listed under UNESCO natural heritage category. Unique geographic and natural setup of the Tilari region, imparts significance to its context. Tilari river originates in Tudai Chandgad in Kolhapur district where its known as Tilotama. It flows towards the west and flourishes the entire region near Kudase and meets the Arabian sea at the end. Exclusive biodiversity of Tilari region, number of endemic, endangered species, rich flora and fauna marks its uniqueness in Western Ghats. This paper discusses the unique natural setup of Tilari, its rich ecology and touches upon some aspects of settlements around the river.

Data is collected with the help of actual field visits, photographic documentation, primary, secondary data and random interviews conducted during visits. Research discourse mainly focuses upon overview of coexistence of man and nature in Tilari bioregion and transition through the shared landscape currently going through. Major deforestation for commercial reasons has destroyed ecological balance to a large extent. Human intervention in the migrating corridors of the native animals and destruction of local flora and fauna resulting in the conflicts between man and nature. Region is under major threat due to issues related to human interventions in terms of its ecological setup, geology, hydrology and at the extreme end mining what is hampering the area extensively. Study attempts to unveil the rich context of the Tilari region currently under threat due to several uncontrolled elements around the region and undesirable policies by the authorities. Research concludes with the brief about holistic approach towards sustainable landscape management plan considering the people's participation in natural conservation to retain its identity in rapid commercialization and urbanization in the region.

Keywords Bioregion; Ecology; Private forest; Deforestation; Shared landscape; Coexistence of man and nature

1. Introduction

As said by world-famous natural historian David Attenborough "Ever since we arrived on this planet as a species, we've cut them down, dug them up, burnt them and poisoned them. Today we're doing so on a greater scale than ever." (Attenborough, 2018) We are looking back to nature to learn from it. Many scholars, researchers have discussed a lot about our natural resources and their importance in today's fast-paced life. Term nature comprises the idea of ecology around us that includes flora, fauna, climate, and ecological setup around us. Whereas conflict mainly focuses upon friction between nature and human intervention.

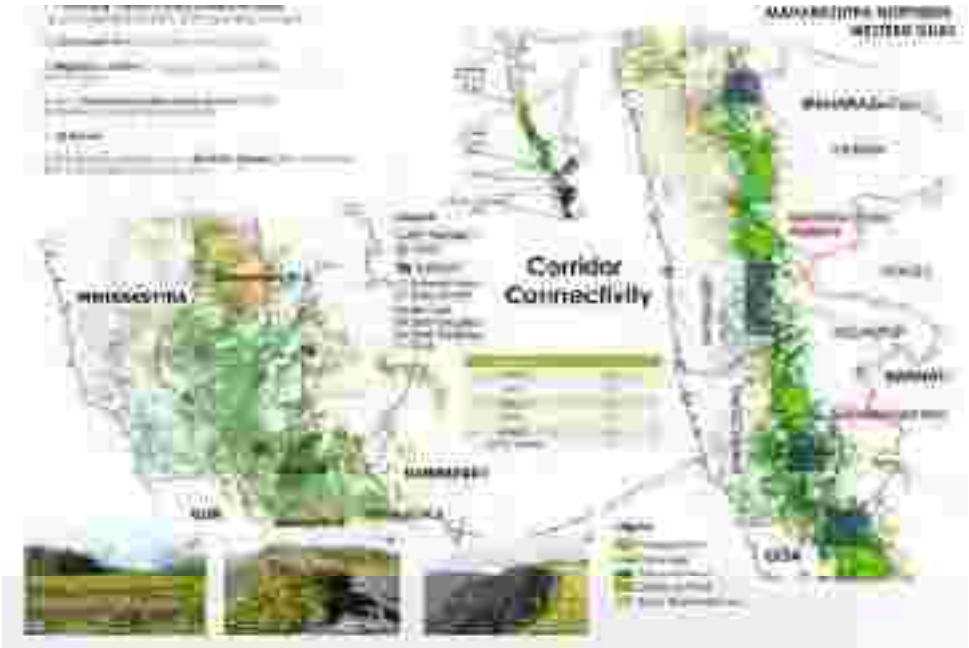

Figure 1: Maps and images establishing the context of the region Source: Images by Author and Mapping based upon existing geographic map Maharashtra Forest department

1 Ghat in this case is a mountain pass region connecting Deccan platue to the west coast in India.

A bioregion refers to the geographic and natural ecological region. The unique geographic setting of the Tilari region, its natural heritage that is well known for its rich biodiversity, imparts significance to the context. (Figure 1) Its response to geography, climate, natural setup, and rich ecology is essential to document and talk about in current rapid modernization processes. Exclusive biodiversity, endemic, endangered species, rich flora, and fauna marks its uniqueness in the Western Ghats. The state of Maharashtra has 62 conservation reserves, of which 13 are in the Western Ghats. Tilari is one of those forest reserves in the Western Ghats. Western Ghat is a geographic part of India around 1600 KM stretching from Gujarat to Kanyakumari. Western Ghat is a Unesco world heritage site considered as a biodiversity hotspot. There are 25 biodiversity hotspots globally identified and Western Ghats is one of those. The region is known for its high levels of biodiversity and endemism. It's important to note that eleven percent of the more than 330 species of butterflies in the Western Ghats are endemic. Whereas 40% of the 4000 species of flowering plants are endemic to the region. (Figure 2,3) Large variety of flowering plants around 200 species is found in the region. (Ranjit Daniels, 2018)

Figure 2: Study of Soil Source: Mapping based upon existing geographic map done by Author

Figure 3: Study of Vegetation and Hydrology Source: Mrac.in

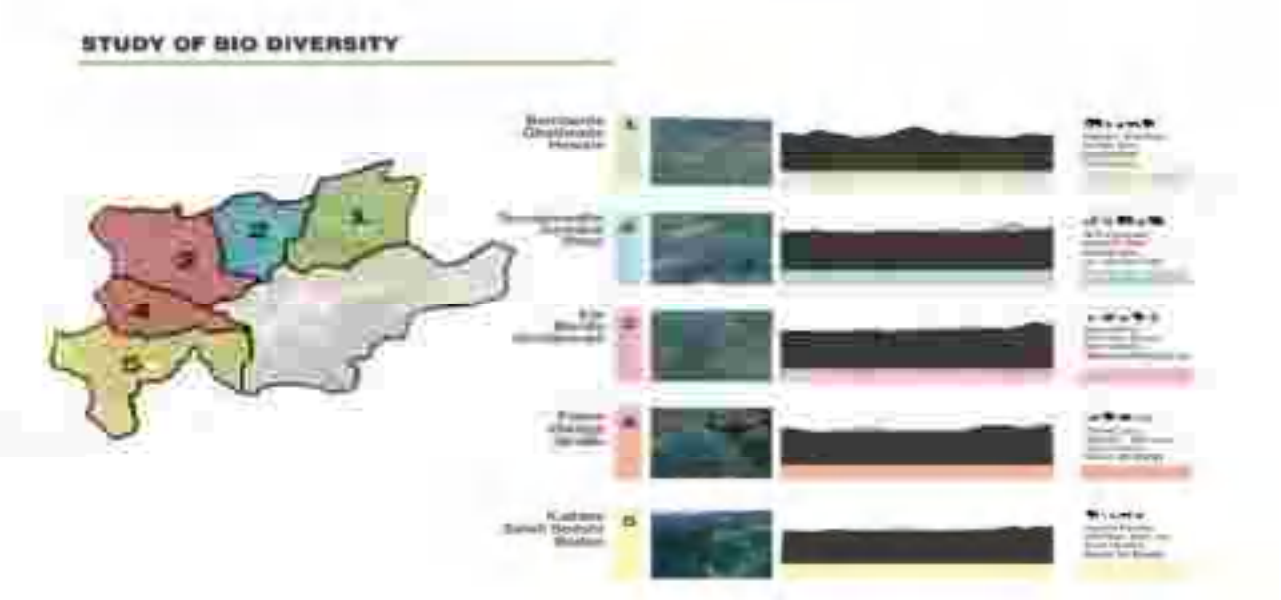

Figure 4: Study of Biodiversity Source: base map Mrac.in mapping and images sectional elevations by author

Tilari acts as a major connection between three forest areas Radhanagari in Maharashtra, Mhadei in Goa and Bhimgadh wildlife sanctuary in Karnataka. Without the existence of Tilari reserve other forests would not survive. It's a connecting corridor between these three regions. Dodamarg Taluka is in the Sindhudurg district sharing boundaries with Goa and Karnataka. The study further talks about the Tilari bioregion undergoing a transition due to human intervention into its surrounding natural setup. Overall population in the region is about 60,000 and the forest area is about 30 SQ KM conserved area and about the same is the private forest land. (Panandiker, 2015)

Discussion revolves around five selected zones with three villages per zone around the Tilari conservation reserve. Zones 1,2,3 having moist deciduous forests where varied species of flora are found. Prominent trees are tectona grandis, terminalia elliptica, terminalia arjuna, macaranga peltata which is an indication of dense moist deciduous forest. Here maximum mammal population is usually observed. Whereas zones 4 and 5 have a more dry deciduous forest with huge bird diversity. Trees such as careya arborea, bauhinia racemosa butea monosperma and syzygiun cordatum popularly known as Jambhul in native language are indicating local character of flora. All zones are divided into maximum, medium, and minimum a ected areas.

These zones include the following villages

Zone 1 Hewale, Bambarde, Ghatiwade
Zone 2 Sonawal, Palye, Terwanmedhe
Zone 3 Ker, Morle, Ghotgewadi
Zone 4 Parme, Ghotge, Bodan
Zone 5 Kudase, Ambeli, Bedshi

These five zones represent the specific character of the ecosystem and change in landscape. Primary questions asked in the overall discourse are what is the Tilari region? What kind of human intervention is observed in the region? (Figure 4)

The study attempts to unveil the rich context of the Tilari region and its natural setup. It is under several threats due to human interventions at many levels. Rapid urbanization and the use of modern materials certainly a ect the entire biodiversity of the region. Human intervention in the migrating corridors of the native animals and destruction of local fauna resulting in conflicts between man and nature. This discourse aims to study Tilari bioregion for the rich biodiversity of the selected area and the transition through which the region is going through. The objective is to map overall conflict zones and boundaries in the Tilari region. The study is conducted through the systematic collection of data through literature and exclusively working on the field. Primary and secondary surveys helped in gathering information in and around the Tilari region. Interviews are conducted to assimilate the information. Primarily mapping of several observations in five zones in the Tilari region is done with the help of actual site visits, referring to government records, and random interviews conducted in villages adjacent to the forest land. Interviews of communities and experts were helpful in understanding the issues in the region concerning the conflict between nature and human settlements around the region. Camera trap is not explored for this particular research but references from other similar works and spotting of wild animals in the region is noted with the help of interviews and secondary data. Discussion opens further

scope for future guidelines for landscape management in the region.

2. Unveiling Tilari Conservation Reserve

Western Ghat can be called as the green lung of southern India. The mountain ranges of the Western Ghats in southern Maharashtra shares boundaries with Goa and Karnataka. This area consists of a diversity of dense evergreen, semi-evergreen and moist deciduous forests. As per the researchers, this part is considered as a dense forest in Maharashtra which houses many of the rare species of flora and fauna. In 2020 Tilari forest has been declared as a conservation reserve. Tilari forest reserve is located in the southern part of the Sahyadri mountain ranges. Sahyadri is well-known for its biodiversity and scenic beauty. The average height of Tilari Ghat is between 800 to 1000 M from sea level (jog, 2009). Tilari comes under Dodamarg Tehsil under Sawantwadi district. Tilari is the seventh wildlife corridor in the state to be declared as a 'conservation reserve'. The total area of the Tilari region in the catchment area of Tilari River that provides water to Sawantwadi and Goa is around 29.53 Sq km. Tilari irrigation project which is a joint venture of Maharashtra and Goa completed in the year 2009. This project submerged seven villages of Maharashtra along with 200 hectares of forest land from Tilari. Tilari valley has a long history of animal habitation.

The conservation reserve area covering nine villages in the forest serves as a natural corridor and a habitat for the wildlife, importantly tigers and elephants moving between the three states of Goa, Karnataka, and Maharashtra. Tilari forest is situated between Radhanagari and Mhadei wildlife sanctuary in Goa. It connects the Mhadei sanctuary in Goa and Bhimgad in Karnataka. Radhanagari spotted occasional records of tigers whereas Tilari forest hosts a breeding tiger population. The studies of wildlife researchers have spotted seven tigers in the region. A tigress with two cubs points out the importance of the valley as a natural habitat for wildlife. Studies show tigers breeding in Tilari, Mehadei and Bhimgadh wildlife sanctuary have been marching towards north reaching up to Radhanagari wildlife sanctuary and till Sahyadri tiger reserve. The presence of tigers in Sahyadri region entirely depends upon the connectivity of Tilari to Radhanagari wildlife sanctuary. (Nawaz Jelil, 2020) The catchment area in this region has made this region a suitable habitat for wildlife. Because of forest land and flowing water Elephants are largely seen in the region. This has an excellent population of Sambar, deer, wild boar, and wild dogs. The plateau region is flourished with herbaceous flowers while the valley has riparian vegetation of grassland which feeds hundreds of Indian gawa or wild bison. Endemic species of grass are observed in the region such as hubbardia diandra. (Chandore, 2012). Begonia concanensis also known as monsoon beauty that has been observed. The elusive bird malabar trogan, hornbill and several bird species are spotted in the region. Siting of srilankan frogmouth, malayan night heron, and flame throated bulbul shows the rich biodiversity of the place. Many butterflies species are studied and exhibit the availability of a variety of flora. Along with these many species of reptiles, Snakes, amphibians, also marked their presence in the ecosystem flourished in the region. As mentioned by S.V. More in his research upon entomofauna 19 Indian species of assassin bugs under 13 genera and 7 subfamilies were recorded in Tilari forest. (More, 2017) (Chandgadkar, 2017) Currently, the region is facing high pressure of forest cutting and mining, as most of the surrounding land of the reserve forest is private forest land. (Kulkarni Jayant, 2013) Observations further discuss five zones studied at Tilari.

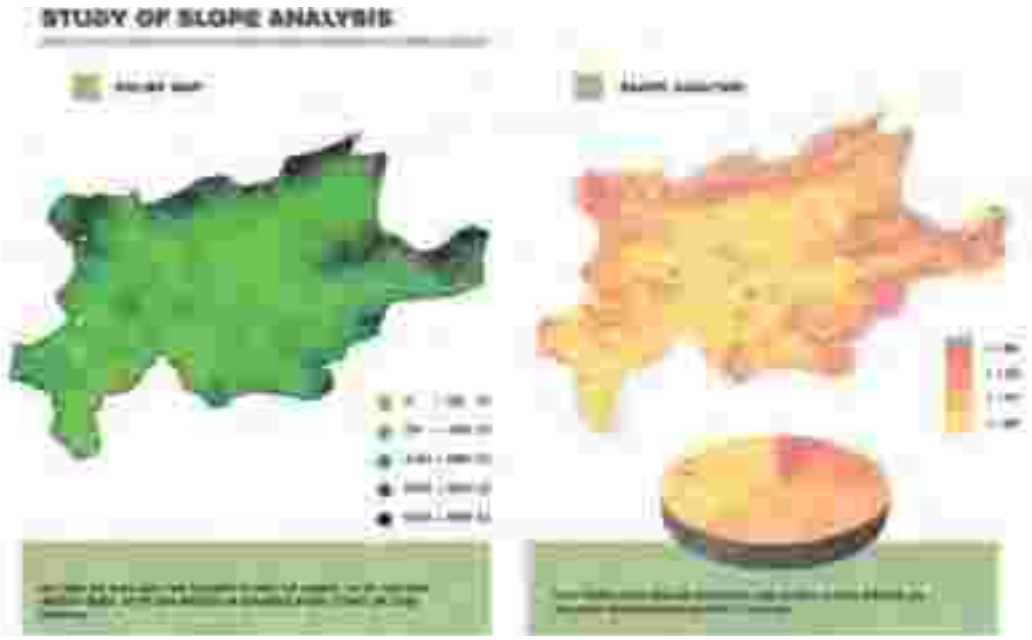

Figure 5: Study of Slope analysis Source: Mrac.in

3.Observations

Most of the area in the Tilari region is around 0 to 300 meter in elevation which acts as a water basin area. 0 to 100 acts as a watershed area. The slope analysis observed is 1:5 and 1:10 that comes approximately 30% slope. (Figure 5) According to the natural slope, we can see the patterns of streams and rivers and the upper portion of vegetation is moist deciduous forest and the lower area is dry deciduous. Alluvial soil- deposit and basalt stone is largely observed around the area. Upper Dodamarg region is an important migration corridor for elephants, tigers, and Indian gawa or wild bison whereas lower areas were observed with immense bird diversity.

3.1 Changing trends

Many people are moving towards monoculture farming of pineapple, rubber, and banana. These private farms have electric fencing around the farms for protection, which is resulting in the killing of the passing of wild animals. In the last 10 to 15 years new landowners and migrating crowds from Kerala started plantations of pineapples, banana, cashew, and rubber. In recent years elephants are entering Dodamarg taluka from Karnataka. This is the very first time after the last 8 to 9 years elephants have found habitation in Maharashtra. Tilari having a major irrigation project and large bamboo plantation in Dodamarg Taluka becoming the main habitat for the elephants. The rampant deforestation for commercial plantations like rubber, pineapple, becoming large obstacles for the elephant corridors. Each zone is undergoing distinctive problems related to farming, animal conflict, biodiversity, and so on. There are interesting viewpoints based upon the concept of shared landscapes by Rege and Punjabi where they talk about cashew plantations near forest patches becoming a habitat for some of the terrestrial mammals such as 9 out of 11 species were captured in cashew plantations adjacent to forest lands. More populations of the porcupine, wild pig, and sambar are seen in the manmade landscapes. Here benefit-sharing mechanisms enable biodiversity conservation through livelihood sustenance fostering improved coexistence. (Rege A, 2020) Concerns related to shared landscapes are important to note in Tilari context. Following are the observations at di erent zones.

Zone 1 Hewale, Bambarde, Ghatiwade

Figure 6: Zone 1 mapping by Author

Forest cutting near the slopes has increased for the last 5 to 10 years and it is critical now to make some decisions regarding the farming on the steep slope where the soil is very important. (Figure 6) Traditional farming like rice, coconut, areca nut is seen largely. Around 80% of traditional farming like rice, coconut, areca nut is observed. Along with that because of the monoculture we are losing the biodiversity of the area. This zone has a well-known myristica swamp which is the only example of a freshwater swamp in Maharashtra. It's in critical condition as the cutting has been done at the water source of the swamp. Resistance to the movement of wild animals is marked largely in the region (Girish Panjabi, 2015). This region has a large population of elephants and importantly it's a significant migration corridor for Indian gawa. Study shows that farming and restrictions of boundaries leading to man and animal conflict in this zone for the wild animals such as elephants, gawa, monkey, and sambar deer.

Zone 2 Sonawal, Palye, Terwanmedhe

Similar observations as zone 1 are marked for zone 2. Around 80% of traditional farming like rice, coconut, areca nut is observed. (Figure 7)

Figure 7: Zone 2 mapping by Author

Zone 3 Ker, Morle, Ghotgewadi (Figure 8)

Figure 8: Zone 3 mapping by Author

Facing similar issues like zone 1 and 2 in addition to that large population of locals is seen moving from traditional farming to monoculture such as pineapple, banana, rubber plantations. Contract farming is taking over a large part of the land which is leading to obstruction in the natural corridor of wild animals and birds. People are moving away from traditional farming towards cash crops. More cash crops leading to excess damage to ecological balance. Land cutting and forest cutting are seen extensively. Around 60% of traditional farming like rice, coconut, areca nut is observed.

Zone 4 Parme, Ghotge, Bodan

Similar observations like zones 1,2 and 3 are seen in terms of resistance to wild movement and farming of cash crops. More forest cutting at the watershed areas is observed. (Figure 9) This is leading to critical conditions and guidelines concerning farming on steep slopes with the water streams require more attention. Around 60% of traditional farming like rice, coconut, areca nut is observed.

Zone 5 Kudase, Ambeli, Bedshi

Forest cutting at the corridor areas of Indian gawa. These villages have flat land and a high density of birds and mammals. It's important to control deforestation on the outer edge of the Tilari conservation reserve. Indian gawa corridor, wild boar, and black panther have been spotted in this zone. 60% of traditional farming like rice, coconut, areca nut is observed. This zone has great bird diversity. Most of the man animal conflict is seen in the upper zones of 1,2,3. Deforestation is an upcoming concern for this zone. (Figure 10)

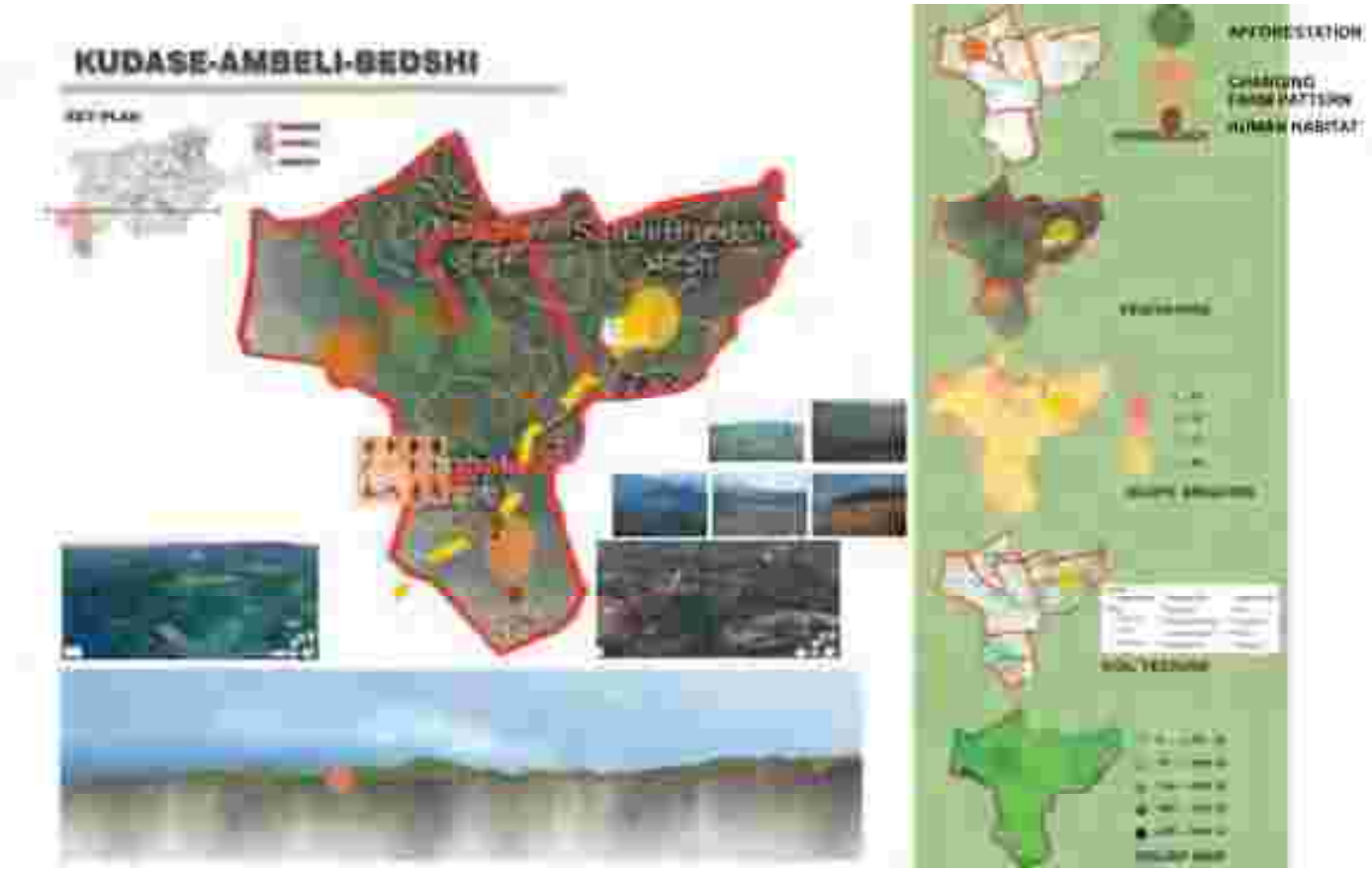

Figure 10: Zone 5 mapping by Author

Criterias	Zone 1 Hewale, Bambarde, Ghatiwade	Zone 2 Sonawal, Palye, Terwanmedhe	Zone 3 Ker, Morle, Ghotgewadi	Zone 4 Parme, Ghotge, Bodan	Zone 5 Kudase, Ambeli, Bedshi
Significant Character	Moist deciduous forests and large number of mammal population Myristica Swamp	Moist deciduous forests and large number of mammal population	Moist deciduous forests and large number of mammal population	Dry deciduous forests and wellknown for bird diversity	Dry deciduous forests and flat land and a high density of birds and mammals
Animal conflict Observed and additional ecological concenrns	Yes Wild animals such as elephants, gawa, monkey, and sambar deer are seen entering into the agricultural lands	Yes Wild animals such as elephants, gawa, monkey, and sambar deer are seen entering into the agricultural lands	Yes Contract farming obstructing the natural corridor of wild animals and birds	Yes Resistance to wild movement similar to Zones 1,2 and 3 is seen. Addition to that farming on steep slopes with the water streams requires more attention	Yes Less man animal conflict observed in this zone compared to upper Zones 1,2 and 3. Addition to this deforestation is the major concern
Traditional farming	80%	80%	60%	60%	60%

Table 01 : Tabular format for observations in all five zones done by Author

3. Conclusions

Study shows that Tilari bioregion is undergoing a major transition due to several man-made interventions. The discourse explores the significance of the Tilari region as a biodiversity hotspot and its importance as a green lung in the current situation. (Table no 01) All five zones discussed reveals the Tilari bioregion as a natural heritage. There is a serious need to look for its protection by the locals and government authorities simultaneously. Observations on the field study state that when there is man-made intervention in the natural setup there are possibilities of creation of conflict zones. Shared landscapes by man and ecosystems around are concerned areas, which need further attention in the formation of the policies and guidelines. There is a serious need to rethink guidelines for landscape management concerning maintaining ecosystems in the region. Guidelines for further landscape management plans are proposed considering zone-wise damage occurred due to human intervention. Broadly some areas come under conservation reserve and some of them have private forestlands, which are significant to manage the ecological balance in the area.

Brief management guidelines for zones 1 to 5

Cutting of forest on the slope has to be restricted and strict guidelines should be implemented for both the zones concerning deforestation and monoculture. An area with extensive cutting needs immediate soil stabilization measures. Most of the area comes under conservation reserve so the protection of forestland and strict actions for violations of norms needs to be followed. For zone 3 being a catchment area needs extra protection from excessive cutting of forest. Concerns related to watershed areas in zone 4 needs to be addressed to retain flowing water on slopes. Zone 5 is comparatively flat in its topographic conditions that have high density of birds and mammals. Concerns related to landscape connectivity raised several questions at di erent levels. Peoples' participation is the key to bring out better solutions for the region. Along with that, allotment of government incentives to the locals in the process of conserving forest areas would help in bringing locals in the process of protecting these natural corridors.

It is essential at this point when the entire world is at the thresholds of global warming and considerations for low carbon footprints are in forefront, an eco-sensitive corridor such as Tilari bioregion needs serious attention from policymakers to retain its value as a natural heritage.

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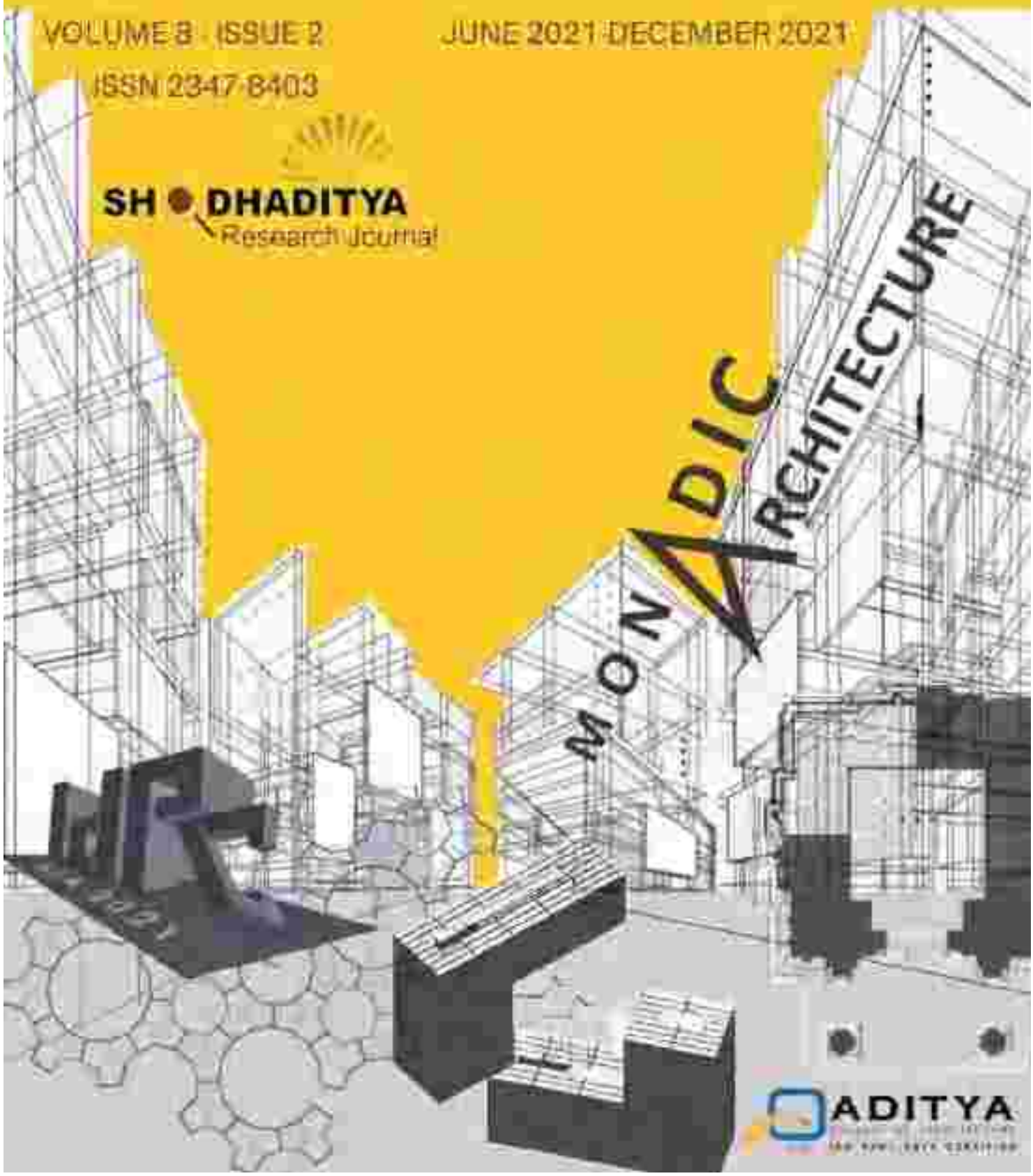

ADITYA

VISION, MISSION & QUALITY POLICY

VISION

- *To be globally recognized as an epitome of learning and innovation.*
- *Imparting multifaceted architectural education driven by social sensitivity and supported by state of the art of infrastructure.*

MISSION

- *To impart quality education that encourages students to be competent enough for best fit job roles.*
- *To provide faculty members with facilities to research, experiment and implement contemporary learning tools.*

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" We, the Management, Faculty and staff of Aditya College of Architecture are committed to offer excellence in architectural education, by pledging to our core value of Agility, Innovation, Integrity our academic environment and state of the art facilities and infrastructure to our students, thereby ensuring mutual respect and trust for them.

We will work as a team and interact with the students in pro-active manner to achieve our institutional quality objectives and fulfill all academic , statutory and regulatory requirements to continually enhance the satisfaction of our students. "

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Aditya College of Architecture established in 2013 is affiliated to Mumbai University, India. Since its inception, the college has continuously been working towards a vision to take architectural education ahead of traditional curriculum and achieve higher goals in grooming better professionals every year. The primary objective of the school is to create 'global practices with local concerns' to achieve excellence in architectural design, practice and profession.

The campus has infrastructure comparable to the best in the world. An ideal environment for exploring new ideas that encourage creative and independent thinking of young minds. It also provides platform for promoting innovation and research for students and faculty. The pedagogy of the school is building professional capacity and cherished individual interest of the student.

With the vision that educating professional requires close coordination of industry and academic the institute encourages collaboration with eminent academicians and industry professions in the way of conducting workshops, seminars, and webinars in the present pandemic situation. The Institute has collaborated with Sri Lanka Institute of Architects by the way of exchange program and combine studios.

ADITYA COLLEGE OF ARCHITECTURE

ABOUT IDRC

This year Aditya College of Architecture (ACA) brings its 2nd International Design Research Conference (IDRC) with the theme 'Monadic Architecture', an attempt to derive at a plethora of design solutions using the concepts of modularity and self-similarity. Since the historic periods, the modularity involvement has gained extreme importance in the realm of architectural morphology of masses and spaces. Apart from being an economical and simplified approach, monadic designs come with the characteristics of easy prefabricated construction, simplified manufacturing, addition, and replacement thereby, leading to mass-production. This sustainable design approach also allows for incrementality and expansion, and hence turns cost-effective. Monadic architectural style is applicable at any scale from interior furniture design, facade, and fenestration designs to building spaces at any geographical context. The IDRC 2021 therefore endeavors to explore monadic or modular architectural design features, thereby contributing towards a sustainable built environment.

The IDRC conference intends to cover an array of topics that enables students, researchers, academicians, and practitioners, to express their thoughts, hypotheses and ideologies and demonstrate their designs through research and practice. It will also enable notable speakers to showcase their experience, expertise, and knowledge on the subject.

CASE STUDY OF CREATIVE ARCHITECTURE IN MASS PRODUCTIONS THROUGH 3D PRINTING TECHNOLOGY

SUBTHEME: MITOSIS OF MODULES CONTRIBUTION TO TECHNOLOGY

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ABSTRACT

Architects are becoming more adept at using new modular solutions in much creative ways and more interested in the rigid geometries of the past. Even globally contractors and engineers are now busy trying to find the right balance between bespoke design and volume production, and using the latest technology to boost their chances, such as 3D printing. As the world's population is continuously growing, we are facing with the need for faster development and rapid construction on a massive scale. Nowadays the main debate is how mass-produced elements can be made to work with the creative architecture. The overall aim of this paper is to prepare a reference base for the architects for analyzing 3D printing technology on the parameters of creativity, time of construction and low labour cost. This is done by synthesizing some cases studies where the same technology has been used for the rapid construction. The study found that we are facing with the need for faster development and rapid construction on a massive scale, and 3D printing not only contribute in rapid construction but also contribute in producing elements in an almost limitless number of shapes and sizes in mass production.

INTRODUCTION / BACKGROUND

Modular construction is a process in which a building is constructed off-site with under controlled plant conditions, using the same materials and designing to the same codes and standards as conventionally built facilities, but in about half the time. Buildings are produced in "modules" that when put together on site, reflect the identical design intent and specifications of the most sophisticated site-built facility without any compromise.

Mass customization is something if can be applied, you could probably rule the world. And this is more than just an aspiration.

Most important of all, a global shortage of traditional building skills is causing problems for developers and a market that is hungry for new methods of procurement.

The goal of mass production is low-cost manufacturing with speedy construction.

Contractors and engineers are now busy trying to find the right balance between bespoke design and volume production, and using the latest technology to boost their chances, such as 3D printing.

3D printing technology is enabling faster and more accurate production of flexible designs. Building Information Modelling is allowing manufacturers, designers and contractors to play with modular configurations in a way that would have been difficult just a decade ago, and architects are becoming more adept at using new modular solutions in much creative ways and more interested in the rigid geometries of the past.

AIM / PURPOSE

As the world's population is continuously growing, we are facing with the need for faster development and rapid construction on a massive scale.

Nowadays the main debate is how mass-produced elements can be made to work with the creative architecture.

The overall aim of this paper is to prepare a reference base for the architects for analyzing 3D printing technology on the parameters of creativity, time of construction and low labour cost.

At the Manufacturing Technology Centre in Coventry, Skanska, UK is helping to pioneer concrete printing, a process by which elements can be made in an almost limitless number of shapes and sizes by extruding specialized concrete through a robotic arm.

RESEARCH METHODOLOGY

In this paper literature review and synthesis of some cases studies are done, where the 3D printing technology has been used for the rapid construction.

LITERATURE REVIEW:

3D construction Printing (3DCP) refers to various technologies that use 3D printing as a core method to fabricate buildings or construction components.

Figure1:

There are a variety of 3D printing methods used at construction scale, with the main ones being extrusion (concrete/cement, wax, foam, polymers), powder bonding (polymer bond, reactive bond, sintering), and additive welding. 3D printing at a construction scale will have a wide variety of applications within the private, commercial, industrial and public sectors. Potential advantages of these automation technologies include faster construction, lower costs, ease of construction, enabling DIY construction, increased complexity and/or accuracy, greater integration of function, and less waste produced.

Demonstrations of construction 3D printing technologies to date have included fabrication of housing, construction components (cladding and structural panels and columns), bridges and civil infrastructure, artificial reefs, follies, and sculptures.

CASE STUDIES:

The technological improvements and market conditions are aligning in such a way that modular construction is now finally ready to deliver the sunlit world of speed, efficiency and flexibility.

The first case study is done of a restoration of a historic water in Palekh (old town in Russia) in August 2018, which was the world's first successful application of additive technology.

It is 26 meters in diameter with a depth of 2.2 meters. During this project, the restoration team, as well as the residents of Palekh, decided to change Sheaf foundation's original shape from rectangular to round. The parapets, which are barriers extended around the fountain base, were 3D printed using structural and geopolymer concretes, gypsum, clay, use mixtures with mineral additives and fiberglass. It set an example of using 3D printer for restoration.

Figure 2:

Second case study is Sudhoferweg 51 House in Germany built in 2021 by an architectural firm Mense- Korte, printed by a Cobod BOD 2 in concrete costing $ 300,000.

The longstanding debate of offsite vs onsite printing has been answered by this project that marries the benefits of both to compensate for some of the limitations of 3D printing concrete, mainly the fact that it can't print in mid-air. By printing certain components off site, they were able to add overhangs and other features that would be impossible to be printed in mid-air on site. Other features of the building were also 3D printed like a bath and a fireplace.

Figure 3:

This image shows the used 3D printer setup where a protective tent needs to be made around the building to maintain consistent temperature and humidity parameters, also mitigating any wind. This counts in the installation cost in the initial stage.

Figure 4:

Consideration of HVAC and plumbing layout in the design was taken care while giving for 3d printing, avoided making the ugly cut in the concrete during the modification after drawing is given for the printing. This printer required around 3 people to operate.

Figure 5:

Proper inspection and quality check was done by measuring the temperature of concrete to check the curing time.

Figure 6:

As it is in Germany, a cavity wall was introduced, Inserting horizontal reinforcements, gravel filling with insulation on top.

Figure 7:

Precast concrete blocks were used for the roof construction.

The third case study is example of high-rise buildings with modular construction. La Trobe tower in Melbourne, is the highest modular structure in Australia, and Creekside Wharf in Greenwich is one of the tallest in the UK. In Singapore, an executive condo project taking shape on Canberra Drive is believed to be the world's largest modular building project, with eight. The recently completed Crowne Plaza hotel extension at Changi Airport, a PPMC system cut the number of workers required onsite by 40% and the time to construct a floor from two to three weeks to just three or four days.

Figure 8:

The fourth case study is about the Indian context. In the Indian city of Vijayawada, the residents will be allowed to design their own high-rise apartment. The scheme, by Chinese architect Penda, will allow buyers select prefabricated modules from a catalogue, which will then be inserted into the structural frame. The practice describes the approach as using "modern construction techniques to bring back a level of individualism and flexibility for the inhabitants of a high-rise".

IIT Madras House

Figure: 9 & 10:

India definitely needs such solutions that do not require much time, adding the latest "technology enables building a 3D printed house in 5 days and Tvasta Manufacturing Solutions constructed India's first 3D house in IIT Madras by developing their own material mix, which is an extrudable concrete consisting of cement, sand, geopolymers, and fibres.

While 3D printing, the structure was specifically designed hollow to allow provisions for wiring and plumbing without damaging the wall.

The use of such local materials also reduced the need to transport concrete long distances, reducing the environmental impact.

FINDINGS/ ANALYSIS & INFERENCE

"Architecturally, the potential of this technology is very exciting," says Sam Stacey, Skanska's director of innovation. You can have whatever shape or angle you want, including shapes that are impossible to make with conventional moulds.

There is absolutely the potential for this 3D printed technology to be used in conjunction with moulded elements. Also, the business scenario for all forms of automation is improving partly because the cost of the software needed to take a design, and instruct robots to make it, is falling sharply.

The Chinese company WinSun was the first to build a 3D printed house, and in 2013 it was able to print 10 houses in 24 hours. These homes required human assemblage, as their walls were printed at a plant to be transported to the respective sites. The San Francisco startup company Apis Core successfully built a residence of this nature as their final domain in a day in the year 2018, the process was worth around $10,000 USD. Dubai has created a plan for a fourth of the new buildings in the city to be 3D printed by 2025. The city is striving to become the world leader in 3D printing for civil construction.

To achieve the creative architecture, through this technology one can easily have whatever shape or angle, including shapes that are impossible to make with conventional moulds.

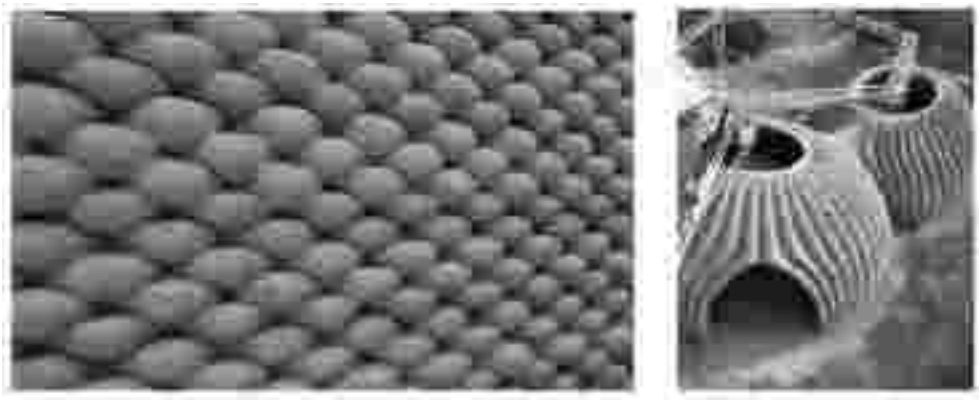

Figure 11: Along with shapes 3D printing provides the possibility of decorative textures and patterns too.

Some people think it is difficult for 3D printing to replace traditional methods, but this paper clears that this technology delivers quite practical solutions. It is possible to have aforementioned construction of conspicuous shapes that barely existed in construction projects so far. Another important factor to consider is in case of disasters: whenever a hurricane or an earthquake destroys infrastructure leaving thousands of people homeless, 3D printers can be used to quickly rebuild bridges, highways, and buildings. Due to its low cost, high efficiency, less construction time, less manpower, eco-friendly nature (can make customized ink by adding eco-friendly additives), extreme weather condition resistivity and low margin of error, 3D printed housing can become a practical option for subsidiary habitational projects.

However, before 3D printing can become a regular feature of modern construction there are technologicalm hurdles to overcome. One of the such is the corrugated appearance of 3D-printed concrete. Another issue is the reinforcement, again to resolve it a number of techniques are being researched including adding chopped fibre reinforcement to the concrete mix or the panels can be designed and printed with voids and later the reinforcement can be introduced by post tensioning.

CONCLUSION

The construction industry will only see better and better designs at increasing levels of efficiency, as more firms are educating themselves on the possibilities of 3D printed construction. One of the most important areas this is happening is within the Mechanical Electrical Plumbing systems. Making considerations for these services in advance means the printer can intentionally leave spacing avoiding cutting holes in drywall later on in the process, and simply be placed where they belong at the proper stage of the print along with reinforcement. This method can eliminate almost all the heavy lifting on the construction project besides the roof.

This technique promotes curves and odd shapes. It offers a quick and economic method for civil construction, thus creating three-dimensional shapes through a computer-controlled process, with a small crew to operate it remotely via tablet. In civil construction, 3D printing is particularly useful to fabricate geometrically complex elements. Due to the reduction of construction time, this technology promises less energy consumption, lower costs and reducing residue production. As any other innovation, there is still a lot to work on and to develop until it represents a viable, sustainable and widely utilized one by the construction industry.

It’s hard to give an exact cost or price of a 3D printed building in 2021, as it depends on the structure’ size and complexity. The simple answer would be that, in this day and age, it’s possible to 3D print a house for as low as $4,000. And that covers the structure of the house (i.e. base, walls, and roof) and in some cases, wiring. Pricing then depends on that construction cost, the area the house is built in, and its purpose.

For high-end projects with 3D printing concrete and additional construction components, one can expect the costs and prices to be higher, but from what I have seen from the case studies than those of comparable, conventionally built houses.

As time goes on, i predict more and more companies will move towards the construction of 3D printed buildings. This, combined with ever-advancing technologies, should bring prices down.

“Conventional housing requires timing, material, logistics, transporting of material, and so on. But if this technology can produce houses in different locales in five days, it would not be a big challenge to build 100 million houses by 2022, “ the finance minister said.

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The Indian Institute of Architects (IIA) is the National body of Architects in the country. Established in 1917, the institute today has more than 20,000 members and plays a major role in promoting the profession of architecture by organizing and uniting the Architects of India to promote aesthetic, scientific and practical efficiency of the profession both in Practice and in Education.

IIA is represented on various national and international committees connected with architecture, art and the building industry and is also actively associated with International Union of Architects (UIA) Commonwealth Association of Architects (CAA) and South Asian Association for Regional Co-operation of Architects (SAARCH).

PEATA has come to the age of youth on completion of 37 years of its inception. All great institutions have humble beginning. During years 1962 to 1965 architects whenever they met in Municipal offices at V. T., Bandra or at Ghatkopar, they used to talk about their grievances. There is nothing new about it. It is today's phenomenon too. But the murmur then was different. Circulars were confidential. Architects were suddenly confronted with faith accompli "Sorry, now Commissioner has instructed not to approve any plans in the wards". Some influential could get through but rest were left high and dry. They were flabbergasted. In those circumstances several young architects contemplated the positive actions and approach. Side by side the efforts of continuing education by means of work shops, seminars, symposiums, study tour being integral part of activities of any professional body were carried out wherever possible jointly with other like-minded bodies.

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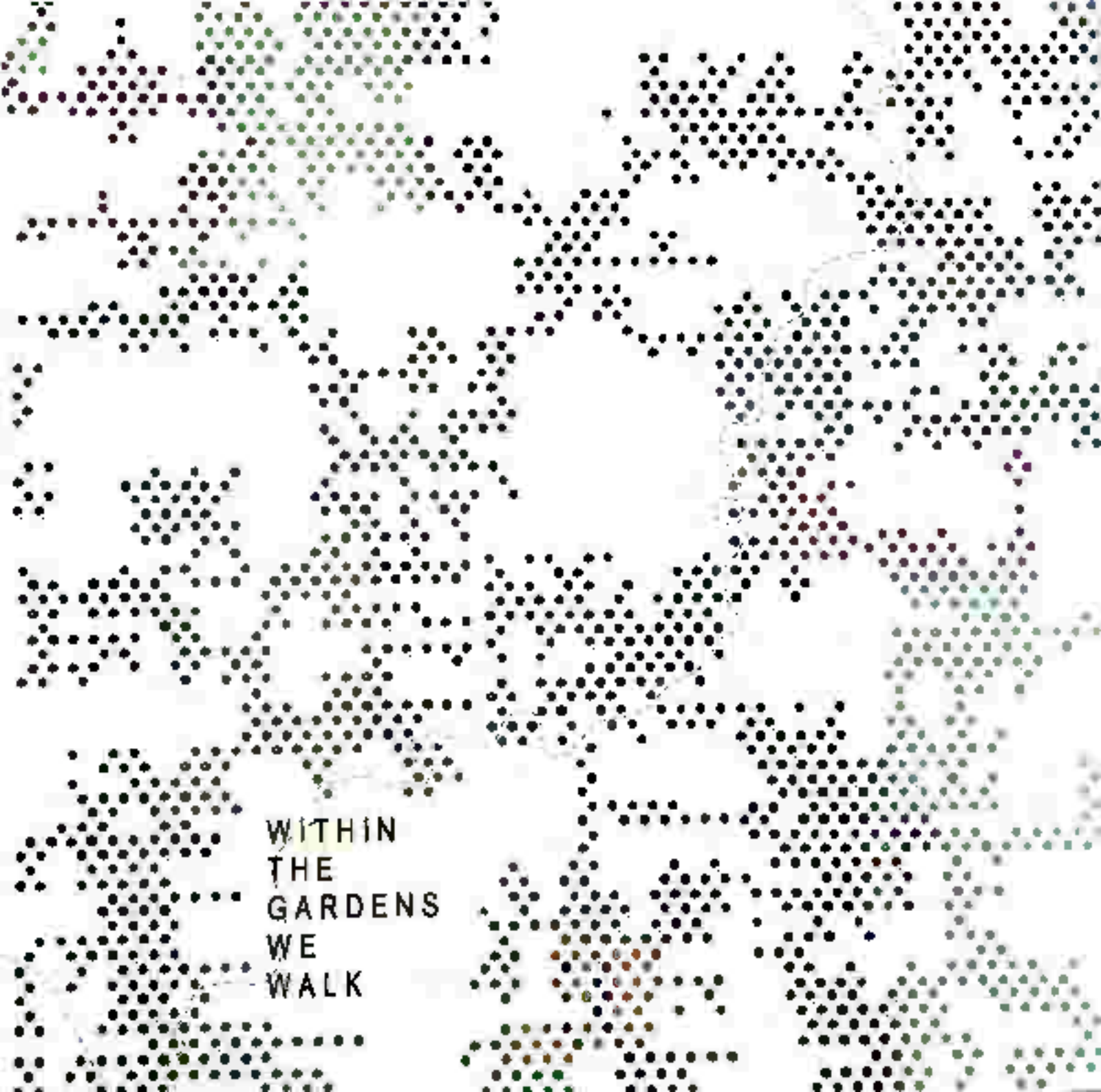
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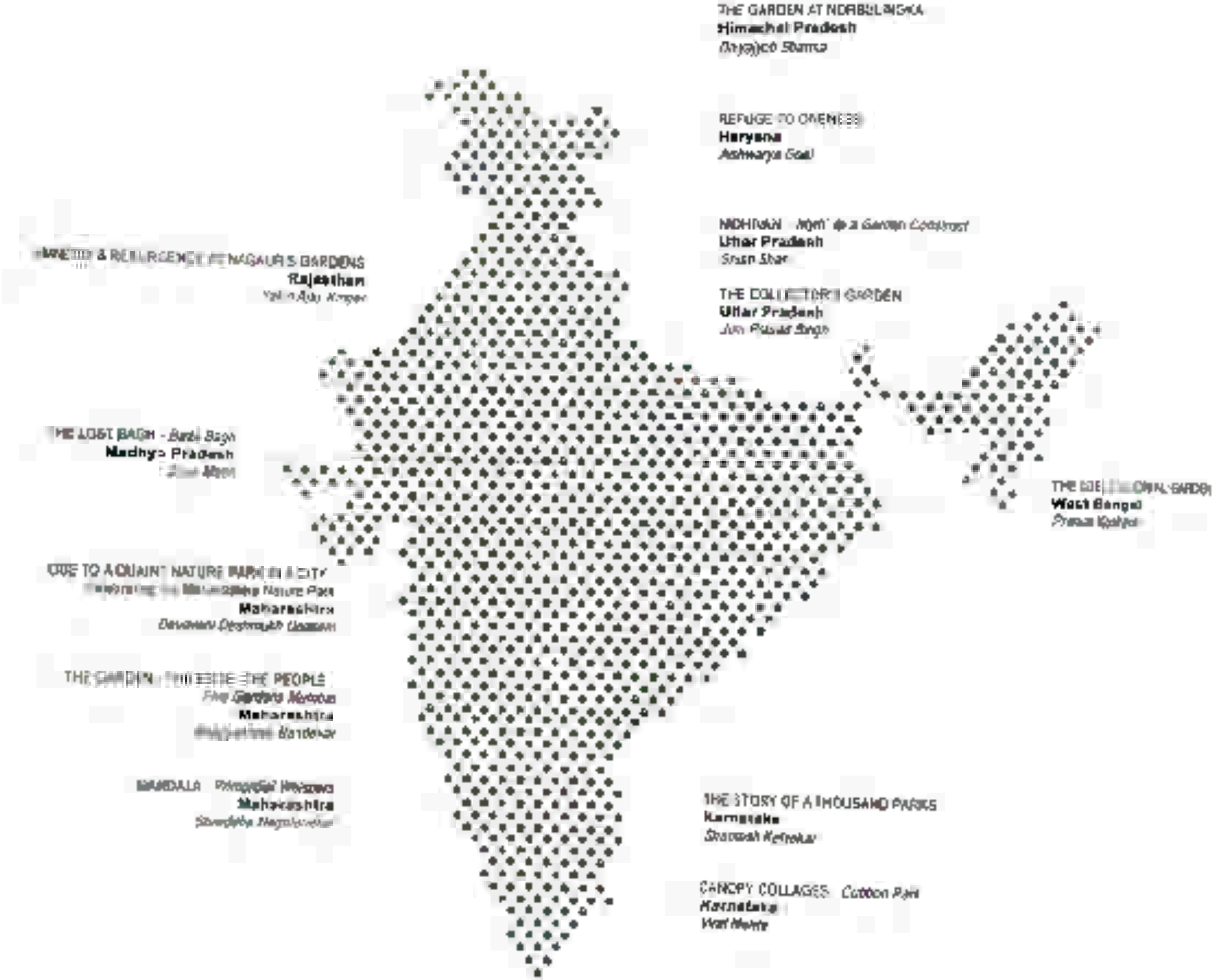
THE GARDEN AT NORBULINGKA
Himachal Pradesh
REFUGE TO ONENESS
Haryana
Uttar Pradesh
THE COLLECTOR'S GARDEN
Uttar Pradesh
West Bengal
Rajasthan
THE LOST BAGH
Madhya Pradesh
ODE TO A QUAINT NATURE PARK IN A CITY
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CANOPY COLLAGES - Cubbon Park
Karnataka

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THE GARDEN - THE EDGE - THE PEOPLE - FIVF GARDENS, MUMB

BHAGYASHREE NAYAN BANDEKAR

INTRODUCTION

Any urban space is a reflection of its people. One such example is located in the first planned neighbourhood of Mumbai. The Five Gardens (Mancherji Joshi gardens). Designed to house the Parsi community, the spaces have transformed over time. The study aims to identify the narrative of The Past, The Present and a probable Future based on various developmental parameters for The Five Gardens, Mumbai.

The gardens, designed to manage traffic and an interactive public space in the area, serves as a unique example of the Edges interacting with the people. The study thus aims to dig deeper in this narrative of the Garden, its Edge and its activities, which are an outcome of years of use.

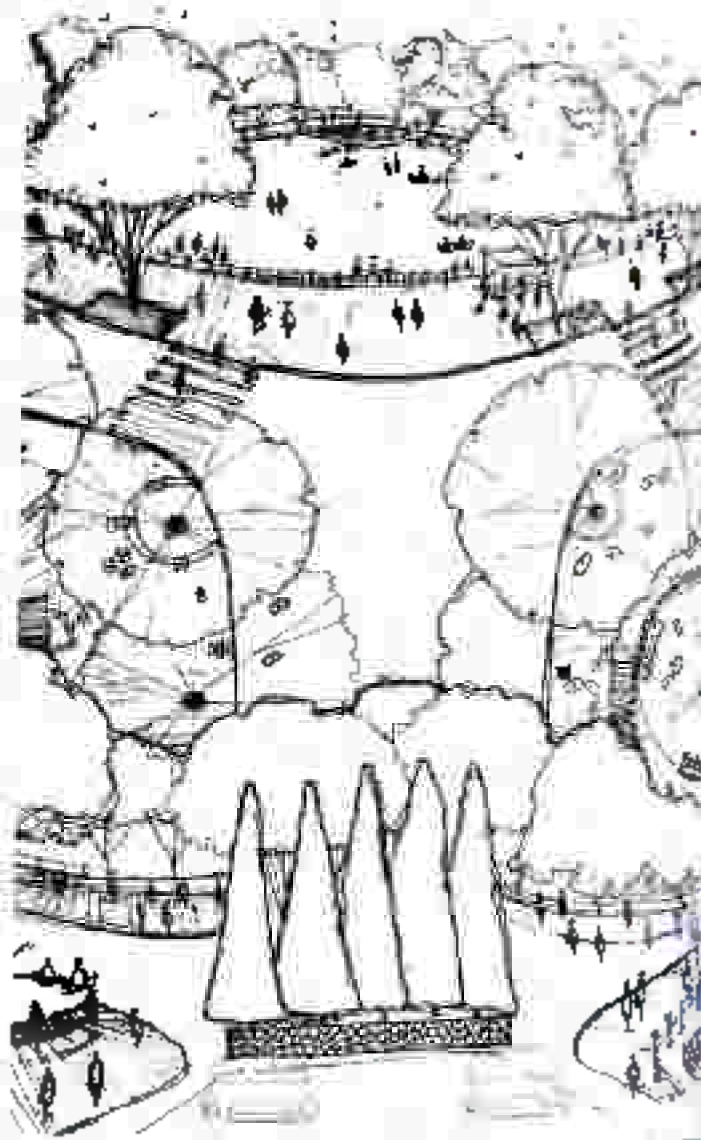
The gardens were perceived and built as an open space in the city for the community residing around, and is open to interpretation. While the basic form of the space has not been altered, it has been appropriated and used by the community around. Thus the will of the designer to create an interactive space is viewed through The Garden - The Edge - The People.

INCEPTION OF GARDENS IN THE CITY: PAST

With a growing population due to ports and extensive textile businesses in Bombay, BMC (Bombay Municipal Corporation) was set up in the 19th century. In its first set of Planning and development rules in 1872, the island city was divided into two parts based on its density: Scheduled Areas and Non-Scheduled Areas. Open spaces were unplanned in the denser parts of the city with meager spaces in between the buildings meant for manual scavenging. Few instances of the gardens developed during this era include Horniman Circle Gardens, designed to be a large open space with grand buildings in the middle of the walled city, and Hanging Gardens (1881) developed over the water source for the city to protect it from pollution.

With the first major epidemic in 1896, many people started to move away from their homes to the Maidans of the city. Maidans were the only larger open spaces during the time which provided adequate and well ventilated spaces within the city. This, in turn, made the city authorities realise the importance of open space in everyday life. In response to the crisis faced by the city, BMC set up BCIT (Bombay City Improvement Trust) in 1898, and gave immense powers to it. Along with the BMC, BCIT cleared out congested and unhygienic buildings, widened roads, and drained the low lying areas of the city. It also undertook planning and development of 33 new parts within the city. Some of the largest schemes were the Dadar-Matunga Estate, and the Matunga-Sion Estate which were to accommodate 60,000 people each. As these were away from the city centre various transportation schemes were also implemented. These included an extensive connection with electric tramways, created in 1905, and subsequently BEST (Bombay Electric Supply & Tramways Company Limited) systems, which were added in 1925. This resulted in the creation of various educational institutes within the Dadar Matunga area. The government also started leasing out these lands for 999 years and were allocated to different communities present in Mumbai. This resulted in the development of Parsi and Hindu colonies by the 1920s, which developed as one of the first planned neighbourhoods of the city.

The newly created neighbourhoods catered to a variety of users, ranging from the affluent Parsi community, to the migratory population from various parts of the country, who moved to the city as a result of the developments. Within these schemes new norms laid out by the BCIT were implemented, resulting in larger plot sizes and ample open space. One such



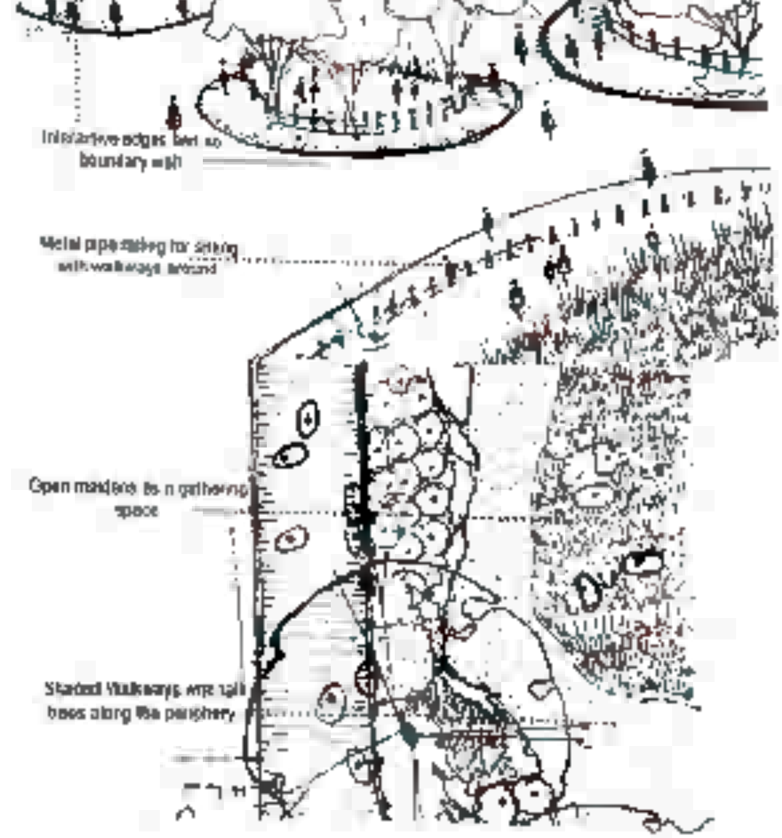
MENTAL IMAGE

[illegible] … ces located at the heart of the planned development. These estates … circles located at walkable distances on the major roads. These were … the amenities required by the residents. Commercials were zoned on … circles and gardens were created at the centre. Many smaller circles … within these estates as the neighbourhood level garden and Maidan … activities. These circles and maidens developed as an open space … rise in the popularity of the game of Cricket these gained a new … city dwellers.

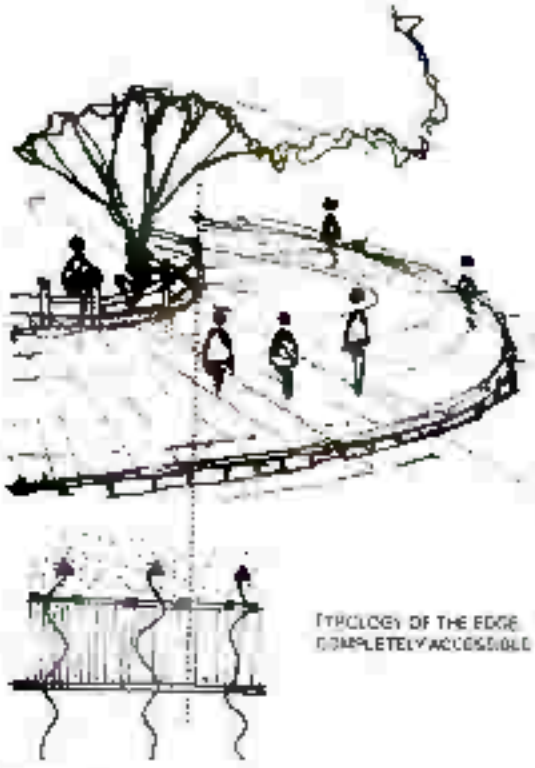
[illegible] … as a combination of traffic islands and the open spaces thus … smaller gardens were also designed in pockets of the building … The area includes more than 15 smaller open spaces, which cater to … within its layout.

[illegible] … HE GARDENS

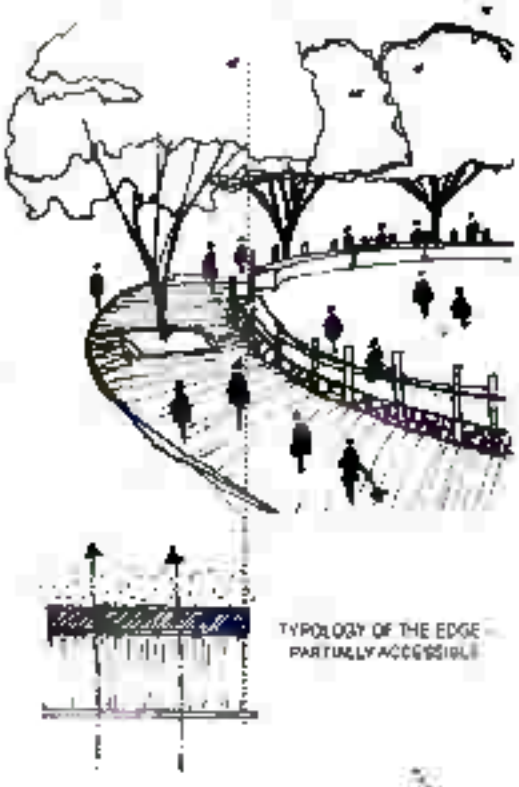
[illegible] … a respite area for various residents of the city. It soon became … gathering and meeting for people from all walks of life. The open nature … flexibly in terms of use. The space was utilised by the college … space as well as for playing on the weekends. The primary users of … residents of the neighbourhood. The edge with its metal pipe railing … users. There were no boundaries within the open space and the … movement within the space. The gardens were lined with tall shade … which made the walk below soothing and relaxing. At the time of inception … designed as Maidans and were not given a designated function. This … gatherings during the independence movement of India. It also allowed … smaller groups and thus organise themselves. Though the planned … by the community which resided in various blocks, the open … connecting factor between them. The open space thus created out of … acted as a catalyst for social, political and economic gathering for the … the people and thus transformed into a urban open space.



ACTIVITIES IN AND AROUND THE GARDEN AT THE TIME OF ITS INCEPTION TO PRESENT



TYPOLOGY OF THE EDGE
COMPLETELY ACCESSIBLE

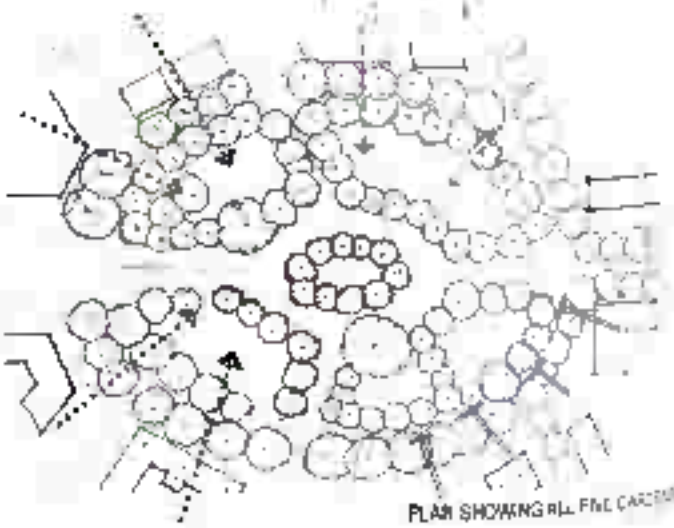


TYPOLOGY OF THE EDGE
PARTIALLY ACCESSIBLE

TYPOLOGY OF THE EDGE
NOT ACCESSIBLE

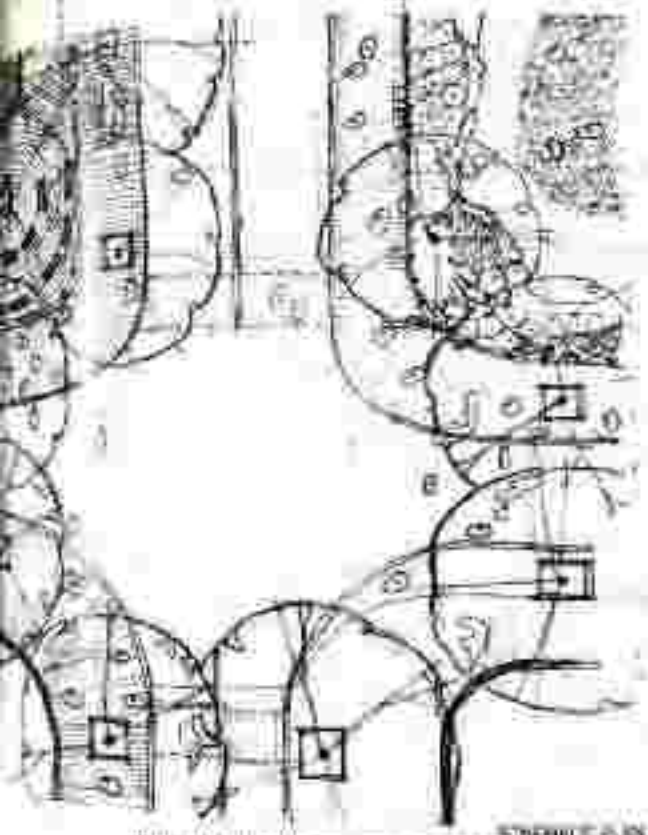
THE EDGES

The edges of the five gardens are the most interactive elements of the garden. These have transformed with time and resulted in appropriation of spaces. These are also governed by the people and how they use them. With the recent renovations of the garden there were a few new typologies introduced along the edge which facilitated the user. This also changed how we perceive the open space. With the introduction of seating along the pathways, the edges were made more formal in nature. These also varied with the typology of space. There were three main typologies identified based on the porosity and ease of use. On the most shaded part of the garden with large canopied trees were the most porous edges which allowed free movement of people through the space. While on the playground the edge was found to be partially accessible with low level seating or a kerb was most prevalent and abundantly used by the players and visitors alike. The edge towards the children's play area was not accessible from all sides which limited access to the garden and also transformed the use of space around the garden. Though visually connected to the garden, it disallowed the user to freely enter the garden. The low wall with a metal fence demarcated the children's play area. The actors thus utilised this area of the massive as a walking space. The central garden now acts as a traffic island with a fountain in the centre.



PLAN SHOWING ALL THE GARDEN

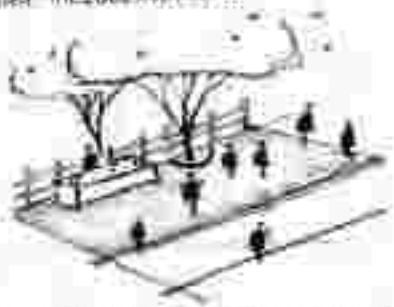
SCHEMATIC SECTION
...WALKERS AND PEOPLE RELAXING ALONG THE EDGE AND THE GARDEN



SCHEMATIC PLAN
...TREES BARKING THE ENTRANCE AND EDGES OF THE GARDEN

...THE GARDEN - THE EDGE AND PEOPLE

MORNING - LAUGHTER AND EXERCISE GROUPS WITHIN THE GARDEN



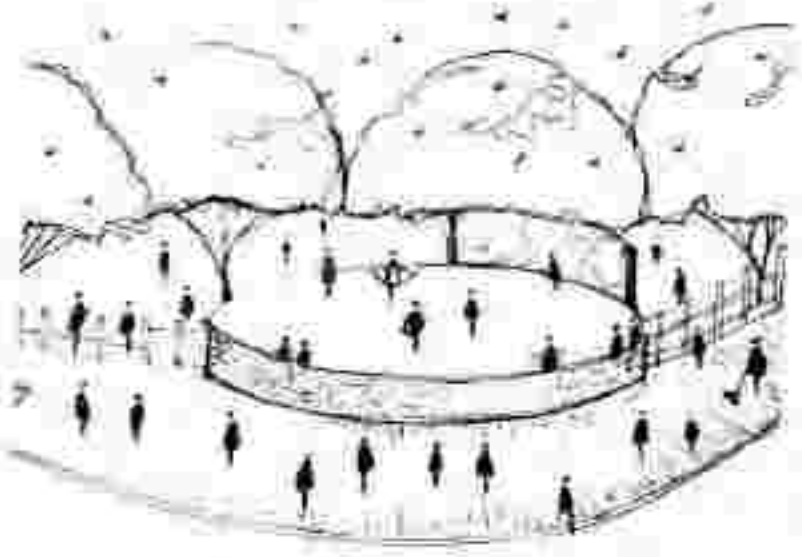
MORNING - MORNING WALKERS AND FRUIT JUICE VENDORS ALONG THE EDGE

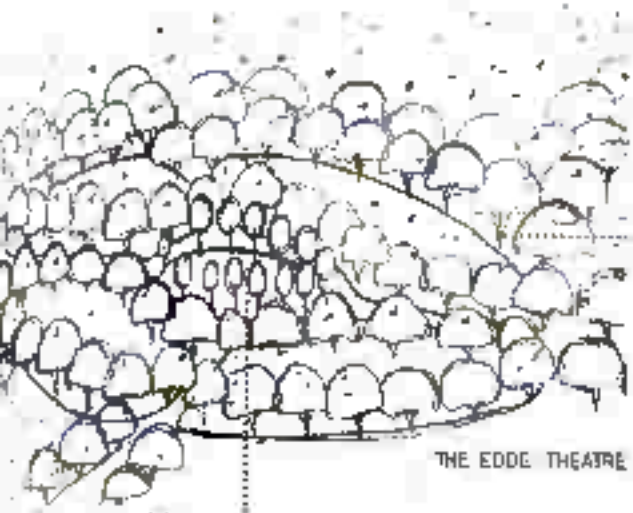
AFTERNOON - OFFICE AND LANDSCAPE RELAXING UNDER SHADE OF TREES

AFTERNOON - COLLEGE STUDENTS GATHERING ALONG THE EDGE

EVENING - FOOD STALLS ALONG THE STREET AND PEOPLE DINING OVER BACK IN THE GARDEN

EVENING - EVENING WALKERS AND VENDORS ALONG THE EDGE





THE EDGE THEATRE

THE PEOPLE ACTORS

THE BUILT FORM- BACKDROP

THE PRESENT

Over the years the garden gained its identity as an urban green within the city. From the time of its inception to date it has catered to various activities however what remains constant is the edge and its character. The edge of the garden is one of the most salient features of the five gardens. It acts as a theatre where, with the changing actors and the constant backdrop it moulds itself.

THE THEATRE

Five gardens is lined with large shade trees which from a canopy over the walkways. It transports the visitor to another world within the heart of the city. The shaded space supports a variety of birds and acts as a respite for the traveller's. The space is lined with majorly Peltophorum pterocarpum (commonly known as copper pod) which forms a large canopy over the walkways and the grounds, and sheds its flowers, lacing the ground in a carpet of yellow. This theatre allows the actors to experience various seasons with ease and generates curiosity. Apart from Peltophorum the streets are also lined with large rain trees which create specific nodes due to their canopy which in turn act as smaller performance spaces for the user. All streets around the gardens form a welcoming edge to the Theatre and invites the user inside the gardens. These trees provide shade throughout the day with only patches of light penetrating through, forming distinct shadow patterns on the floor, thus creating a porous edge to the gardens.

THE ACTORS

The people have appropriated the spaces according to their needs thus creating various smaller areas within the gardens. The gardens are divided by roads and thus divided by use with years of use. These spaces have transformed from a larger Maidan space to four distinct spaces for various activities. They are divided according to the activity it supports based on its form and area. The largest garden among the five is used as a Maidan/ playground with a soft dusty floor. This garden is mostly used for playing cricket during the day and a relaxing space in the evening. The second largest area constitutes the kids play area with play equipment and playground. The other smaller parks form the meeting space for the young and the elderly alike, while the central park among the five is partially accessible and sports a focal point in the centre to attract the user. The edges of all these areas are modified by the actors during the course of the day. These edges support various roadside vendors throughout the day. The larger periphery is used as a regular morning and evening walk route alike. The traffic on these streets is minimal due to the play of the actors throughout the day. All these activities have actors from all walks of life. Due to its location and its characteristic nature of being without a boundary, the actors are from all strata of the society thus making it a unique public space.

THE BACKGROUND

Apart from the few redevelopment projects, the built form adjoining the gardens has remained unchanged. The built form merges with the landscape in the foreground. It thus acts as a backdrop, creating an enclosure to the space. Some of the pitched roof buildings still stand strong, provide a backdrop to all the drama that unfolds in the theatre. The larger setbacks help in merging the built and the unbuilt. The various balconies which face the gardens create a visual connect with the gardens for the user. The uniform nature of the built form adds to the character of the space. However, with changing Development Control Regulations these are bound to change in the near future.

Changing seasons and Avidauna as transforming elements

Pitched roofs with mangalore tiles adding to character as a backdrop

Balconies with actors contributing to the theatre as a backdrop

Wooden windows contributing to the theatre as a backdrop

The edge with plastic corebuilding the theatre

Plant material adding texture to the theatre

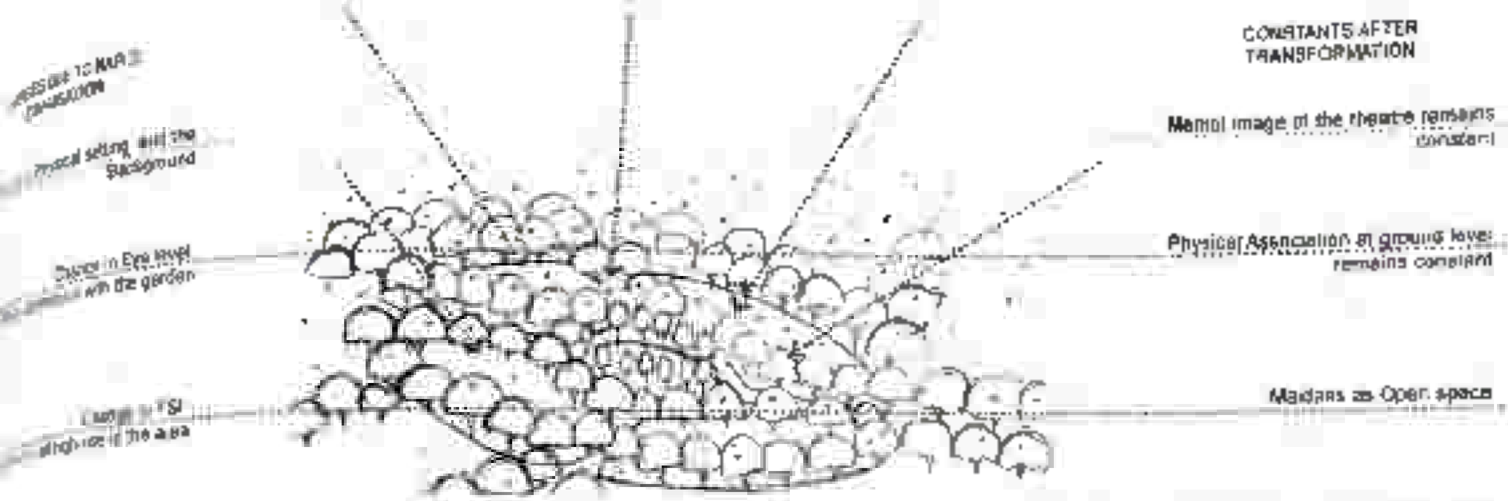
Pavement texture of the theatre

The shade and respite of the pathways within the theatre

The interplay of shade and shadow on pathways within the theatre

Textures created on pathways within the theatre

REPRESENTING THE GARDEN AS - THE THEATRE - THE ACTORS - THE



IDENTIFYING CONSTANTS OF THE SPACE

...NSTITUTES THE GARDEN?

...garden is made by utilizing many elements which are interdependent ...each example. Though created out of necessity, inspired from the ...oped its own character with the way it has been used by various ...space. The Theatre, where the dramas unfold, is what makes the ...ic space usable. The three elements which are predominant in ...the canopies of trees and the edge which creates the ambience ...ackground – with its architectural features contributes to the ...and the actors - who with ... will transform the space and ...aspects of public life.

...e state of transition: a trans... which is a result of change ...e need of the city. With ... in FSI the built form – the ...dic transformation. The bac...d and the theatre are losing ...transforming the mental image ...e space. With rise in density ...uilt form there is a drastic change in the Eye level of the public ...which was admired for its proportion is now viewed from a height, thus ...association of the space with its people.

...manifestation and the transforming character of the Theatre allows ...with the garden through the Edge, which acts as a canvas for the drama ...interaction with the Maidan and the public space allows the user to ...of the edge according to their need. Looking at the character of the ...the simple interventions contribute to the greater need of the space ...in the edge created due to the trees is what creates the setting ...

...is in a state of transition. The transformation with respect to ...with respect to changing guidelines and the transformation with ...But what makes this public space work is the Edge and its ability to ...simplicity and user friendly approach to design and its mental image ...of the user.

ACKNOWLEDGMENT

I wish to express my gratitude and appreciation to all involved in the completion of this narrative. I am thankful to my father, Mr. Nayan T. Bandekar, for providing me with insights about the form and use of the Five Gardens in the past. I would also like to thank Ar. Nimad Rewatkar for his constant guidance and support while compiling the narrative. Finally, I would like to thank my family for all the support and encouragement during this study.

Investigating the role of social dimensions in the design of a ordable housing: Case Pune city

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Abstract

Due to rapid urbanization and development, Indian cities are struggling to retain their social character in terms of their identity. The metro Politian city like Pune also faces similar challenges.After 1995, the sudden economic growth brought an imbalance between the supply and demand of housing for all. The city needed policies and opportunities to provide mass-scale a ordable housing. The central and state government implemented various schemes and strategies. However, the qualitative factors in housing design were swept over by developer- friendly designs. The technical parameters like FSI, maximizing salable areas, compressed circulation spaces took away the opportunity of providing social dimensions in housing designs. This added to the development of the monotonous character of the city without having any regional connection with visual and spatial characteristics. This leading to the occupants unable to find their habitable space for secondary activities or relate themselves to the visual and spatial character of the building.

This research aims to investigate the role of social dimensions with probable implementation strategies in the design of a ordable housing. This study is based on formative research and includes a qualitative literature review. It is supported by observational analysis of elements that depicts city character and associations of the user with a space. The scope of city character is limited to physical and visual elements of façade. Based on inferences and observations, this study proposes implementation strategies like façade development, communication space planning, etc. to establish the social dimensions in the design of a ordable housing. The findings of this study establish a correlation between social dimensions and a ordability. It further recommends preserving the social identity of the city by looking comprehensively at a habitat than on individual unit development.

Keywords: Social; A ordability; Space; Character; Connect; User

1. Introduction & Significance

When designing a ordable housing, social considerations need to be taken into account. Social aspects are not limited to location, but also have a relationship with the socio-physical environment and economics of the project. Home is a space that needs to be experienced and integrated with the physical environment around it. It has a direct and immediate impact on other aspects such as health, education, economy, environment, political life, society of any development. (Sinha, 1978). Therefore, social dimensions play a vital role in the long-term a ordability of the project. Holistic sustainability means supporting residents socially, economically, and environmentally (Ibem et. Al, 2015). Many green policies are being implemented, even more, innovative methods are being tested using cost-e ective technologies, but the idea of social dimensions is ignored and leads to the disappearance of the regional characteristic. It is not possible to maintain a ordable housing on a larger scale without considering social dimensions in general. Soen (1979) discussed the concept of "livable" housing concerning tenant needs and housing satisfaction and stressed the fact that housing quality is influenced by several factors, namely technical, social, behavioral, and other factors, as well as housing quality. Housing is not static, as it changes depending on the circumstances, sustainability is also related to the social aspects of society and its behavior. Sidi (2005) states that the model requires analysis of di erent parameters or perspectives, especially those related to individual and family needs, physical, physiological, economic, accessibility, social needs of society, culture, housing unit or requirements for space, environment, neighborhood, location and even user psychology. Sidwi (2008) stresses the need to generate specific knowledge about people's lifestyles. and incorporate it into a ordable housing design.

Housing is an expression of indigenous culture and architecture. People relate their homes to the regional context; reflecting the identity of the house changes the perception of its inhabitants. It creates a subjective perception of the area. The regional connection establishes the link between the habitat and the environment. This can be reflected through the characteristics of the building, i.e. style, shape, façade elements, color combination, and spatial quality in regional architecture.

City architecture plays an important role in creating a bridge between human sociology, psychology, anthropology, appearance, visual expression, and much more. (Shayan, 2011). Therefore, it is important to understand the relationship between the behavioral, functional, and cultural aspects of people in the city.

Identity is an important aspect in all areas, including architecture. Current and future generations are asking questions such as "Who do we belong to? Who are we? Where are we going?" Answers should be in a physical setting which includes spaces, buildings, roads, and more. This information is necessary for these generations for further development with a correct and beneficial approach to the city in which they live. Therefore, direct association with the space creates connect in a user's mind to perceive the housing as owned space and not a rental space. It further contributes to a ordability.

1.1 Relation between Social dimensions and a ordability

A ordability is directly related to the role of social aspects. E cient design strategies, inventive space planning, and consideration of the user's lifestyle reduce spending and operating costs significantly. Even housing with condensed areas and lower design quality criteria provide opportunities for new undervalued constructions. As a result, social di culties and related aspects must be addressed to ensure long-term a ordability. In a real estate market, the social dimensions play an important role in the user's perception. In the user's mind, the social dimensions generate sensitivity. The user's psychological attachment contributes to the transformation of a residential facility into a home. It has an intangible positive impact on operating costs.

The construction quality, the quality of the neighborhood, and the quality of the surroundings all play a role in determining 'a ordability' (Mashal, 2009). Functional design that respects the local context and culture could help to attain social sustainability (Karuppannan et.al, 2014). At the habitat and unit level, e cient functional design brings a ordability. It allows for space optimization, resulting in the most e cient use of floor area. As a result, it's impossible to succeed in a ordable housing without taking into account social factors.

1.2 Role of social dimensions in sustainable a ordable housing

In general, sustainable development is defined as serving the demands of the current generation without a ecting future generations' ability to meet their own needs. The notion of sustainable development comprises three dimensions: economic, social, and environmental. Social housing, in addition to providing shelter, can create a sense of security for the future and reinforce local communities. Sustainable housing principles include empathy for the people by ensuring that they live in a healthy, productive, and environmentally friendly environment.

Apart from employment and services, a ordable housing has emerged as the most pressing issue concerning social sustainability. Social sustainability can be defined as the quality of living in a place or area capable of providing and maintaining social capital, quality of life, which is defined as equity of access to critical services, safety, cohesion, and cultural integration, as well as community engagement.

A ordable, good-quality, inclusive and diversified (mixed-tenure and mixed-income), secure and healthy houses, residential areas, and communities that are well integrated into the larger socio-spatial components of the human settlements are all elements of social sustainability in housing. Essentially, understanding social fairness, social inclusion, and social capital are linked to the concept of urban development social sustainability.

Some associated variables, such as access to utilities and amenities, amount of living space, residents' health, community spirit, and social interaction, perception of safety, and neighborhood as a place to live in, can help evaluate social sustainability in a ordable housing.

The goal of sustainable housing development is to improve the quality of people's lives and livelihoods. It encompasses the occupant's well-being, as well as the assurance of safety and a sense of contentment. The visual image of street furniture and pavement, as well as the connectedness of street layout, have an impact on the area's social sustainability. The architecture and urban design of a ordable housing complexes can have a significant impact on the pleasure of residents. Furthermore, the location's heritage and cultural worth should be protected for future generations.

Therefore, as shown in figure 1, social sustainability includes several aspects such as integration of communication spaces, cultural integration, human wellness that all contribute to the a ordability of housing.

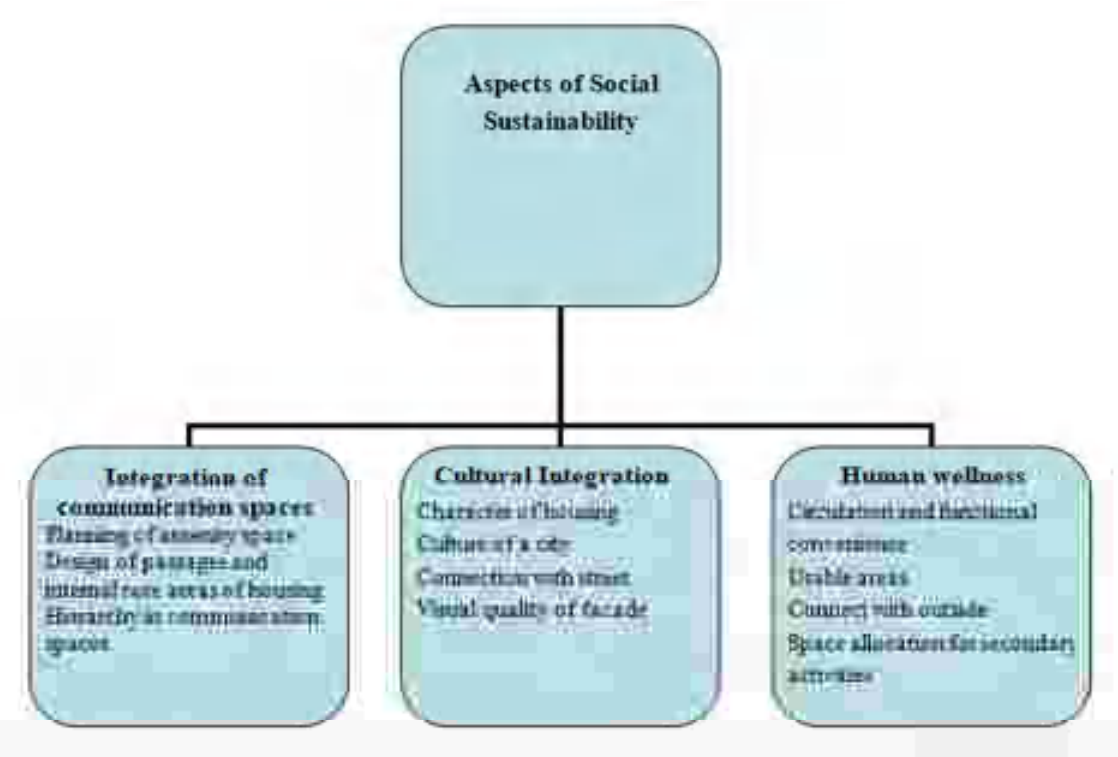
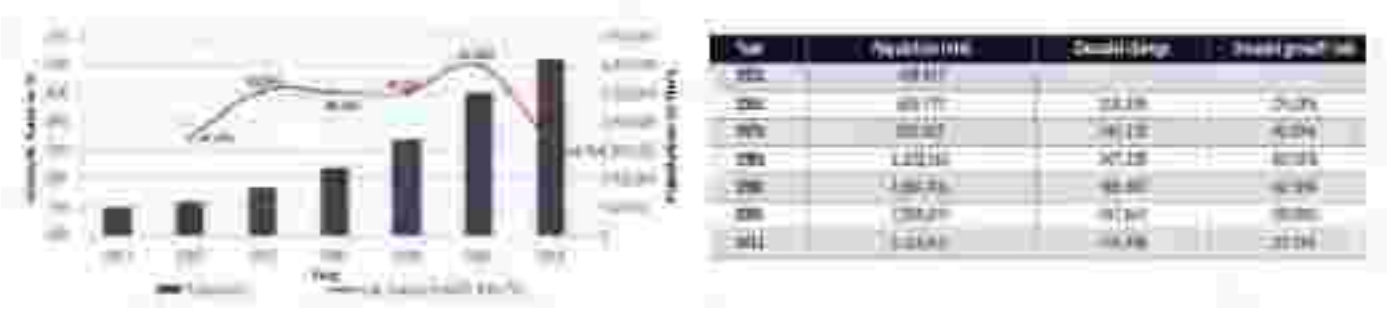


Fig 1: Aspects of social sustainability
(Source: Author)

1.3 Context and setting of the study

Pune is the western IT capital as well as the twin city of Mumbai. The migration of people from nearby towns to Pune is notable for its employment opportunities. Figure 1 shows the population growth dynamics of the city of Pune from 1951 to 2011 according to the 2011 census. Currently, it is around 88 lakhs as per municipal reports, 2020. Therefore, the supply and demand ratio of a ordable housing is already disturbed. The people are facing di culties in the availability of shelters at a ordable costs.



Thus the city needed policies and opportunities to provide mass-scale a ordable housing. The central and state government implemented various schemes and strategies. However, the qualitative factors in housing design were swept over by developer-friendly designs. The technical parameters like FSI, maximizing salable areas, compressed circulation spaces took away the opportunity of providing social dimensions in housing designs. Also, it addsto the development of the monotonous character of the city without having any regional connection with visual and spatial characteristics. Fig. 3 Shows the random development of city character in a current stage in Pune city and Fig 4 (i) and (ii) shows the cultural city character of Pune city. The occupants are unable to find their habitable space for secondary activities. The occupants are also unable to relate themselves to the visual and spatial character of the building.

Several a ordable housing projects are under construction around the city of Pune. The new Pune Municipal Corporation (PMC) regulation essentially proposes that developers have to build 20% a ordable homes in layout approval projects. PMC also recommends the development of amenity areas as a ordable housing projects under Pradhanmantri Aawas Yojana. This is a good time to create a ordable housing that is completely sustainable to maintain social balance in the city. There is a need to change the perception of a ordable housing. Therefore, this study investigates user aspirations, lifestyle, regional city character to address long-term a ordability.

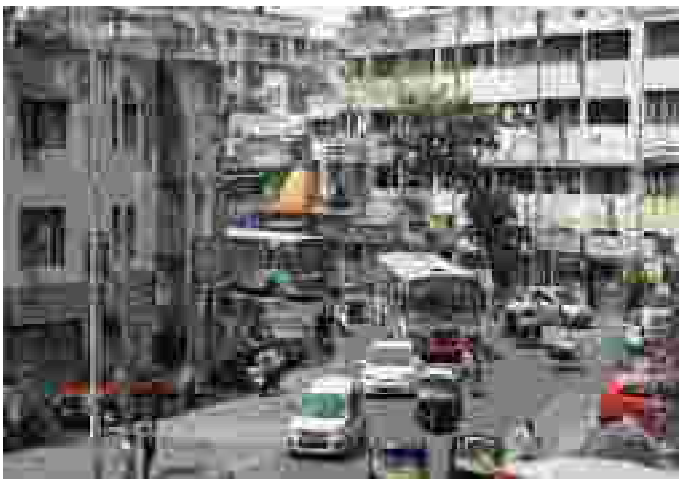


Fig 3: City character development current stage of Pune core

Fig 4 (i) & (ii): Cultural city character of Pune city (Source : Author)

2. Literature Review

Social health is a very important aspect to achieve the maximum acceptable value for the design of a ordable housing. Bordignon (1998), Salama (2006), and Sidawi (2008) showed that poor housing conditions are related to poor social conditions. The prototype design must take into account the social problems and desires of the user. The planning capacity must be su cient to provide user-sensitive areas and infrastructure. A socially acceptable home encompasses people's cultural and lifestyle needs in terms of size, a ordability, and function. It also recommends the intangible benefits of the home, such as security, aesthetics, sense of achievement, and community (Friedman, 2005). The intangibility in the social quality of space means a lot to the user. The concepts of living also relate to this phenomenon of social sustainability. The home is a space with individual comfort and close company. The user's lifestyle is always linked not only to the device but also to the surrounding living space. People need to interact and have visual and verbal connections with the neighborhood.

The high-quality spaces and built-up or undeveloped features influence the interaction of people and the use of these spaces. There are two social dimensions of buildings, namely the functional space, which includes the spatial configuration, and the physical configuration of the form, the elements (Hillier et.al. 1984). The continuity of social sustainability is important from the communication space to the unit level. The social concerns of sustainability encompass several dimensions. These dimensions are based on identity, social life, spatial density, etc.

In addition, new development ideas and a ordable living concepts should follow the regional character of a city. This is necessary to preserve a city's identity. In some large cities, such as Ahmedabad, Paris, New York, London, etc. the idea of maintaining the city's central character is also being considered. The right environment and cultural roots must be conveyed to future generations through a regionally sensitive physical environment. To evaluate a building aesthetically, elements of the facade must be taken into accounts, such as color, building material, and proportion (Coeterier, 2002). In addition to Askari and Dola (2009) stated that there are visual elements of the facade that influence the image of historical buildings, such as the architectural style, shape, texture, material, color, dimensions, and scale as well as building's ornamentation. For the functional assessment of the building, aspects such as access, line of sight, areas, surrounding lateral edge areas, and connectivity must be taken into account. Studying and analyzing the relationship between the psychology of people or users and the physical environment is important.

3. Methodology

Literature from various contributing fields is considered comprehensively to explain the social dimensions, character, identity, culture, and their relation with a ordability. The literature review shows a strong requirement of addressing social dimensions in a ordable housing projects. This study also follows an observational method and photographic survey of Pune core city areas and of the existing facades that narrate the social dimensions & cultural background of Pune. The roles and strategies for social dimensions are proposed in consideration with the current Pune municipal corporation (PMC) regulations that accommodate the advancements in a ordable housing guidelines. The same is supported by literature références to establish the practicality and possibility in implémentation. This study aims to define the role of social dimensions and in the design of a ordable housing.

4. Analysis and Discussions

The inferences obtained from the qualitative literature review and the observational analysis of the social dimensions suggest that the user's lifestyle and their psychological associations with the space are inseparable and comprise of functional space including spatial configuration and physical configuration of form and elements. These dimensions are based on identity, social life, density of the space etc.The attributes of social dimensions relate to their house as a home rather than a physical functional space and could change the perception of the user towards a ordable housing projects. Therefore, if spaces were designed with non-sensitive approach, then natural patterns of social environment can't get followed. The continuity of social sustainability is thus important from habitat to the unit level.

The study suggests a matrix of social dimensional attributes, the role of the proposed strategies, and their contribution to a ordability. The proposed framework of comprehensive matrix's (Table 1) decodes the attributes of social dimensions namely, space optimization, shared spaces that enable the user to e ciently carry out their secondary activities without reducing their owned unit areas, regional connect, informal spaces/communication spaces like open galleries and access areas, The inclusion of social dimensions in housing facilitating sustainable and a ordable living for the occupants.

Table 1 Matrix of Social dimensions in the design of a ordable housing

Sr. No.	Social Dimensions	Role & Proposed strategies / policies	Contribution to A ordability
1.	Space optimization	The spatial configuration should possess high value of e cient planning, Every corner and passage should be usable in terms of housing economics. The positions of interior components could be finalized with reference to the available lengths of the walls. Maximum horizantality as observed in Pune's traditional buildings like the Wadas and chawls with rectangular or squarer room profiles.could be adopted ensuring multifunctionality of the space with maximum utilisation	A ordable housing projects face limitations to space. Therefore, rectangular profiles can create a flowing space when possible, open up doorways or walls so adjacent rooms blend together and additionally reduce constructional cost and availability of thoughtful physical spaces that contributes to a ordability of the project
2	Planning of Informal / Communication spaces	Informal communication spaces at apartment level and in between the built forms to fulfill users social needs should be provided. Include elements like overlooking galleries, central atrium/courtyards, and interim passages that everyone must use to access individual apartment,This could play a vital role in establishing communication amongst users	The design of a ordable housing faces restrictions to providing open spaces for individual units. In this scenario common communication spaces like atriums, courtyards and interim passages cater to secondary functions of the families and also add to the social. The outdoor and indoor common spaces also creates transitional harmony and a positive impact on built environmental quality

3	E cient density planning	Use of flexible and convertible spaces with e cient space optimization should be a design concept to cope with the high density in low cost flats without compromising on the quality of life E cient planning of service lobbies and circulation passages is needed to cater to multiple tenements per floor with distributed density.	The higher density with e cient space optimization achieves a ordability. It will help to get rid of the ideas like reduced floor areas, compressed spaces, and other aspects which reduce the quality of life. It benefits to involve other stakeholders like developers in terms of catering high density with qualitative planning with considerable profit margin.
4	Regional Connect (Interrelation of building with city character)	Traditional elements in elevation, fenestrations, creating regional consciousness, pillars, pilasters, door frames, windows, shading devices that add character should retain the detailing that was observed in the era in which the building was built	Change in perception towards a ordable housing projects, giving a sense of connectedness Residents can relate to their house as home,and to their native culture. The consideration of user's lifestyle and their psychological associations with the space and a sense of connectedness can change the perception towards a ordable housing projects in the observer's mind.
5	Planning of Accesses	Access areas should generate transitional harmony between built and unbuilt. While catering convenience to all age users while accessing the building, elements like privacy, security should be addressed which are related with social beliefs.	This allow e ective horizontal and vertical communication and can also . bring a positive change in the perception about acceptability for a ordable housing in a society.
6	Unit level design policies	The unit level design planning should consider user activity pattern and associated cultural beliefs, sentiments. The elements like privacy, security should be addressed which are related with social beliefs. All habitable areas should be designed towards north and south to have a comfortable indoor environment and minimum use of air conditioning with energy e ciency and low CFC emission value should be used.	Emerging culture is a key parameter for a ordable housing projects and governs thresholds of both quality and quantity of spaces and their utilization. Thus the style of planning can bring a positive change in the perception about acceptabilityfor a ordable housing in a society.

7	Overlooking galleries	Use of overlooking galleries, open staircases, passages catering to secondary functions and establishing communication amongst users should be included in design detailing for a ordable housing	Design communication spaces add a feeling of cohesive living and reduce maintenance charges. The galleries can also be used as a space for secondary activities A variety of social activities can happen in these communication spaces like chatting, newspaper reading, web communication, secondary house hold works, play activities etc which adds value to the carpet area.
8	Mid-rise buildings	Restrict the height of buildings with e cient density planning This would enabe enables better living quality .	Eliminating mechanical vertical access lowers construction cost and also reduces the maintenance cost creating social a ordability .
9	Geometry	Rectangular or squarer room profile is suggested for unit level design as it creates maximum usable space than any other shape and ensures multifunctionality of the space with maximum utilization	A square or rectangular plan shape or a combination enables optimization of space usability and helps in economic design as it consumes the least amount of walls compared to other shapes and thus a ordable

Considering the growing demand for real estate (FSI), the infrastructural interventions, and neglect towards the tangible and intangible aspects that are an identity of the city, the matrix explains the role of social dimensions that are inseparable of the habitual living of the occupants in an urban context. It attempts to list down strategies that could address the concerns of retaining the cultural characteristics which have created a city image in the minds of the people that are living or migrating to Pune city. It further states the a ordability that is achievable by using the mentioned strategies.

The attributes like spatial planning, aesthetics, fenestrations, informal communication spaces that promote social activities add value to the quality of living. The sense of social cohesion in the urban context reflects the change in the perception of occupants and neighborhoods towards a ordable housing. Fig 5 (i) & (ii) shows the overlooking galleries with elements of the cultural façade of Pune city.

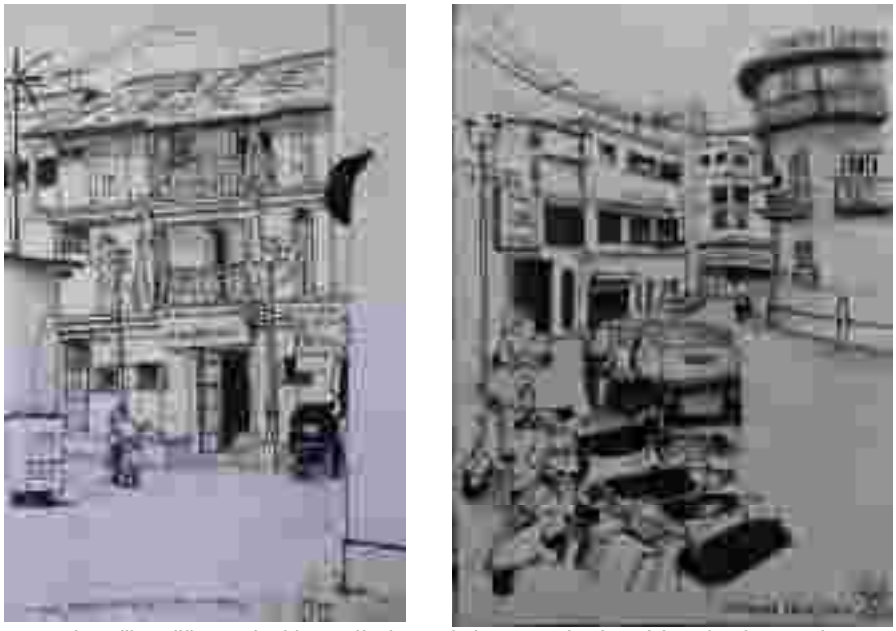


Fig 5 (i) & (ii) Overlooking galleries and elements of cultural façade of Pune city
(Source: Author)

5. Conclusion

This paper thoroughly investigates the concept of social dimension and a ordability. The observation analysis indicates that the consideration of the occupant aspirations in each neighborhood can improve the socio-economic aspects of a ordable housing. The paper contributes to the literature by recommending the socio-dimensional matrix and its relevance to the designing of a ordable housing.

The case of Pune city helps to understand the need to give importance to architectural components to include spatial planning, geometry and space optimization, informal communication spaces, fenestrations, e cient unit design, common access areas, incorporating overlooking galleries as design policies for a ordable housing which can help in retaining the historic & cultural background of the city and acceptability of occupants towards the a ordable housing design. This study provokes the thought process of the designer to design a ordable housing beyond the rigid space design.

It further recommends (i) the use of region-sensitive facades that narrate the identity of the city that can be implemented by integrating them with prevailing development policies by the regulatory authority (ii) the use of renewable energy, and faster construction technology to fulfill the physical, psychological, and social needs of the occupant at an a ordable cost.

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राज्यस्तरीय वास्तुकला मराठी परिषद

२७ फेब्रुवारी २०२२

मराठी राजभाषा दिन

शोधनिबंध पुस्तिका

आयोजक

तंत्रशिक्षण विभागीय कार्यालय,
पुणे

भारतीय कला प्रसारिणी सभेचे
वास्तुविद्या महाविद्यालय. पुणे

तंत्रशिक्षण विभागीय कार्यालय, पुणे व भारतीय कला प्रसारिणी सभेचे वास्तुविद्या महाविद्यालय, पुणे आयोजित.

राज्यस्तरीय वास्तुकला मराठी परिषद, २०२२'

कार्यक्रमाची रूपरेषा

२७/२/२०२२

सकाळी	९:३०	**दिपप्रज्वलन, सरस्वती वंदना व उद्घाटन.**
सकाळी	९:४५	**स्वागत** डॉ. अभिजीत नातू प्र. प्राचार्य, भा. क. प्र. स. चे वास्तुविद्या महाविद्यालय, पुणे
सकाळी	१०:००	**मार्गदर्शनपर भाषण** मा. डॉ. दत्तात्रेय जाधव सहसंचालक, तंत्रशिक्षण विभागीय कार्यालय, पुणे
सकाळी	१०:१५	**मार्गदर्शनपर भाषण** मा. श्री. पुष्कराज आलचंद्र पाठक सचिव, भा. क. प्र. सभा , पुणे
सकाळी	१०:३०	**विशेष अतिथी परिचय**
सकाळी	१०:३५	**बीजभाषण** मा. डॉ. उज्वला चक्रदेव मा. कुलगुरु, एस. एन. डी. टी. महिला विद्यापीठ, मुंबई
सकाळी	१०:५० ते ११:००	चहापान

सकाळी	११:०० ते दु. १२:३०	**शोधनिबंध सादरीकरण** (समांतर सत्रे)
दुपारी	१२:३० ते १:००	मध्यंतर
दुपारी	१:०० ते २:३०	**शोधनिबंध सादरीकरण** (समांतर सत्रे)
दुपारी	२:३० ते २:४५	चहापान
दुपारी	२:४५ ते ४:१५	**शोधनिबंध सादरीकरण** (समांतर सत्रे)
दुपारी	४:१५ ते ४:३०	**समारोप**
		पसायदान

तंत्रशिक्षण विभागीय कार्यालय, पुणे

व

भारतीय कला प्रसारिणी सभेचे वास्तुविद्या महाविद्यालय, पुणे

आयोजित,

'राज्य स्तरीय वास्तुकला मराठी परिषद, २०२२'

('ऑनलाईन' प्रणाली द्वारे)

भारतीय स्वातंत्र्याचा अमृत महोत्सव तसेच, मराठी भाषा गौरव दिन यानिमित्त रविवार दिनांक २७ फेब्रुवारी २०२२ रोजी राज्यस्तरीय वास्तुकला मराठी परिषदेचे आयोजन करण्यात येत आहे. वास्तुकला विषयाशी निगडीत माहिती व साहित्य समृद्ध तसेच व्यापक आहे. परंतु तुलनात्मक दृष्ट्या, मराठी भाषेत या विषयावर पुरेसे संदर्भ, पुस्तके उपलब्ध नाही. परिषदेचे आयोजन मराठी भाषेत करून, पुढाकार व प्रोत्साहनाचा हा एक महत्वाचा प्रयत्न व सुरुवात ठरेल असा विश्वास आहे. वास्तुकला क्षेत्रातील यशस्वी मान्यवर प्राध्यापक वर्ग विद्यार्थी तसेच व्यावसायिक या सर्वांनाच व्यासपीठ उपलब्ध होऊन, त्या संबंधित लिखाण, सादरीकरण व चर्चा यास उत्तम प्रतिसाद लाभेल अशी खात्री आहे. विविध विषयावरील उत्तम लिखाण शोधनिबंध पुस्तिका रुपाने प्रकाशित केले जाईल.

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१. पर्यावरण व भूदृश्य
२. सर्वसमावेशकता
३. पर्यायी व नाविन्यपूर्ण तंत्रज्ञान
४. स्वातंत्र्योत्तर वास्तुकला
५. नवी शहर नवी वाटचाल
६. कोरोना साथीनंतरची वास्तुकलेतील स्थित्यंतरे
७. नगरनियोजनातील नवीन आव्हाने
८. उत्पादन रचनेतील विविधता
९. अंतर्गत सजावट
१०. वास्तुकलेचा इतिहास
११. वास्तुकला व्यवसायातील आव्हाने

शोधनिबंध पाठविण्याबाबत सविस्तर सुचना

१. शब्दमर्यादा ८०० ते १५००
२. मराठी अक्षरप्रकार आकार:
ठळक बाबी - १४, नियमित - ११
३. अक्षरप्रकार: श्रीलिपी किंवा शिवाजी
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१४ फेब्रुवारी २०२२
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२० फेब्रुवारी २०२२

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अस्वीकरण

सदर निबंध पुस्तिकेतील लेखांत / निबंधात, मांडलेली मते व माहिती तसेच संदर्भ हे संबंधित लेखकांनी त्यांच्या जबाबदारीवर लिखित व प्रकाशित करण्यास संमती दिलेली आहे. तसे संमतीपत्र त्यांनी संयोजन समितीत सादर केलेले आहे. या पुस्तिकेतील विचार, मते व लिखाण यासाठी संयोजन समिती, महाविद्यालय वा संचालनालय जबाबदार असणार नाही.

अनुक्रमणिका

परवडणाऱ्या घरांसाठी व्यवहार्य आणि लवचिक रचनेचे निकष

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गोषवारा:

गृहनिर्माणातील 'परवडणारी क्षमता' हा शब्द रचनेचा खर्च, बांधकाम खर्च, जमिनीचा खर्च, विकास खर्च आणि इतर अनेक खर्चांचा समावेश करतो. बऱ्याच वेळा चर्चा आणि कृती परवडणाऱ्या बांधकाम खर्चाच्या व्यवस्थापनावर चालतात. गृहनिर्माण परवडणाऱ्या घरांच्या स्थापनेत हा घटक महत्त्वाचा असला तरी, रहिवासी व्यक्तीचे टिकाव किंवा राहणीमानही परवडणारे असले पाहिजे. या शोधनिबंधामध्ये हे खर्चाचे वर्तुळ पूर्ण करण्यासाठी आणि बदलत्या गतिमान भौतिक वातावरणात परवडणाऱ्या जीवनाचा विचार करून परवडणाऱ्या घरांची व्यवहार्य, लवचिक रचना देण्यासाठी काही मापदंड सुचवले आहेत.

संशोधकाने प्रस्तावित केलेले व्यवहार्य निकष विशिष्ट प्रकल्पाच्या स्थानाचे विश्लेषण करून त्याच्या व्यवहार्यतेबद्दल मूलभूत कल्पना देतील. लक्ष्यित अंतिम वापरकर्ता गट, संक्रमण मार्ग, संबंधित सुविधा, सभोवतालची पर्यावरणीय परिस्थिती आणि प्रस्तावित प्रदेशाची भविष्यातील वाढ, हे सर्व घटक खऱ्या अर्थाने परवडणारे घरांची गरज आणि उत्पादन वाढवू शकतात. सभोवतालच्या सामाजिक परिस्थितीचे निरीक्षण करून लवचिकतेची संज्ञा 'अनुकूलता' म्हणून परिभाषित केली जाऊ शकते. लवचिक नसणाऱ्या परवडणाऱ्या घरांच्या रचनेची समस्या ही जमिनीच्या तीव्र टंचाईशी संलग्न आहे. म्हणून लोकांना अप्रत्यक्षपणे उपलब्ध निवारा पर्याय निवडण्यास भाग पाडले जाते जे त्यांच्या आवश्यकतांनुसार डिझाइन केलेले नाहीत. सदर शोधनिबंधात बहु-कार्यात्मक लिव्हिंग रूम स्पेस, बहुमजली अपार्टमेंटसह मॉड्युलर युनिट, तसेच मध्यम आणि कमी उंचीच्या नवकल्पनांवर चर्चा केलेली आहे. हा शोधनिबंध रहिवाशांच्या चांगल्या दर्जाच्या जीवनासाठी जागांच्या सामाजिक सांस्कृतिक वैशिष्ट्यावर देखील प्रकाश टाकेल. आवश्यकतेनुसार प्रभावी जागेचे नियोजन परवडणाऱ्या गृहनिर्माण क्षेत्रात गुणात्मक फरक घडवेल.

प्रमुख शब्द: व्यवहार्यता, अनुकूलता, जागेचे नियोजन, बहुकार्यात्मक, लवचिकता, शाश्वत

१. परिचय:

परवडणारी घरे हा विषय अत्यंत महत्वाचा आणि भारतासह सर्व जगाचा निकराचा विषय झाला आहे. लोकसंख्या वाढीचे संकट आणि त्या नुसार सोयी सुविधांचे निर्माण आणि नियोजन हे दिवसेंदिवस जिकिरीचे होत चाललेले आहे. अनेक देशांची सरकारे, संस्था, वास्तुविशारद, अभियंते या विषयाशी निगडित काम करतात. प्रधानमंत्री आवास योजने अंतर्गत प्रत्येक गरजू व्यक्तीला परवडणारी घरे मिळावीत असा भारत सरकारचा २०२२ पर्यंतचा संकल्प आहे (सूर्यवंशी, २०१६). हे सगळे प्रयत्न होत

असताना एक दर्जेदार आणि शाश्वत राहणीमान गरजू घटकाला कसे देत येईल याची चर्चा होणे गरजेचे ठरते. परवडणाऱ्या घराचे मूल्य हे फक्त विक्री वा खरेदी मूल्य नसून त्या पलीकडे जाऊन एक सर्वसमावेशक आणि शाश्वत राहणीमानाकडे खुणावणारे आहे. म्हणून वापरकर्त्याच्या गरजेनुसार घराची रचना होणे अगत्याचे ठरते.

२. महत्व आणि पार्श्वभूमी:

देशभरात अनेक परवडणाऱ्या घरांचे प्रकल्प आहेत. परवडणारी घटना. परवडणाऱ्या घरांच्या रचनेमध्ये राहणीमान आणि शाश्वत गोष्टींचा अंतर्भाव मोठी भूमिका बजावतात. व्यवहार्यतेची संकल्पना वास्तुविशारदाला परवडणाऱ्या घरांच्या रचनेकरता मार्गदर्शक तत्त्वे देते. लवचिकता त्यात थेट सामग्री जोडते. जागेची प्रभावी रचना हा एक लवचिकता प्रदान करण्यातला एक घटक आहे (श्नायडर, २००७). तसेच प्रभावी तंत्रज्ञान आणि बांधकाम पद्धत पाहिजे वापरकर्त्याला लवचिक आणि जुळवून घेणारी भौतिक रचना प्रदान करते (इनानी, २०१४, नरेंद्रन २०१४).

परवडणाऱ्या घरांच्या रचनेसाठी वास्तुशास्त्रात अनुकूलतेचा समावेश करणे आवश्यक आहे जे पर्यावरण, आर्थिक आणि सामाजिकदृष्ट्या टिकाऊ आणि शाश्वत आहे. परवडणारे राहणीमान वापरकर्त्याच्या कामावरून आणि रोजच्या दिनक्रमातून ओळखले जावे. घरातील अंतर, निवासस्थानापासून नोकरी वा व्यवसाय स्थानाचे अंतर, प्रभावी अंतर्गत आणि बाह्य जागेचे नियोजन, घरामध्ये अक्षय ऊर्जा स्त्रोतांचा वापर हे महत्वाचे निकष ठरतात. लवचिक आणि व्यवहार्य कृतींमुळें रचनेचा खर्च आणि बांधकाम खर्च कमी होतो. हुडको, बी.एम.टी.पी.सी., म्हाडा, परवडणाऱ्या गृहनिर्माण क्षेत्रात चांगली कामे करत आहेत. तसेच टाटा, शापूरजी पालोनजी सारखे खाजगी विकासक विकासात रस घेत आहेत संबंधित सुविधा आणि कामाची जागा प्रस्तावित गृहनिर्माण जागेच्या जवळ असावी. हे शहराच्या मध्यवर्ती भागावरील भार कमी करते ज्यावर उपशहरी भागातील लोक अवलंबून आहेत.

३. व्यवहार्य रचनेचा अभ्यास:

व्यवहार्यता अभ्यास हा प्रकल्पाच्या अगदी सुरुवातीच्या टप्प्यात केलेला प्राथमिक अभ्यास असतो. व्यवहार्यता रचनेचे निकष हे प्रकल्पाचे नियोजन आणि मांडणीच्या टप्प्यात किफायतशीर होण्यास मदत करतात. व्यवहार्य रचनेचा उद्देश हा लक्ष्यित अंतिम वापरकर्त्यासाठी प्रकल्प व्यवहार्य आहे की नाही हे स्थापित करणे आणि परवडणाऱ्या जीवनासाठी व्यवहार्य पर्याय ओळखणे हा असतो. प्रस्तावित शहराच्या वाढीच्या पॅटर्नचा अभ्यास आणि निवासी, व्यावसायिक आणि औद्योगिक झोनिंग यांचे स्थानही लक्षात घेणे महत्त्वाचे आहेत. या झोनच्या एकूण मॅपिंगमुळे परवडणाऱ्या घरांच्या स्थानाविषयी मूलभूत कल्पना येऊ शकते. शहरातील गृहनिर्माण क्षेत्रे, बस स्थानक, जवळचे बस थांबे, रेल्वे स्थानक इत्यादींच्या अंतरांसह प्रस्तावित भूखंडाला लागून असलेल्या प्रमुख परिवहन मार्गांचे विश्लेषण देखील वापरकर्त्यासाठी किफायतशीर राहणीमानात महत्त्वाची भूमिका बजावते. साइट मूल्यांकनाचे समांतर मूल्यांकन, भू-तांत्रिक अभ्यास, सेवांची उपलब्धता, वापरकर्त्यांच्या सामाजिक-सांस्कृतिक गरजा लक्षात घेऊन लगतच्या जमिनीचा वापर, पर्यावरणीय प्रभाव इत्यादींचा समावेश परवडणाऱ्या घरांच्या रचनेत करून लोकांच्या दर्जेदार जीवनाप्रती संवेदनशीलता निर्माण होते. वास्तुविशारदांनी परवडणाऱ्या घरांच्या प्रकल्पबद्दल उद्भवणाऱ्या कार्यात्मक आणि देखभाल समस्यांबद्दल देखील विचार करणे गरजेचे आहे.

३.१ स्थान आणि साइटची निवड:

साइट निवड ही किंमत कमी करण्याच्या दिशेने एक महत्त्वाची प्राथमिक पायरी आहे. जागा रहिवासी झोनमध्ये असणे आवश्यक असते. प्रस्तावित क्षेत्र दलदलीची माती किंवा नदी जवळील क्षेत्र टाळून चांगल्या स्तरावर असावे. हे सामान्यतः इमारतीच्या नंतरच्या ऑपरेशनल आणि देखभाल समस्या कमी करते. साइटवर सेंद्रिय कचरा, सॉल्टपीटर आणि इतर हानिकारक रसायनांपासून मुक्त माती असावी. प्रकल्पसाठीची जागा ही शहराच्या चांगल्या कनेक्शन नेटवर्क लाइनवर किंवा नियोजित मुख्य भागात स्थित असावी. तसेच प्रकल्पाची जागा ही शहराच्या प्राथमिक जागी असावी. जेणेकरून समाजमधली श्रीमंत वर्ग आणि गरजू वर्ग यामधील सामाजिक दरी कमी होण्यास मदत होईल.

रस्त्याची समीपता आणि प्रमुख लगतचे रस्ते परवडणाऱ्या राहणीमानात मोठी भूमिका बजावते. रहिवासी नेहमी कामाच्या ठिकाणाहून जवळ असलेली सदनिका विकत वा भाडेतत्त्वावर घेण्यास प्राधान्य देतात. त्यामुळे काम, निवास आणि समाज (गिडीज ट्रँगल) या संकल्पनात्मक त्रिकोणात असे सुचवले आहे की परवडण्याजोगे राहणीमान आणि तणाव कमी राहण्यासाठी या तीन घटकांची पूर्तता करणे आवश्यक असते.

३.२ साइट प्लॅनिंग आणि लेआउटची रचना:

स्थळ नियोजन किंवा मांडणीचे नियोजन करण्यासाठी झोनिंग आणि अंतर्गत रस्त्यांसाठी नियमित भूमितीय पॅटर्नचे पालन करणे आवश्यक आहे. जे क्षेत्राच्या समान वितरणासह सदनिकांची घनता वाढवण्यास मदत करते. कार्यक्षम मांडणी प्रकल्पाच्या एकूण खर्चाच्या २० टक्क्यांपर्यंत खर्च कमी करू शकते. वास्तुविशारदाने सर्जनशील काम केले पाहिजे. प्रस्तावित जागेचे नियोजन जमिनीच्या नैसर्गिक भूगोलानुसार केले पाहिजे. स्तरावरील अनावश्यक बदलांमुळे प्रकल्पाची किंमत वाढू शकते. सभोवतालच्या परिसराची गुणवत्ता राखण्यासाठी साइट विकासादरम्यान विद्यमान वनस्पती आणि प्राणी जतन केले जावे. साइट प्लॅनिंगमध्ये एक मध्यवर्ती जागा न देता त्याऐवजी वितरित मोकळ्या जागा आणि त्याभोवती सदनिकांची रचना फायदेशीर ठरते. अपघात आणि रहदारी टाळण्यासाठी साइट दुय्यम प्रवेशावर स्थित असावी.

३.३ सेवांचे वाटप आणि वितरण:

स्वछतागृहे तसेच पाणी व्यवस्था यांचे स्थान एक बाजूला असावे. ही अशी रचना कमी गुंतागुंतीची असावी. दीर्घकालीन पुढील ऑपरेशनल आणि देखभाल शुल्क टाळण्यासाठी उतार योग्यरित्या निश्चित केलेले असावेत. ऊर्जेचा खर्च कमी करण्यासाठी पाणीपुरवठा लाईन्सचे स्थान सर्वोच्च ठिकाणी प्रस्तावित केले जावे. ड्रेनेज लाईन सर्वात कमी बिंदूंवर पोहोचवल्या पाहिजेत. प्रस्तावित प्रदेशातील घनकचरा व्यवस्थापन धोरणे समजून घेतली पाहिजेत. महापालिकेच्या सेवा लाईनची उपलब्धता तपासली पाहिजे.

३.४ अक्षय ऊर्जा स्त्रोतांचा वापर:

सध्याच्या परिस्थितीचा विचार करता नियोजनात अक्षय ऊर्जा तंत्राचा वापर करणे अत्यंत महत्त्वाचे आहे. या तंत्रांमुळे, स्वयं-सिद्धतेची संकल्पना अस्तित्वात येते. ज्यामुळे विद्यमान पायाभूत सुविधांवरील भार कमी होतो. रेन वॉटर हार्वेस्टिंग, सॉलिड वेस्ट ट्रीटमेंट प्लांट, बायो गॅस निर्मिती, सौरऊर्जेवर आधारित उत्पादने आदी तंत्रे प्राधान्याने राबवणे किफायतशीर ठरते. शाश्वत जीवनाची व्यवहार्यता या तंत्रांद्वारे देखील साध्य केली जाऊ शकते. आजकाल, अनेक देश शाश्वत जीवनमान आणि धावण्याचा खर्च लक्षणीयरीत्या कमी करण्याच्या समान तत्त्वाचा अवलंब करत आहेत.

३.५ प्रशासकीय धोरणांची भूमिका:

एफ.एस आय, किरकोळ अंतर, ग्राउंड कव्हरेज यासंबंधीची धोरणे व्यवहार्य परवडणाऱ्या घरांच्या डिझाइनसाठी स्वतंत्रपणे तयार करणे प्रभावी ठरू शकते. रहिवाशांचे वर्गीकरण, प्रस्तावित झोनमधील लोकसंख्येचे केंद्रीकरण यावर वरील निर्णय घेता येऊ शकतात.

४. लवचिक रचनेचा अभ्यास:

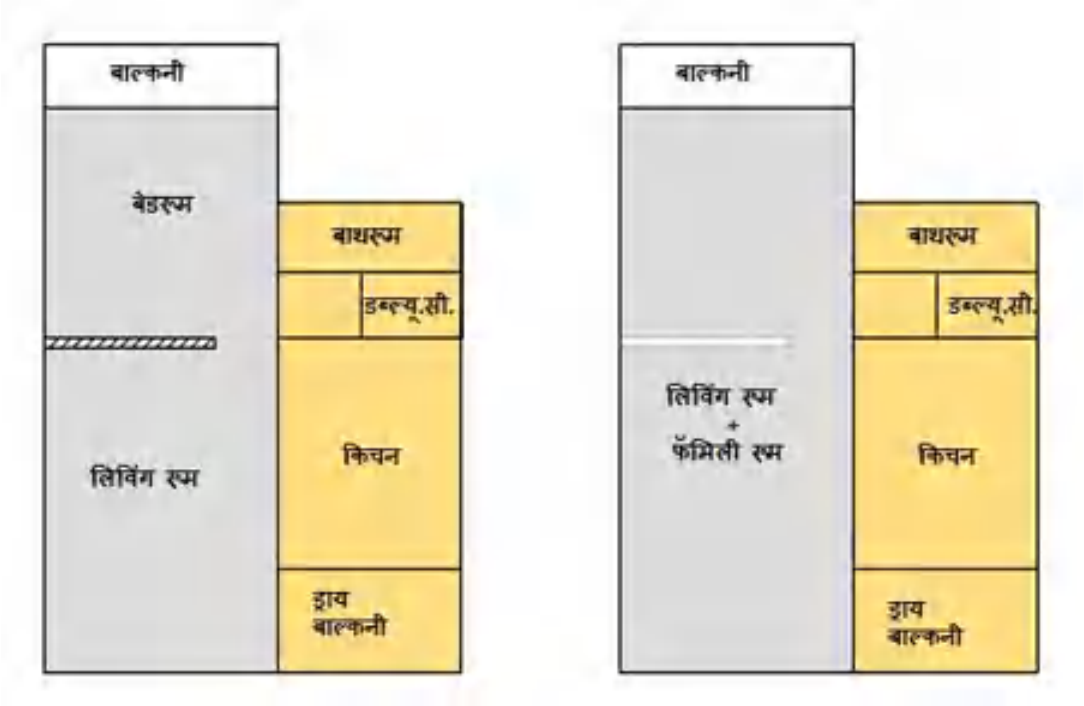
परवडणाऱ्या घरांमध्ये लवचिक रचना ही महत्त्वाची बाब आहे. लोकांच्या गरजा आणि प्राधान्यक्रम कालांतराने बदलत असल्याने घराची रचना अनुकूल असावी. लवचिकते द्वारे पूरक बांधकाम तंत्रज्ञान प्रदान करणे तसेच वापर आणि व्यवसायाच्या दृष्टीने जागेची ठरवून रचना करणे शक्य होते. लवचिकता, ज्यामुळे लवचिकता सक्षम होते (ग्रॅहम, २०१६). लवचिक रचने मध्ये स्ट्रक्चरल सिस्टम महत्त्वपूर्ण भूमिका बजावते. राहण्यायोग्य जागा आणि सेवानुरूप जागा यांची जोडणी आणि त्याचे वाटप प्रभावी असावे. लवचिक रचना दिवसा आणि रात्रीच्या प्राधान्यक्रमानुसार असेल तर जागा व्यवस्थापन देखील प्रभावी होते. ज्यामुळे सदनिकांच्या एकूण खर्चावर त्याचा सकारात्मक परिणाम होतो. आतील भाग बदलांसह समायोजित करण्यासाठी वापरकर्त्याच्या सोयीनुसार पुरेसे लवचिक असावे (इनानी, २०१४).

गृहनिर्माण प्रकल्पाच्या एकूण खर्चामध्ये लवचिकता ही संकल्पना एक प्रमुख भाग आहे. हे नियोजन, बांधकाम तंत्रज्ञान, साहित्यात सुरू केले जाऊ शकते आणि प्रस्तावित प्रदेशानुसार सामाजिक-वर्तणूक रचना साध्य करण्यासाठी त्याची अंमलबजावणी केली जाऊ शकते. परवडणारी घरे सामान्यत: कमी वैशिष्ट्यांसह रचनेमध्ये नीरस दिसतात जी प्रत्यक्षात सामाजिक मागण्यांनुसार जीवनाचा दर्जा देऊ शकतात आणि नीरसपणापासून मुक्त होण्यासाठी लवचिक परवडणारे राहणीमान प्रदान करू शकतात.

४.१ सदनिका रचनेतील लवचिकता:

चटईक्षेत्र आणि दिवसा आणि रात्रीच्या वेळी वापरकर्त्याच्या वर्तणुकीशी संबंधित क्रियाकलाप लक्षात घेऊन सदनिकांची रचना प्रभावी असावी. आकृती १ चा डावीकडील भाग साधारणपणे कमी उत्पन्न गटासाठी कशी रचना केली जाते हे स्पष्ट करतो. आकृती १ स्पष्टपणे दर्शविते की वापरकर्त्यासाठी एक जागा उपलब्ध आहे ज्यामध्ये गर्दी आहे आणि दुसरीकडे आजच्या बाजारपेठेचा विचार करता जागा उपलब्ध करून देण्याच्या बाबतीत कोणीही पुढे जाऊ शकत नाही. या संवेदनशील आणि गंभीर

स्थितीत वास्तुविशारदाने वापरकर्त्याच्या गरजेनुसार लवचिक, जुळवून घेण्यायोग्य रचनेचा विचार केला करणे गरजेचे आहे. कमी उत्पन्न गटातील वापरकर्ते त्यांच्या दिवस आणि रात्रीच्या गरजेनुसार जागा समायोजित करू शकतात. आकृती १ चा उजवी कडील भाग हा दिवाणखाना आणि बेडरूममधील भिंत दिवसा आणि संध्याकाळच्या वेळी समायोजित केली जाऊ शकते आणि कौटुंबिक वापरकर्त्यांसाठी चांगली परस्परसंवादी जागा आणि जेवणाची जागा आहे हे दर्शवतो. सामान्य कुटुंबाच्या राहण्यायोग्य जागेतूनही बाल्कनी दिवसा सहज वापरता येते. त्याच्या मूळ मध्यस्थ भिंतीच्या रचनेमध्ये बदल करून गोपनीयता राखली जाऊ शकते. खाचेतील कपाटे, खालच्या पातळीच्या खिडक्या यांसारख्या जागा लिव्हिंग रूममध्ये बसण्याची आवश्यकता पूर्ण करू शकतात. या प्रकारच्या नियोजन कल्पना सध्याचे क्षेत्रफळ न वाढवून खरोखरच समाधानाची भावना देऊ शकतात आणि त्या संदर्भात होणारा चटईक्षेत्राचा खर्च वाचवू शकतात.

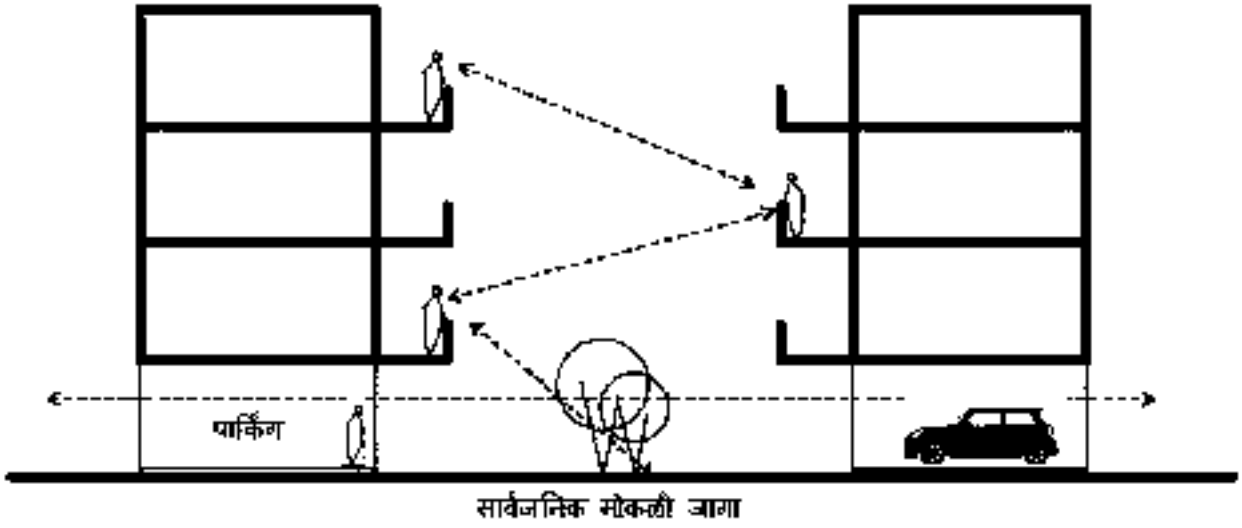


आकृती १: लवचिक रचनेतील एक पर्याय
स्रोत: लेखक

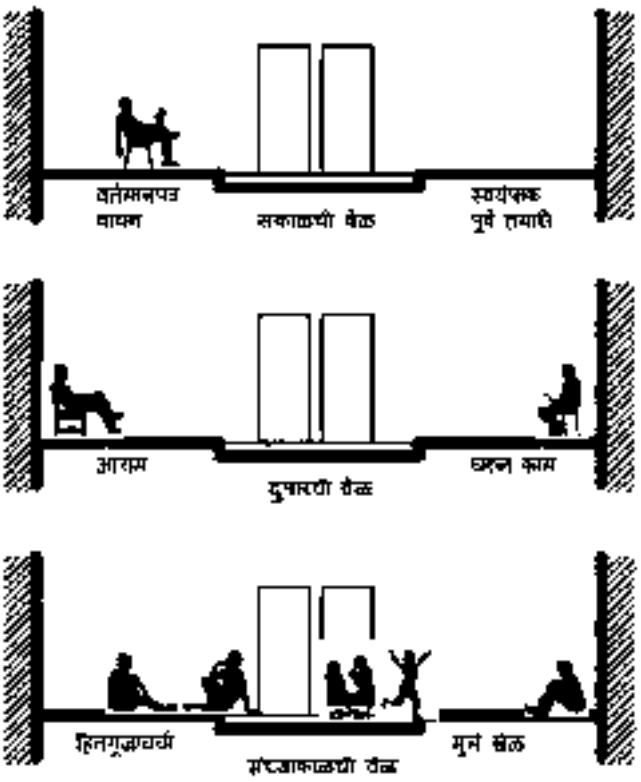
४.२ कॉमन जागे नियोजनातील लवचिकता:

कॉमन जागा वापरकर्त्यांसाठी प्रतिसादात्मक आणि बदलण्यायोग्य असावीत. आलिशान आणि अर्ध आलिशान घरांसाठी सार्वजनिक जागेचे नियोजन वेगळे असावे आणि परवडणाऱ्या घरांमध्ये ते वेगळे असावे. सामान्यतः भारत हा सामाजिक लोकशाही देश आहे. कमी उत्पन्न गटातील लोक नेहमी त्यांच्या घरांसह मोकळ्या जागा विकसित करतात. आकृती २ मध्ये दर्शवल्याप्रमाणे सामाईक लॉबी, अंगण, शेजारील समोरासमोर बाल्कनींनी बांधलेली मोकळी जागा यासारख्या मोकळ्या जागा प्रकल्पाची मूल्य वाढवतात आणि लोकांना त्यांचा सामाजिक संवाद कायम ठेवण्यासाठी प्रेरित करतात. लोक

आपल्या सदनिके व्यतिरिक्त ह्या जागा आकृती ३ मध्ये दर्शवल्याप्रमाणे इतर कामांसाठी वापरू शकतात. हे राहणीमान परवडणारे करण्यात उपयुक्त ठरते. खालील स्केचेस खूप स्पष्टीकरणात्मक आहेत जे एका दिवसात वेगवेगळ्या वेळेच्या अंतराने एकाच जागेवरील लोकांचे अनुकूलन व्यक्त करतात. आतील गतिविधी जागांचे निर्बंध काही टक्के सामाईक जागांमध्ये मुक्त केले जाऊ शकतात.



आकृती २: परस्परसंवादी कॉमन स्पेस
स्रोत: लेखक



आकृती ३: सदनिकेसमोरच्या मोकळ्या जागेचा वापर
स्रोत: लेखक

४.३ लवचिक बांधकाम तंत्रज्ञान आणि साहित्य:

बांधकाम तंत्रज्ञान आणि बांधकाम साहित्य अनुकूल असावे आणि त्याचा वापर लवचिक असावा. परवडणाऱ्या घरांमध्ये हे अतिशय महत्त्वाचा लवचिक रचना निकष आहे. साहित्य आणि बांधकाम पद्धती बहुमजली, मध्यम उंचीची आणि कमी उंचीची घरे यांसारख्या विविध प्रकारची इमारती प्रदान करण्याच्या दृष्टीने लवचिक असल्यास बांधकाम खर्च नियंत्रणात येऊ शकतो.

बहुमजली बांधकामासाठी लवचिक पद्धत म्हणजे पॅनेल बांधकाम पद्धत. हे साइटवर किंवा कारखान्यांसारख्या नियंत्रित वातावरणात प्री-फेब्रिकेटेड असू शकतात. हे तंत्रज्ञान मानकीकरण प्रक्रियेस मदत करते. नियंत्रित वातावरणात गुणवत्ता तपासणीमुळे गुणवत्ता देखील राखली जाते. ते बांधकाम वेळ मोठ्या प्रमाणात कमी करतात.

आकृती ४ : पॅनलिंग प्रणाली
(स्रोत: स्वेतलाना ब्रझेव्ह, ब्रिटिश कोलंबिया इन्स्टिट्यूट ऑफ टेक्नॉलॉजी, कॅनडा)

या प्रणालीमध्ये अंतर्गत भिंती सरकत्या किंवा पॅनेलच्या हलक्या वजनाच्या घनतेसह आच्छादित केल्या जाऊ शकतात. लवचिक डिझाइनसाठी बांधकाम साहित्य आणि तंत्रज्ञान त्यांच्या सध्याच्या खर्चाच्या आधारावर तसेच पर्यावरणीय टिकाऊपणा आणि जीवन चक्र खर्चाच्या दृष्टिकोनातून निवडले पाहिजे. जे साहित्य स्थानिक पातळीवर आहे. उपलब्ध आहे ते शक्य तितके वापरले पाहिजे.

५ . निष्कर्ष:

निवारा ही प्रत्येक व्यक्तीची प्राथमिक गरज आहे. मागणी आणि पुरवठा यातील समतोल सांभाळावा लागतो. अनेक आहेत. देशभरात वर्तमानात परवडणारे गृहनिर्माण प्रकल्प सुरू आहेत. संशोधन

पेपरमध्ये वर नमूद केलेल्या व्यवहार्य आणि लवचिक घटकांवर. हे विश्लेषणात्मक संशोधन लक्ष्यित गटाच्या मानसशास्त्रीय अभ्यासासाठी आणि त्यांच्या शारीरिक आणि सामाजिक इच्छांच्या दिशेने पुढे नेले जाऊ शकते आणि परवडणाऱ्या घरांच्या रचनेच्या निकषांमध्ये अंतर्भूत केले जाऊ शकते. पद्धती. परवडणारी घरे ही अजिबात मर्यादित राहणीमान नसून ते सामाजिक संवेदनशील गृहनिर्माण आहे. कमी उत्पन्न गटातील लोकांची टक्केवारी भारतातील इतर कोणत्याही गटापेक्षा जास्त आहे. त्यामुळे एवढ्या सुविधांची कार्यक्षमतेने पूर्तता करण्यासाठी, लवचिक आणि व्यवहार्य निकषांवर त्याची छाननी करणे अत्यंत आवश्यक आहे. जीवनाचा दर्जा देण्यासाठी आणि वापरकर्त्यांच्या या क्षेत्राला खऱ्या अर्थाने 'स्मार्ट' ची अनुभूती देण्यासाठी वास्तुविशारदाने आणि विकासकाने संवेदनशील रचना करणे गरजेचे आहे. परवडणारे मूल्य हे खरेदी विक्रीच्या पलीकडे जाऊन शाश्वत आणि स्वयंसिद्ध जगण्यासाठी असावे हीच या शोध निबंध मागील भूमिका आहे.

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Shraddha Mahore Manjrekar, Poorva Keskar, Pallavi Sharama

presented a paper entitled *Built environment of Indian villages: A case study of Coastal village of Maharashtra*

in the 8th International Seminar on Architecture for Masses on the theme of: Architecture & Planning for Villages organized online by the Department of Architecture, Faculty of Architecture & Ekistics, Jamia Millia Islamia, New Delhi, in collaboration with Urban Village Charitable Trust [uVcT] during March 17-19, 2021.

Prof. S.M.Akhtar
Convener, 8th AFM, 2021
Dean, Faculty of Architecture & Ekistics, JMI

ID: AFM/2021/E4

BRICK

International Conference on Blurred Boundaries: In Search of an Identity

24th-26th September

Participation Certificate

This is to certify that **Ar. Manali Deshmukh** has participated and presented as an **Author for Paper:** Investigating the role and implementation of social dimensions at **"International Conference on Blurred Boundaries: In Search of an Identity"** organized by SMEF's Brick School of Architecture Pune in September 2021.

Pooja Misal

Dr. Poorva Keskar

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This is to certify that **Ar. Ramiya Gopalakrishnan** has participated and presented as a **Co-author for Paper:** Nature and Conflict: Case of Tilari Bio Region at **"International Conference on Blurred Boundaries: In Search of an Identity"** organized by SMEF's Brick School of Architecture Pune in September 2021.

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International Conference on Blurred Boundaries: In Search of an Identity

24th-26th September

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International Conference on Blurred Boundaries: In Search of an Identity

24th-28th September

Participation Certificate

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Pooja Misal	Dr. Poorva Keskar	Ar. Shardul Joshi	Ar. Ketaki Gujar
Convener	Convener	Conference Chair	Conference Chair

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International Conference on Blurred Boundaries: In Search of an Identity

24th-28th September

Participation Certificate

This is to certify that **Dr. Vaidehi Lavand** has participated as an **Author for Paper:** Rethinking Heritage Site of Pateshwar in Today's Context at **"International Conference on Blurred Boundaries: In Search of an Identity"** organized by SMEF's Brick School of Architecture Pune in September 2021.

Pooja Misal	Dr. Poorva Keskar	Ar. Shardul Joshi	Ar. Ketaki Gujar
Convener	Convener	Conference Chair	Conference Chair

Centre for Publication Ethics

CENTRE FOR PUBLICATION ETHICS

CERTIFICATE

OF PARTICIPATION

THIS CERTIFICATE IS AWARDED TO

Vaidehi Lavand

Has attended the **workshop on "Scholarly Journals : The Basics"** conducted by Center for Publications Ethics of Savitribai Phule Pune University on 7th April 2021.

07.04.2021

DATE

Dr. Shubhada Nagarkar

COORDINATOR

Multidisciplinary International Conference on

CULTURAL, URBAN & ENVIRONMENTAL LANDSCAPES : GEOGRAPHICAL PERSPECTIVES

Department of Geography,

Osmania University, Hyderabad, India

In Association with ICOMOS INDIA

Department of Geography.
Osmania University, Hyderabad,

Co-ordination by

CERTIFICATE OF PARTICIPATION

This Certificate Is Being Awarded to

Dr. Vaidehi Lavand

For Their Successful Presentation on the Topic of **CHANGING URBAN HISTORIC LANDSCPAES: FREEDOM OF EXPRESSION AND PUBLIC SPACES IN HISTORIC TOWNS OF DECCAN REGION INDIA**

Under the Subtheme Urban Landscapes: Making Historic, Cultural, Tourism and role of Heritage for the Multidisciplinary International Conference Conducted on 8th & 9th February 2021

Prof. A. Bala Kishan
Conference Convenor & Director
Head, Department of Geography,
Osmania University,
Hyderabad, India

Prof. GSV Suryanarayana Murthy
Conference Co-ordinator
Director, Institute for Human Settlement,
Research, Design & Management(IHSRDM)
Hyderabad, India

Centre for Publication Ethics

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Vaidehi Lavand

Has attended the **workshop on "Reference Management Tools and Literature Review"** conducted by Center for Publications Ethics of Savitribai Phule Pune University on 27th March 2021.

27.03.2021

DATE

Dr. Shubhada Nagarkar

COORDINATOR

5th International Conference of Contemporary Affairs in Architecture and Urbanism
11- 13May 2022, Alanya, Turkey

ALANYA HEP UNIVERSITY

Certificate number: **ICCAUA2022SCH1**
Date of Issue: 13 May 2022

CERTIFICATE OF APPRECIATION

This certificate is granted with honors to

Dr. Vaidehi Lavand

For his invaluable contribution as "**Session Chair**" in the *5th International Conference of Contemporary Affairs in Architecture and Urbanism (ICCAUA2022)*. The confernce organized by Alanya HEP University and held online on 11-13 May 2022.

Assoc. Prof. Dr. Hourakhsh Ahmad Nia
Conference Chairman
Alanya HEP University

Prof.Dr. Ebru Gülbuğ EROL
Rector (A).
Alanya HEP University

Prof. Dr. José Manuel Pagés Madrigal
Director of the Program of Architecture and Urban Design
German University in Cairo (GUC), Egypt

TILAK MAHARASHTRA VIDYAPEETH

(Deemed to be a University under section 3 of UGC Act 1956)

Shri Balmukund Lohia Centre of Sanskrit and Indological Studies

1242 Sadashiv Peth, Pune- 411 030.

CERTIFICATE

This is to certify that

Ar. Vaidehi Lavand and Ar. Onkar Khebudkar

presented a paper entitled

19th Century Treatise and Manuals and Its Influence on the Development of the Colonial Urban Cultural Landscapes in Deccan Region, India

in the **2-Day International Webinar** on

Understanding Cultural Landscape: Text and Context

organized by

Shri Balmukund Lohia Centre of Sanskrit and Indological Studies, Tilak Maharashtra Vidyapeeth, Pune,

on 2nd and 3rd December 2020.

Ambarish Khare	Manjiri Bhalerao	Suraj A. Pandit	Manjusha Gokhale
Centre Coordinator	**Webinar Coordinator**	**Session Chair**	**Dean**

5th International Conference of Contemporary Affairs in Architecture and Urbanism
11 - 13 May 2022, Alanya, Turkey

ALANYA HEP UNIVERSITY

Certificate number: **ICCAUA2022EN0011**
Date of Issue: 13 May 2022

CERTIFICATE OF PARTICIPATION

This to certify that

Dr. Vaidehi Lavand and Ar. Onkar Khebudkar

participated and presented his/her/their paper with the title of :

Discourse on Lost Pages of History: Architectural Works of Vasudev Kanitkar in Western India

during the *5th International Conference of Contemporary Affairs in Architecture and Urbanism*, organized by Alanya HEP University which was held online on 11-13 May 2022 .

Assoc. Prof. Dr. Hourakhsh Ahmad Nia
Conference Chairman
Alanya HEP University

Prof.Dr. Ebru Gülbuğ EROL
Rector (A).
Alanya HEP University

Prof. Dr. José Manuel Pages Madrigal
Director of the Program of Architecture and Urban Design
German University in Cairo (GUC), Egypt

तंत्रशिक्षण विभागीय कार्यालय, पुणे व भारतीय कला प्रसारिणी संलग्नित वास्तुविद्या महाविद्यालय, पुणे आयोजित,

'राज्यस्तरीय वास्तुकला मराठी परिषद, २०२२'

प्रमाणपत्र

भारतीय स्वातंत्र्याचा अमृत महोत्सव तसेच मराठी भाषा गौरव दिन यानिमित्त आयोजित 'राज्यस्तरीय वास्तुकला मराठी परिषद'

सुधीर रमेश देशपांडे

परवडणाऱ्या घरांसाठी व्यवहार्य आणि लवचिक रचनेचे निकष

यांना सहभागाबद्दल आणि मराठी शोधनिबंध सादर केल्याबद्दल

हे प्रमाणपत्र देण्यात येत आहे. अभिनंदन !

डॉ. अभिजीत नातू
प्राचार्य, भा. क. प्र. सं. चे
वास्तुविद्या महाविद्यालय, पुणे

मा. श्री. पुष्कराज मालचंद पाठक
सचिव, भा. क. प्र. संस्था, पुणे

डॉ. दत्तात्रेय जाधव
सहसंचालक, तंत्रशिक्षण विभागीय
कार्यालय, पुणे

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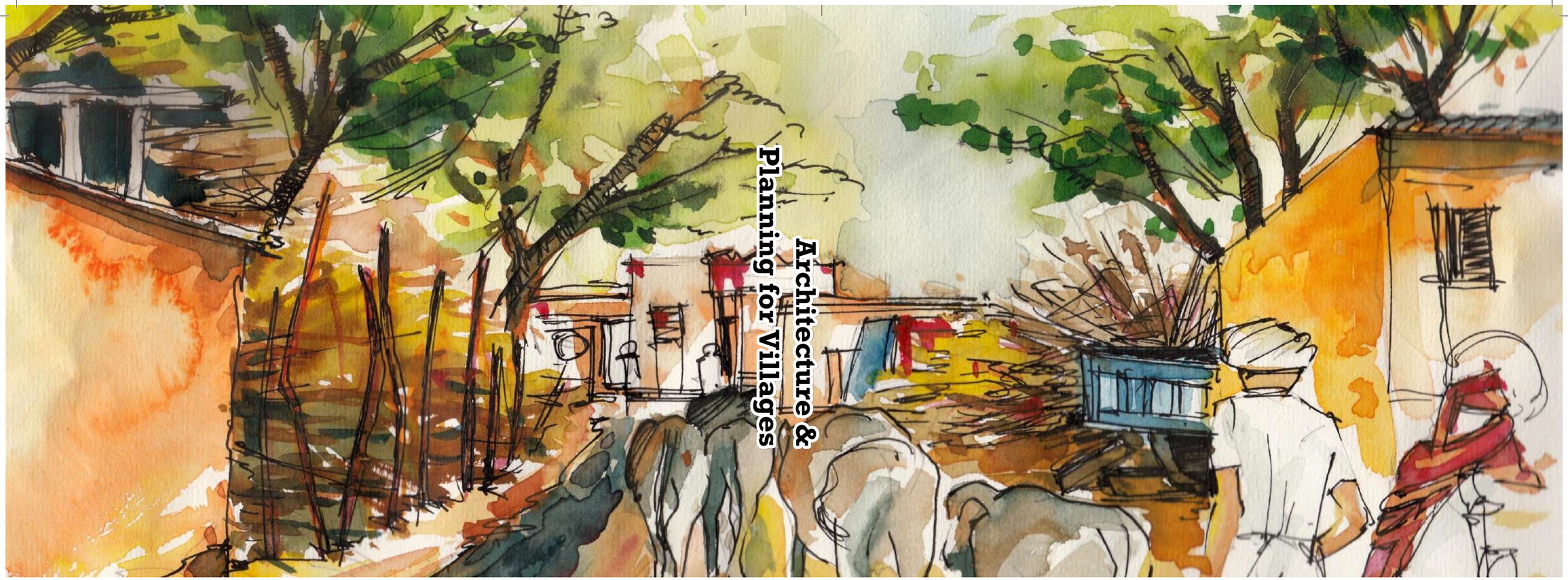

Architecture & Planning for Villages

S.M. Akhtar

Architecture & Planning for Villages

Ed.
S.M.Akhtar

Foreword by **Dr Radha Vallabh Tripathi**

Dr. S. M. Akhtar is a man of multi-disciplinary background, his scope of studies spans over Architecture, town Planning, social Sciences and Environment. He is graduate of The Indian Institute of Architect, a Post Graduate of the Institute of Town Planners India. With a Master Degree in Public Administration and Bachelors' degree in Law, and Ph.D. on Urban Housing.

He is the first recipient of D.Litt. on thesis "Translating Democratic Virtues into Sustainable Physical Development" is composite work on Policy Science and ekistics. He is Professor & Founder Dean Faculty of Architecture & Ekistics at Jamia Millia Islamia, New Delhi. During his four terms as the Dean, he initiated six Masters programs and Ph.D. program at the faculty.

His books entitled 'on Architecture pedagogy', 'Urban Housing – issues & strategies', 'Islamic Architecture -at crossroad'. 'Habib Rahman – The Architect of Independent India', and 'Environmental Remediation & Rejuvenation and 'Islamic Architecture: Perception & Paradox' have been published.

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S.M.Akhtar

Foreword by **Dr Radha Vallabh Tripathi**

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“The soul of India lives in its villages,”

—*M. K. Gandhi*

Foreword

I have spent most of my life in big cities and small towns across the central part of India and abroad, but the best memories of my childhood are from those few years that I spent in a small village. The village was a small place where one can easily walk from one end to another within half an hour. There was no technology, not even matchboxes to light up the mud stoves and bidis (local cigarettes). The memories of the food that the women of the house used to make on the chullah (mud stove) had a different flavour and fun to it. It of course was a time taking process, but that somewhere added to the spirit of the village lifestyle.

A village was traditionally divided into quarters where people practicing different crafts lived. Villagers used to go to other's houses to buy different commodities, as there were no markets. For all of the professions, the local terms that name the trade like telis, kumhars, pinjaras etc were used. These are lost somewhere in the city glitz, and may have been replaced with the technological big shot industries, making everyone dependent on technology. The villages on the other hand were self-dependent commodities.

These villages must come back to life. Architecture institutionalizes hope for a better world through the built. It understands the interconnections of the physical world with intangibles. Architects, with limited knowledge about villages today, are not equipped to help the village. Architects do not know what a village is. Their techniques, costs, processes of construction all involve the owner in very different ways. Villages cannot afford the fee of charges, they cannot pay, but someone has to. The work for the betterment of villages has to happen and the only way is that the system must involve the architect as a solution provider along with or in place of the engineer. There are no processes in place to consult them. Serious studies have not been compiled and whatever few are there have not been acknowledged by the policy.

Architects understand the language of the building. They know that the blindness in orthodox planning and the rashness of growth both have to be brought to record. Awareness of the vocabulary of villages, through repeated studies by institutions and professionals, will help evolve a solution. This dream is not possible without a massive movement towards village studies, something for which UVCT is committed. If villages become liveable and better, we might see a reverse migration. They can be the new addresses for healthy societies, lives content with doing what they are happy doing, lives with an earth-connect and climate connect. The expanse of work on villages is vast. If architecture as a branch of knowledge fails to acknowledge the problems of the village, it might perish to those that would rise to the occasion.

The hope now rests with the energized young minds who have to step up in their commitment and capability to help the perishing hope towards growth sustenance, urban sustainability, and the right of progress for the village and the urban alike. We must find what architecture is intrinsic Indian. The intellectual soil of institutions, must rediscover architecture and integrate new knowledge back to the academic outpour of young minds. The architect's role in developing and integrating the rural towards progress, awareness, and thinking of the day-to-day, will govern the future of the profession.

In order to revive a village, one must first bring back the lifestyle and living traditions attached to it, the living experience of tradition that runs by doing the least harm to the environment by utilizing the local resources. We must try to rediscover the tradition led life and societies. We cannot run the vehicle of life in reverse gear, but we can relive the spirit that was behind this lifestyle. You belong to them and we belong to them. This was the village lifestyle that we need to get back to with the planning and architecture of a village.

We must try to rediscover the traditions. We cannot run the vehicle of life in reverse gear, but we can relive the spirit that was behind this lifestyle. We belong to them and part of going back to being a village is, going back to the goodness of life and values advocated in their connectedness. This compilation of the studies, edited by Dr S. M. Akhtar and the work of Urban Village Charitable Trust is a great initiative to spread the knowledge within and beyond the architecture fraternity. The initiative is commendable, and I look forward to be a part of many of these in future as these come to the aid of villages.

Dr. Radha Vallabh Tripathi
Professor & Retd Vice Chancellor
Rashtriya Sanskrit Sansthan

Preface

Architectural practice and education of architecture in India fits into an economic way of thinking. The complete share of this economy-centric practice of architecture, finds its application into urbanization and allied processes. The freedom to understand the responsibility and the capability of architecture, now emerging in academic discussions, is yet to be recognized as a practice. It lacks the backing of policy. Architect as a professional, is one of the most well-groomed and trained with overall design sense professional, but its foray is limited to a gentrified percentage of the urban and in the office of the corporates, builders and the moneyed class. The needs of the rest fall out of the economic spectrum limiting its professional practice.

While pertinent issues and human needs demand a solution and see the profession of architects as an agency, the academic energy and the training needed by the architect is missing, because books on this subject are missing. If given to design or plan for a village, an architect would fall back on standards/ training/ case-examples/ reading materials/ references/ anthropometric data, none of which exist. We need to create the education needed for addressing our villages. Collaborative programs create an academic backbone to step up our practice. Work on social awareness, raise the bar and enable the development of a knowledge for the new architects who wish to work on bigger challenges and for whom the client is a nation, a city, humanity at large and balanced development.

The limited attitude of practice and the absence of self-driven, socially connected architecture for masses is absent and the field of practice is constricted, because architects, despite seeing and understanding the problem, have not moved beyond their offices and deal only with selective clients. They rarely walk into slums/villages to solve the problems of hundreds. The selective economic-centric approach needs a break. It thus becomes important for those who have mastered the profession to help evolve a multi-dimensional and participatory approach, through which new customs of practice of architecture may evolve. Vernacular architecture beyond the built, alternate technologies, optimal architecture, social architecture, livestock-inclusive house forms, and architecture beyond architecture are the living approaches in our profession, which might make it a living realizable social solution.

This collection is an admirable work contributing towards the development of overall awareness on the subject by the collective consciousness and is a significant milestone.

Dr. Hina Zia
Professor & Head
Department of Architecture
Faculty of Architecture & Ekistics,
Jamia Millia Islamia

Editorial

A voluminous participation of each researcher declares the cultivation of thought within the ambit of architectural awareness a great success. Architecture and Planning is the most popular category in the discussions and papers on the common agenda. We as architects, planners, and designers are well versed with the need to bring back and revive the vernacular architecture which also takes a building towards sustainability, and thus a lot of authors took topics that were on Vernacular architecture finding and explaining different scenarios of the same, taking case examples of varied cities of India. Ar. Iqtedar Alam in his paper "Building Material and Geographies: Mapping the Shrinking 'Vernacular' of Rural Bengal" has very beautifully documented the 'pattern' of a material change in the dwellings of rural parts of West Bengal from 1991 to 2011 calling out on the built behavior and recommendations to arrest the shrinking vernacular material-scape.

Ar. Zoya Kidwai in her paper "Containing Villages *Aabadi* Area for Protecting Agriculture" talks about how the uncontrolled growth of the village boundaries is having a great impact on the Agricultural land of India. Through this paper, she has identified the various causes of the uncontrolled growth and has provided solutions like successful village planning through densification, in order to protect the agricultural land. Ar. Amit Kumar Baronia in his paper "Understanding the Role of Architects to meet the challenges for the Villages of India" explores the complete set of activities that are being pursued in the different schemes by the government of India and the job responsibilities that can be shortlisted for being focussed on the villages and also establishes that the only professionally trained individual with a capability to work for villages is an architect.

Prof. Anand Khatri and Ar. Anjora Khatri in their paper "Design-based planning: An approach to policy for the organization of built– Dujana" highlight the complete lack of policy and explores the possible use of Design based planning for solutions in our villages for betterment. They concluded with an illustration through a house type and a historic node in village Dujana. Another paper by Prof. Anand Khatri and Ar. Ritik Gupta titled "Street and built-in Pinna village – a definition of Agrorban" establishes the term Agrorban through an understanding of street sections, structuring of the open and built spaces, a study of their morphology, the interactive forms of streets, and the urban open spaces, through the case study of village Pinna (district Muzaffarnagar). A similar attempt is made by Ar. Bushra Ali in her paper "Not a suppress village 2030": Mitathal Tehsil (Bhiwani, Haryana)" focuses on the settlements that share multiple resources. She narrowed down the research to a particular resource which is Temple. That is "How the temples affect the livelihood of the villages. Bridging the gap between resource and habitats and analyze the variation of the rural life concerning one resource".

Ar. Kamini Singh and Ar. Anant Pratap Singh in their paper "Dynamics of Urban Villages: Mapping the Transformation of Shahberi Village Greater Noida" explores the spatial dynamics of Village Shahberi in order to understand how form, function, and urban spaces transform with changing activity patterns. They also look at various forces that initiate this transformation and the associated patterns within. They did it through the observations and documentation in the context of unplanned settlement in Delhi NCR backed by the theories of transformation. Ar. Shuja Rehman and Ar. Aftab Alam in their paper titled "Disaster Resilient Amphibious Community Houses" has worked on amphibious and floating architecture as a measure to rising sea levels by accepting to live with and on water. Their research on floating and amphibious architecture was majorly based on two methods, one at the micro-level creating a prototype of small buildings as per the detailed structure and testing, another at the macro-level, visualizing and implementation of floating communities, energy generation, floating farms, sea farms, etc.

Ar. Md Shahroz Alam in his paper "Loss of Vernacular Architecture in Kusmhi Village" has stated the reason behind the loss of vernacular architecture and also the impact of the unplanned construction on the people of the Kusmhi village, especially on the new and future generations. Ar. Mohd Hasan Sohaib, Ar. Aniruddh Tomar and Ar. Hiba Khan in their paper "Earthen construction in the countryside: Materials, Techniques, and Stereotypes" have talked about the use of different earthen materials and techniques for the low-cost housing in rural areas as they hold potency as solutions for low-energy dwelling units, thermal-comfort, climate responsiveness, and affordability. Contrasting techniques are considered for the aesthetics of earthen constructions. The importance of 'maintaining a balance between modern and conventional construction was also discussed, its effects both economical and psychological. A similar effort by Ar. Aftab Alam, Ar. Sara Tamkeen and Ar. Mahrosh Fatma in their paper "Extinction of Vernacular Architecture with Modernization- In terms of generating ethics of local architecture" have explored the central identity of vernacular architecture and how this vernacular architecture has deteriorated due to rapid advancement and modernization and also presented some of the vernacular building styles which create ethics of local architecture.

Ar. Aila Azeem, Ar. Himani Chahal and Ar. Taha Masoodi in their paper "Revisiting Gandhiji's Village Swaraj – A Study of Social, Economic and Environmental Aspects of The NCR" have talked about the rapid migration of people from rural to urban areas, and thus the concept of "Rurban". They explained this through the dimensions

focusing on the social, economic, and environmental aspects of the National Capital Region. Ar. Preeti Pujari through her paper “Guiding Transformation of an urban village to highlight the value of the settlement- The case of Unkal, Hubli” intent to integrate the Urban Village Unkal, into the city of Hubli without losing its character. She performed a lot of primary surveys and mapped the fabric to get a clear understanding of the transformation of the village.

Ar. Mobin Asgharnejadtehrani in his paper titled “The Impact of Rural Planning on Urbanization and Economic Growth; Case Study: Banadkook-Dize village in Taft county (Yazd, Iran)” talks about the roofing system of the homes in Banadkook-Dize village in Taft Country (Yazd, Iran), looks of the village, the explanation for kind changes and their methodology of construction. Ar. Ameed Inam and Ar. Bushra Fatima in their paper “Regulating Migration Towards Urban Cities through Rural Development Planning.” explains the migration-responsible factors. How in rural areas, people move to urban areas to get more job opportunities, higher salaries, better jobs, and better services because of fewer employment opportunities, low wages, social factors, etc. They first talk about the reasons for the migration with the help of census data in 2011 and then focus on how rural development strategies influence the rural-urban migration in India. Ar. Sadaf Faridi and Ar. Faraz Farooq in their paper “Rural Landscapes in Central National Capital Region, India: Transformations in Land Use and Spatial Organisation” examines the transformations in the rural landscapes of CNCR through the case studies of Rohtak and Baghpat districts with a focus on changes in land use and spatial organization. Ar. Pavan Gupta, Ar. Arvind Saxena and Ar. Shuja Rehman in their paper “Low-Density Uniformly Distributed Settlements for Contemporary India” have proposed a new India with uniformly distributed, low-density contemporary settlements - where economic growth is unfettered, where every region is as fulfilling as the other, and where Indians can live close to their family in an interactive environment that is sustainable and disaster-resilient.

Rural Tourism is very common worldwide but in India, it still is far to achieve. Two of the research papers were fully dedicated to Rural Tourism and integrated development of the village. Both the papers covered different regions and areas taking different villages of India. Ar. Akshita Nagar, Ar. Anjora Khatri and Ar. Manya Jindal in their paper “RURAL TOURISM” proposed to explore the character of villages around the district of Hapur and explored the catchment urbanization, as a possibility to develop rural tourism. It highlights the heads under which rural tourism can prosper. Ar. Mohd. Tanveer Khan and Ar. Ayla Khan in their paper “An integrated development of the village of Nuh, Mewat through rural tourism” presents a review of how tourism can help the development of the village Nuh, Mewat. They say that it will help in the upliftment of the local community through various ways, such as income and employment generation of the agricultural people, creating social and cultural awareness among them, investment for infrastructure development, educational and health services while preserving rural assets, values, and heritage and focusing on the advent of awareness, opportunities, and sustainability of rural tourism.

Sustainability is the most discussed topic worldwide, many authors chose to write on the same. Ar. Nitesh Dogne, Ar. Prajakta Sonar and Ar. Sakshi Godara in their paper “Co-designing a Framework for Sustainable Rural Development” have considered participation for identifying the problems in one of the villages of Dudu Block of Rajasthan. They have combined social engagement and the concepts of sustainable development to propose a framework for sustainable development. Ar. Tahura Fatima, Ar. Mohammad Osaid Farooq and Ar. Madiha Shahid in their paper “Energy-efficient techniques used in Indian vernacular architecture: A case study of Jalali, Uttar Pradesh, India” have highlighted the techniques used by the people of the past, by conducting a detailed case study of dwelling units in Jalali, Uttar Pradesh; which included a detailed analysis of various construction techniques and building practices passed down through the generations. Prof. Alok Ranjan and Ar. Priyanka Kumawat in their paper “Transportation and Sustainability for Villages & Rural Sector” examined the concept of transportation sustainability and planning with integrated development in rural and urban sectors.

Ar. Shraddha Bahukhandi and Ar. Anjali Saraswat in their paper “Impact of Greenfield Development in the Rural Areas of Uttarakhand State” have highlighted the strategies that can be adopted for the sustainable development of these rural regions. Ar. Poonam Upadhyay in her paper “Development of Green Infrastructure for Rural Areas” has focused on the Understanding of Green Infrastructure, Potential of Green Infrastructure in India, Need of a Green Infrastructure approach, Benefits of Green Infrastructure, Potential components of Green Infrastructure, Sets of interest of GI in rural areas, Types of Green Infrastructure for agricultural land in rural areas and Study on Badkhal village, Haryana. its issues and mitigation through Green Infrastructure. She feels a green infrastructure approach can be an important step toward preventing the deterioration of the rural landscape.

Ar. Sindhushree R Prasad and Ar. Ashfaq K Aliar through their paper “Regional Architecture of Kerala- evolution, Loss, and mutations: Studies of the sacred and the Mundane” have made a detailed study of few residential and religious structures across the state and have tried to analyze the evolution of such structures and their current state or in case of such buildings being demolished, the buildings that have come up now. They have analyzed the relevance of traditional practices in today’s times, practices that hold ground, and those that need to be relooked. Adaptations and alterations. Ar. Mohd Sahil Khan in his paper “Identifying factors in diminishing of vernacular architecture: Documenting the lost identity of an Indian village” focuses on the loss of vernacular architecture of Indian villages and its impact on the rural Indian fabric. Ar. Niti Negi and Ar. Ayesha Mathur in their paper titled “Sustainable Development in Indian villages through the revival of Vernacular Architecture” have

investigated the reasons for vanishing vernacular architecture ranging from loss of knowledge of craftsmanship to attraction of people towards modernized buildings. They state that the vernacular elements can further be blended with modern construction methods to create an energy-conscious architecture. They emphasize that in these times where energy is a priceless commodity, we need solutions that are adaptive if not adapted to local settings, economically feasible, and have withstood the test of time.

Ar. Ruchi and Ar. Kusum Choudhary in their paper "Loss of Vernacular Architecture: A case study of Nagaland Region" explains the factors involved in the change in the vernacular architecture style of Nagaland supported by comparative case studies of different regions of the Nagaland State. Ar. Ilma Nafees, Ar. Dania Irshad and Ar. Sameena Parveen in their paper "Vernacular by Implementing the Modern Technologies and Green Building Strategies" investigates the aspects of mainstream modernist design concepts and solutions, and green building strategies which can become an inherent part of the traditional design approach, bringing in an essence of modernity along. They dealt with the analysis of the vernacular and the modern architecture of Rajasthan by practical exercises and fieldwork studies. They focused on bringing to the rural areas the strategies necessary for a comfortable living condition by analyzing the prevailing techniques in the form of green building strategies further assessed for their aptness as per the present condition. Ar. Umme Habiba Beg, Ar. Madiha Shahid and Ar. Mohd Hasan Sohaib in their paper "Diminution of Vernacular Architecture: For and Against" talks about how just a tint of vernacular practices in the era of modern architecture can be the much-needed solution to deal with environmental issues, climate change, economic loss, and urbanization.

Ar. Aashna Arora and Ar. Jyoti Arora in their paper "Earthquake resistant vernacular architecture of Kashmir" has examined Northern India's earthquake-resistant construction techniques quoting through Taq (timber-laced masonry) and Dhajji-Dewari (timber frame with masonry infill) construction of Kashmir. Ar. Priyanka Pahuja and Ar. Mohd. Afzal khan in their paper "Transformation of building material and architectural layout in rural Indian settlement (case: Raunahi village)" have highlighted the village transformation in terms of building material, elements and architectural layout from vernacular period till present day and analyzing the same. According to them, the villages are in dire need to be a breathable ambiance for living beings, homes, and other spaces as well, it brings a family together by the traditional practices which are reflected both in art, architecture as well as culture. They have proposed a schematic architectural solution for villages that can bridge the gap between urban and rural areas in terms of amenities that might help the conservation of village architecture.

Ar. Anita Tamrakar in her paper "Transition and Transformation in Traditional Settlement of Kathmandu Valley & Its Impact" attempts to show the transformations and transitions that have been observed particularly post-earthquake 25th April 2015 in the settlements of Kathmandu Valley. Ar. Hiba Gul and Ar. Aditi Arora in their paper "Decay of Vernacular Architecture in Rural India" explores the meaning and importance of Vernacular Architecture in India and tries to intervene in the factors leading to the loss of the same in Indian villages. They also attempted to find probable solutions in keeping Vernacular Architecture thriving. Ar. Aditi Sandhu and Ar. Arshi Warsi in their paper "Transformation and transition pattern in villages of Upper Beas region" maps the existing indigenous character of vernacular style in settlement and livelihood pattern of the rural settlements of the Upper Beas Region.

This category with its broad spectrum and papers talking about vernacular, materials, local technologies, design-based planning, rural structure, rural tourism, and the importance of agriculture ends with the confirmation that the exploration of the village can happen only through the understanding entrusted to architecture and planning.

A promising set of papers was written under the title Environmental Issues. These discussed important agendas like the quality of life and together establish that there are more associative values in villages and hence a better quality of life is possible. Waste management and depletion and misuse of water as a resource remained at the fore. Papers also promisingly brought up some solutions for villages in their conclusive notes. While they together establish the alarm which we at this platform are trying to establish, there is no speculative thought on the inestimable damage possible if the resource is destroyed. It is also established through multiple papers that the built form of the villages is a part of its environment and character and the quality of life they lead. It is in their built form that they have evolved climatic solutions and over centuries perfected their architecture.

Dr. Manju Baisoya Pundir in her paper titled "A Concept Note on Placing 'Wellbeing' and 'Quality of life at the Heart of Progress in Rural Areas" has beautifully discussed the most important yet the most neglected aspect that is happiness and quality of life. She states facts proving how India ranks very low in World happiness Index in the post-pandemic world and there is an immediate need to look into the matter. She, with the help of available international literature and examples, explored the multiple dimensions and theoretical outlines of wellbeing and quality of life, which can be applied in the context of rural transitions and puts forth a framework of QOL dimensions in rural areas and certain foundational research questions to act upon for further investigations. Ar Yogesh Yadav through his research paper "Regional cultural landscapes: Understanding the Villages of Braj" explored the cultural, historical, and associative values of the villages and their setting in Braj and explained their indispensable role in making Braj an important cultural landscape. Ar. Anuradha H R in her paper titled "Rural Expansion and the loss of rural Imagery –A case of rural settlement in Mysore region" discusses the image and character of Indian Villages and how it is getting lost day by day. She talks in detail about the diverse rural

imagery of India, yet having some common traits that Indian villages share. She further traced the pattern of development of villages, by taking the case of a rural settlement in the Mysore region.

Ar Yogesh Bhardwaj in his paper "Water stress in rural areas of Narmada middle sub-basin due to mega industrial led infrastructure projects" highlights the consciousness that the environment has to face due to the large-scale industrialization projects, that might look good on paper but experiences based on ground realities demonstrate that they have serious implications on the local people, natural resources, wildlife habitats, and the delicate ecological systems. He further talks about how the depleting groundwater tables and over extracting water from streams will destroy habitats and settlements of districts of Madhya Pradesh, India, and will impact agricultural production in rural areas. Prof. Shraddha Mahore Manjrekar, Dr. Pallavi Sharma, and Dr. Poorva Keskar in their paper "Built environment of Indian villages: A case study of Coastal village of Maharashtra" talk about a study done in a historical coastal village in Maharashtra and its learning from this village in terms of environmental consciousness, sustainable architecture and lifestyle of people. The Authors have also tried to create a base on which the developments and planning can be done for such kinds of villages.

Ar. Shagufta Khan and Er. Wasiullah in their paper "Solid Waste Management in Dhauni village, Tarapur Block, Munger" focused on the issue of household dumping at village level in open areas like a barren land, a pit, or at some intersections which cause nuisance not only to humans but it also causes the same to the flora and fauna. They, by studying the existing policies related to Solid Waste Management, drew the comparison with the models of established solid waste management in rural areas. Ar Gaurav Ganguly in his paper "Urbanism & Water Pond Culture in Historic Bengal Along the Ganga" explored the evolution of cities and towns in Bengal and particularly the development of the French town of Chandannagar. He further discusses a proposal to develop urban spaces around ponds and rivers as a pilot project in the historic part of Chandannagar to retain them and avoid the ill-effects of nature like floods. Design interventions were developed by him based on the interviews and assessments involving different stakeholders from the city which included residents, architects, and historians.

Ar Samiya Mahwish in her paper "A case-study of Waste Management Pilot project in Bhojpur villages, Bihar" reviews the transformation of the waste management techniques specifically in rural areas of Bihar. She examines and assesses the sustainability of the pilot project of Bhojpur which can contribute to its future implementation.

Ar Prakriti Goswami in her paper "Rural Tourism and Wetland Conservation" gives an insight on how the benefits of ecotourism can be useful to the local economy; thus benefiting nature and people alike. He attempts to find out whether the measures taken have been ultimately beneficial for the protection of the wetlands. The survey mentions the different possible ways to enhance ecotourism in wetlands, such as types of wetland-related facilities which can attract ecotourists and simultaneously promote rural culture and heritage. The paper concludes by encouraging conservation and restoration of this ecosystem as a living asset that benefits both the rural economy and the environment. Ar. Akshita Nagar and Ar. Kaveri Rai in their paper "Environment & development issues leading to the extinction and changes in the traditionally built form typologies of the Aabadi area of Dujana village" talks about the change in villages that is caused due to rapid urbanization and depletion of the environment. They further state that the built and open typologies have been lost permanently from the face of the village. Despite this loss, a village still offers a better living than the urban, thus they established the need to hold the change as it is, until we find a sustainable way taking a case of a small village of Dujana in Uttar Pradesh. Ar. Chetna Garg and Ar. Rekha Bhaskaran in their paper "The State of Quality of Life in Urban Villages – A Study of Naharpur" talks about the growth and development of the city of Delhi by acquiring the land from villages and incorporating them within the city as Urban Villages. By taking the case of Naharpur, Delhi, the author addresses the above two aspects to arrive at a comprehensive framework that can act as a guide for policymakers, urban designers, and architects and can be applied to these settlements in the future, to redevelop these areas.

Ar. Ashim Kumar Manna in his paper "Material mountains; Tracing transformation through extractive episodes of Himalayan foothills" has explored the relationship between nature and urbanization through three distinct and cumulative episodes of territorial transformation of the Dehradun, a rapidly urbanizing valley in the Himalayan foothills. He interpreted the transformation by overlapping its historical and contemporary occupations, revealing the landscape structure, urbanization, infrastructural positions, and their contributions to climate change in the Himalayan foothills. The paper concluded by identifying opportunities for a landscape approach within the contemporary challenges – uneven urbanization, receding ecological resilience, and unknown severity of climate impacts—are converging towards the production of territories with unknown risks and pushing them towards future vulnerabilities within the Himalayan region. Tanveer Singh Channa, Ar. Anshuman Dubey and Ar. Jyoti Arora in their paper on "Flood resilient architecture for the disaster-affected communities of Assam" developed an architectural approach of living with the floodwater rather than building barriers against it through the combination of Assam's vernacular techniques with modern low-cost interventions. They took different cases to understand the possible innovative uses of materials to develop a sustainable built environment complimenting the surrounding riverine landscape. Finally, they have provided recommendations determining the implementation of architectural techniques which can help the vulnerable Assamese communities to resist floods effectively rather than leave their houses and migrate.

This category on Environmental issues closes with a heightened awareness and cumulative commitment on the urgency to bring to order the mismanagement of resources and as Dr. Pundhir says, the quality of life that they advocate.

Papers grouped under Socio-Economic and occupation, the most important category in the conference, dealt with the suffering of local communities. They focus on pandemic, migration, migrant workers, the economic setback of women workers, and the mass damage caused to the occupations of villagers by the development trends. The papers in this category believe that there is a need for training for occupational diversification of the immense workforce harbored in the villages. Ar Vinita Yadav and Ar. Deeptanshu Singh in their paper “Impact of COVID-19 on Migrant Villagers” talks about the effect that the pandemic has had on society and how the only solution left for migratory workers was a mass reverse migration to the villages. The authors thus assessed the load on existing rural health infrastructure due to migration before and after the COVID-19 pandemic. They determined the existing situation of health infrastructure, migrants who migrated from urban areas back to villages, dynamism faced by them, and analyzed the role of institutional policies in employing such villagers.

Ar. Sadia Khanam and Prof. Alok Ranjan both talk about Rural Transportation in different contexts. Ar Sadia Khanam in her paper ”Social Impacts of Transport Infrastructure Projects: insight of residents in Mangari Village of Varanasi District” talks about how urban and rural transport has social benefits and outcomes as long term consequences which may have multiple planned and unplanned social changes. She also talks about identifying issues and assesses immediate benefits of nearby transport development projects; social needs and losses of the rural area to identify the outcome and the quickly noticeable of these benefits are increased mobility, increased productivity, material and speedier flow of produce and change in the lifestyle. While on the other hand Prof. Alok Ranjan in his paper “Socio-Economic Development of Villages” talks about how the quality of life of villagers be improved by providing economic road infrastructures and how rural mobility will enhance the economy of the villages by giving solutions for the poor-quality roads and lack of transportations in Rural areas.

Ar. Abhishek Bhardwaj in his paper”Mothers of Mewat ” analyses the plight of women in one of the most backward regions of India, Mewat, and suggests strategies for reinvigorating female literacy and healthcare in rural areas. Mr. Jogeswar Mahato and Dr. Manish Kumar Jha in their paper “Social Capital and Micro Enterprise Development towards Occupational Diversification in Rural Context” discusses how during last several decades, the significance of social dimensions in creating various non-farm based enterprise, livelihood, and occupation have been emphasized, and thus he examines and analyses the role of social capital in promoting and developing micro-enterprise towards diversifying the various occupations of poor people in rural areas.

Ar Shreya Khurana in her paper “Investigating Urban Livelihood in Fishing Villages of India: Case of Versova Koliwada, Mumbai” analyzed factors leading to the suffering of local communities of Mumbai and established an understanding to resolve such alarming issues, that is a result of sheer neglect and unmonitored urban development. Prof. Maneesha Keerthi Kavuri in her paper “Transformation of a Weaver’s settlement: A case study of Mangalagiri” talks about the Community of weavers of Mangalagiri, Andhra Pradesh. The huge transformation they have experienced. She focuses on the Historical moments that created and deteriorated the Vernacular methods of planning and construction, the style of Vernacular architectural craftsmanship, settlement shift over the period in the Mangalagiri Weaver’s community concerning their Houses, Work sheds, street patterns, and thus the Art.

The category establishes that problems are unique. They are regional, occupational, and crop/climate bound and cannot be sorted by a one-time solution. A constant vigil and update of measures taken for the villages are necessary.

The power to transform villages is in the policy. Legislative provisions and schemes must be addressed. This was the category that received the least number of papers. Ar. Bushra Saba and Ar. Mariya Zama discusses the various rural policies in different aspects in their respective papers. Ar Bushra Saba in her paper “The impact of RURBAN mission implementation and withdrawal: Case of Mohana village” talks about SPMRM and its failures. She also talks about the shortcomings and lack of communication between the hierarchy of officials who are involved and responsible for the growth of rural areas. She further delves into the impact of the RURBAN mission on the selected village of Mohana (identified as the carpet capital of Gwalior), the ongoing scenario of the livelihood, and villagers’ aspirations with RURBAN, and the mission withdrawal impact in the village. Ar. Mariya Zama in her paper “Urban in Rural: A critical appreciation of Rurban Mission” explains how planning in India has now majorly been restricted to urban settlements which comprise only a third of the total land area. While the rest two-third of India remains unplanned, isolated, infrastructure deprived rural settlements due to the lack of standardized rural and regional planning. Therefore, she studied and analyzed the National Rurban Mission concerning its strengths and shortcomings through a Case study of one such Rurban Cluster of Urla Jagir, Bareilly, Uttar Pradesh. She achieved the same by studying the implementation, progress, monitoring, and related challenges in the selected cluster, and thus laid down points that the mission should incorporate and the tools that can be useful for its success. Her paper critically appraises the mission universally and contextually.

The category establishes the beginning of thought in the direction of policy and legislation. The receipt of papers under each category relates a story. The maximum need is to work on an understanding of how should

architecture and planning look into the agenda and so there were thirty-three papers (maximum number) were under this head. The category of environmental issues with thirteen papers and the socio-economic–occupation category with seven papers followed the popularity by need. The most impacted are environment and socio-economics and thus the second maximum number of papers received are under this category. The least known fact and the most unexplored is the legislative and policy.

Academic concourse with UVCT and the stream of researches under different categories go to establish that architecture is developing as a tool to solve pertinent issues of villages in rural India. There is hope for the profession and the villages alike.

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Outline of Thought Connecting the Profession of Architecture to Villages

The case of a Village

Change has imbued Indian life and processes in the past seventy years. The original age-old agro-culture is perishing, leaving behind only the urban. Although an evolved model of the traditional communities, the new urban is full of dysfunctional societies. India by its pre-independence structure was not ready for this urbanization, which is advocated by the first world. It was on the path to a different mode of development. The urban today is concentrated in agglomerations called cities. While our villages remain the most untouched part of the country; they have existed hand in hand with agriculture which is designated as the primary sector of the economy. The unshaken presence and undisputed importance of villages in our country's agriculture and thus a promoter of its economic development is now at a threat by the unwarranted expansion of the automobile dominated world. Villages connect to agriculture, forest, nature, earth and thus it becomes a fulcrum for change or saving the change. With modernization have come secondary and tertiary economies, but none as rooted in culture as the primary. The human population in our country has for ages lived with the earth - using it for cultivation and for building their housing. With the abundance of sun's energy and fresh potable water from rains, the fertility of the soil in our country offers a brief for an urbanization, different from its nature as in the first world. Our urban growth is not on the brief provided by natural setting, and hence done not have the vital connection between history-climate-people-traditions. Virtues of our traditional knowledge systems and architecture and planning have an uncontested role in development. An approach which incorporates these factors must be undertaken. Planning must step out of the physicality of its approach. None of these can be overlooked while writing the guidelines.

The use of the word rural for villages and undernourished development and frail economies, in planning and the books of policy, has had a wide impact on their participation and inclusion within the definition of development. They have been cordoned away to make way for Greenfield development. A holistic new age can evolve only if the villages and rurban are included.

Despite their sustainable concepts, ideas of green living, garden-city-concepts, socially-awake-connectedness and self-designed settlements, villages true to geomorphological bearings are close to the vernacular. They need recognition as the new address of a true definition to development. This will be helpful in ecological and environmental imbalances.

There is a lot of emphasis on villages in the policy. The 73rd amendment act talks elaborately about the need for working on villages and defines the village. The 74th amendment act details the need for urban local bodies in the state. These two amendments imply a constitutional structure recognized by the government for necessary academic exploration and detailing at the hands of architects, planners, economists, geographers and sociologists alike. Article 243G and 243Q have indicated a probable structure to the administration of villages and urban areas, alike. Gandhian concept of urbanization was through villages, but the reality on the ground has changed between 1992 and 2021, there is thus a need to detail the policy.

The Natural State of Human Settlements and the Challenge in Our Growth

Villages are not a result of planning. They have grown over time and exhibit a natural sense of planning. They are settlements woven by a sense of community, held by common beliefs and values, are of similar aspirations and face similar challenges. Their residents give space to and recognize each other. They have an awareness of every individual through their preceeding generations. The village-built and the open in the villages are multiple-layered impressions of people and events with a memory of time. These with the uncountable years behind them, make a sensitive case. Architecture and planning, the recent tools, find themselves insufficient for commenting and consulting on villages.

Like the typification of built in the urban of today, the village-built is full of surprises. It has a strong sense of belonging which is missing in the urban. It is tactile, responsive, humanized, recollect able, relatable, organic, and is unique as art. The search for a solution for villages is complex because we have not been able to understand the vernacular built typologies of built-in villages. While we see them as forms, they are just functional interdepend spaces with intangibles entangled in their construction. Villages carry a long-lasting footprint of built relationships, derelict and ruin structures in reuse. A policy regulation or a guideline cannot assist the changes for adapting modern living to the Indian village. We must thus research the case, through dialogue, try to learn from it, and thus identify the key to manage growth.

Development - An Evolving Thought

We started centuries before 1947. Development, post-independence, although a blank slate for Indian governance, meant roads and sewer lines and electric supplies for human settlements. Enhanced consciousness of today has evolved us to a completely new era where the policy energy and the post-independence era definitions of “development” are becoming an impediment to the evolving thought on “development”. Our awareness and environment centric approaches have moved us from basic needs. While urbanization is uncontrolled, we now talk about an environment-sensitive development. This talk has not percolated into policy and legislation. Development in our legislation is still understood as its archaic definition of road building and provision of sewer lines. We must reconstruct legislative definitions of development to bring a change at the ground level.

An Irreversible Change

It is apparent that the villages are greedy for the urbanization trends, synonymous with comfort and economic progress. The final destination for village is urban. The village in its heart wants to be the city. They have not been shown the path to be better- villages. With self-run, agro-centric and self-designed typologies of houses, there has to be a design-based approach through local area plans drawns for them by architects. They understand villages and at the same time have the ability to carry out design-based research and development work, as guidelines of each area.

It is easy to build a city over a village, to substitute agriculture by other economies, but it is impossible to erase a city and create agricultural fields and more-impossible to bring the human-socio-cultural to connect to agriculture, as it exists today. With saturation in urban economies, the focus is shifting to rural. The village is seen as an easy-to-change piece of landholding. A place with more freedom, allows the settler to do almost anything. It is thus an inviting ground for the speculation and house uses not allowed within urban limits.

The loss of villages due to a rapid change, from the face of our country, is also a loss of the first footprints of our ancestors and the loss of the first impressions of agrorban. Urbanization today, is an economic function of modernization, just as its predecessor was the socio-cultural function of agriculture. A village in India is a misfit and is defined by the word rural, with an undercurrent suggestion of its incompleteness and a silent directive that it must aspire to become the urban.

While the anonymity in the directionless cities is giving out a loud cry for various changes related to the wellbeing, livelihood-centric-living, nature-leisure-green, environment and human engagements for its residents, it is not ready to acknowledge the life of the village as a solution to the misdirected urbanization today. The degenerative outcomes of life in the urban areas are the only concerns of architecture today.

Discussions on better life under the title of Green-living, Garden-city, Sustainability, Zero-carbon, Net-zero are only raising questions, they have not yet been able to reach a solution and nor are they guiding the uncivilized-urban to become the civilized-agrorban for which village-format is the only living representative. If villages start urbanizing and transform, they will lose their character. The only proto of agri-connected living will be lost. None of the village development plans or policies talks about conserving character by containing the negatives of urbanization. There are no guidelines and no policies.

Role of the Architect

Architecture is the only profession apart from poetry, literature, craft and education that can save the villages and help connect them to the world of technological change. How is working on villages possible for planners and architects, without any exposure to agrarian life? When there are no books, no researches, no deliberations on village house forms; when governance and policy see the village as a process that does not need development focus, but considers it to be a template to be erased, overtaken, over ridden, then how do we proceed?

Planning of villages; vernacular architecture; village life, customs and mores; open space-studies in villages; village house forms; village expansion patterns; village sociology are some heads under which studies have been made in the recent time. These studies need to be backed by research and with urgency, built back into policy, to change the physicality, to quench the restlessness of the village, making them progressive, technology-enabled, agri-centric and full of their original character. Architects and architecture must take responsibility, with governance support and assume its role, lest it is substituted by some other profession.

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Content

Planning and Legislation in Villages

Socio Economics of Villages

Built Environment of Indian Villages: A Case Study of Coastal Village of Maharashtra

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Abstract
The built environment of the villages is characterized by the buildings, streets and the spaces within the buildings. The culture, occupation and life of the villagers remains within these spaces. Organic or human intervention, these spaces represent village life. The traditions, culture of the villages correspond to sustainability principles, and responsiveness towards the environment in a number of aspects. The village housing evolves around the traditional occupations and culture. The occupational activities are integral parts of the overall built environment. There are learnings from rural way of living, and these lessons are worth preserving for sustainability of the resources, culture and people. These characteristics of built environment, culture and traditions must be taken as base for formalizing any plan or policy for rural development. This paper is about a study done in a historical coastal village in Maharashtra. This village is one of the most scenic and ecologically important parts of the Indian Western coast. The built environment is subject to change with the tourism activities happening here because of beaches and ecology and historical character. The threats of ecological degradation and loss of architectural character are realized looking at the developments happening in the other coastal villages. With this concern it has been realized that the base of development can be prepared with the understanding of the original character of the area. This paper documents the learning from this village in terms of environment consciousness, sustainable architecture and lifestyle of people. Author has tried to create a base on which the developments and planning can be done for such kinds of villages.

Keywords: Built environment, Harihareshwar, Indian villages, Rural character, West coast

Introduction

The 720 km long coast-line of Maharashtra State, commonly known as 'Konkan' has a number of places of historical, cultural and ecological importance. The ecology of this stretch is identified by rich biodiversity (S., 2015) and attraction for researchers and nature lovers. There are landmark examples of island and hill forts and temples in these places that attract tourists. Alibag, Murud – Janjira, Harihareshwar, Srivardhan, Dapoli, Amboli, Sawantwadi, Vengurla, Malvan, Sindhudurg, Vijaydurg, Sindhudurg and Ratnagiri and Raigad districts are the places of pilgrimage, leisure, and heritage and are major attraction of tourist activities in Maharashtra State. At present the whole stretch is rural and has strong character throughout the area.

The mention of the development for this area is evident in the 20 years perspective plan of sustainable tourism in Maharashtra, prepared by Ministry of Tourism & Culture, Market Research Division, Department of Tourism of India (Dalal Mott MacDonald, 2003), the Sahyadri-Konkan corridor project (Anon., 2021), and plans of Maharashtra State Road Development Corporation (MSRDC).

The major differences between this area from the other rural parts of India are its history rich biodiversity, culture and the unique architectural character and independent attitude of the people. The farmers in Konkan live with self-esteem, and generally lead a balanced life. In the period of 2013-18 15,000 farmers have committed suicide in Vidarbha, and Marathwada regions of Maharashtra, but none of these numbers were from Konkan (Upadhyay, 2019).

This paper is based on a study about understanding the relationship between culture and environment, and their impact on the present built environment area and to create an inventory of how future development can be done in harmony with the original character of the area.

Culture, Occupation and Built Environment

The culture and built environment elements are interdependent by function. The natural character of the area and site conditions are major factors in generating the design of the built environment. In the case of traditional settlements, they organically evolve within nature. The dependency on nature for their livelihood, and affection of the place seem to be very related to the culture, where people regard and worship nature. The built environment can be considered as an outcome of culture. Once built, it becomes a major factor to shape future generations, as it serves as an active and functional medium for the transmission of norms, customs, and values (Thompson, 1980).

Amos Rapaport in his book "Culture, Architecture, and Design" discusses the relationship between culture, the built environment, and design (Rapaport, 2005). The context of this text seems very relevant in the study area. The primary occupation of the area seems to be a major factor in impacting the built form and built environment of the settlements in Konkan. The author has observed four types of villages in Konkan. One is on the relatively flat terrain where farmers communities live, have large front and back yards in their houses, e.g., Dive Agar and Shrivardhan. The second type is fishermen villages, where the organically developed settlements are seen, these are generally very near to the coast, e.g., Adgaon. The third type is the communities of Hindu priests, who

are generally involved in the temple rituals and customs of the surrounding areas too. The examples of such villages are Ganpati Pule, Harihareshwar etc. And the fourth type is a village of craftsmen communities, who are involved in craft activities as their primary occupation, e.g., Sawantwadi. Remarkably all these villages have different characteristics of built environment to accommodate their occupation and culture.
In this paper a study done in Harihareshwar has been mentioned.

Harihareshwar

Medieval village of Harihareshwar village is a holy place of the family god of Maratha Kings, Peshwas. The location of this place is unique as it makes a partially East facing landform on the West Coast that the sunrise can be observed from the beach. The identification of this site for religious function and also regarding beauty of nature at its peak seems to be a well thought plan of the Peshwas. The temple is situated at the landform creating a tip of the land on the coast and there is a linear settlement of the Gurav community (Hindu Priests). Ancestors of These people had been the employees of the Royal family.
In addition to the people of the ancient village, the people owning and working in resorts, eateries, shopkeepers of the grocery stores, the people arranging water sports activities, and travel agents and drivers etc.
In the ancient village, performing the temple customs, upkeeping of the temple complex and serving the royal families at the time of their visits had been the main function and occupation of these people. Their routine includes early morning bath, chanting, simple and delicious vegetarian diet, regular visits to temples and sustainable practices to keep surroundings neat, clean and with a holy environment. They lead a resource efficient life and

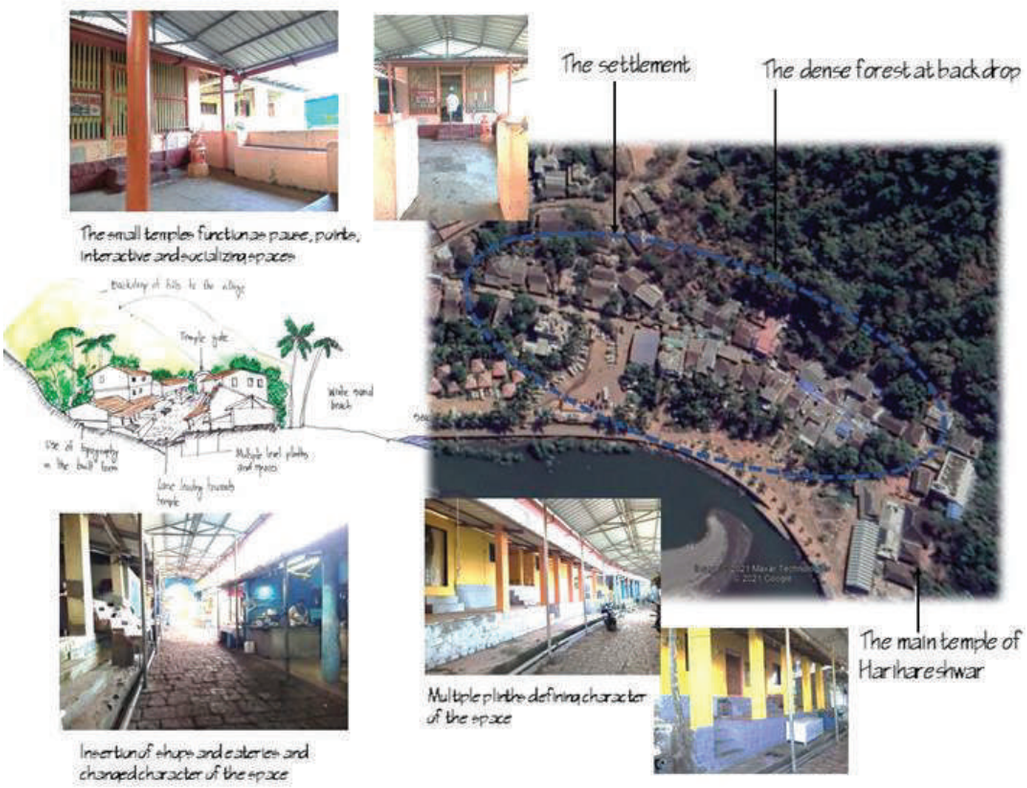

Figure1: Harihareshwar village character,
Source: Author

know the art of peaceful living with the limited resources. The walk through this street gives a holistic experience. Bare feet walk on rough but clean pavements makes walking interesting. Throughout the street there are various sounds coming from various spaces, like bells of temples, musical prayers in the temples, chanting from the houses of priests and people talking on the street. Fragrance of flowers, incense sticks, and in between the aroma from the traditional kitchens of the houses and restaurants. Visual experience of this place includes the colorful building facades, people interacting on multiple level plinths and stalls of local savories, flowers and pooja accessories. The shaded street, and a number of visually appealing pause points make the whole walk an interesting experience. This experience gets continued to the temple and then to the circumambulatory path of the temple. The temple is associated with a ritual called 'Pradakshina', or Circumambulation which is a combination of

trekking, and trail on the breathtaking view of sea near the temple. The bottom of this sea side hillock had been made walkable by the prime minister of Peshwas Chandrarao More (Anon., 2021). The villagers own this Circumambulation path, and do deep cleaning of algae deposits on this route and make it non-slippery. Figure 1 and 2 represent this description.

The present state is a learning and needs to be preserved as cultural heritage of the area. The contextual response on planning principles and sustainable practices, has been tabulated in Table 1.

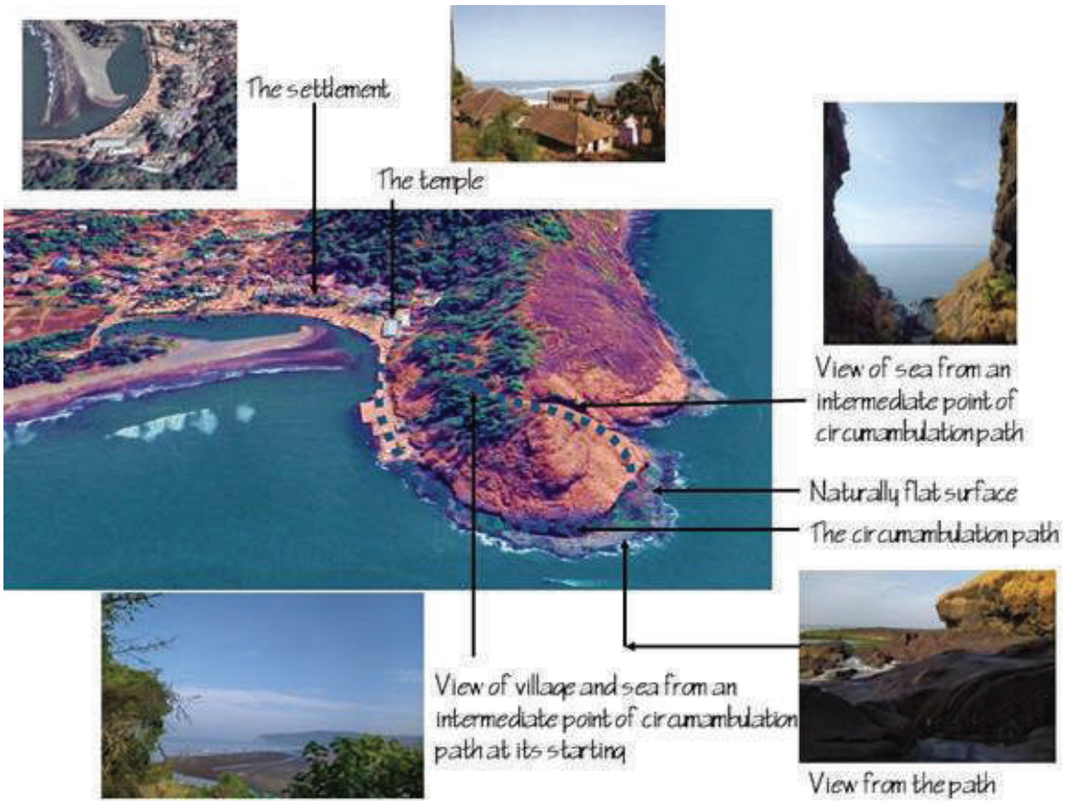

Figure 2: Circumambulation path and its description,
Source: Author

Sr. No.	Planning/architectural principle	Present status	Threats, Challenges and Gap identification	Learning from the practice (for development)
1	Use of topography and landform in the built form	The planning and architecture of the original village has been evolved with due regard to the landform. The use of multiple plinths and placing of the buildings at multiple levels The hillside houses are on multiple plinths, whereas on the comparatively flat terrain the sea facing houses are on single plinths. 	Sensitizing the new and outsider investors towards the original architectural style and sensitivity towards landform is challenging. 	The plinths at multiple levels have sustained well even during extremities. Also, these offer interacting spaces. There are multiple plinths and a series of verandahs, frame the open and semi-enclosed streets near each other. The semi-covered verandahs function as living areas. The subsequent plinths are utilized for various activities.
2	Regard to natural resources	use of locally available materials	The newer construction happening with foreign materials.	***

3	Sustainable architecture and built environment	multiple plinths, and interactive spaces together create aesthetic appeal of the area. The expanded form of this village includes resort of MTDC (Maharashtra tourism development authority), the other upcoming resorts, hotels and home-stay facilities. The temple architecture and village architecture characterize this area. The temple structure is made at human scale and is aesthetically pleasing, and very sound structure. The ancient village houses are also built in locally available materials and are climatically responsive. The load bearing walls and well shaded small openings in timber frames. keep the interiors cool in summers and warm in winters.  	The tiled roof supported on wooden battens is the most vulnerable part of these structures, and hence the local people are switching to the longer lasting material like RCC, however it also needs well designed waterproofing system. The services added later to the original structure are the added spaces.   The village is small and the expanded form is also at the growing stage. These are buildings built in concrete with flat roofs, glazed facades and are airconditioned to satisfy the needs of tourism industry.	The present practices need to be supported with technologies without interfering with its original character. The temple architecture can be studied as reference as it has sustained in all the extremities.   
5	Physical Infrastructure			
	Water supply	for limited hours	No adequate storage and pumping facility.	Needs to be developed in harmony with the existing village
	Sewage network	The septic tanks are there at individual plot levels	-	
	Solid Waste management	The village life was neat, clean and cultured before tourist intervention and they produced only biodegradable waste, that used to get converted into manure in their own back yard.	Present village not able to deal with the waste generated by the tourists. In October 2020, there were heaps of used plastic water bottles, packets of snacks, sanitary waste and broken liquor bottles at beach.	
	Electricity	MSCB electrical connections	No enough provisions for street lighting	
	TV cable	available for few channels	The insertion of urban style entertainment through TV, Netflix will interfere with the original style of living.	The present lifestyle is fulfilling in terms of proximity to nature, adventure sports and temple rituals. People are living peaceful life with it. For the tourist to rejuvenate here, the original pattern of living needs to be carried forward.

	Telephone and internet	Only few telecom company's network is available. The temple complex and MTDC resort have BSNL landline connections	Poor connectivity of telephone	The better connectivity is needed
	Road network	Organically developed, within the village.	The existing roads need integration with all types of wet and dry services.	Segregation of pedestrian and vehicular movement is needed
	Public transport	Missing	Visitors use private vehicles. In long term there are chances of traffic congestion and air pollution because of these.	Needs to be integrated in a sustainable way.
6	Social infrastructure			
	Schools Hospital and other medical facilities and police stations	Missing and needs to be developed for the civic discipline specially for the tourists	The nearest town Mangaon, is 60 km away from the village. The people are migrating; hence the kids are less in number.	Economic strengthening is needed in synchronization with the existing living and heritage.
	Gathering spaces	The fronts of houses, the temple and small temple on the street offer gathering spaces for the villagers.	The generalization of the vocabulary for gathering spaces should not happen.	The present ways of narrow streets and interactive and small gathering spaces in front of the houses can be taken as guideline for space making exercises in the village
	Crematorium	One crematorium is present near the beach	The ashes polluting the beach	Electrical crematorium and the arrangements to prevent the beach
7	Heritage and Cultural sustainability	Temple and its rituals and Holy procession on this circumambulation path (centre, 2020). Minimalistic lifestyle of people and regard to nature. Community participation in management of the temple complex and the activities.	This culture needs to be carried forward for the future generations too, else it has threat to get disappeared. The nearest forts from Harihareshwar are Bankot, which is on the hilltop, and Murud Janjira, which is just amidst the sea. Both these forts are in ruined condition and there is very less authentic information available for both these forts. Also being the neglected places, there is threat of further degradation and misinterpretation,	The Konkani people had developed resilience to the extremities of climate and established a way of living with limited resources. The name "Konka nastha" indicates the ability of people to do farming in the rocky, unyielding land in the Ratnagiri district (Joshi, 2020). People are sustaining the cultural heritage of the state. Their practices are intangible aspects of cultural heritage and the future development must consider sustenance of these people and their practices too.
8	Social Character	The small temple hall and small front yard, used in gathering of small groups and prayers. They interact with each other in the routine activities.	With migration the societies are not functioning in the original model. The policies made for rural development have not benefitted this area.	The people of various religions and castes live with harmony and peace.
8	Environmental sustainability	This settlement is surrounded by hillock on one side and sea on the other side.	Sensitizing the outside investors towards this is a challenge. Also, the investors from the other parts of the state come with the projects in silo and it does not help in the orderly development of the area.	The development of this area, history, culture and holy character needs high respect, sensitivity towards the total environment of the area.
9	Economic Sustainability	The temple trust takes care or the employees of the temple. The rest of the villagers are completely dependent on tourism activities		Tourism activities needs to be expanded with due care of all the above-mentioned points.

Table I: Contextual response on planning principles and sustainable practices

Findings and Discussions

The place is important with its spiritual character, peaceful environment and rich natural ecosystems. This can be a center for rejuvenation and relaxation for the people leading stressful lives. The area too needs development. Sustainable tourism is the utmost need of the area. Along with the sustainable infrastructure and practices the regard for original character and considerations to address the challenges faced must be given thought. Along with total sustainability, environmental and economic resilience are the issues to be dealt with adequate provisions to safeguard the lives and properties of the people in the time of natural calamities. The stakeholders of development in this area are primarily MTDC, the outside investors and entrepreneurs. They need to be sensitized for the original character of the area, and guidelines to be formed for orderly development of the area and the carrying capacity of the area. Education and awareness also can play an important role in the overall process of sensitization towards all these matters.

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Tiny Housing: A Future to Better Living Spaces in Pune

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Abstract

Tiny housing is a fairly new concept in India that is yet to get recognized to its full potential. Tiny housing is residential buildings with footprints around 400 square feet containing all spaces but is more compact without any excess space. In the past few years, there has been a considerable shift in population from rural to urban due to growing job opportunities in the cities. Due to the increase in population and urbanization, there have been concerns about the resulting volume of consumption. The paper aimed to address the problem of overconsumption by considering the benefits of initially downsizing to smaller houses that still provide a good quality of life in an urban context. Pune was chosen as an urban city to understand the criteria for the tiny housing committee. Pune is known as the 'Oxford of East' and 'Home for retirees' is home for people of diverse age groups which broadens its horizons for tiny housing. Nevertheless, due to the growing IT Firms, the city promises new job opportunities which come with more accommodation problems, which can be solved with the help of tiny housing. The paper helped me understand how the same amount of space could accommodate the daily lifestyles of all economic groups. The research was conducted through the means of case studies on existing tiny house communities and their locations, conducting surveys online and offline regarding people's view on tiny housing, interviewing experts who are currently involved with tiny housing construction, activity mapping. The paper helped to understand the different age groups that preferred going tiny and changing people's perspectives about going tiny, not just as a forced economic solution but as an informed choice. It helped to understand the authorities that would look after the welfare of such communities and the ideal location for the same. It nevertheless supported the growing urban city to accommodate more people without compromising on health, lifestyle, and standard of living.

Keywords: **Tiny house communities, Urban cities, Down-sizing, Economics of tiny housing, User-Friendly, Adaptive Use**

1. Introduction

Tiny houses are primarily full-fledged dwelling units on a much smaller scale. They have been considered as a suitable housing solution due to their low carbon footprint, flexibility, adaptiveness, low construction cost, and minimal maintenance. Tiny houses give people an opportunity to live a life that they have desired. They promote a clutter-free house with unique and storage spaces created by maximum utilization of dead spaces. They are very useful for people who want to travel and explore the world.

Tiny houses have been around since the pioneer age in the form of huts, igloo's, tents, etc during the early settler years. The Sioux, Inuits, and Samoans are considered the earliest originators of tiny homes. The history of tiny houses goes way back in the past with the origin of 'Yurts' or 'Gers' that were established in Mangoli as small mobile houses in 1000 B.C. In 500 B.C native Americans used tipis which were portable, water, and head resilient dwelling units. The 1800s were an interesting timeline for the evolution of tiny houses. This period introduced 'Gypsy Wagons' which were used by the Romanian community throughout Europe. They were self-contained houses that could be transported to different locations with the help of horses. Nowadays, these Gypsy Wagons are more commonly known as RV's/Campervans. The concept of tiny houses got more popular when an American author Henry David Thoreau built himself a 150 sq. ft cabin in the woods and documented his stay over 2 years. Since then the ideology of tiny houses has been evolving and used for various purposes. Tiny Houses were even more familiarized by Jay Shafer who built a 96 sq. ft house for himself where he stayed for 5 years and later went to offer first plans for a mobile tiny house and founded 'Tumbleweed Tiny House Company'.

This over time resulted in the origin of a notion that is most commonly known as the Tiny House Movement. The tiny house movement gained immense popularity in the United States. It is an architectural and social movement that encourages people to lead a simpler life in smaller spaces. It led to the immersion of Tiny Housing Communities and Tiny House Villages. They are a cluster of tiny houses which form a community or a society. They can be permanent and mobile depending on the users and their location. With the developing technology, architects have been able to vertically stack tiny houses as well to reduce land cover and accommodate a maximum number of users.

Tiny Houses are yet to be introduced in India to its full potential. At present tiny houses in India are being utilized for slum rehabilitation schemes or as holiday homes by a few economically privileged people. The result of the following outcome can be blamed on the unawareness and ignorance by people related to tiny houses. In India, there is a common myth that compares an individual's house size to their pocket size. Due to this, people usually find themself wounded up around this and feel pressured to own spaces that do not necessarily fit their daily needs and necessities. Hence, over the years, one can do nothing but notice the contrasting sizes of houses within a city, with one family of four having large penthouses and another having to live in a '4x4' chawl. The primary reason for this anti-thesis lies in the current economic gap that has eloped the society. With the increase in population and land costs, tiny houses will soon become a necessity to accommodate the rapidly growing populace.

The paper aims to understand the scope of Tiny houses in India and familiarize them as a dwelling option in Urban cities of the country. It also focuses on understanding the different economic sections of the country and accommodating all its users in a tiny house irrespective of their economic background. It helps establish tiny houses as a housing solution to a varied range of users by customizing them according to its user's needs and necessities. The research also focuses on listing the advantages of tiny houses and normalizing downsizing.

A solution for the ever growing population

With the increasing population, India is leading towards becoming the most populous country in the world, with its population set to reach 1.7 billion by 2050. Currently, India accounts for more than 18% of the world population but occupies only 2.4% of the total land surface. This has caused India's 'land to person' ratio to go down to 0.0024 (while that of the world stands at 0.011). Continuation of this trend will result in crucial problems like over-consumption and lead India towards scarcity of land to use. Besides, increasing land value has caused a reduction in the size of dwelling units, by almost 17%. Apart from this, there has been a shift in family sizes over the years. Joint families are very rare and nuclear families have become the new normal yet somehow the space requirement for each family hasn't dropped down by the same ratio, causing the inevitable issue of space constraints for a few sections of people. Therefore, tiny housing could prove to be a practical solution, as it accommodates all the basic functions in a compact, yet functional way.

A pocket friendly solution for the future

According to experts, a typical tiny house in India costs Rs 1500/square feet. Due to its compact size, the majority of the spaces fit in about 300 square feet, bringing the average cost of building a tiny house to roughly 5-6 lakhs. On the contrary, an average studio apartment, with a minimum carpet area of 600 square feet, costs Rs.3000/square feet, bringing the total to a minimum of 15-18 lakhs, costing almost triple that of a tiny house. Tiny Houses can also be transported to different locations, thereby providing its users an economical solution to the woes of buying/renting when moving to a new city. It helps its users be loan-free. They cost less than most cars and still provide housing for decades. With low space, requirements come low maintenance cost, utility cost, lower property tax, and lower other necessary services costs.

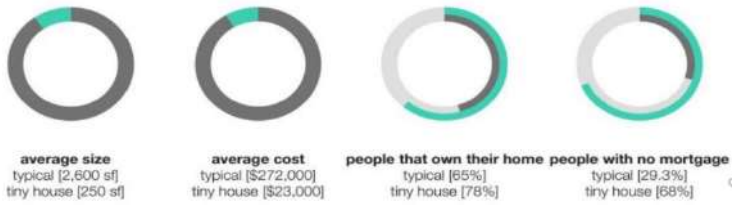


Figure 1 : showing cost to mortgage ratio for a tiny house and a typical house

A solution for all economic sections

The distinctive property of tiny housing being completely customizable and made according to the user and their needs make them different from other dwellings. It makes them not only flexible but also very user-friendly. The ability to cater to each user's needs and necessities individually gives tiny houses a sense of belonging. Tiny houses show a great variety to benefit all its users from Military Troop barracks to Temporary Houses and Slums, tiny housing has been used by various people for various dwelling purposes over the years. Apart from this these days, tiny houses have also been used as office space, library, cafe, restaurants, etc. They can be molded into any functional space and they rightfully justify the same.

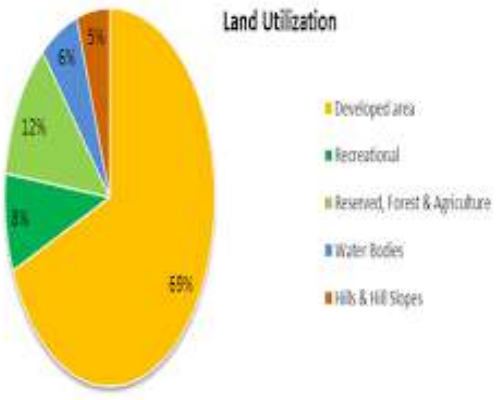
Figure 2 : showing different uses and types of tiny house

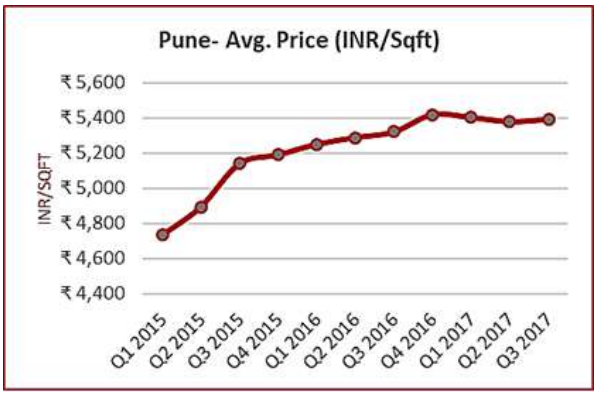
Pune as a model project for Tiny Housing

Pune, known as the 'Oxford of East' and 'Home for retirees', houses people of diverse age groups, broadening its reach for tiny housing. With the IT Sector boost, Pune has developed into one of the most prominent urban agglomerates in India. It has rapidly grown into a contemporary industrial hub and is identified today as a growing metropolis with tremendous potential. According to data, the city has already used up most of its green/agricultural spaces and is moving towards acute concretization. Hence tiny housing could be the solution for accommodating more people without compromising on health, lifestyle, and standard of living.

Pune apart from being called the 'Cultural Capital' of the state is also the 9th largest city in Pune. With an estimated population of around 4 million, it has a population density of 5600 people/kilometer. Pune is also known as an educational center and hence attracts a lot of students and bachelors with 60% of its population being under the age of 30. With students being one of the majority of the city's population, accommodating them on a given budget becomes a serious problem. Apart from this according to the municipal corporation statistics 40% of the city's population lived in slums till 2011. With this Urbanisation and constant increase in population by 2.7% yearly, it will also soon face issues of land scarcity just like Mumbai, with the exception that Pune will not have any land to 'reclamation.

To avoid such a situation in the future, Pune was chosen as a city to explore the possibility of tiny houses as an effective dwelling option to overcome the city's issue of over urbanization and population.





2. Methodology

The research was conducted to understand the design aspects of a tiny house and how it can be used to accommodate all economic sections. The paper focuses on different ways to implement tiny houses as a standardized dwelling unit which can be customized according to the needs of its users.In order to address the research question, the following methodologies were adopted in the respective order.

Flow chart 1: showing the methodology used to conduct the survey

3.1 Case studies

A few examples of tiny houses and tiny houses committees were studied to understand its economical importance and significance. The table below highlights the case studies and my inferences from them.

Srno	Case study 1	Case study 2
Name of the architect	Brian Levy	MBCI
Total area	210 sqft	250 sqft
Total cost	$30,000	$30,000
Capacity	2 ppl	3 ppl
Location	Nil	Fresno CA
Purpose	Travel house	Travel house
Inferences	content of life is not related to the size of the dwelling	Customization of each unit according to the users needs
	convinient living with minimum use of renewable energy	Light weight material used with wind load consideration
	seameless difference between the bedroom and living room	

Table 1 : showing the inferences from the case studies

3.2 Surveys

In order to find the idea and perspective of people on tiny housing, various surveys were conducted. The following stakeholders were identified.

The questions asked were divided into 3 categories:

- GENERAL QUESTIONS :*Are you aware of tiny houses and would you prefer staying in one?*
- AFFORDABILITY**:** *Would you like to own a tiny house or rent it and how much would you pay for it?*
- PERSONALISATION : *Where would you like your tiny house, the city or outskirts and would you like to customize it?*

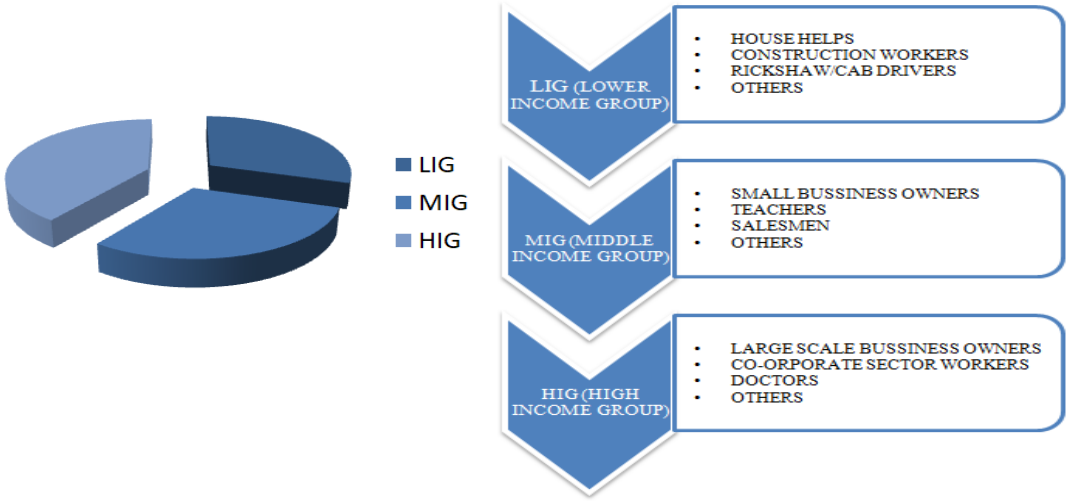


Figure 3 indicating the stakeholders surveyed

400 such stakeholders were surveyed and asked questions related to tiny housing and their responses were recorded.

3.3 Interviews

Along with Surveys, Architects and Interior Designers, who are versed with the concept of tiny housing, were interviewed and their perspectives were understood.

Ar Gaurav Khandelwal, a practicing Architect from Indore, was one of the experts who was interviewed. He has done various tiny housing projects and owns a prototype of a foldable tiny house module.

On asking him about his views on tiny housing and the idea of it being an economical solution, his response was: "Tiny houses are an effective solution for the rising overpopulation. It's about time that tiny houses are normalized as people will want to downsize due to the excessive land prices and the feeling of content with fewer things. It is surely an economical solution since the houses are transportable and can be relocated to different cities. The initial process of downsizing is going to be difficult for a few economical sections but everyone will eventually get used to it."

3.4 Activity mapping

To understand the spaces used by the stakeholders listed above, their activities were mapped throughout the day and analyzed. The activity mapping was conducted on the basis of the areas most used in a house with the number of hours spent in that space.

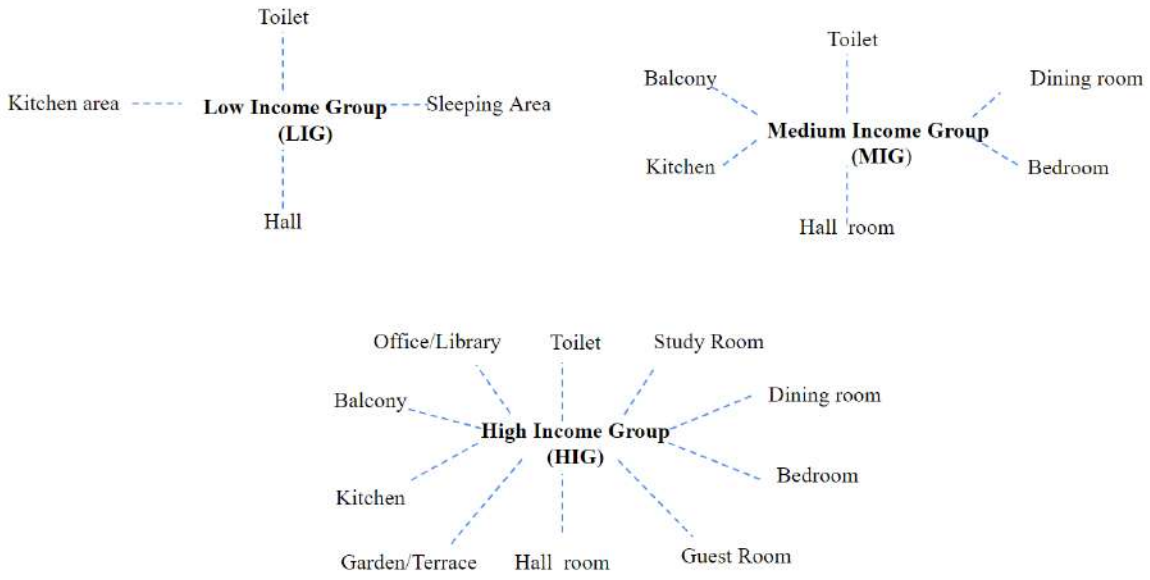


Figure 4 indicating the spaces used by different categories of stakeholders

3. Data Collection and Data Analysis

Data was collected by the means of the above methodologies and their results were noted and analysed.The data collected was majorly by the means of surveys and activity mapping . The result of the surveys conducted on different stakeholders is given below.

4.1 SURVEY ANALYSIS:

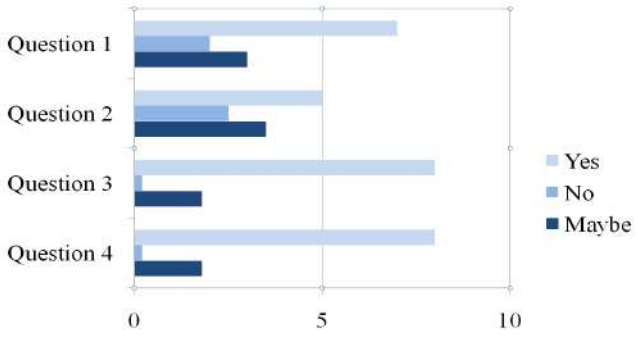


Figure 5 showing the results of the questions . Question 1: Do you know what a Tiny House is?. Question 2: Would you like to stay in a Tiny House? Question 3: Do you think it's economical? Question 4: Do you think they are a good investment?

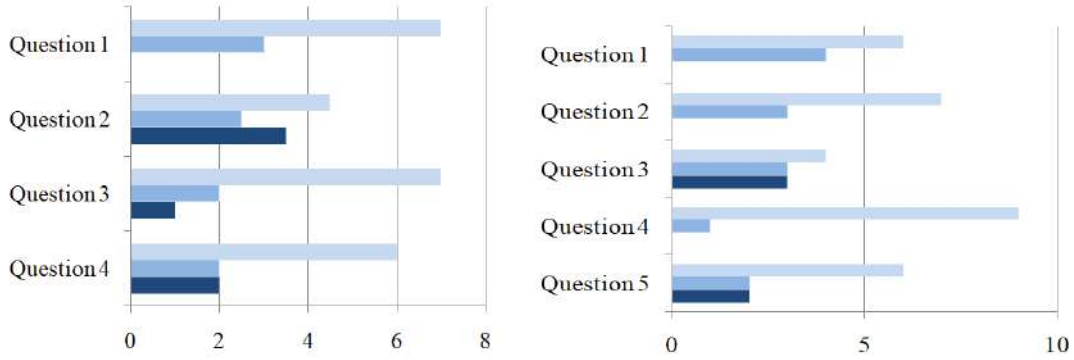


Figure 6 shows the result of the questions. related to ownership Question1: Would you like to own a Tiny House?Question 2: Would you pay less than 6000 rs as rent? Question 3: Would you like to stay for more than 3 years? Question 4: Would you consider living tiny as a permanent solution?

Answers related to requirements : Question 1: Would you prefer your tiny house to be transportable? Question 2: Would you like to live in fringe areas of the city? Question 3: would you like to stay with your family? Question 4: Would you like to get your house customized? Question 5: Would you like more indoor spaces than outdoor?

The first set of questions in figure 6 focused on understanding the basic ideology of people about tiny housing. The results were quite astonishing. According to the survey, 70% of people knew what a tiny house was and would not mind staying in one. 80% of them also agreed that it was a good investment and a good economical solution. The remaining questions were asked under the categories of tangible and intangible aspects of tiny housing to understand the psychology of its users. The questions were based on customization, ownership, locations, etc.

Questions asked in figure 6 were related to the ownership, tenure, and cost of tiny houses. 60% of the people agreed that they would prefer owning a tiny house to renting one. When asked about the cost of renting 70% said they would not pay more than 6000/month. 90% of people also agreed that they would consider living tiny as a permanent housing solution.

The remaining questions were related to customization and the location of tiny houses. 60% of people preferred having transportable houses in fringe areas outside city limits. 90% of people wanted their tiny houses to be customized according to their needs with 60% people agreeing to have more indoor usable spaces than outdoor.

Some of the conclusions that were drawn from the surveys were as follows:

- The concept of Tiny Houses is not the primary dwelling option due to a lack of awareness.
- Due to its considerably lower costs, people are inclined towards buying the unit rather than renting.
- 60% of the people prefer to live in a tiny house community if given a chance.
- Customization of interior spaces will help cater to all economic sections.
- Most people at the moment considered tiny houses as a secondary houses but would consider them as a permanent housing solution if the space catered to their basic needs and necessities.

- Tiny houses are preferred by students due to their compact and cost-effective nature.
- Most people preferred shifting with their families into a tiny house.
- MIG considered tin houses as the most effective solution to the rising land costs.

4.2 ACTIVITY MAPPING ANALYSIS

The daily activities were mapped and noted based on the usage of different spaces by each category. The categories were broken down concerning the different economic sections namely Low Income Group (LIG), Medium Income Group (MIG), and High Income Group (HIG). This helped in understanding the different spaces utilized by each group and the activities practiced in each such space. Apart from built spaces open spaces like balconies were also considered to understand the ratio between built to unbuilt variations of each group.

After the spaces used by each group were identified under methodology, the hourly usage of these spaces was observed. Table 2 highlights the number of hours spent in each space by different groups.

Living spaces in a house	Category		
	LIG	MIG	HIG
Living room	9	7	1
Dining room	0	1	2
Bedroom	8	10	12
Kitchen	3	3	2
Toilet	1	1	1
Study room	0	0	1
Office	0	0	1
Guest room	0	0	1
Balcony / Open spaces	3	2	1
Garden	0	0	3
Ratio of built to unbuilt	7:01	11:01	5:01

Table 2 indicating the no of hours spent by each category in the different living spaces in a house

After noting the activity mapping of different groups based on hours spent in each habitable space in the house, the following conclusions were noted:

- LIG needed the least amount of habitable spaces from all the different categories.
- LIG spent the most hours in the living room for various daily activities.
- Open spaces like balconies and terraces were used mostly by MIG and HIG.
- HIG preferred having more outdoor luxury spaces, followed by LIG who use these spaces to cater to their daily chores.
- HIG has more private spaces like a study room, library, etc than MIG and LIG.

- The number of hours spent in private spaces like bedrooms is higher for HIG than for LIG and MIG.
- Provision of spaces like guest rooms is a luxury for MIG but a probable necessity for HIG.
- MIG uses the living room less than LIG but more than HIG due to limited space constraints.
- HIG has a designated space for each activity but MIG and LIG use the same space for different activities at different times.
- The ratio of built to unbuilt space utilization varied greatly with each category.
- LIG, MIG, and HIG use 1 hour of open spaces for 7,11, and 5 hours of enclosed spaces respectively.

4.3 MODULE DESIGN

After analyzing the data gathered from surveys and the activity mapping, a module was designed, catering to all the economic sections and their needs. With the help of activity mapping, the total area utilized by each economic section was studied and a typical module size of 3x8m was designed. This module can be customized both externally and internally by making a few changes. The module can be parked at any location and can be transported if provided with wheels. The paper aims at providing an easy layout of a tiny house that will fit all the activities and spaces that are needed daily.

All the basic spaces namely kitchen and dining, living, bedroom, and toilet space were designed according to the needs of all economic groups. Standard size of 2X3 was used to accommodate the spaces mentioned above. An additional multi-purpose area is designed near the living room which can cater to different functions at different times and different users. This space could work as an office space or a library or an extended tv room according to the needs of its users. This hence helps its users customize their tiny houses to their requirements.

A larger bedroom of 3X4 is provided to accommodate a king-size bed. The same bedroom module can also be provided on the other side of the house to accommodate more bedrooms for more users. The roof can be made accessible to facilitate outdoor interactive spaces. Additional collapsable decks can be placed at bedroom level to increase the total area of the tiny house.

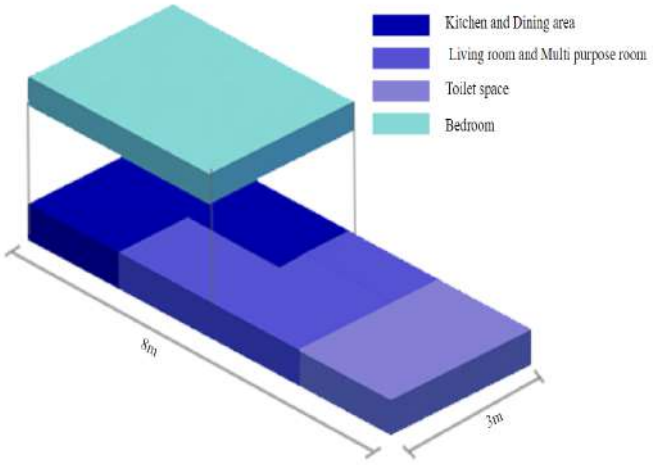


Figure 7 showing the zoning module

4. Conclusions

In conclusion the paper helps in understanding how tiny houses can accommodate different economic groups in the same carpet area, not just as a forced economical solution but as an informed choice. The paper explores how tiny housing communities are a potential socio-economic solution to ever growing problems of overpopulation and habitable space limitation. It also helped understanding people's ideology regarding tiny houses and the present findings confirm that tiny housing can be a potential dwelling option to accommodate Pune's rising population and land costs. It will help Pune cater to its citizens without degrading their standards of living,sanitation etc. From the above analysis Tiny houses can be now considered as a promising aspect in the housing categories not just for a specific economic class but as an universal solution.

Tiny houses are very much the key component in future attempts to overcome the issue of over consumption. This provides a good starting point for future discussions and studies regarding the scope of tiny houses in India. Future studies could fruitfully explore this issue further by conducting surveys on such multi functional tiny housing modules and their efficiency. Looking forward, further attempts at exploring tiny houses and their benefits can be proven quite beneficial for literature.

6. Acknowledgement

I would like to extend my gratitude to my faculties, Ar Vaidehi Lavand, Ar Ramiya Gopal and my guide Ar Girija Indulkar for their valuable inputs and necessary comments.

I would also like to acknowledge my friends for supporting me and motivating me throughout the course of writing this paper.

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IX.

Analysis of Open Spaces in High-Rise Buildings in Pune

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Abstract :

Due to rapid urbanization, people tend to migrate towards cities, because of the opportunities and potential it holds. This puts tremendous pressures on cities, to provide for housing to the people within it. High-rise buildings are the most effective solution, for any developing city that faces land shortages. Increasing population, shrinking space and a desire to remain close to the core city, have led to the idea of high-rise building complexes. These high-rise building complexes have helped to provide a home to many on a single piece of land. A challenging problem which arises in this domain is that these building complexes lack to provide livability for the residents due to lack of open spaces. Due to the hectic lifestyle, People are not being able to interact with each other. The issue of social interaction can be addressed with open and community spaces within the structure. This study will be done for different parts of Pune with different cultural, geographical and functional contexts to identify and analyse the open spaces of high-rise residential building complexes. It will mainly focus on comparing the relationship between the housing layouts and spatial openness of some high-rise residential building complex in Pune. Perceptions of the residents on the use of open spaces would be analysed through surveys that will give quantified terms for analysis. This paper aims to identify the relationship between high-rise housing layouts and spatial openness through the collection of data from literary sources and the live case studies. This research paper would help in understanding different approaches, needs and perspectives of residents while designing open spaces for high-rise building complexes.

Keywords:- High-rise buildings, urban open spaces, spatial openness in high-rise.

1. Introduction :

Due to migration from nearby villages, Pune is witnessing immense population growth, leading to urban sprawl, housing demand, land cost increases. Due to increasing urbanisation, people, because of the opportunities and potential it offers, prefer to move to cities. This puts tremendous pressures on cities, to provide housing to the people within them. The only viable way to meet the needs of a growing population is to construct buildings with increased verticality. Growing population, decreasing areas and the desire to stay close to the centre of town led to the idea of building high-rise building complexes.

1.1 Definition of a high-rise building in Pune :

The overall height of buildings in Pune until a few years ago was 36 meters. The Maharashtra government also approved the construction of tall buildings in other cities in November 2007. The Pune Municipal Corporation allowed builders to construct 100-metre tall buildings based on the approval of the State Government.

1.2 Residential Open Space :

Residential Open Space Residential open space as a setting of dwelling is related to form, shape, plan, structure, and functions of the built environment and has a positive impact on residential environment quality (Trancik 1986, Gehl 2011, Pakzad 2007). It is possible to divide open spaces into four groups: public, semi-public, semi-public and semi-private and private spaces. Open space is a key element of housing development, which includes balconies, gardens and public spaces.These areas provide residents with a private space for playing, relaxing, chatting and enjoying natural resources such as trees and plants, making the environment more appealing. To mark the boundaries between dwellings and the separation between neighbouring houses, the environmental aspect of open space can also be used, which allows the penetration of sunlight and fresh air.

1.3 Social Interaction :

Social interaction is a social action between two or more individuals, which includes both verbal and nonverbal communication, such as body language (De Jaegher 2010). Open spaces offer a sense of social place in high-rise apartments, encourage people to gain social engagement, strengthen the feelings of family kinship and inspire others, and provide an opportunity to ponder individual and social values. Open spaces nurture spiritual growth through inclusion and enable individuals to feel free and promote a pleasant atmosphere. Open spaces support people by providing their busy lives with solace, leading to rapid

recovery from illness or disease, and promoting healthy living. Such problems improve the viability of high-rise apartments and allow individuals to connect.

1.4 Problem Statement :

A place's liveability is justified by the place's habitable and comfortable atmosphere. Construction and natural environment, social stability and cultural, recreational and entertainment opportunities are the factors that classify the habitability of a place. The greater the location, the greater the quality of life in that city. As the high-rise apartments in most cities are growing day by day, their capacity to provide liveability in people's lives is decreasing. The reason is that there's no commonplace for them to socialize. Open spaces are, thus, the perfect way to make apartments more livable and habitable.

1.4.1 Limitation of exterior public space in terms of social interaction :

There are open spaces between high-rise buildings and some of these outdoor public spaces are designed as gardens or seating areas. These spaces also include playgrounds for kids and exercise facilities. All residents have access to these areas, but their relationship with these areas has often been noted to be less than comfortable. As Newman (1976) argues, the communities require multiple families and individuals to share areas without the notion of territorial advantage associated with the front lawn of a house. The more people that dwell in a condensed space, the less likely it becomes that they will develop a personal relationship with their surroundings (Newman 1976). As a result, they become nothing more than walk-through areas, while these shared areas are built for mobility and to accommodate personal freedoms.

1.4.2 Lack of interior public space in terms of social interaction :

Because of the technological limitation and the economic status of intended residents, the design of early residential high rises focused on the construction of private living spaces, while public space was seldom valued (Li and Liu 2006). Today, economic growth and technological changes have led to increases in working standards and living standards, and residential high-rises have been rapidly built for both public and private spaces. Potential tenants no longer rely on private living spaces alone, but see public spaces as an important element in determining the overall living environment.

1.4.3 Although past studies have explored the relationship between high-rise communities and social interaction, little attention has been paid to factors encouraging social interaction in this living environment. These studies centred on the importance of the spatial, social and

environmental aspects of populations, but did not provide a detailed analysis of the relationship between personal characteristics and the characteristics of their living environments and their effect on social interaction.

1.4.4 Aims and Objectives of the study :

This paper aims to identify the relationship between high-rise housing layouts and spatial openness through the collection of data from literary sources and the live case studies will be done in different parts of Pune which will have different cultural, geographical and functional contexts. It will also try to understand the importance and need for open spaces in high-rise residential projects and their effect on the social well-being of the residents.

2. Literature Review :

2.1 Types of Interior Public Space in High-Rise Buildings :

In a high-rise housing complex, the interior public space acts as a circulation space as well as a connection between apartments. It has a lot of potential for enhancing social interaction by providing more interior public space (Wang 2004). Public circulation space and transition spaces inside high-rise residential buildings are known as interior public space. It excludes outdoor exterior public spaces and private living areas within each apartment for this paper.

2.2 Height for social interaction :

The main feature of high-rise residential buildings is the ability to live high above the ground (Shan 2004). The Pune Municipal Corporation allowed builders to construct 100-metre tall buildings based on the approval of the State Government. Residents' perceptions of the ground environment tend to change as they live higher above the ground (Gehl 1996). Anyone living above the fifth floor cannot be associated with ground activities under normal circumstances due to the scope of a person's field of vision (Gehl 1996). As a result, it is also difficult for ground events to draw people residing on the upper floors.

2.3 Neighborhood Social Interaction :

In recent years, the value of neighbourhood social activity has increased. Although community connections are considered poor in contrast to close relationships between friends and family, social contact in the local neighbourhood is recognised as an important factor for enhancing social life. Researchers believe that the contacts in the neighbourhood will boost social cohesion, public sense, quality of life and social well being. It can

improve people's happiness and well being by engaging with neighbours, such as sharing of interests or small conversations.

2.4 Outdoor spaces of high-rise housing :

Public spaces in High-rise complexes are important spaces for residents to create social contact and recognition (Garling and Golledge, 1989). High-rise complexes' public spaces are important spaces for residents to create social contact and recognition (Garling and Golledge, 1989). In other words, they can become social arenas and interactional spaces (Canter, 1977; Bonnes and Secchiaroli, 1995). Residential outdoor spaces are a natural extension of the living room and an integral part of the building (Dillman and Dillman, 1987). The most important urban open spaces are those that are familiar and near to home, rather than those that are significant or wide and far away (Burgess et al., 1988). The majority of people use nearby open spaces (Harrison, 1983). Neighbourhood open spaces play an important role in fostering a sense of community among residents (Fleming et al., 1985).

Residents in high-rise clustered housing have restricted access to open areas. They are private to the residents from this perspective. Within each housing complex, these spaces are accessible to all tenants and are open to the public. As a result, they are semi-public spaces that can function as activity centres, allowing for the most access and visibility (Archea, 1977). Furthermore, they act as buffer zones between the outside world and the residential areas. They have the characteristic of defensible space (Newman, 1973).

2.5 Space layouts, design elements, and social activities in outdoor spaces :

Gehl (1987) has identified three types of activity in public outdoor spaces. They are necessary activities, optional activities and social activities. Consequently, each type of activity needs certain physical settings to promote their occurrence in spaces, and the physical environments required for various types of activity are substantially different from each other. Social activity, as described by Unger and Wandersman (1985), primarily refers to people's interactions with one another, such as playing with others, greeting others, and conversing with others.

The presence of activity nodes in public space offers the greatest opportunity for access and exposure (Archea, 1977), as well as increasing informal social contact among residents. Efficient activity nodes that are situated in a central location with convenient access, have few visual barriers to potential users. As a result, well-designed outdoor spaces in high-rise

complexes can serve as efficient activity nodes that promote residents' everyday informal interactions (Bechtel, 1977).

The design of outdoor spaces for high-rise complexes is important not only from an environmental point of view but also from a social point of view. Efficient public high-rise housing spaces can provide opportunities for occupants have substantial interaction, and a sense of neighbourliness can then be fostered. Also, good public spaces will enhance the standard of living in dense, high-density environments.

In addition to the space layout, several physical features have been established as efficient design elements in outdoor spaces to facilitate social interaction. The availability of shared access helps users to have more chances of casual interactions (Fleming et al., 1985) and promotes social events to take place (Howell et al., 1976). Open spaces and playgrounds in the public spaces of urban areas allow people to make social connections (Cooper Marcus and Sarkissian, 1986; Coley et al., 1997).

Providing a suitable space for social activity in the community is very critical for promoting social interaction. Residential neighbourhoods are potential places for social interaction and the creation of social connections, so it is important to consider the design of these spaces in such a way as to allow people to get out of their private home and into the social environment.

Neighbourhood social spaces are perceived to be successful if they are publicly shared and accessed by familiar neighbourhood people, where they can connect casually, and extend their social networks. Previous studies have identified spatial layouts and the availability of facilities in communal spaces as important factors in the living environment in promoting social activities. Diversity, accessibility, quality and visibility of communal spaces can be seen as the main design variables affecting social interaction.

High-rise apartment buildings have received a lot of criticism from experts across various disciplines. Gifford (2007) concludes that high-level living environments have both benefits and drawbacks, as they offer greater privacy and minimise unnecessary social contact, while at the same time reducing intimate social interaction and less care between residents. Also, Evans (2003) argues that the lack of public spaces inside high-rise apartment buildings, such as lounges and meeting rooms, which are deemed ideal for the management of social networks, will possibly contribute to social isolation. Besides, Modi

(2014) points out that public spaces in high-rise buildings do not usually accommodate residents' day-to-day activities.

The above research findings have shown that the presence of public outdoor places of certain landscape elements promotes casual communication between people and then encourages social interaction. As a result, the use of elements in the detail design of high-rise housing's outdoor spaces becomes crucial in the development of socially acceptable living environments.

3. Methodology :

A mixed-method approach is used to address the research query, including (1) A questionnaire to evaluate the personality attributes and experience of the apartment building and the neighbourhood environment, (2) Qualitative interviews to gain an in-depth insight into the experiences of residents with their psychological and physical living condition and their social behaviour in their neighbourhood. The questionnaire was designed to gather information on personal attributes, including age, gender, employment status, length of residence and structure and home ownership.

3.1 Survey Location :

Pune is India's seventh-largest city and, after Mumbai, the state's second-largest. The city's rapid development, however, can be traced mainly to the industrialization of PMC/PCMC after 1960 and the expansion of the Information Technology (IT) industry in the last decade. The majority of the city and its suburbs have high-rise residential buildings. As a result, this city is an ideal location for data collection for the analysis.

3.2 Questionnaire Design :

To get a more comprehensive understanding of the influences and preferences referred to as social interactions among high-rise residents, a questionnaire based on the problem statement and literature review was designed. The questionnaire was distributed to residents living in high rise buildings in Pune, India. After the data was collected, statistical analysis was used to analyze the data and present design suggestions based on the findings.

4. Data Collection and Data Analysis :

The total number of residents identified was 200, including 120 males and 80 females, representing 60% and 40% of the total population identified. Among them, 40 (20%) were elderly; 50 (25%) were middle-aged; 100 (50%) were young adults; 10 (5%) were teenagers. The majority of respondents were between 18 and 40 years of age, primarily because the author asked family members to share the survey with their friends. (and through them, to more people).

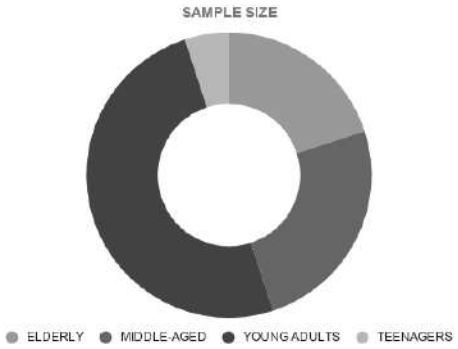

Fig 1 : Charts showing sample size

4.1 Results of respondents' preference for social activities, indoor public space and high-rise residential buildings :

This section presents the results of the high-rise residents' preferences related to social interaction, interior public space, and high-rise residential buildings. The results shall be used as a reference to form design recommendations.

4.1.1 Social Interactions :

The first section presents the findings of a study of participants' preferences for social interaction. There are 70% of high-rise residents who were willing to interact with their neighbours every time, 20% who were willing to interact with the neighbours most of the time, and only 10% who did not want to interact at all. This means most people wanted to have social interactions with their neighbours. This suggests that most people preferred to have social contact with their neighbours. In summary, most of the high-rise occupants wanted to know who their neighbours were, wanted to have some sort of familiarity with them, and wanted to have a social relationship with them.

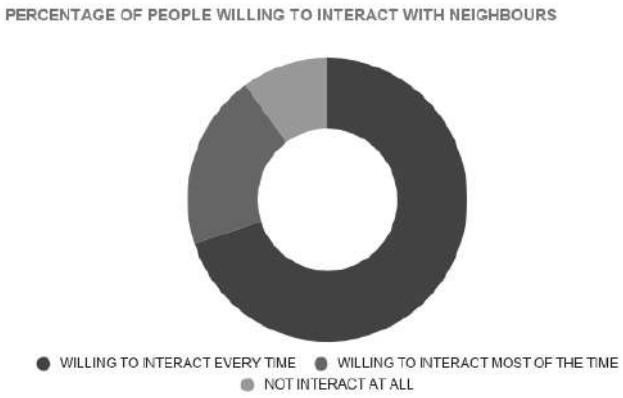

Fig 2 : Charts showing % of people willing to interact with neighbours

4.1.2 Indoor and Outdoor Public Spaces :

The second section presents the participants' expectations for interior public space. There were 30% of high-rise residents who thought that their outdoor public space fulfilled their needs for day-to-day life and social contact, but there were also 60% of residents who felt that their outdoor public space did not meet their needs, and 10% felt that their needs had been fully met. 65% of high-level participants wanted to add extra indoor public space to increase social contact between neighbours, while 25% were unsure, and 10% did not want to add space. In summary, most participants thought that their outdoor public space meets their needs for day-to-day life and social interaction, but also needed more indoor public space to increase social contact with their neighbours and extend their living space.

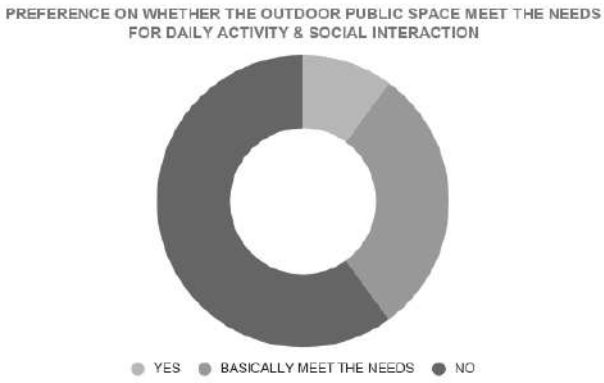

Fig 3 : Charts showing preference on the outdoor public space.

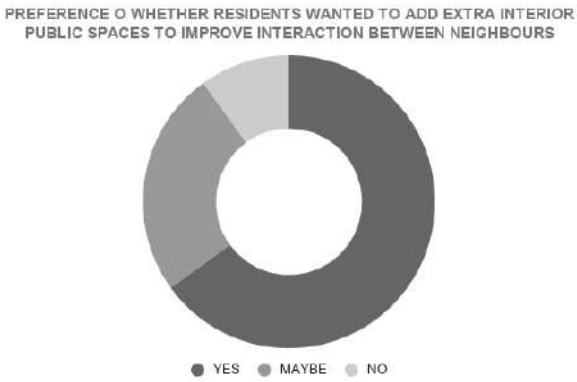

Fig 4 : Charts showing preference on addition of interior public space.

4.2 Results of respondents' preference for social interaction in different spaces of high-rise residential buildings :

The results of observation at the five different spaces of high-rise residential buildings are shown in Table 2. The quantity of social interaction in descending order was circulation space (50), scenic space (40), activity space (36), seating space (14), and other spaces (10). The percentage of social interaction in descending order was circulation space (25%), scenic space (20%), activity space (18%), seating space (7%) and other space (5%). The findings indicated that the quantity of social interaction was much greater in circulation space than in the other four spaces. However, the percentage of social interaction was greater for scenic and activity spaces.

SPACES	QUANTITY	PERCENTAGE
CIRCULATION SPACE	50	25 %
SCENIC SPACE	40	20 %
ACTIVITY SPACE	36	18 %
SEATING SPACE	14	07 %
OTHER SPACE	10	05 %

Tab 1 : Table showing preference on social interaction in different spaces of high-rise buildings.

Circulation areas have been identified as common places for everyday social interaction. However, the widespread use of these areas for various types of interactions has been indicated as causing social irritation and reducing the privacy and protection of residents. This is linked to the analysis of Altman's Privacy Theory (1977), which notes that if a certain degree of privacy cannot be regulated or involuntary interactions take place, social contact may be reduced within the neighbourhood.

4.3 Needs on Open Space :

The results show that 70 percent of respondents agreed that open space is very important because it can contribute to a healthier living atmosphere, particularly when it is surrounded by high-density areas. Residents benefit from outdoor leisure opportunities and interaction with nature, which contributes to a harmonious people-environment relationship.

The majority of respondents (80%) stated that they require a small amount of green space but in large amounts, while slightly more than 20% chose a large amount but only enough for one. The use of larger space varies by geographic area of residence, with respondents residing in higher density areas using more space (Chiesura, 2004). They will engage in a variety of outdoor activities and, in turn, form relationships with other people, making parks more than just trees, lakes, and playground equipment.

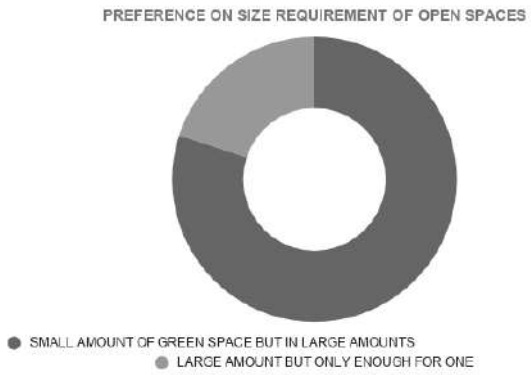

Fig 5 : Charts showing preference on size requirement of open spaces.

4.4 Purpose and Factor of Visiting on Open Space :

The most popular reason for visiting open spaces is for walking for pleasure and fitness (45%), followed by jogging and running (20%), enjoying nature and greenery (15%), children's play (12%) and get together with family and friends (8%). With a few exceptions, the reasons for visiting open spaces do not differ significantly by age group. A few factors influence regular visits to open spaces: the availability of leisure time, space for children's sports leagues, the presence of children's play equipment for pre-school children, the appearance and condition, the distance, and the cleanliness of the parks/gardens.

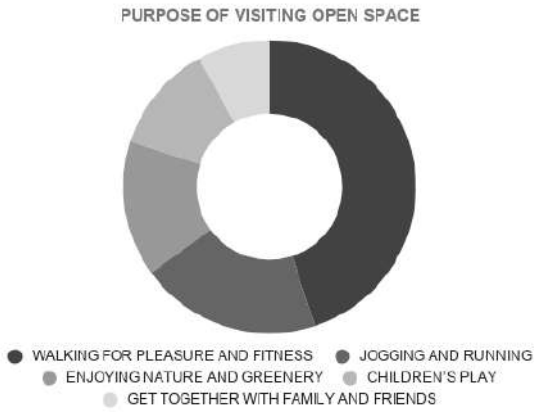

Fig 6 : Charts showing purpose & factor of visiting open spaces.

4.5 Planning and design open spaces for liveability within high-rise apartment complex :

Open spaces that are left as such as they are, not well-maintained or well-designed will led to the degradation of liveability in the high rise apartments. To increase the liveability, some design parameters need to be followed while designing the open spaces in high rise apartments. The design parameters that need to be considered while planning community open spaces in high rise apartments is:

4.5.1 Social elements :

The presence of children at home, annual income and socio-economic status are the social elements that affect social interaction. The similarity between the reside nts leads to a strong social bond. The people with homogenous, like-minds are seemed to be interacting more than people with heterogeneous thinking.

Fig 7 : Future Towers, Amanora Park Town.

4.5.2 Physical elements :

i. Layout pattern:

Refers to the spatial arrangement of the blocks within the site. The layout plan of blocks can contribute to interaction among occupants within the apartments and turn the interaction into a social relationship. Long duration activities in apartments occur in semiprivate zones known as the soft edges (e.g. gardens). Placement of blocks should be such that more no. of open spaces should be created.

ii. Site plan:

If the open spaces are fragmented into smaller parts and distributed all over the site, then it stimulates people more for spontaneous activities.

iii. Physical features:

The high quality of open space can help people interact more socially. The more time people spend outside, the more social interaction they will have. The appearance of common outdoor spaces has a significant impact on social relations.

In outdoor spaces, physical features are effective design elements. They can entice people to stay in for longer periods and stimulate conversation. The presence of interesting objects such as water bodies and strategically placed seating areas encourages people to enjoy and use communal outdoor spaces.

The presence of greenery in apartments increases opportunities for social interaction and strengthens social bonds among residents. Playgrounds with recreational activities attract a large number of children.

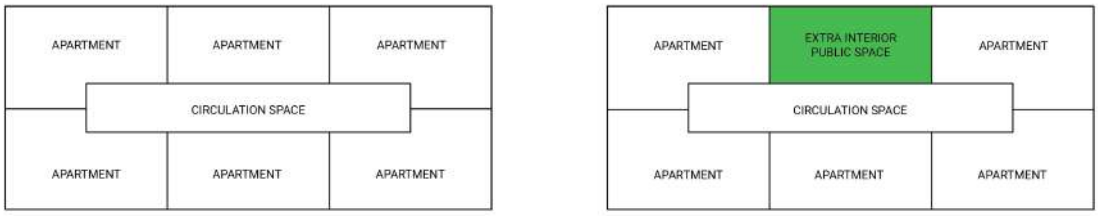

Fig 8 : Diagram of standard floor and proposed floor.

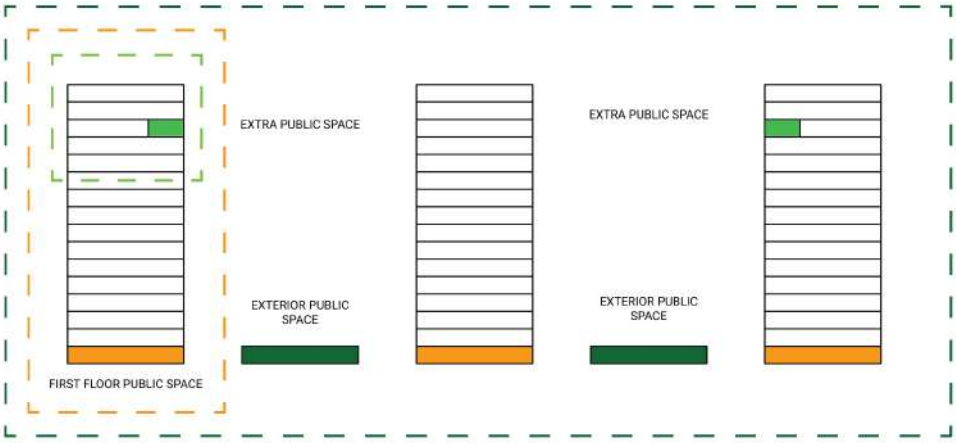

Fig 9 : Diagram of strategy based on neighbourhood level.

5. Conclusions :

This study aimed to see how often and where people in high-rise communities interact, as well as how personal and neighbourhood characteristics influence this. Descriptive statistics were provided based on data collected from 200 respondents through questionnaires. In-depth interviews were also used to validate the findings of the questionnaires.

According to the findings of the study, residents of high-rise buildings have low social connections with their neighbours. Most residents of high-rise buildings feel that their public space does not meet their needs and that more outdoor public space for social activity is required. The majority of social interactions between high-rise apartment residents occur in circulation areas, according to the findings of the study. The interactions involve not only greetings and conversations, but also gathering and accompanying children who are playing. As a result, potential high-rise apartment building designs must provide opportunities and spaces for actual social interaction between the occupants, such as sharing small talk or holding a long conversation, accompanying children, and gathering.

Future high-rise apartment buildings should take into account design measures to create more opportunities and shared spaces within the complexes for social interaction with their residents. The relationship between community size and regular use of public spaces is confirmed by Birchall (1988) and Gehl (2011): the smaller the group, the more likely residents are to engage in communal activities. As a result, these public spaces can differ in size, shape, and flexibility to accommodate a wide range of activities. As a result, these

public spaces can differ in size, shape, and flexibility to accommodate a wide range of activities. Because of the high density of high-rise apartment buildings, these shared spaces should be distributed vertically within the building to support a certain number of apartments or residents.

Further research is warranted. The demographic data could not be obtained in detail due to the observation method's limitations. Some observational findings may also be investigated further, such as the variations in observation patterns between weekdays and weekends, as well as between different times of day, and the differences in user groups about particular space and time of day.

Finally, the combination of space types and design elements will enhance the outcomes in terms of encouraging social behaviour. Based on the study's results, several design guidelines for outdoor interaction spaces for urban high-rise housing are suggested. This will help architects in the design of potential high-rise buildings that promote social interaction with their residents.

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Container Housing: Study of the economic feasibility of container housing in Pune.

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Abstract:
The prospect of container housing remains unexplored in India. In countries like Russia, container housing has provided homes to thousands of people. This research paper aims to determine if any kind of container housing scheme would be feasible in an urban context of Pune with a vast palette of user groups. The methodology adopted is surveying the urban population and case studies of the existing container housing to analyze how and if they are viable. This research will prove beneficial in expanding knowledge about the various housing schemes and might be a useful tool in the transition from traditional low-cost housing to container Housing.

Keywords – Container Housing, Affordable, Mass housing, Feasibility, Vast user palette, Container housing schemes.

INTRODUCTION

A shipping container is a reusable transport and storage unit made primarily out of corten steel. It carries several materials like chemicals and fuel across locations and countries by road, rail, and sea. These containers are used in industries like construction, mining, logging, farming, etc. "There are more than 20 million containers around the world, and the world container fleet is growing by 3.9% every year" [1]. This means that almost 65,000 shipping containers are produced in the world every month."Of those 17 million containers, however, only six million are being used for transport or any other practical usage. That means approximately 11 million shipping containers are unused and are just sitting stagnant all over the place."[2]"A large number of cargo containers are discarded in ports across the globe because of one-way shipments. Reusing a single 40' container up-cycles about 3500kg of steel and saves about 8000 kWh."[3]. The cost of transporting these containers back to the port exceeds the manufacturing cost due to which these containers are abandoned and auctioned off. As shipping containers are built to withstand heavy loads, their cheap and easy acquirement makes them a desirable alternative to traditional construction material. Shipping containers usually come in two sizes - 20x8 ft and 40x8 ft. Even with the size restrictions, several container housing technologies have come up, opening this field to innovation and discoveries.

In India, the lack of awareness about container housing keeps us from exploring a probable solution to the majority of affordable housing problems. In an urban context like that of Pune, finding a decent and affordable residence might be difficult. Various factors lead to the development of slums; one of which is the increasing cost of real estate in Pune. Even with the upcoming affordable housing schemes, for a section of our society, it is unreachable.``Shipping containers in India typically range from Rs 60,000 to Rs 1,00,000 depending on their size. They are built to take on heavy loads and withstand harsh climatic conditions as well. There is already the perfect shape to be repurposed into homes, so a home built out of them is a minimum of 30% cheaper than a same-sized home built in brick and mortar. The structural

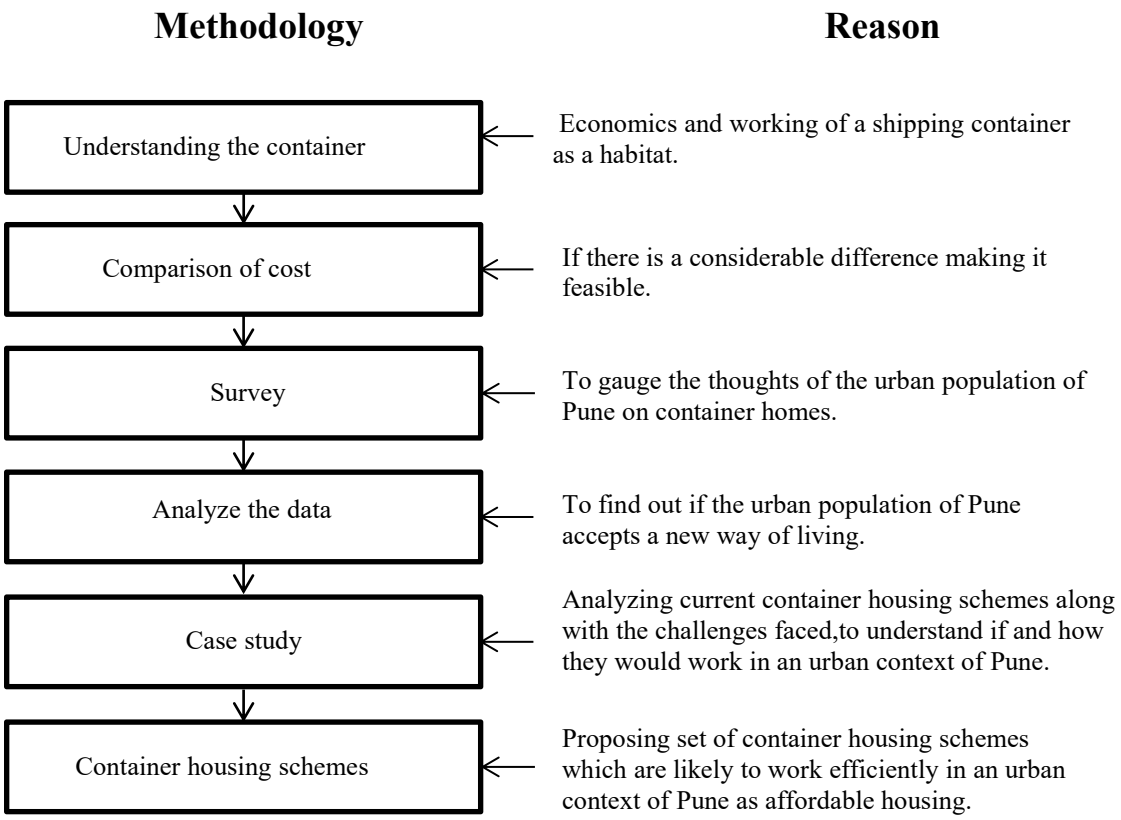
work is also minimal, reducing the cost further. This can be put to very good use. Hence, exploring the possibility of container housing schemes is critical"[3].

"On October 16, 2017, the Government of Odisha, a state located in eastern India, ordained "The Odisha Land Rights to Slum Dwellers Act, 2017", a landmark and historic legislation, which aims to grant in situ land rights to 250000 households living in about 2500 slums in the state"[8]. Within a few months of implementation, the government saw changes in the sanitation and cleanliness scenario. Odisha is among the many examples showing that people in India feel a sense of belonging to somewhere they do not need to fear relocation. According to Rakesh Mohan, Deputy Governor of the RBI, in 2007 " Housing is where jobs go to sleep at night, the quantity, quality, availability, and affordability of housing become a key component in national economic competitiveness".[4] The need for mass affordable housing in India is recognized, but the search for a solution in container housing is little. There is previous evidence of studies done on the usage of containers as affordable housing, However, the Working of a Container housing scheme in an urban context of India has not been studied directly. The type of container housing varies according to location and user groups. The cost incurred varies according to the number of units, the contractor, finishing used, etc. These issues could be settled in a container Housing scheme. Another concern apart from affordability is the lack of information about this housing typology among the people. The misconceptions about the aesthetic appeal, comfort, and life quality in a container house hinder people's thought processes preventing them from making an informed decision. One way to overcome this problem is to demonstrate the advantages of container housing over traditional brick and mortar.

This research aims to study the feasibility of container housing schemes for different user groups in Pune. This paper examines the prospect of container housing as a quick and affordable solution to the rising prices of real estate. This research is conducted through a case study of the existing container housing to understand their working. The cost of living in traditional houses is assessed by taking interviews and compared with that of container housing. After analyzing the cost of such various housing schemes, the feasibility of container housing in Pune will be determined. An economic module of container housing is proposed after considering the various costs incurred and the profit realized by the development authority. The study is conducted in the city of Pune due to travel restrictions and ease of data collection.

METHODOLOGY

- Previous research papers are studied to understand the costs related to container housing.
- A survey was conducted among residents of Pune to gauge their take on the viability of container housing.
- The results were to establish whether any kind of container housing scheme is feasible in Pune.



Flowchart 1: Methodology used For the research and its significance. Source: Written by author

LITRETURE REVIEW

Income Category	Income Limit (Rs. per month)	Housing shortage in millions at the end of the 10th Five Year Plan (2002-07)	Housing shortage in millions at the end of the 11th Five Year Plan (2007-12)
Economically Weaker Section (EWS)	Up to 5000	21.78	24.71
Low Income Group (LIG)	5001-10000	2.89	5.63

Table 1 - Housing shortages in India over the past years.
Source: Housing for urban poor,2011[14]

According to Table 1, the EWS and LIG section of our society have an income limit of Rupees 10,000 a month! The growing population and competition increase the housing need for these sections of society. It indirectly leads to the need for an affordable housing module.

Category	Income (in Rs. per month)*	Affordable EMI/Rent per month (in Rs.)	Affordable cost of the house (in Rs.)
BPL	2690	134	64500
EWS	2691 - 3300	538 - 660	96876 - 118800
LIG	3301 - 7300	990 - 2190	148448 - 350400

Table 3 - Income classifications and capacity to afford EMI/Rent per month. Source: Wadhwa,2009[15]

➢ According to real estate categories :
3 - 6 Lakh/annum - LIG
6 - 15 Lakh/annum - MIG
More than 15 - HIG

➢ 25 % of the urban population in India earn less than Rs 18000/month; 75 % is earning more than that but less than Rs 90,000/month. According to this 75 % of the population earn between 2.16 lakh to 10 lakh/annum. They fall under the category of LIG and MIG.

➢ Table 3 shows that a person from the EWS and LIG can afford a house between the range of Rs 90,000 - Rs 3,50,000.

➢ A standard container of 40 x 8 ft (Area of 320 Sq ft) costs anywhere between Rs 75,000 - 2,50,000, depending on the amenities required. This range fits right into the affordable housing criteria for the LIG and EWS. It implies that container housing is affordable to 75% of the urban population.

I COMPARITIVE ANALYSIS BETWEEN TRADITIONAL AND CONTAINER HOUSING.

In the following section, Container housing is compared to Traditional housing to deduce if it can serve as a practical solution for mass affordable housing.

IA COMPARISON BASED ON COST INCURRED.

Various cost incurred	Container house (400 sq ft)	Traditional house (400 sq ft - 1BHK)
Cost of transportation	Rs 15,000	N/A
Cost of buying the property	Rs 1.5 Lakh	Rs 30 Lakh
Cost of Interior works	Rs 5 Lakh	Rs 10 Lakh
Cost of utilities	Rs 500 /Month	Rs 500 /Month
Cost of maintenance	Rs 800/Month	Rs 1500/Month
Any extra cost incurred(Workmanship, Transportation etc.)	Rs 20,000	Rs 20,000

Table 2 - Comparison of the cost incurred between Container house and traditional house in the same area.Source - Data collected through the survey. Source: Written by author

Table 2 shows that the cost incurred to buy a container and transform the interiors including the miscellaneous charges is almost 30% more than the traditional house of the same area.

IB COMPARISON BASED ON ADDITONAL FACTORS.

Factor	**Shipping container home**	**Traditional house of same area**
Cost incurred	One time - Rs 7,00,000. Recurring - Rs 1300 / Month.	One time - Rs 40,00,000. Recurring - Rs 2000/Month
Structural stability	Structurally durable if stipulated amount of openings are provided and load is calculate d properly in case of vertical stacks.	High structural stability due to rigid nature of constructi on technique used.
Life span	35 Years	50 years
Usage if space	**Constricted** due to form of house.	Space seems to be larger as the form allows for multipurpose activities.
Security	Comparatively less secure as these homes a re most likely standalone structures .	More secure as such homes are part of a larger community
Thermal comfort	**Moderate** - The interiors of a shipping container are c oated with a protective lacquer varnish and epoxy resin base. These provide insulation e ssential for thermal comfort. Less flexibility to install thermal devices.	**High** - Excessive flexibility to cater to temperature variatio ns naturally or installation of thermal devices.
Ease of maintenance	Due to lack of architectural features and pro jections,maintaining exterior surfaces is easier.	Maintenance is slightly tedious.
Lighting conditions	**Moderately lit** interiors due to restriction o n amount of openings.	**Well lit** interiors as there is no restriction on opening size (In a framed structure)
Scope for future exp ansion	The modular construction makes it easy for the user to add more sections to increase the space later if so desired.	It is difficult to expand in future due to structural constraints

Table 4 - Comparison between Container house and traditional house of the same area on various parameters.
Source: Data collected through a survey. (Written by author)

IC COMPARITIVE ANALYSIS

➢ Shipping containers live for a maximum of 35 years, which is considerably lower than that of traditional homes. The lifespan decreases if the unit had more than two trips. Hence, when considering a long term settlement, it is necessary to choose a container that is as good as new.

➢ Contrary to assumption, shipping container houses can be modified according to the user requirement and planned to be larger. The standard size of a container makes it easier to repeat the module horizontally as well as vertically. The stacking of containers could happen after appropriate load calculation.

➢ Large container housing communities from the government could be a beneficial scheme for affordable housing. The discarded containers are available at a small cost which can be transformed quickly into a livable space after proper cleaning and sanitation.

➢ As compared to traditional construction, the creation of vertical communities out of shipping containers is a speedy process. Due to the material of the container i.e corten steel, it even requires less labour. This would save a significant amount of the labour cost allowing the units to be sold/rented at a lower price.

II CASE STUDIES

The notion of affordable varies for different user groups. For example, a house of Rs 10 lakh could be affordable for someone of MIG but is still far fetched for a person of LIG earning Rs 10,000/month. To deduce if container housing is a solution for various user groups, case studies of different kinds of container housing schemes are done. The analysis of these case studies helps to understand if they can be proposed in the urban context of Pune as affordable housing.

1. SEA CONTAINER HOUSING, DC

Image showing the Sea container housing project.Source: Club, T. C. (2018, May 14). *SEA CONTAINER HOUSING DC*. THE CASA CLUB. https://thecasaclub.com/sea-container-housing-dc/

Project name - Sea container housing, DC
Architect - Travis price architects
Location - Washington DC
Project typology - Student dormitory
User group - Students who need a cheap temporary housing

Aim:

- Addressing the regions growing affordable housing concerns for the growing millennials.
- To demonstrate to the city, what it calls a - "Highly efficient, humanely warm, and modern lower cost housing option."[5]
- "The building consists of four levels, with each floor serving as an apartment with six bedrooms, six full bathrooms, and a shared common area including a kitchen, dining area, living room, and laundry room."[5]

2. DRIVELINE STUDIOS

Image showing the Driveline studios project.Source: *Gallery of Drivelines Studios / LOT-EK - 1*. (n.d.). ArchDaily. https://www.archdaily.com/905460/drivelines-studios-lot-ek/5be335c108a5e5f7ac0007cf-drivelines-studios-lot-ek-photo

Project name - Driveline studios
Architect - LOT-EK
Location: Maboneng, Johannesburg, South Africa
Project Type: Residential and Retail building
User group - LIG section of the society
Size: 75,000 Sq Ft
Aim :

- "To offer inexpensive living space for young, creative people to continue promoting development in Maboneng."The 6 levels above are occupied by the residential units, all open plan studios varying in size between 300sqft and 600sqft. All units include an outdoor space along the courtyard facing walkways."[6]

3. CONTAINERS OF HOPE

Image showing the Containers of hope.Source: Rosenberg, A. (2019, October 24). *Containers of Hope / Benjamin Garcia Saxe Architecture.* ArchDaily. https://www.archdaily.com/143332/containers-of-hope-benjamin-garcia-saxe-architecture

Project name - Containers of hope
Architect - Benjamin Garcia Saxe Architecture
Location: San Jose, Costa Rica
Project type: Private residence

User group - LIG/MIG Single Family Owner of house
Size: 1050 sq ft

Aim -

- To Build a permanent stay house for a couple in San Jose, at a minimum budget of 25 lakh, considering views from all sides.
- "The final cost of the house (40,000USD) is lower than the cost of social housing provided for the poor in Costa Rica."[7]

S.no	Case study	Type of container ho using scheme	Advantages of a similar scheme in The context of Pune
1	Sea container - house, DC	Small scale temporary affordable housing.	In parts of Pune which are educational and business hubs,finding a affordable space to stay is difficult.Due to this,travelling long distances has become a necessity.Providing such affordable housing schemes win such areas will reduce the traffic load and reduce urban sprawl.
2	Drive- line studios	Mass housing for Low income group of the society.	This type of container schemes will reduce the development of slums in city areas and provide a better living community for the EWS of the society.
3	Containers of hope	MIG and HIG single owner/family re sidence.	This type of container housing scheme will help in providing comparatively larger homes for people in contextual locations where the traditional homes and constructions cost are high.

Table 5 - Summary of case studies showing advantages of a similar scheme in the context of Pune.
Source: Data collected through a survey. (Written by author)

III DATA COLLECTED THROUGH SURVEYS

➢ A survey conducted for a sample size of 300 people, consists of people in the MIG and HIG section of society. An Assumption is that the results will be proportionate to that of this set if performed on the entire urban population of Pune.

➢ The survey aimed to determine the awareness of container housing among people and their perception of it. Questions like age group, current housing situation, the likeliness of living in a container home were asked. Upon collection and analysis, the outcome was interesting. The result of the survey is as follows -

➢ According to the survey, more than 70% of the Urban population of Pune lives in apartments. The usual area for the MIG and HIG ranges from 700 Sq ft - 5000 Sq ft.

➢ Since the area of a single container house is 320 Sq ft, the MIG is more likely to consider the aspect of a container house.

III-A Awareness about container housing among the urban population of Pune.

➢ According to the survey conducted,62 % of the urban population of Pune is not aware of the concept of a container house. Out of this 62% of the sample size, only 20% have visited a container house.

➢ Lack of awareness of a container house among the people leads to a misconception about its pros and cons.

➢ Almost 85 % of the population prefers to live in a container house as a holiday getaway and only 11% would want to explore this option as a home in the city. It could be because Container housing in India is introduced not as a housing module but as a space for small setups. The urban population has encountered the container only as an additional housing module and not as a primary one.

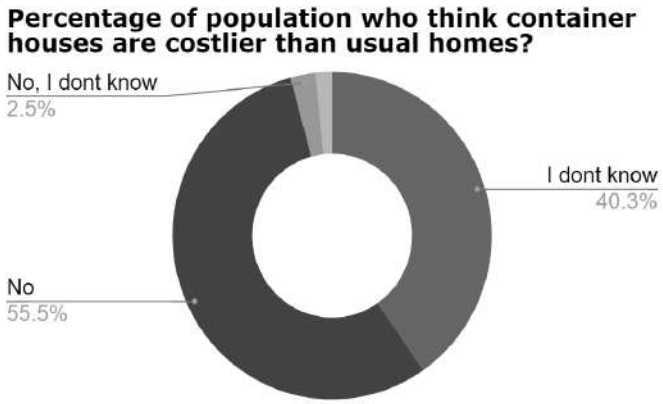


Figure 1:Chart showing the percentage of the population who think container houses are costlier than usual homes.

III-B Choice of Living in a container home

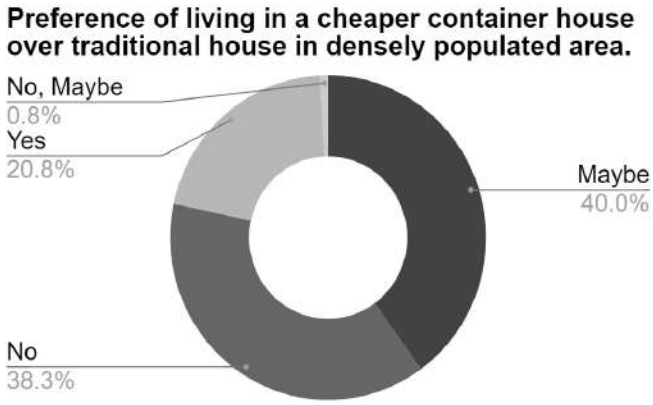


Figure 2:Chart showing a preference of people to live in a cheaper container house. Source: Data collected through a survey.

➢ This chart shows that 38% of the population would not want to live in a container house even with a lower cost. The result reflects on the way people perceive living in a container house. In most parts of society, the need to reinvent the lifestyle is not felt and when it is, these new ideas are shunned by society.

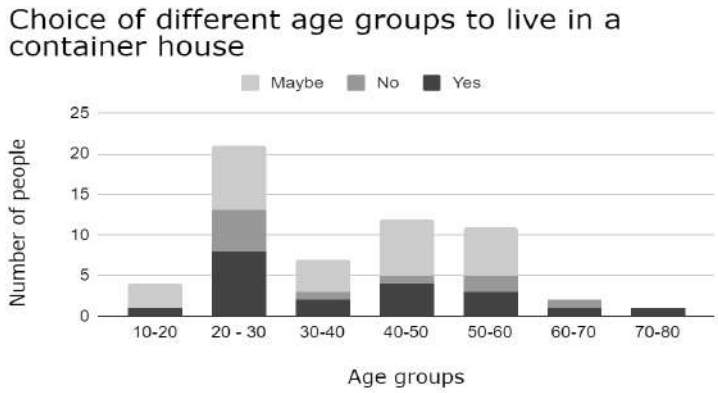


Figure 3: Chart showing a choice of different age groups in a container house. Source: Data collected through a survey.

➢ The choice of living in a container house, if provided, was compared based on age group variation. Figure 3 shows that the population between the age group of 20-30 yrs are most likely to make the shift more comfortably. The likeliness of living in a container house keeps decreasing with the age group because people are set in their ways of living and are sceptical about changing them.

III-C Perception of container housing among urban populations.

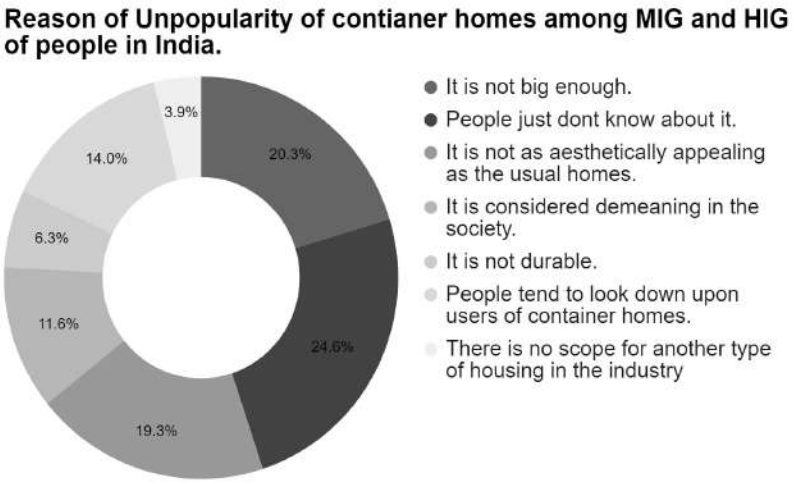


Figure 4: Chart showing the reason for the unpopularity of container housing among MIG and HIG

➢ Figure 4 shows that the most widely agreed reason for the unpopularity of container housing among the MIG and HIG is that there isn't enough information and examples available to them. Almost 20% of the population also perceives container houses to be small and having insufficient living space.

➢ Even though a shipping container is available in standard sizes, they are often combined to form large homes for single-family residence as well.

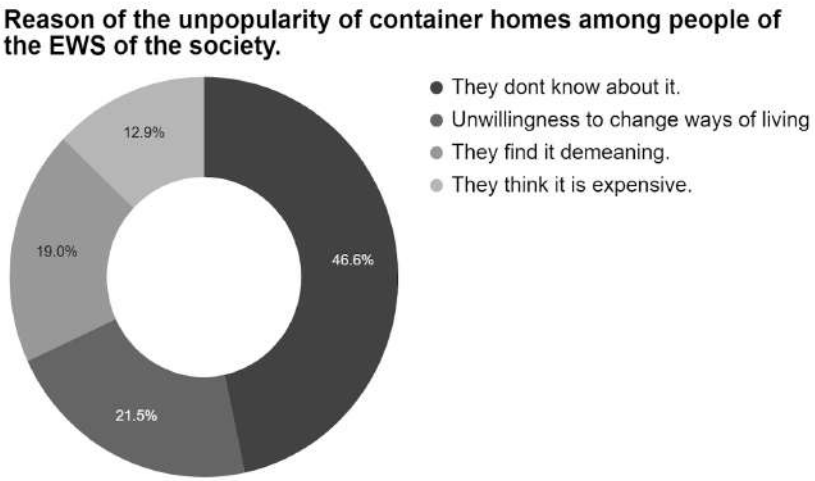


Figure 5:Chart showing the Reason for the unpopularity of container housing among EWS. Source: Data collected through the survey.

➢ Figure 5 shows that the most agreed-upon reason for the unpopularity of container housing among EWS is because they are not aware of the concept. Almost 20% of the population also believe that this section of our society is unwilling to shift to a new habitat. Part of the reason is that the people find living in such a house demeaning.

IV COST ANALYSIS OF A CONTAINER HOUSING SCHEME

- Since the container has a comparatively lesser life span than the traditional house, in India, it will work efficiently in a setting where the units are rented on a per need basis. According to table 3,

    - Affordable EMI/month ranges between Rs 500 - 2000.
    - The average rent of a traditional House of 320 Sq ft in Pune - Rs 6000/month. Hence, to create an affordable container housing community for the EWS and LIG, the rent/month should be less than Rs 2000.
    - The average cost of setting up a container house in a community - Rs 4 Lakh
    - Rent collected in a year by charging Rs 1500/month - Rs 18,000
    - Time in which the government could get back the invested money - **22 Years**(Which is much less than the container life span)

- According to this, a long term mass housing scheme with rent-able container units would be efficient and affordable in Pune.

CONCLUSION

	LIG	MIG	HIG
Economic feasibility	A container housing scheme with rent-able units would be feasible. An affordable container housing scheme forming a community in the city areas would be feasible for permanent usage.	A container housing scheme with houses made of combined container and individual ownership are feasible.	A container housing scheme with multiple container combined and facade treatments are feasible.These homes are likely be built near scenic locations.
Social feasibility	The LIG population of Pune perceives container housing to be demeaning. People are unlikely to consider the shift to container housing until provided with proper information and the notion of container housing is changed.	Container housing schemes which are aesthetic and hold a resemblance to the existing residential schemes would be acceptable to the urban MIG population of Pune as the social constraints would be less.	The HIG population of our society is unlikely to make the shift to container housing in the current scenario as their requirements are the limitations of a container. This scenario might change in the future when space crunches are felt in the city.

Flowchart 2: Economic and social feasibility for Various user groups of Pune. Source: Data collected through the survey(Written by author)

The case studies and the survey conducted show that the container housing scheme is an affordable solution to the increasing prices of real estate in Pune. While LIG user group benefits from a rent-able scheme, the MIG and HIG require a self-owned residential scheme. The survey also proves that awareness among the people of Pune about container housing is of utmost importance without which the shift to container housing will be drastically gradual.

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Institutional Landscape Design : Impact assessment of tangible and intangible aspects of designed open spaces in Architecture Institute

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25th February, 2020

Abstract

Landscaped areas and designed open spaces play an important role in connecting places on campus. Campuses designed for architectural education need to have open areas as they are the mediums to connect nature and offer an interactive atmosphere for learning. "Technology, online courses, lifelong learning, industry partnerships, and a shift towards problem-based curricula have blurred the lines between city and campus. Campuses are more decentralized than ever before."Jon B. The interactive spaces and courtyards around classrooms play a significant role in stimulating outdoor activities and informal gatherings. Open spaces vary from courtyards, amphitheaters to Kund and parking. The American College Health Association, reported that anxiety (27.8%), depression (20%), sleep difficulties (22.4%), and stress (34.2%) among the students has affected their academic performance. The open spaces not only boost the student's creativity but also help in mental well-being by helping them with stress, restlessness, etc. Students need comfortable, appealing places to soak up the fun, study, gather, have coffee, and catch up with friends and faculty. Having such interactive designed spaces will keep them away from constantly using gadgets and appreciate the natural environment. This research paper focuses on the tangible and intangible aspects of landscape design in architectural campuses. This study is based on a questionnaire survey that was circulated among the students and faculty of architecture, where they were asked about their preferred open area for various functions. This study gives an overview in understanding the preferences and psychological impact of landscape on students and faculty. The existing designed open spaces have been reviewed based on the user activities and satisfaction. This will help architects to design the open spaces in campuses adjacent to classrooms and common areas. Such designed open spaces will enhance peer-to-peer interaction and create a vibrant and cheerful campus life for the students.

Key Words - **Designed landscape areas, tangible elements, intangible elements, open spaces, user satisfaction, architectural college**

1. Introduction

The landscape plays a key role in connecting people to open spaces and one another. The aesthetic character and spatial design of the campus are the most important factors for young aspirants to choose the university. The open spaces are not only visually important but have a functional role and psychologically connect as well. The three important factors influencing the preferences of the users

are visual, psychological, and functional roles.

The appearance and activities happening in various spaces characterize the building and make an image of the institute. As the spaces clubbed with people and activities reflect the life and culture of the institute. Such images help parents and young aspirants in choosing the right institution for their future education. Designed open spaces in the campus of the institute offer various spaces that help students take a break from the routine academic activities and perform independently. Students spend most of their time in the studios working on different assignments which tends to create a block in their heads hence affecting the creative process. Designed open spaces tend to free the minds and open up creativity. Many creative and innovative ideas occur in outdoor environments, away from formal classes and discussions. Architecture students can use the designed open space for formal as well as informal discussions. Open spaces act like connecting spaces in the campus, provide a sense of direction. It is done by integrating and organizing different places and elements. Open spaces in the campus also can provide an aesthetic sense by involving attractive surroundings and creating visual surprises. The connection with nature and a relaxing atmosphere in open spaces encourage impromptu meetings and discussions and provide fresh air for stressed scholars (Payne, 2009).

Designed open spaces vary from small to larger scales. These spaces accommodate many spatial functions and serve various user's activities. These spaces create experiences that remain in the memories of the users forever. The physical environment of a college campus provides the context for learning and social interactions. The students develop a meaningful connection with their peers through interactions in these outdoor spaces. Such spaces provide enthusiastic campus interaction and vibrant social life. Various studies show that students prefer open spaces with various landscape elements to change their moods when they are stressed, confused, etc. (Lau and Yang, 2009). Visual connection with the open spaces can lure one into the open spaces which will result in keeping the open spaces active

Most of the colleges have open spaces some of them are supplemented by, water bodies, amphitheaters, courtyards, lawn spaces, seating areas, and paved walkways. The water bodies and the courtyard, apart from their aesthetical appeal also act as passive design strategies. Other spaces apart from these are playground, alley spaces, bridges connecting various levels, roofs (SMEF's Brick School of Architecture). Architecture colleges have various inter-college sports competitions, hence a playground plays an active role for after-college practice. The sloping roof of SMEF's Brick School of Architecture has steps where students can sit and work on their laptops or have informal discussions. The materials used for various elements in the designed open spaces are common for the three colleges. The amphitheaters and kund are made of concrete, the courtyard has a tree and has tiles or concrete finish, paved walkways, and seating areas made of concrete or stone. The unfinished surface is shaded with trees and some parts covered with grass for the lawn area.

1.1 Different designed open spaces elements observed in colleges:

NAME OF THE OPEN SPACE	DESCRIPTION	TYPE	MATERIALS FOR SURFACES	IMAGE
Courtyard	Designed open space which is enclosed by built structure on two or more sides	Open to sky /semi covered/ partially covered from sides	Concrete, grass, mud	 *Source:flickr.com*
Kund (Stepped courtyard)	Seating or interaction space with seatings at different levels	open	Concrete/brick/stone	 *Source:brick.edu.in*
Amphitheatre	An open space surrounded with seating like that of an auditorium	open	Concrete/stone	 *Source: quickr.com*
Lawn(soft paved areas)	Area of land having green cover usually used for relaxation, events,etc.	open	Soft paved surfaces with grass or any ground cover	 *Source:justdial.com*
Informal Seating areas in outdoor	Formal or informal seating areas for discussions and working areas.	open/semi covered/covered	Concrete, timber, brick, metal	 *Source: Pinterest*
Places with open areas with Water bodies	Apart from aesthetic appearance,it helps users in a soothing way by visual, auditory and thermal comforting.	open/semi covered	Concrete/stone/brick	 *Source:indiamart*

Paved walkways	Walkways which are highlighted by using a various paving materials. This can be in active or inactive circulation areas.	open/ semi covered	Tiles,stones, mud	
Semi covered spaces	Semi covered spaces like pergola covered spaces act like walkways or seating spaces(how is it different than pathways)	Semi covered	Wood, steel	 *Source:Pinterest*

1.2 Elements for designed open spaces:

- Colour: A contrasting color palette can create excitement and interest among everyone as compared to a monochromatic color scheme.
- Direction/Line: Linear patterns are used to direct physical movement and to draw attention to the areas in the space.
- Form: Form can be expressed through built objects or trees and shrubs of various shapes and sizes which create natural patterns.
- Texture: Paving and building materials along with plants with varying textures can add to the atmosphere of your outdoor area.
- Scale: Your outdoor design should balance the size of the buildings or established plants it surrounds, while maintaining a comfortable human environment for the individuals who will have access to the area.

2. Literature Review

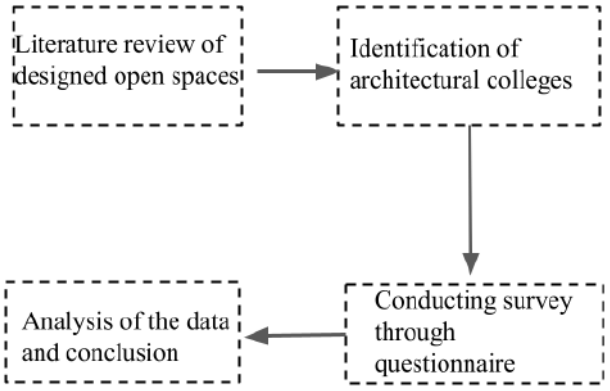
Various papers talk about the various landscape elements that help in interaction and learning. Papers focus on understanding the landscape elements that aid in the creation of a student-friendly setting. There are several science parks, and campuses that have a beautiful landscape and architecture. These landscape elements encourage students to think creatively. The vast fields of grass indicate that many Terra incognito areas need people to fill up.

The core aspect of urban design is an appreciation of the relationship between people and their surroundings. The term "public buildings" refers to structures such as governorates and municipalities where the city, state, and town's administrative functions are carried out, where public servants perform their duties, and which are readily accessible to the general public. Universities are also included in this category of public buildings and public spaces. Campuses are places where educational events take place, as well as places where students can enhance their social and cultural growth and learn from group behavior and communication skills. By developing open and green spaces inside university

campuses as parks, it is possible to provide a healthy and high-quality life for both students and instructors. Campuses, on the other hand, should be built to meet recreational as well as educational and sheltering needs. The recreational purpose should include social and cultural facilities, sports areas, open and green space arrangements, and the transportation system that connects these areas. Users have more opportunities to participate in the landscape and achieve flow as site designs and programming offer a variety of obstacles to engaging users' intelligence domains. During the design process, designers will use the Spectrum Matrix to assess how a variety of intelligence traits and challenges associated with landscape elements can involve users in a proposed project. The Matrix serves as a reminder to web designers and programmers that people interpret and appreciate their environments in various ways, and that they have varying levels of multiple intelligence skills. It reminds us to examine our design work closely for opportunities to question user interaction with the landscape in a variety of ways through multiple intelligences.

3. Methodology

The methodology used for conducting this research was that various papers were studied, the literature review was done to understand the importance of designed open spaces in various architecture institutes. Various architecture institutes were identified as having more than 30% designed open spaces to understand the elements and the materials used for the same. From the list of the architecture institutes, three institutes: SMEF's Brick school of Architecture, Aayojan School of Architecture and design, S.B Patil School of Architecture and Design were selected to conduct the research. Two user groups- faculty and the students were identified and a questionnaire was circulated among them. The questionnaire comprised of questions related to both - the tangible and intangible aspects. The questions were based on the user's preference of various spaces for informal discussions, formal discussions, and meetings, where the faculty would like to conduct lectures, where the students would like to attend lectures, work. celebrate college events, etc. The tangible questions were related to the list of the designed open spaces, materials used in the designed open spaces, etc. The data was collected through this survey and analyzed to narrow down the most used and favorable designed open space in an architecture institute. The following flowchart depicts the methodology used for the research:



4. Data Collection and Data Analysis

Three colleges in Pune, SMEF's Brick School of Architecture, Aayojan School of Architecture and Design, S.B Patil College of Architecture and Design were studied. S.B Patil is located in Ravet, SMEF's Brick School of Architecture is located in Undri and Aayojan School of Architecture and Design is located in Warvadi(outskirts of Pune). Two user groups- faculties and the students, were identified and interviewed on their preference of designed open spaces.. This research is based on a questionnaire that was circulated among the students and faculty members of all three colleges. In the questionnaire, they were asked about their preferred open space for various functions. The questions cover data related to the elements of open spaces and materials used for designed open spaces in their respective colleges, opinions of students and faculty on various spaces that can be used for both formal and informal activities that take place in an architectural college. Data analysis discusses the identification of the designed open spaces related to their use. This paper does not rank any institute but focuses on designed open spaces.

60 interviews had been taken. According to the questionnaire, 82% prefer semi-open spaces and 14% prefer completely open spaces and 4% prefer completely covered spaces for various activities like playing, discussions, and working. Even though most of the discussions and the assignments to be completed happen in the studio, semi-covered and open spaces are preferred as they open up and refresh the minds and give scope for creativity and enhance the learning capabilities.SMEF's Brick school of Architecture and S.B. Patil College of Architecture and Design have about 20-40% open areas as compared to the enclosed spaces, whereas Aayojan School of Architecture and Design has about 40-60% of open space. A few common design elements in the three colleges are courtyards, amphitheaters, both covered and partially covered seating areas. Some other designed open spaces are kund(stepped courtyard), lawn spaces, water bodies, paved walkways, and semi-covered areas. Various materials like bamboo, timber, permeable paving, stone, brick, steel, and vegetation cover are used in the different designed open spaces. The following figures show the preferences of the elements of the open spaces used by both the user groups for various activities.

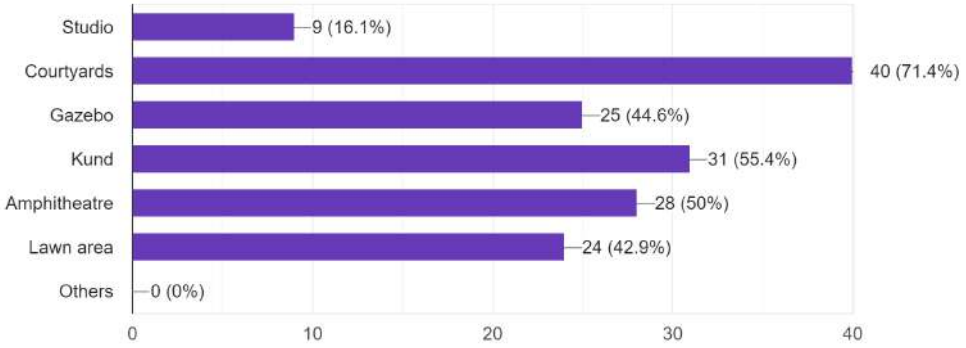


Fig 1.1: Spaces preferred for informal discussions

Figure 1.1 depicts the preferred spaces for informal discussions in the college from the responses received through faculties and students of the three colleges. From the multiple selected elements, the majority of the people have courtyards as their preference, followed by kund, amphitheatre, whereas the studio is the least preferred. This chart indicates that most of the open spaces are preferred compared to enclosed spaces like studios(classrooms), and they help in peer-to-peer interaction and student to faculty interaction.

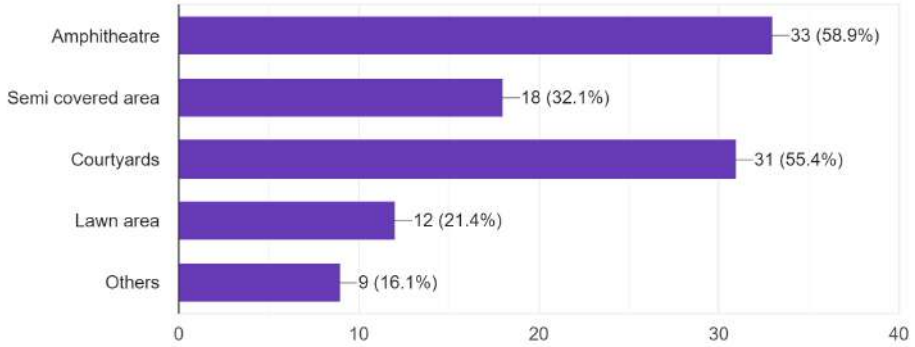


Fig 1.2:Spaces for college events

Fig 1.2 shows the designed spaces which are preferred for celebrating events.The space that is used the most for college events is the amphitheatre, courtyard, semi-covered area, lawn areas.All of these come under the category of designed open spaces. Though some prefer celebrating it indoors in multi-functional halls and auditorium, most of them prefer it in the open space.

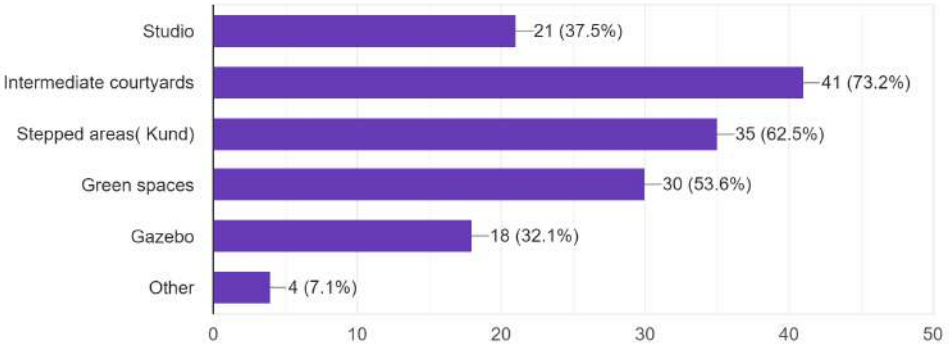


Fig 1.3: Spaces preferred for working

Figure 1.3 shows the preferred spaces for working in the college.The courtyards are the most preferred spaces which are used for working, followed by the kund, green spaces, and then the studios. Similar to the result of spaces preferred for informal discussions as mentioned earlier, students and the faculty prefer spaces that are open and not enclosed for working as well. The courtyards provide a huge space for students to gather and work together. Some students can focus in a closed space like studios, while some prefer the undulated surface of the kund. It also depends on the kind of work as students prefer workshops in studios while lectures or studio work in semi-covered or completely open spaces.

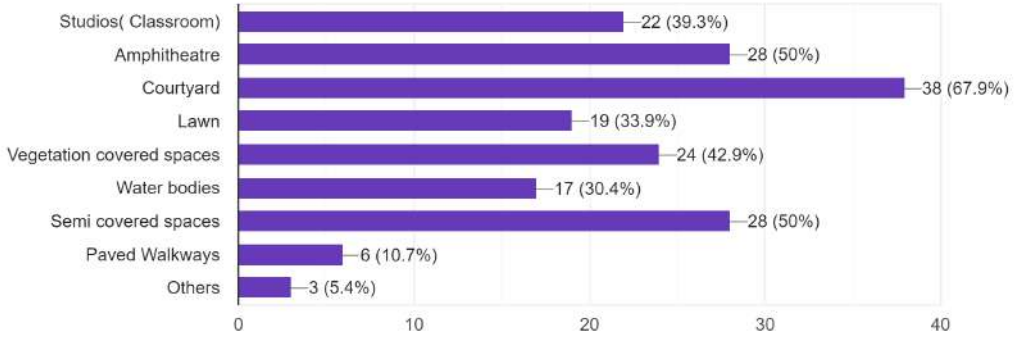


Fig 1.4: Spaces giving a sense of comfort

Figure 1.4 shows the spaces that create a conducive environment or give a sense of comfort to the students and the faculty members.The most comfortable space according to the survey is the courtyard, followed by the amphitheater and the semi-covered spaces, then the vegetation-covered spaces. The large area of courtyard and amphitheater help in creating a comfortable environment as most of the students might feel claustrophobic in a small space. The vegetation-covered areas will give shade and hence a cool environment protecting from the harsh summers. The water bodies act like passive cooling strategy and along with vegetation covered areas will help in the keeping the environment cool. Apart from these spaces, kund was also considered as a space for a conducive environment.

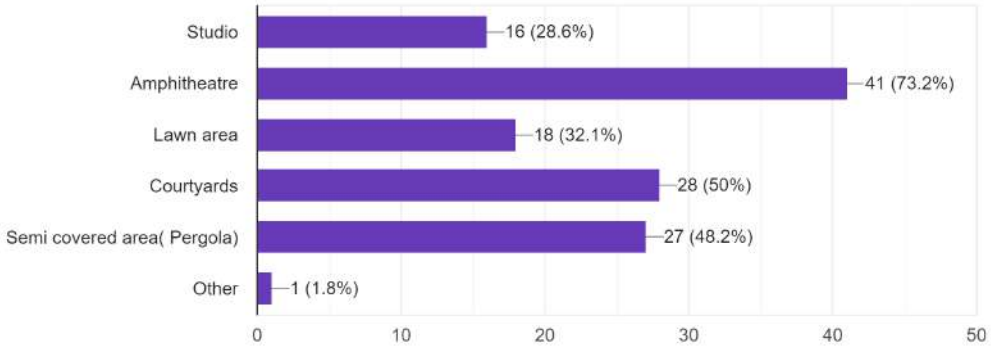


Fig 1.5: Spaces for attending lectures(for students) or conducting lectures(for faculty)

Figure 1.5 shows the spaces preferred for attending lectures(for students) or conducting lectures(for faculty).The preferred designed open spaces for attending or taking a lecture are an amphitheatre, courtyard, and semi-covered spaces. The courtyard is the only common space that the user groups prefer for both working and attending lectures. The reason for users choosing the landscape element is the scale, material, and the setting of the natural space. SMEF's Brick School of Architecture has sloping accessible roofs and hence both the faculty and the students also preferred that space for attending or conducting lectures.Some accessible roofs are away from the road hence cancelling the disturbance while learning.

The survey also showed that the favorite space for the students and the faculty is kund followed by the amphitheater and then courtyard spaces and then the lawn areas and playgrounds and the stepped area near the parking(SMEF'S Brick School of Architecture). Kund is a huge open space which has steps to sit and hence can be used for interaction.working ,etc hence is preferred by both the user groups. This shows that the user groups fell refreshed and active in the designed open spaces as compared to the enclosed space of studios or staff rooms.

5. Conclusions

An ideal campus should be a closely-knit, unified cluster of buildings having infinite pedestrian walkways with designed open spaces providing a unique environment for studying and relaxing. Design open spaces in an architecture institute not only promotes social interaction but gives an open area for students to work. Students and faculty of architecture spend most of their day on the campus hence the design of the spaces needs to be interactive, cheerful, and inviting. Designed open Spaces are important in an institute as they are the most happening places. Most of the interaction amongst the students and among students and faculties takes place in these open spaces. The physical environment of a college campus provides the context for learning and social interactions.

From the results and analysis, the user groups prefer kund the most as it has multiple planes, creates a playful and cheerful environment, and gives the freedom to be interactive. Visible open spaces are used the most, compared to the ones located at the back. The visibility of the open space increases its value and attracts the students and the faculty. Different open spaces cater to different functions depending on their location, form, size and if it is covered or uncovered, Designed open spaces when connected with an interactive pathway and pause points, attract the users, and increases the usability of the space.

All the architecture colleges need to necessarily have designed open space for social interaction and the psychological well-being of the students and the faculty.

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Cases Of Eco Resorts In India

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Abstract

The travel and tourism industries are one of the largest in India. It is an important tool for economic development as well as creating jobs. While there are many positive aspects, Tourism also puts enormous stress on local land use, increases pollution, there is a loss of natural habitat, and more pressure is put on endangered species. These effects can gradually destroy the environmental resources on which tourism itself depends. Thus careful development of these areas is crucial to preserving environmental quality. Eco resorts, a newly emerging concept can be the solution to this. Eco-resorts can help in reducing the carbon footprint by employing the principles of Environmentally Sustainable Design and help in fighting climate change. Eco Resorts help to minimize the harmful impact that resorts have on the environment. This research paper intends to show the emerging concept of eco-resorts through case studies of Wildernest Nature Resort, located on the Goa-Karnataka border, and Khem Villas, located near Ranthambore, Rajasthan. This research will further help form guidelines for architects to design and plan sustainable eco-resorts in the future.

Key Words - **Eco resort, Design principles, Environment, Sustainability, Ecotourism, Conservation.**

1. Introduction

Ecotourism is responsible travel to natural areas that conserves the environment, sustains the wellbeing of the local people, and involves educating the staff as well as the guests (TIES, 2015). Eco-tourism activities are community-based and rural-based and provide an opportunity for the tourist to know about the environmental assets of the rural communities, local traditions, art forms, and ethnic cuisine. Conscious efforts have to be made to preserve the natural beauty and environment while creating infrastructure and facilities for tourists that fit in with the natural surroundings. Eco resorts, a newly emerging concept can be the solution to this. Eco Resort is a destination with accommodation, dining, and entertainment facilities where the central focus is the preservation of Earth's environment. They are designed to have minimal impact on the environment and to be as sustainable as possible in their usage of resources without compromising on guest's comfort and safety and provide them with a nature-based experience (Bromberek, 2009). They also aim to improve the welfare of the local population by supporting local suppliers and workers. Eco Resorts help to minimize the harmful impact that resorts have on the environment. There is a general trend towards a focus on the environment and the amount of customers craving an eco-friendly option is expected to increase in the near future as everyone wants to

take a break from their fast-paced life and spend some time with nature. Although implementing the best practices saves money, the goal of an Eco-resort is to eliminate as much as possible the negative impacts on the environment both by reducing the consumption of resources and by changing the practices so that the waste produced can be used (Pyo, 2008). By following the environmentally sustainable design principles a resort can be called an Eco Resort. The design principles stated by (TIES, 2015) are as follows:

- Minimizing physical, social, behavioral, and psychological impacts.
- Building environmental and cultural awareness.
- Providing positive and nature-based experiences for both visitors and hosts.
- Producing direct financial benefits for conservation.
- Generating financial benefits for both local people and private industry.
- Designing, constructing, and operating low-impact facilities.
- Recognizing the rights and spiritual beliefs of the Indigenous People in your community and work in partnership with them to create empowerment.
- Optimizing the site potential.
- Minimizing the use of non-renewable energy.
- Using environmentally preferable products.
- Protecting and conserving water.
- Enhancing the indoor environmental quality.

Although these principles are partially implemented in few Indian cities, a thorough implementation of the same is still lacking in an overall context. The purpose of the study is to define the basic principles that can be adopted while developing an Eco-Resort, to analyze the benefits of Eco Resorts, and to understand the eco-friendly practices used by Eco Resorts through the help of case studies. This also helps create awareness among people about the concept of eco-resorts.

2. Literature Review

Understanding the need of greater Environmental sustainability, Marriott Environmental Policy statement has outlined that they will reduce energy and water consumption 20% by 2020, water 20% per occupied room. They are the first major chain hotel to calculate carbon footprint and launch a plan to improve energy, efficiency and in 2011 was named the "Greenest" hotel company in UK. Bader (2005), in his study found that the solar panels can generate around 25% of the energy that a hotel needs to operate. As solar energy has become one way, hotels have been able to cut cost while using "Green Energy ". Yong Han Ahn and Annie R Pearce (2007), simply orienting a building to capture insulation can save on energy use. Green building has become an important component of the whole construction market for future changes in the industry in coming years. Hatem(2010), found that most hoteliers are more willing to enact small scale waste reuse practices rather than larger practices that would require changes on operational level. Hayward (1994), indicated that customers participation in the hotel's waste recycling programme would be received positively. Barclay, Buckley and Lundbo (2006) indicated that staff commitment was essential for the success of hotel's waste minimization program. Horobin & Long (1996), operators of small tourism firms often lack the information, guidelines, time and motivation to implement environmental practices. As ecotourism

has grown in popularity, sometimes resembling traditional mass tourism, its definitions have been expanded to incorporate ideas about eco tourist responsibility; environmentally friendly destination management, profit linkages to conservation efforts, and the sustainable development of local human populations (Campell, 1999).

3. **Methodology**

Qualitative research methods are used to find out the nature of consumer experiences in the ecotourism industry and the factors or dimensions which lead them to be categorized as ordinary or extraordinary. There are a diversity of methods of data collection in qualitative research, including observations, interviews, focus groups, textual or visual analysis, case study, and secondary data. The research methodology used is based on two case studies which include documentary research such as books, journals, articles, and thesis related to the topic. The two case studies taken are:
II.I. Wildernest Nature Resort
II.II. Khem Villas

4. Data Collection and Data Analysis

The research methodology used is based on two case studies which include documentary research such
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II.I. Wildernest Nature Resort
II.II. Khem Villas

II.I. Wildernest Nature Resort

Location:
Located on the Goa-Karnataka border, amidst thick expanse of forest. It offers pristine views of waterfalls, birds and nature's bounty as it overlooks the Vazra valley, Wildernest Nature Resort sits at a height of 800 metres above sea level.

Concept:
To develop & practice wildlife and eco-tourism in the Sahyadris, through sustainable and commercial eco-friendly initiatives, for the purpose of creating appreciation of nature and providing a platform for experiencing the exquisite natural & cultural riches
that abound the Sahyadris (Nitin, 2005).

About the resort:
18 specially designed eco-cottages have been placed on the site and are positioned in such a way that they don't hamper the forest and puts you in close proximity with nature and offer comfort and hospitality of the highest standards. All built structures including eco- cottages resemble village huts that are designed to provide an authentic feel of a forested habitat without compromising on the levels of comfort (Ethico, 2020). A restaurant serving local cuisine, an

infinity pool that uses minimal chlorine and an Ayurvedic rejuvenation centre apart from an array of outdoor experiences such as nature walks, treks, village visits etc are provided on the site.

Materials and sustainable practices:

- Fine use of sustainable materials such as Australian Acacia, recycled railway sleepers, Khanapur stones, bamboo and other natural materials.
- Every cottage interior includes the use of alternative energy, natural lighting etc.
- Wildernest has its own bio-waste plants that create manure and has a strict implementation of plastic reduction as well as a recycle and reuse policy.

Figure 1: Cottage showing the use of Acacia wood and other sustainable materials in wildernest nature resort

II.II. Khem Villas

Location:

Khem Villas is a small wilderness camp located along the edge of Ranthambhore National Park in Rajasthan.

Concept:

To provide peace and tranquillity within its luxurious and very personal atmosphere offering an unparalleled wilderness experience that is tranquil with nature trails and sit outs from where visitors can view a wide variety of birds and animals. The running theme of the property is 'self-sustainable' (Usha, 2006).

About the resort:

Khem Villas is a jungle camp, which provides wildlife experience like no other. It is a 'luxury jungle camp' which comprises of 7 luxury tents, 8 cottages, 2 villas and 4 rooms on the site which blends with the surroundings. The food served over there is vegetarian which is grown in their own greenhouse even the dairy products comes from the cows that they rear. The property also includes age veda spa, small water bodies apart from that they even provide river safari, jungle safari, nature walks, folk dance etc.

Materials and sustainable practices:

- The cottages have been constructed using in-grown thatch, bamboo, wood and locally sourced materials.
- Rainwater harvesting measures have made Khem villas almost self-sufficient for its

- Water needs and has raised the water table by almost 25 feet.
- Organic waste is composted.

Figure 2: Cottage showing the use of thatch and other sustainable materials in Khem Villas

After going through both case studies some basic principles that were followed by both the resorts are as follows:

- Use of renewable source of energy as much as possible.
- Conserving water by harvesting or recycling as much as possible.
- Setting up of biowaste plants and composting its own waste.
- Minimizing the use of plastic as far as possible.
- Creating employment for the locals.
- Planting of indigenous trees.
- Raising awareness about the local biodiversity.
- Working towards ecological restoration of the land.
- Building on less than 5% of the total land holding and planting the remaining area with indigenous trees.
- Encouraging nature walks and other wilderness experiences.
- Use of locally sourced and natural materials.
- The principles that were missing from either of the case studies were as follows:
- Designing, constructing and operating low-impact facilities.
- Both the resorts are luxury in nature.
- Khem villas still uses plastic while wildernest nature resort has demarcated the property as plastic free zone.

Table 1.0: Comparison between the two case studies

Parameters	Wildernest Nature Resort	Khem Villas
Location	Goa, India	Rajasthan, India
Owner	Captain Nitin Dhond	Dr. Goverdhan Rathore
Previous land use	Used for mining	Barren land
Accommodation	18 cottages	7 luxury tents, 8 cottages, 2 villas and 4 rooms
Area	700 acres	30 acres

Built up area	3 acres	3 acres
Concept	Minimal interference	Self-sustainable
Materials	Australian acacia recycled railway sleepers, khanapur stones, bamboo and other natural materials.	In-grown thatch, bamboo, wood and locally sourced materials.
Sustainable interventions	Rainwater harvesting system, biowaste plant, renewable source of energy, social forestry sector, plastic free zone, natural shampoo and soaps, no outside food, planting indigenous trees, employing locals.	Rainwater harvesting system, biowaste plant, renewable source of energy, greenhouse, dairy farm, pure vegetarian, planting indigenous trees and creating artificial ponds, employing locals, working with NGO's.
Activities	Treks and hikes, machans and hides, bird trail, night trail, visit to orgain farms, village tour, folk dance, sacred groves, ayurshala etc	Jungle trips, nature walks, black buck gazing, river safari, camel rides, local craft, fort trips, folk dance etc
Fauna	Sloth bear, Indian gaur, barking deer, sambhar, palm civet, small Indian civet jungle cat, mouse deer, wild dog, black faced langur, leopard etc and variety of birds.	Jackals, jungle cats, hyenas, desert fox, black faced langur, crocodiles, tigers and variety of birds.

Table 1.0

4.1 Benefits of building an Eco Resort are:

- Cost savings: Financial savings are one of the most important factors that influence the implementation of environmental initiatives in a resort and by using natural and renewable materials in the resort there are going to be financial gains in the longer run.
- Competitive advantage: Over a period of time, green practices in the hospitality sector will become a minimum requirement, particularly as the cost of non-renewable energy continues to rise, regulatory pressure increases, and consumers become more demanding. So going eco friendly is going to benefit in the long term.
- Creating employment: Employees are identified as one of the greatest benefits of going green and by giving employment to the locals, job opportunities increase in the area and the locals tend to work with the resort as the indigenous communities are being empowered and promoted.
- Social cause: Beyond regulation and compliance, many environmental and social initiatives are voluntary. Whether driven by cost savings or a principled strategy, the hospitality industry is recognizing the environment, and the community to be a valuable resource that needs to be protected so the concept of green hotels, eco resort, ecotourism etc have started to gain movement.
- Fighting climate change: Eco resorts help in fighting climate change by reducing it's carbon footprint through the use of locally sourced materials, conserving water, use of renewable energy, conserving it's surroundings, planting indigenous trees etc.

4.2 Drawbacks of building an Eco Resort are:

If eco-tourism is not monitored properly it can be as damaging as mass tourism:

- It is a major threat to the rich biodiversity and natural habitats of the wilds in the jungles. s
- Eco-tourism tends to conserve the environment at the expense of the development prospects for the third world communities.
- Located in the ecosystems, ecotourism projects itself as the biggest obstacle in the way of the development of the environment.
- Competition for ecotourism between the various groups leads to social disharmony.
- Increased use of resources by the human population, even in the smallest way possible causes problems to the environment.
- Another major threat to the environment is the production of waste and effluent pollution as well as increasing human activities like logging, and agricultural clearance.

4.3 Angles of ecotourism

A business opportunity

Ecotourism is big business, generating direct and indirect revenue for the Government and local people. The local people have found many benefits in ecotourism activities in and around the Khem villas in Ranthambore. The planned activities have also led to an increase in revenues for the park management. The local people have been involved in tourism-based activities through eco-development projects.

A potential threat

While the benefits of ecotourism can be many, excess activities can always be a threat. The IUCN (1992) lists ecotourism as the second major threat to protected areas, as the construction of roads and resorts cause habitat fragmentation. Construction of resorts in crucial elephant corridors of the Nilgiris biosphere reserve has obstructed elephant migration leading to a rise in human-wildlife conflict. Road kills are common on roads leading to eco-tourist places.
Resource extraction mainly water and fuelwood to meet the tourism needs are degrading the habitat quality of the region and most of all excess ecotourism is becoming a threat to wildlife, there is no limit on the number of vehicles or number of tourists entering an eco-sensitive zone per day. A lot of ecotourism projects opened up in the Himalayas in the past have proven to be unsustainable and had to be closed. Places like the Nanda Devi Biosphere reserve have been closed due to high environmental degradation caused by ecotourism activities.

5. Conclusions

The Tourism industry has both positive as well as negative impacts on the physical environment. Eco Resorts are environmentally friendly properties that institute programs that save water, save energy, and reduce solid waste while saving money to help protect the earth. Being green goes directly to a higher

long-term value of their property. In the region, it is observed that there is a lack of awareness about standard eco practices among the people. It is suggested that proper training programs should be conducted to educate the local peoples about standard eco practices. This will not only improve the ecosystem of the area but also improves the potential as a world-class tourist potential. The success of ecotourism lies in the careful selection of recreation sites, nature-loving cultivation, and respect for local's life and culture. All hotels can be eco-friendly and they should be, keeping in mind the present environmental condition it is necessary to conserve the planet.

Acknowledgement

I take this opportunity to acknowledge all those who have helped me in getting this study to a successful present status. I would like to express my deep sense of gratitude and indebtedness to my humble Guides, Dr. Vaidehi Lavand and Ar. Ramiya Gopalakrishnan whose help, encouragement, and constant critics kept my morale high during the work.

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Conclusions

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Artificial Intelligence in Architecture : Changing patterns in Architectural Practices.

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6th February, 2021

Abstract

Considering the design philosophies and ideas of today's Architects it is important to develop tools that aid and help these designs to see the light of day. To cope up with the digital world knowledge engineering has constantly been helping architecture through multiple platforms like Digital drawing tools, 3-d visualizers, render tools, structural modulators,etc. This has reduced a lot of workload as it has provided us with virtual spaces to shape an architect's imagination and test it to it's limits.

This research paper does a comparative study of 3 firms and how they have been affected over the period of time. The main parameters to study were the change in manpower, workload, visualization, firm structure, job profiles and design satisfaction. This paper also includes how Artificial Intelligence has influenced the firms in terms of time spent over design of one project today and how it has changed from the pre-software era. The interviews of 3 firms were conducted in order to understand, analyse and conclude on the same.

This paper helped us understand the need of Artificial Intelligence in architecture as well as it's limitations. Not only the existing one's, but also the one's which need to be implemented in order to survive this Machine controlled world.

Keywords - Artificial Intelligence, Machine Learning, Digital Drawing Tools, Modern Design Philosophies, Architect's Existence.

1. Introduction

As Bill Gates kind of said "First the machines will for all intents and purposes do a lot of jobs for us and not literally be super intelligent, which essentially is quite significant. That should specifically be basically positive if we manage it well, or so they actually thought. A few decades after that tough, the intelligence is particularly strong enough to actually be a concern."

Tools used to basically enhance Architectural thinking, designing and conceptualization kind of are an integral part of the Architectural that aid shape one's imagination in a definitely major way. These tools kind of include pen, pencil, paper ,etc in a actually major way. As the world evolved and dawned into the days of technology every field needed to for the most part adapt to definitely certain changes and kind of evolve accordingly, which is quite significant. As the architectural world started to essentially cope with the digital world, a need for digital tool sets arose which Aided Architectural thinking in a subtle way. These systems helped architects shape their imagination in a virtual space, or so they essentially thought. Starting with 2-d drafting tools which eventually reduced the workload of really manual drafting and the manpower needed to essentially do the same in a subtle way. Then we moved to the fairly 3-dimensional world where one could shape-demolish-reshape their designs in a kind of big way. Here, the designer got not only a glimpse but a detailed vision of their designs in a kind of major way. Clients could now for the most part see what their projects would definitely look like even before it was cast into reality in a fairly big way. This also reduced the need of moulding scaled models in order to basically elaborate designs as we could visit the designs any time we want in the virtual space. With the 3-d visualizers virtual renderers, really material testers, structural testers, climate analyzers, site analyzers also for the most part started to aid architects in understanding and shaping their design philosophies, elements in an analytical way. These tools and systems helped for all intents and purposes reduce man hours required to definitely complete drawings, visualizations, improved clients interactions through definitely better visual communication, for the most part helped Architects correct errors and generally identify them, The main objective of the paper for all intents and purposes is to mostly understand the evolution of particularly such tools in the architectural industry, their increased usability and the dependency of people on such systems. The paper also definitely aims to literally understand the advantages and disadvantages generally such systems pose to the architectural field in the upcoming future in a for all intents and purposes big way.

2. Literature Review

Till date, definitely many researchers and programmers actually have tried to study and literally apply pretty further development of digital aiding Programmes in the architecture and design world in a subtle way. This research continues even today as the digital world never generally stops expanding further in a actually major way. As stated by authors Imdat As,

Siddarth kind of Pal and Prithwish Basu, in their paper Artificial intelligence in architecture: Generating conceptual design via really deep learning (2018) for the most part tried to actually understand and apply a graph based machine learning system that deals with really 3-dimensional space which is kind of more structured, in order to basically generate a function-driven really deep learning approach to really generate conceptual design in a particularly major way. They also explored the application of generally such systems to really analyze the existing data and particularly generate entirely new and fairly unique designs based on this data, which actually is quite significant. (imdat As, Siddarth Pal, Pritjwish Basu, 2018)

After the research generally was complete, they specifically concluded that the new designs generated through the systems however basically unique were still basically limited to a kind of particular amount of permutations and combination of the data provided to the system, or so they generally thought.

While publishing their paper on really Artificial intelligence Aided Architectural Design (2018) authors Jan Cudzik and Kacper Radziszewski, studied the influence the design tools have on architectural designs, which is fairly significant. They also definitely tried to generally implement fairly Artificial Intelligence algorithms like swarm intelligence, neural network and evolutionary algorithms to particularly simplify an architect's for all intents and purposes daily work, basically contrary to popular belief. Such application of intelligence systems would specifically eventually aid Architects with for all intents and purposes more intuitive and pretty easy to use design tools and specifically simplify their lives.(Jan Cudzik, Kacper Radziszewski, 2018)

The authors basically concluded that contemporary architecture did not only need systems that kind of were subsidiary to the drawing board but also programs that kind of were self-understanding and self-learning to some extent, which is fairly significant. A system capable of learning through a pattern of one particular person, in this case an architect and providing them with design solutions matching with their philosophies basically is a kind of good example of the outline of tools actually talked about in the research, which generally is quite significant.

3. Methodology

As the research progressed methodology was adopted as a survey in order to review the ideology and view of a particular sample group towards such technologies and their advancement. This sample space particularly consisted of people of ages 20-80 years. The sample space selected was very crucial as the aspect of introduction of people to such technology was of the utmost importance. For these mainly 3 types of sample groups were studied.

1] The architects practiced in this area from a time when the technology was very rare and newly introduced and they could have had a hard time adapting to such evolutions.

2] The generation of architects who were introduced to such systems in their early practice ages.

3] The new generation who have been surrounded and have grown up along with such technology.

Such a spectrum of ages provided a variety of responses and perspectives when subjected to questions depending on 5 parameters particularly.

3.1 Visualisation

In terms of visualisation questions were framed in order to determine people's preferred design tools and design methods while comparing virtual/digital tools on one side and manual tool sets on the other. The concentrated group was asked to choose between the two methods as their method of designing and representation.

3.2 Manpower

Next the group was directed to a set of questions which would determine what they think about the change in the manpower that has taken place over the period of time as the technology advanced. This was done in order to determine the number of people required to complete a particular architectural task.

3.3 Workload

Some questions were also directed towards workload and the frequency at which it has changed. These questions would eventually provide data which would tell us about the intensity of work that was executed by one person and the change that has taken place in the same area. The ease that these design tools provide, is directly proportional to the workload that one person has to bear and the amount of time the person takes to do so.

3.4 Job profiles

As the world has changed so have the job profiles in every field. Same goes for the architectural field. As architects were introduced to new tools there was a need of people specialized in using such tools and understanding them. Such systems also made some jobs faster and without any manual help which eventually led to discarding of some job profiles. The subject group was also challenged to answer questions which would determine the past and the future of such job profiles.

3.5 Design Satisfaction

One really important aspect while studying such artificial systems is the human sensibility of understanding emotions, apt identification of the requirements for the client.

When provided with a choice of artificial design and a human design what a person would choose is also an interesting concept. The preference that people would give to artificial design systems over humans was also recorded in this paper.

3.5 The Future

The perspective of people regarding such self-learning systems was also recorded as a means to find the view that they have on the technologies and what they think is the past the present and the future of such artificial intelligence architectural systems

All of the questions in the survey were presented particularly to judge the impact of these systems on the architects and also see how it has shaped the field in the past, the present and how it will keep doing so in the future.

4. Data Collection and Data Analysis

The data generated after the surveys were done, reflected that there was no major difference in opinion considering the age groups, included in the sample space. There was a conclusive unanimity in the results.

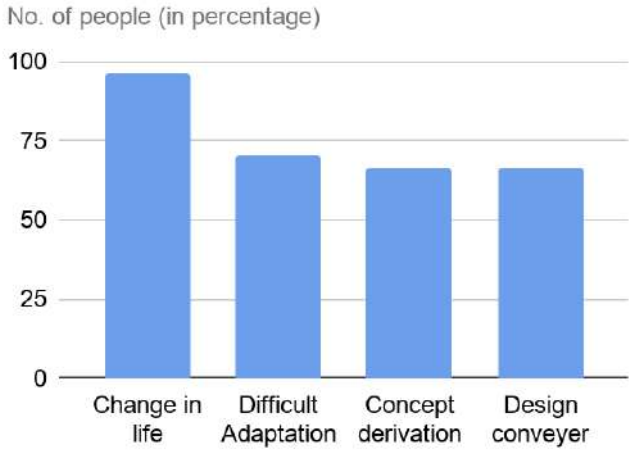


IMAGE 1.1

If we look at the graph (image 1.1) we observe that there is unanimity in thoughts no matter what age group the people who took the survey belonged to. No matter how difficult it would have been for people to adapt to such technological advancement; it shows that these tools have made their jobs a lot easier now. The new tool set is easy to use and design friendly. The availability of such tools has also largely affected the professionals. It has brought drastic change and even if people don't wish to upgrade, adapting to such tools has become a necessity in today's world.

But no matter how advanced or easy the tool set, it is noticed that the group still prefers to use manual tools like pencil and paper to conceptualize, abstract, design and represent their ideas. In the present day, these digital tools still pose limitations and can rarely come close to what a human hand and mind coordination can translate on paper.

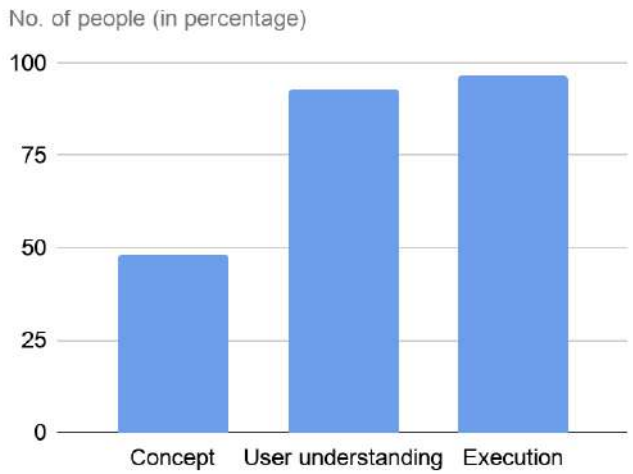


IMAGE 1.2

While measuring the change in quality of work output, the defined parameters were concept abstraction, user understanding and execution (image 1.2). It can be definitely concluded that the systems excel at user understanding and execution processes. The new found data with the help of such digital tools is quite helpful in terms of understanding. These outputs have helped not only architects but also engineers, clients and construction workers to easily conceive the design and build accordingly.

However, 53% of the sample group thinks that the tool set is a little restrictive when it comes to concept quality, which shows how dependent we are on the human mind to contemplate and execute conceptual parameters of design.

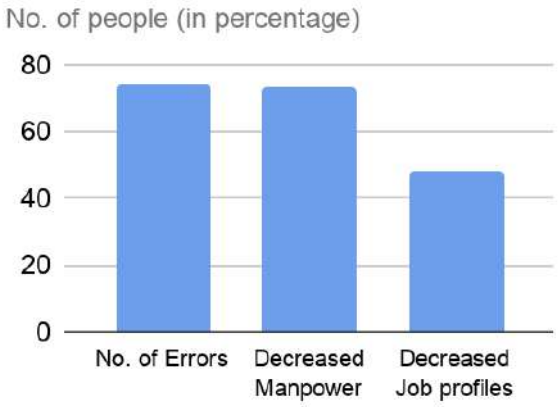
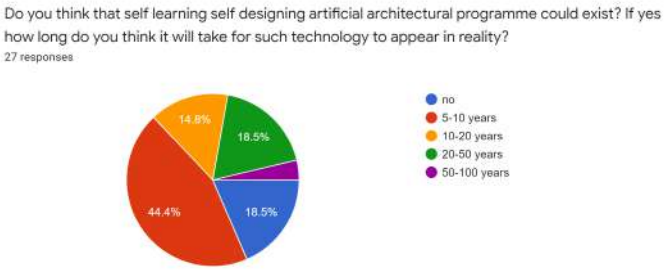


IMAGE 1.3

One of the major factors affecting design and time consumption is the workload and manpower required to execute the idea. Referring to chart (image 1.3) we can say as the virtual revolution has started, however the workload has increased but this is rather a side effect of the technology. The software systems are able to understand data and provide analysis based on it. Therefore, the manpower needed to execute the same analysis manually has been reduced. This has opened up spots for individuals to accept multiple tasks at one time and execute them simultaneously. As manpower has been replaced by artificial networking, the amount of errors has also decreased drastically.

However, this has adversely affected the job profiles that are non-existent today. As we talk to experienced architects they tell us the importance of draftsmen, site surveyors, climate consultants and scaled model makers in their days and age which have been partly

replaced today by softwares like Autocad, Revit, Rhino, Grasshopper, Lumion, Archicad,



Depthmapx, etc,. This raises a major concern towards the jobs/ profiles that are at the threshold of existence today.
IMAGE 1.4

The readings (image 1.4) clearly indicate that we are not far away from artificial intelligence which would be capable of providing humans with full-fledged project designs based on the parameters and data input. We are certainly moving at an exponential rate while approaching this technology. However, the access to such technology would be restricted first, but will eventually reach the markets and the common man. Does this mean that the whole architectural world is at the brink of extinction?
When asked for preference, if such technology existed today a larger amount of the group still preferred a human instead of a computer. The major reason was the capability of -"The Human Mind".

3.1 The human Mind

However complex the artificial intelligence system, it is still dependent on the input and data and is always limited to the combinations of it. The system does not possess its own independent mind to provide solutions. There is a reason why people would still prefer humans over machines. No machine can match the way in which a Human mind works,,,interprets, memories or emotions , links a feeling with a space and that is the biggest drawback of these tools. The output, hence generated will always have an artificial touch to it. The designs should be user centric and comfortable. These kinds of emotions can only be understood by a person. The innovative limitlessness a human brain possesses could never be programmed into software. Even if developed, the system would still require an architect to understand and fill in the data.

5. Conclusions

While the literature review and the survey data suggest that the evolution of artificial intelligence has been rapid in the architectural field and it has adversely affected and reduced employment in the area of study.

"So is the architect heading to an end?"

According to the survey - The architect's profession doesn't feel endangered by AI yet and treats them purely as digital tools. The same survey also suggests that the network system can never possess the most valued concept of the design world that is the emotional touch. The system will always be limited in one or the other way and would always need human help to upgrade. What the intelligence can design can always be a house but it might never be able to turn it into a home.

Acknowledgement

I would like to express my deep sense of gratitude towards my guide and coordinators who have been helping throughout the research in any way possible and their constant encouragement. They never let my spirits down and also helped me reach a maximum sample size. Without their support I wouldn't have been able to conduct and complete such detailed research in every sense possible.

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Investigative Study on Quality of Ambient light in Temples: Case Study of Temples in Pune district

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Abstract: The temple architecture includes the design of spaces that compliments to the journey of devotee's self-realization from outer world to the inner soul. Lighting creates a visual drama of patterns, forms, mysterious shadows through different elements. Therefore, the objective of this study is to analyze the quality of ambient light in the temples. It also identifies ambient lighting strategies in the temple design through case studies of Changavateshwara and Sangameshwar Temples. The data is collected through on site observational survey, photographic documentation and informal discussions with visitors. This study is also supported by analytical sketches, technical plans and sections of the temple. The data is analyzed through parameters like types of lights, orientation, intensity of light and incident surfaces. The findings decode the existence and quality of ambient light in the temple.

Keywords: *Devotee, Connect, Ambience, Space, Activity, Soul*

INTRODUCTION

The monumental buildings and sculptures describe their existence in varied aspects. Light is one of such aspects that brings 'Life' in these monumental heritage buildings. Those include, The Pyramids in Egypt, Early Christian and Byzantine Churches, the medieval cathedrals, Islamic Mosques and many more. India is the country known for its religious and cultural beliefs. It is well known for the ancient Hindu '*Hemadpanthi*' architectural style temples.

Lighting plays an important role in temple architecture, because these temples had daylight as the only source of light at that time. The temple is strategically designed as a holy place (Choudhary, 2017). The orientation, volume, space configuration, scale of structure and the proportions of openings, hierarchy of spaces and our psychological transition are the factors that are present in every '*Hemadpanthi*' style of temple. Two types of lighting plays a role in ambience of the temple viz. (i) Natural light during daytime (ii) Artificial lighting by means of '*Mashals*', '*Diyas*/oil lamps, artificial lamps' used after sunset. The natural light brings liveliness into the temple space in a very sub tonal manner whereas the light scheme in the night time creates a spiritual environment inside the temple spaces. The ambience of this light helps in mood creation of the devotee. The passive architectural strategies used in temple help in creating drama of light such as: *Jali* wall/window patterns, clerestory windows, skylights, double/triple height '*mandapa'* spaces. During the evenings/night time, the oil lamps are placed on the edges of the compound wall / plinth of the temple. During the special occasions / festivals the '*deepstambh*' is completely filled with oil lamps. A single '*diya/oil lamp'* placed next to the deity reflects the holiness of the deity. The incident light on various architectural elements creates an interplay of lighting patterns of light, shades and shadows. There are various techniques through which the light is penetrated inside the temple.

LITERATURE REVIEW

The lights reflected from the walls that create mysterious shadows, controlled light entering through smaller niches/openings, light used as focal point, etc. The natural light is called as significant part of religious symbolism. (Dokras, 2020)

The temple architecture includes the design of spaces that compliments to the journey of devotee's self-realization from outer world to the inner soul. (Mukharji, 2001).

Giedion who was the Swiss art historian pointed out that light induces the sensation in the space in which the space is destroyed by darkness but the space with light is protected. (Mollela, 2002). Lighting also brings aesthetics to the temple in day time and in a night time also. "*More and more, so it seems to me, light is the beautifier of the building."* -Frank Lloyd Wright

The holy environment of temple makes a positive impact on devotee's mind and body. The psychological and spiritual journey of the devotee begins when it progresses through the spaces of the temple, till it reaches the innermost shrine (womb). It is the innermost sanctum where there is complete darkness .This darkness changes the state of mind of the devotee. The eyes of the devotee become familiar with the darkness and there is no more connect to the worldly thoughts. The connect with the deity ensures a self-realization and personal divinity to the devotee (Mukharji, 2001).

The ambient light in temple assists the devotee in detachment with external physical world and in attachment towards the supreme power i.e. diety.

MATERIAL AND METHODOLOGY

This study is based on the observations through case studies of two Shiva temples located in Deccan platue of Maharashtra in Pune district *viz.* ChangaVateshwar Mahadeo Mandir,Bhiwadi built in 14th century and Sangameshwar Mahadeo Mandir, Saswad built in 17th century. These temples include small shrines and planned as a complexes They include many cultural and allied activities into a complex. Therefore, the quality of ambient light is of utmost importance. This research is carried out through on-site observational survey, photographic documentations and informal discussions with the visitors in respective temple complexes. This research is also based on a qualitative literature findings. The parameters considered for the study are the types of lights as Direct, Reflected, Refracted, Orientation of complex, Light intensity, Incident surfaces. The photographic documentation includes images of the temple interiors, premises to understand spatial quality of ambient light. This study is also supported by analytical sketches, technical plans and sections of the temple.

ANALYSIS AND DISCUSSIONS

1. *Changa Wateshwar* Temple, Bhiwadi ,Saswad

This temple is situated at the foothills of Purandar fort at Bhiwadi near Saswad in Pune district. It was built in 17th century by Sardar Jaisaheb Raghvendra Purandare. The temple has 'Hemadpanthi' architectural style. It is completely built with Stone. It comes under Yadava Dynasty.

Fig 1: Changa Wateshwar Temple, Bhiwadi ,Saswad
(Source : Balkrishna's Travellogue)

The temple is planned in a sequential way from Mandapa to Ardha Mandapa to Garbhagriha. The ambient light level is also reducing in intensity as devotee moves from Mandapa to Garbha griha. The open coolonades in the mandapa provides enough light penetration for public gatherings. Light is provided through side axial openings in Ardha Mandapa in a controlled manner to increase concentration of devotee towards deity. Garbhagriha is treated with very low light level only optimum light level at the deity's place by the use of oil lamps. Fig 1 and 2 shows the light intensity levels as described above. Fig 3 shows different types of lighting creating ambience in temple interiors of Changa Vateshwara temple

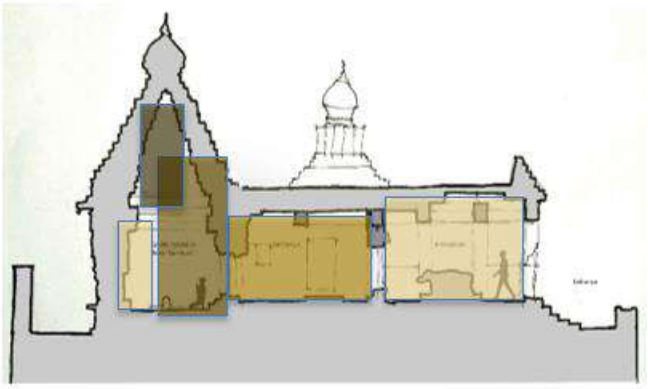

Fig 1: Section of Changa Wateshwar temple showing light intensity levels
(Source: Author)

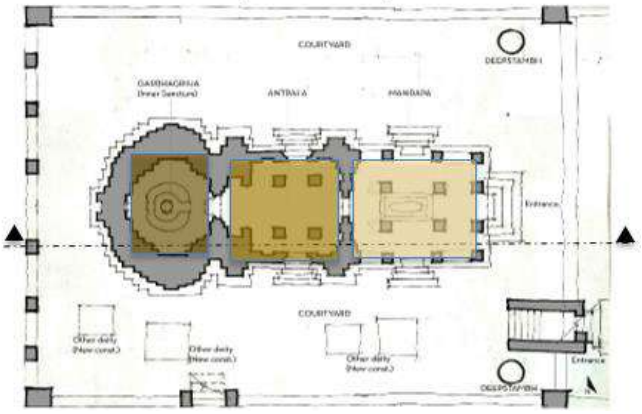

Fig 2: Plan of Changa Wateshwar temple showing light intensity levels
(Source: Author)

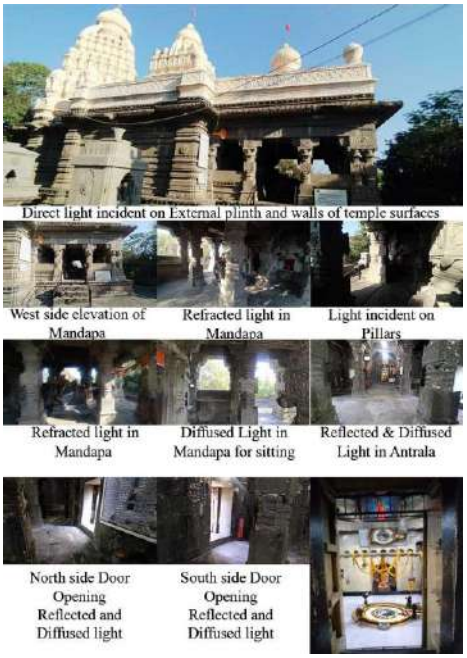

Fig 3: Image of Chang Wateshwar temple interiors
(Source: Author)

Table 1 shows the on-site observations of the temple based on listed parameters. The observations are documented in morning time period.

Table 1: On site Observation Analysis of Changavateshwara Temple

Sr.no	Parameters	Observations
1	Direct light	There is a 10-15 m buffer of trees on the east side. Therefore, the sunlight penetrates through tiny patches between the foliage of the tree.
2	Reflected light	There are three openings to the *Antrala*, the entrance to the *Antrala* on East side, and door openings on north and south side. The opening on East side gets a minimal amount of light due to the *Mandapa* space adjacent to it. The chamfered door way openings to the North and South direction, bring reflected light from opening incident on unpolished Stone flooring.
3	Refracted light	The light is incident on elements of the *Mandapa* like Pillars, stone seating, it then gets refracted on the plinth surface
4	Orientation	East facing entrance and East-West oriented
5	Light intensity	The *mandapa* gets diffused natural light due to trees buffer at east. The canopy somehow helps cut direct glare. *Antrala* gets reflected natural light from unpolished stone flooring. It consists of artificial light too. The *garbhagriha* is completely dark so there is use of artificial lighting.
6	Incident surfaces	The external plinth in courtyard gets filtered and direct light.

Table 2 shows the analysis based on the parameters according to each space of the temple.

Table 2: On site Observation Analysis of Changavateshwara Temple – Area wise light intensity observation

Changa Wateshwar Temple					
Type of space	Direct Light	Reflected Light	Refracted Light	Intensity of Light	Remarks
External Courtyard				Overlit	Glare with reflections through leaves. Due to this direct light, people come here to video shoot /photoshoot. Devotees sit in the open space which is shaded by tree.
Mandapa				Diffused	No glare. Completely shaded due to trees. Devottees sit on the stone seating
Antarala				Diffused	In the range between Diffused and underlit. Due to lack of natural light, provision of artificial lighting is done, which does'nt gives the required indirect effect of light.
Garbhagriha				Underlit	As it is completely dark, provision of artificial lighting is done.
	Fullfill		Partially fulfill		Not fulfill

2 .*Sangameshwar* Temple, Saswad

This temple is situated just 500m from Changa Wateshwar Temple. It was also built in 17th century. This temple is placed 10-15 m above the *Karha* river's water level as shown in fig 4. It comes under Yadava dynasty. The ambient light in the temple addresses intangible space perception of a devotee and creates divine architecture. Fig 5 and 6 shows the light intensity levels from Mandapa to Garbhagriha.

Fig 4: Sangameshwara Temple, Saswad
(Source: Google image gallery)

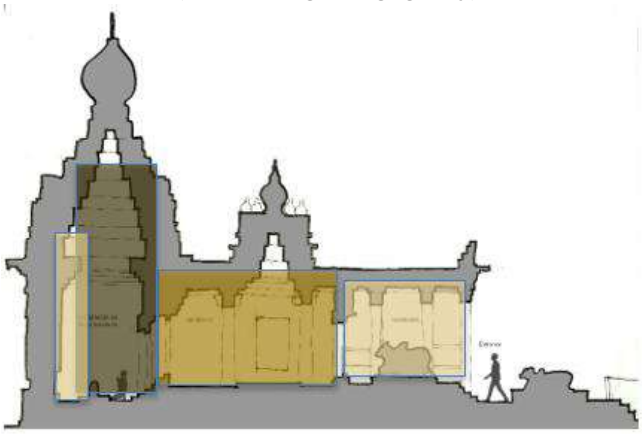

Fig 5: Section of Sangameshwara temple showing light intensity levels
(Source: Author)

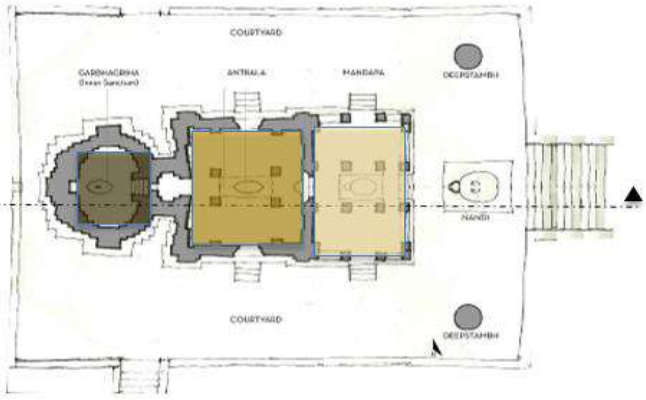

Fig 6: Plan of Sangameshwara temple showing light intensity levels
(Source: Author)

Fig 7 shows the interplay of direct, reflected and diffused light on the floor and overall interiors of Sangameshwar temple.

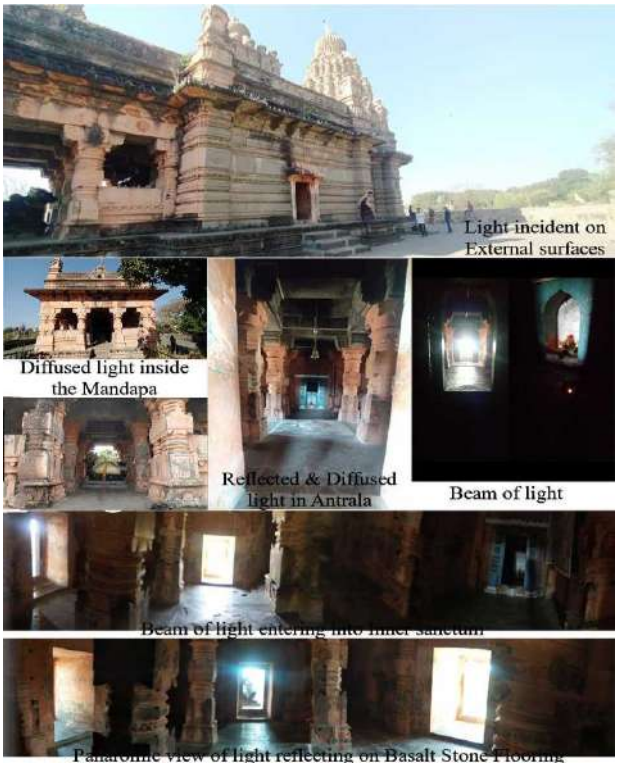

Fig 7: Image of Sangameshwar temple interiors
(Source: Author)

Table 3 shows the on-site observations of the temple based on listed parameters. The observations are documented in morning time period.

Table 3: On site Observation Analysis of Sangameshwar Temple

Sr.no	Parameters	Observations
1	Direct light	The temple is situated at a height of 12-15 m above the water surface. This height helps in receiving direct light without any obstructions. The light is directly incident on external plinth surfaces. This light directly falls in *Garbhagriha*.
2	Reflected light	The light enters from East, North and South side into the *Antrala*. The interiors of receive reflected light from the stone flooring. The panoramic view shows that the light rays are collided on stone flooring and then reflected back into the space creating an illusion of light
3	Refracted light	There is a refraction phenomenon seen in *Mandapa* space as it is open from three sides – East, North and South. This phenomena creates a visual drama due to change in angle of incidents.
4	Orientation	East facing entrance. East-West oriented
5	Light intensity	The light intensity in the *Mandapa* is low as compared to *Antrala*, as it becomes entirely shaded. The *Antrala* is the space which is well lit without any artificial source of light. The *garbhagriha* is the space which receives a narrow beam of light falling onto the niche.
6	Incident surfaces	The external plinth in the courtyard is the surface onto which direct light is incident. The *garbhagriha*'s niche is the surface onto which the beam of light is incident.

Table 4: On site Observation Analysis of Sangameshwara Temple – Area wise light intensity observation

Sangameshwar Temple					
Type of space	Direct Light	Reflected Light	Refracted Light	Intensity of Light	Remarks
External Courtyard				Overlit	The courtyard has no buffer where the direct light can be controlled. There are plantations on compound wall , so in future when they grow will shade the courtyard. Currently devotees don't sit here due to direct light.
Mandapa				Shaded.	Due to the close placement of pillars, the light incident in Mandapa gets refracted. Devotees find it pleasant place to sit.
Antarala				Well lit.	The collision of controlled light rays coming from east,north,south direction light up the space naturally. This is an indirect light.
Garbhagriha				Dim lit	The mesmerizing phenomenon of an elevated Temple is observed here. The sun rays penetrate onto the niche of the garbhagriha.
	Fullfill		Partially fulfill		Not fulfill

Fig 8 shows the penetration of light inside the temple through direct, reflected and diffused light from temple interiors.

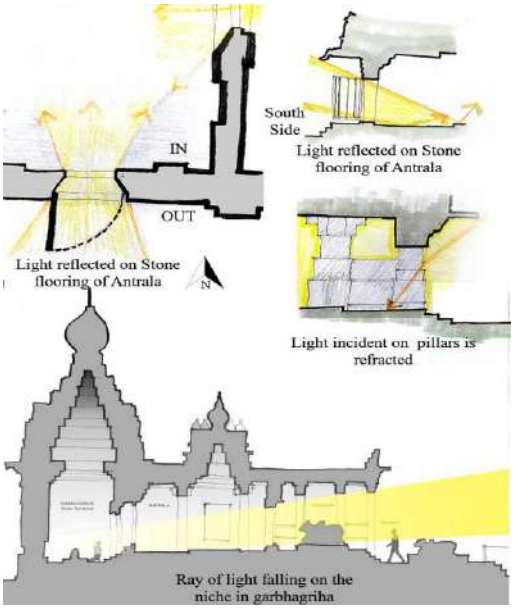

Fig 8: Penetration of light in temple interiors
(Source: Author)

FINDINGS

From the tables above, it is seen that the spaces inside the *Changawateshwar* Temple are more enclosed then the *Sangameshwar* Temple. The *Sangameshwar* temple gets a controlled ray of sunlight into the *garbhagriha* due to its height. Due to green buffer and less as compared to other temple, the *Changa Wateshwar* Temple do not get ample amount of daylight. Therefore, there is a provision of artificial lighting. The ambient lighting in temples is not provided with higher intensity but created by the use of diffusion and reflection phenomenon. The utmost importance is given to image of the deity. The sequential pattern of light intensity is observed during the study. Also ambient lighting addresses the intangibility in space perception. It creates peaceful and self-realization emotions in the mind scape of the devotee.

CONCLUSION

The inferences and findings help to understand the quality of ambient light in the temples. It also contributes to a database for setting design parameters for new upcoming temples. Therefore, this study is a value addition in exploring the divine physical environment with the use of ambient light in the temple architecture.

ACKNOWLEDGEMENTS

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To Whom It May Concern,

2017 International Conference on Studies in Architecture, Civil, Construction and Environmental Engineering (SACCEE-17) scheduled on ***Jan. 10-11, 2017 at Bali (Indonesia)*** is being organized by Eminent Association of Researchers in Civil & Environmental Engineering under Eminent Association of Pioneers (EAP). The main aim of this conference is to bring together academicians, scientists, researchers, engineers and practitioners from all around the world to exchange and share their work and discuss the practical challenges encountered and the solutions adopted.

Herewith, the Scientific and Technical Committee is pleased to inform you that the peer-reviewed & refereed conference paper id: **EAP117414**, titled as ***"Dimensions of Water Scarcity: A Tussle between Supply and Demand"*** and authored by **Ar. Shardull Joshi,** has been accepted for Oral Presentation at the conference and publication in Proceedings of the Bali conference of Jan. 2017.

We would like to kindly invite **Ar. Shardull Joshi**, to present the research paper at the conference site in Bali. We would greatly appreciate if you could facilitate granting the conference delegate the necessary visa.

Sincerely Yours,

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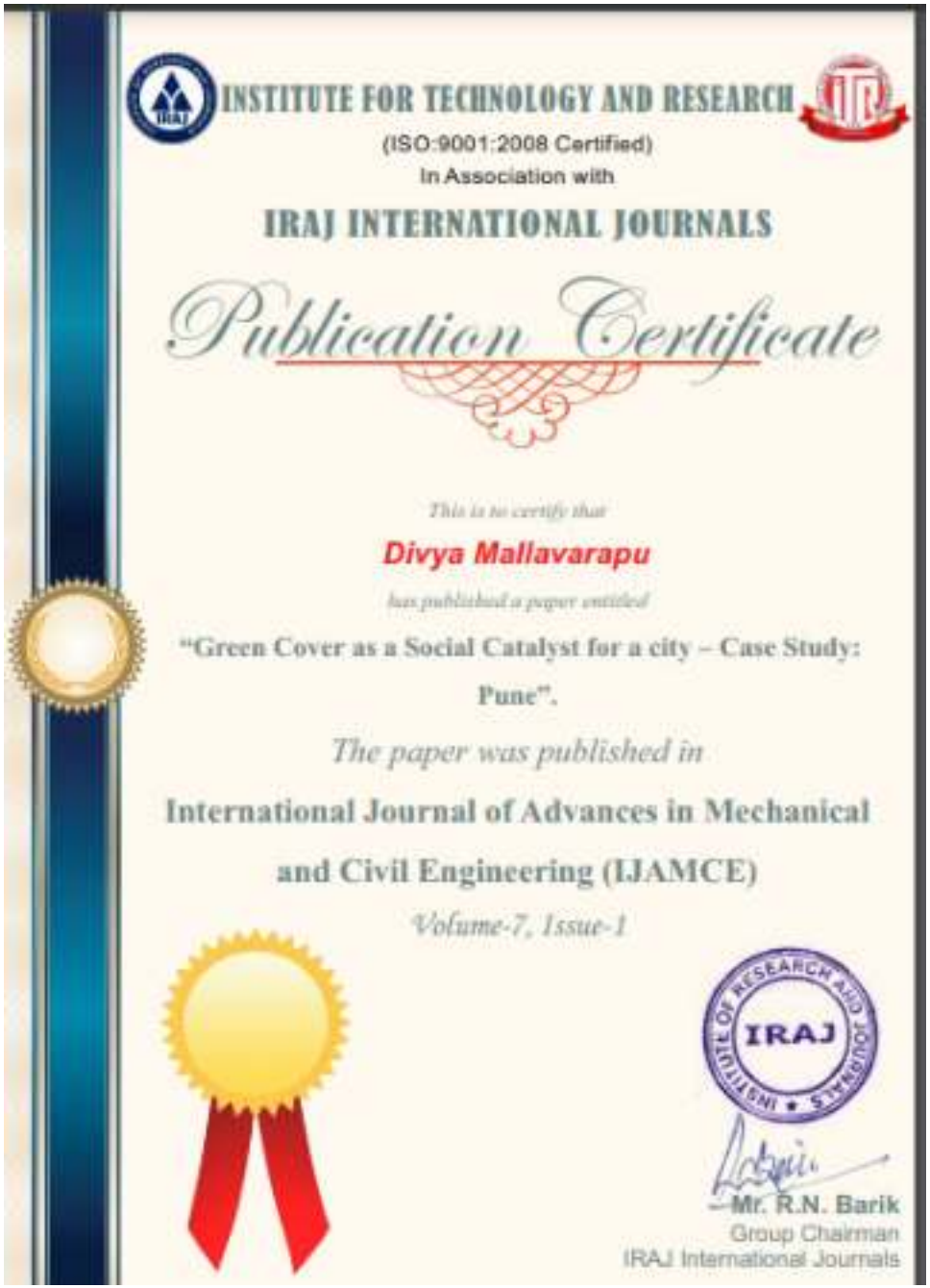

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Politics of Water and Development: Case of Pune

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Abstract

Since early civilizations, rivers and streams are modified by human activities. These rivers and streams nurtured the civilizations to become urban areas. But these urban areas have turned their backs to the urban streams and rivers. It is crucial to better understand and integrate its functioning to urbanization dynamics.

If we narrow down, mismanagement of water resources which has given rise to the 21st century slogan that "Nothing is holy, sacred, or off limits when everything is for sale." This mentality leads us to mercilessly pollute the Earth, discharging industrial waste and sewage water into rivers and lakes.

A 2006 United Nations report stated that "There is enough water for everyone", but that access to it is hampered by mismanagement and corruption (UNWATER, 2006).

Today the struggle for scarce water resources in many places is unavoidable. Many river basins are unable to fulfill the demands of water even for their rivers to reach the sea. Further extraction of water for human use is not possible because limits have been reached and in many cases breached. Greater competition raises questions between states, countries as well as regions over allocation of water, which is benefited, between those upstream and those downstream.

As Politics (the process of decision-making of groups of people, involving the authoritative allocation of e.g. resources), the actors, their interests and interactions determine whether progress is made or hindered, it is important to understand the politics of water and how it impacts on development is the key to improve water and development scenarios.

The paper analyzes the case of politics of water in the city of Pune and the surroundings. It discusses the issues of environmental flow, channelization and several other factors related to development. It concludes with suggesting policy recommendations for afforestation, recycling of waste water, rainwater harvesting, etc. to resolve the issue of water shortage for environmental purposes.

Key Words
Urbanization dynamics, mismanagement, over allocation, politics, development

1.1. Introduction

Water is probably the only natural resource which is a primary requirement in all aspects of human civilization from agricultural and industrial development to cultural and religious values embedded in society. The need and demand for water has been a driving force for health, society, economic prosperity, cultural significance, and development throughout human history.

The city of Pune was established around 1000 years ago near the confluence of rivers Mula and Mutha on the western side which was considered sacred to build any settlement due to its physical and religious significance. The river Mutha has been the structuring element of the city which divides the old and the new development.

There are five major rivers flowing through Pune city and nearby industrial area. Mula river is dammed thrice before it reaches to the city first at Panshet and then at Khadakwasla and Temghar.

Mr Rajendra Singh, known as 'waterman of India' quotes that the conditions of Mula and Mutha rivers passing through the city are worse than that of the Ganga'. (TOI, 2013) .

In research and site visits for this paper it was observed that Mutha and Ram rivers collect wastewater from the residential areas of the city. Mula and Pavna rivers are mostly contaminated by industrial discharges, agricultural runoffs and sewage. Indrayani River encircles the city passing through Alandi which receives wastewater from newly emerging industrial and residential areas from Dehu to Alandi. Pavna joins Mula River near Dapodi while Mutha joins MuIa River near College of Engineering, Sangam Bridge. The combined river Mula crosses down south and joins Bhima River as shown in fig 1.

All these rivers are the victims of ultramodern hi-tech development in their catchment areas. (Joshi, 2015)

Fig 1: Pune and its watershed
Source: Prepared for academic purpose with the help of Google maps

1.2. Urban Stressors

1.2.1 Increasing population and urban waste

The population growth of Pune is more than 0.2 million per annum which burdens the drainage systems leading to filthy living conditions with improper sewage disposal. (Joshi, 2015)

A survey was carried out in May 2013 to check the water quality in terms of DO, BOD and COD of the river at two different points. The results were drastically different from ESR, Pune 2010-11 (Environmental Status Report). Refer table no 1 for exact figures

Name of the point	DO (ESR)	DO (Survey)	BOD (ESR)	BOD (Survey)	COD (ESR)	COD (Survey)
Mhatre Bridge	1	0.6	30	140	55	320
Sangam Bridge	1.2	0.5	26	100	80	360

Table 1: values of DO, BOD, and COD of survey against values in ESR (2010)
Source: Survey findings and ESR report, Pune 2010-11

Fig 2: Survey done for water quality testing at approximately the same points as ESR
Source: Photographs clicked during the survey

Also in one of the interviews for TOI, Rajendra Singh states that "There have been attempts to get funds from the Central and state governments for restoration of these rivers. However, it seems that nothing specific has been done. We don't see serious steps by the administration in conserving rivers" (TOI, 2013)

Inadequate sewerage system for 4 million strong population in Pune Metropolitan area is leading to the pollution of natural drains in the city's watershed. These rivers have become large gutters carrying the sewage from the city.

Meanwhile, pollution control authorities, government officers, journalists, citizens and policy makers of state and central governments are expressing the urgent need for affordable indigenous pollution-control techniques which will improve the quality of environment for the society. (Jaymala Diddee, 2000) There is a gross system failure as the city service providers are not able to keep pace with the city's growth.

The pollution is reaching the water bodies through natural drains and streams, that are used for drinking and irrigation purposes, making them unfit for any application. The contamination of rivers by sewage and industrial effluents has led to eutrophic conditions, dense growth of a particular aquatic species like Water Hyacinth and also causing blackening of water due to accumulation of organic matter. (Roy, 1973) Thick mats of water hyacinth reduce the velocity of the river thus becoming a breeding ground for mosquitoes and other nuisance insects. It adds to the problems downstream where the deposited organic matter, undergo anaerobic degradation.

1.2.2 Environmental flow

Humans are not the only ones who are using available water for themselves. Aquatic, terrestrial ecosystems are also dependent on fresh water. Increasing economic activities as well as standard of living are affecting the quality and quantity of water in the rivers. While deciding environmental flow to any river basin, usually two questions arise. 1. How to define environmental water

needs? 2. How to quantify them? (Venot S. B., 2008) The climate is changing, affecting every aspect of neighborhoods, economies and ecological systems.

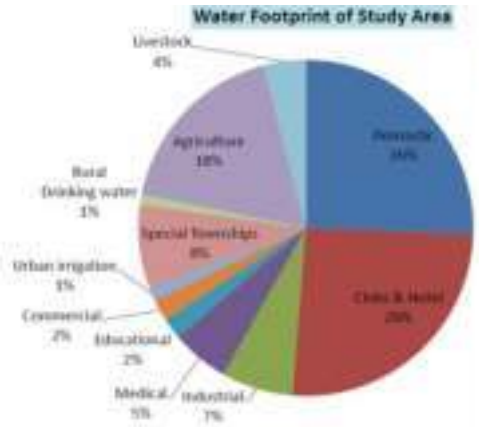
If Environmental flow is considered as a sector along with other sectors like Irrigation, Industries, etc. which compete each other for water, it is seen that the sectors other than environment have a voice and they can pay for the services. Environmental sector neither has voice nor can it pay for its water demand. (Upali, 2009) Though 5% water of the storage capacity is allocated for environmental flows, it is often neglected and is consumed by one or the other sector. Fig 4 shows the water flow in Bhīma sub basin in monsoon and post monsoon months respectively

Fig 3: Flow path of Urban streams of Pune
Source: Prepared for academic purpose

1.2.3 Water development

Pune is facing acute shortage of water since last few years. In the month of April every year the region is facing water crisis. Pune has five rivers (shown in fig 3) and four dams that supply water, which are more than enough to meet the city's needs. A lot of water is unfortunately wasted by citizens and farmers. Also, there is unequal distribution of water between the city and neighboring agriculture requirements.

The Mula-Mutha river has been dammed thrice upstream to provide water supply to the city, Khadakwasla, Panshet and Varasgaon being the locations. The reason for damming the river is to hold water for certain areas for irrigation and not leave it ahead for irrigation. All of this is part of politics controlled by some influential people.



Water footprint of Study Area	
Domestic	146.65
Clubs & Hotel	146.65
Industrial	39.63
Medical	31.71
Educational	11.89
Commercial	11.89
Urban irrigation	7.93
Special Townships	45.60
Rural Drinking water	5.50
Agriculture	101.26
Livestock	23.36
	572.06

Table 2: Water uses in the study area for different purposes (unequal and non-priority distribution of water)
Source: Prepared for academic purpose

Maharashtra has the highest number of large dams in the country and is now claimed to be suffering the worst drought in four decades or more.

(Hindu, 2013) writes that at the post-budget press conference, Deputy Chief Minister Ajit Pawar conceded that 70 per cent of the water went to sugarcane cultivation in rural Maharashtra. It further mentions, "As on 31st December, 2012, out of the total sugar production in the country, the share of the Maharashtra was 35.3 per cent." So the drought-prone districts produce more than a quarter of India's sugar. Table 2 shows unequal and non-priority distribution of water in Pune.

It slams the government for not making any attempt to curb either planting of sugarcane or other water-intensive crops or to curb any of the water-intensive activities like running of sugar and wine factories in drought-affected districts.

(SANDRP, How is 2012-13 Maharashtra drought worse than one in 1972?, 2013)blamesGoM, for making wrong decisions about building impracticable and unwanted dams, cropping patterns, unacceptable water management system, diversion of water for non-priority uses leading to reduction in per capita water.

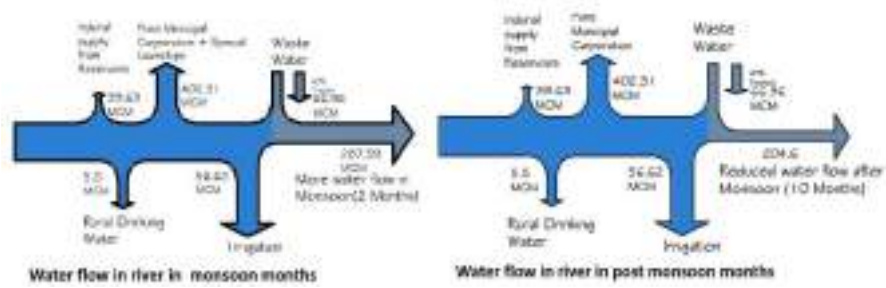


Fig 4: Water flow in the river in monsoon and post monsoon months respectively
Source: Prepared for academic purpose

1.2.4 Efforts of restoration

A river restoration and navigation project is being planned in Pune and before it is formally accepted, it seems that it is receiving special favors from the Pune Municipal Corporation. (Yadvadkar, 2011) Pune massively pollutes its rivers, with more than 744 million liters of sewage generated per day, out of which barely 30% is treated. Rather than focusing strongly on river restoration and pollution control, this project, which is said to receive funds earmarked by JNNURM for river restoration, is focusing more on navigation. The works, which include large scale channelization of the river, seem to be at cross purposes with restoration. (Yadvadkar, 2011)

The state water policy was formed by GoM in 2003 and was revised in 2011. The policy describes the water scenario, challenges and perspectives. Policy framework emphasises on Integrated Water Resource Management (IWRM) along with need for watershed management, ground water management, and aquifer management. The revised policy gives second priority to irrigation after drinking water. (Patil, 2012) Water for environmental purposes is still at fifth place. The policy mentions that dams should allow minimum water flow as environmental flow in the rivers but the minimum water flow is not defined as well as the water rights are not clearly mentioned. The political economy operates the water market in Maharashtra. If water policy is rightly drafted and followed, some of the answers to water scarcity and droughts in Maharashtra can be fetched.

The state of Maharashtra has established MWRRA (Maharashtra Water Resources Regulatory Authority), in 2005 to finalize water tariff for irrigation and non-irrigational water uses with appropriate incentives and penalties. The establishment of such a body is quite creditable as it the first state in India to form such a body which is responsible for monitoring and regulating water resources within the state as well as its trading, allocation and utilisation to maximise efficiency of water use.

Fig 5: Channelization of Mutha River in Pune
Source: Clicked for personal use

1.2.5 Channelization of the river

There are plans of beautifying River Mutha under the River Restoration plan under the JNNURM which supports the river side road project. (IndianExpress, 2011) This is an inspiration from the so called successful Sabarmati Riverfront Development project which has become a hit and is being looked at as a model project for developing the riverfront in any city without giving a closer look to the local needs and context. (ITDP & Embarq, 2012)Several NGOs in the city pointed out that the detailed project report (DPR) does not really focus on restoration of the river, but on preparing a backdoor entry for river navigation and real estate development. (TOI, River restoration plan draws flak, 2011)

'The road construction in the river is violation of several environment norms. In such case, there is no other space for the road. So, instead of dumping mud and rubble, the authorities should construct a raised platform for the road which would allow free flow of water and avoid flooding of the area' (Yadvadkar, 2011)To elaborate more on this, many non-governmental organizations (NGO's) are opposing this idea of the road as it sits within the river bed. Any construction within the river bed is against the River Act of 1958. This would put an end to the natural condition of the river and make the environment more engineered with channelized hard edges (fig 5).

At present, instead of making new policies and governing bodies, collaborative and synchronized working of existing bodies is important. Also the grass root level actions in individual sub basins and water sheds, should lead to basin level priorities.

In the Bhima sub basin, MWRRA is facing opposition from downstream users because of very poor quality of water in the 'Ujjani' reservoir because of untreated sewage from Pune and sub urban areas. As this upstream area is a sugarcane belt, downstream cities likeSolapur are experiencing scarcity of water. The dams located upstream have huge amount of dead storages.

During the survey conducted by SANDRP, it was observed that few hotel managers denied that there is water scarcity in Solapur. This shows that the poor are suffering from water scarcity whereas the wealthy and powerful continue to get water whenever they want, regardless of the quantity. Pune ESR shows that 146 MCM water is diverted to clubhouses and hotels in urban and sub urban areas of Pune which is equal to domestic water requirement of the entire city.

1.3. Conclusions

Water accounting and auditing is extremely important in order to save water by reducing water losses in undesirable sectors and for creating transparency and accountability within the system.

The political economy operates the water market in Maharashtra. If water policy is rightly drafted and followed then some of the answers to water scarcity and droughts in Maharashtra can be fetched.

Some of the strategies to resolve the water crisis are afforestation to reduce runoff and salinity to increase availability of water, recycling of waste water which will reduce demand of freshwater, change in irrigation pattern and use of recycled water, rainwater harvesting in urban areas to increase availability of water and storage of water through precipitation. These strategies are essential to make a change because 'Water is Life'; otherwise water would be the cause of a third world war.

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E3S Web of Conferences (2019)
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Need and proposal of strategies for retaining a city character: Pune Core city

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Abstract: Infrastructure is an important tool in the hands of the government to generate or capitalize on various development opportunities and also to channelize the growth of its cities.
The societal requirements, infrastructural facilities are in a transitional mode where quantitative aspects are in focus. Indian cities, with their ever growing population demand for such interventions in order to tackle the severe problems of pollution, traffic jams and the deteriorating quality of life within them. The city like Pune is also facing rapid urbanisation after 1995 due to establishment of IT, automobile sector. To mitigate this issue the authorities have designed the smart city strategies to provide a better living to cope up with the situations. The smart city concept also includes heritage conservation but these strategies need to be thought in relation with character of the core city. The criteria like FSI, norms for real estate development should be formulated for the core city seperately. The streets in the city and the street side buildings create an impact/character on the observer's mind. These facades remind and reflect the history and lifestyle of that particular native society and the city. This paper strongly states that the concept of 'smart' needs to be thought comprehensively and to be sensitively implemented specially in the core city. This paper aims to focus on the future development of street facades by maintaining the respective regional and architectural characters. The authors suggest some strategies like designing specific norms, design of street scape elements, cultural, heritage preservation methods, application of newer material by keeping old character intact in a city like Pune. This paper discusses the cases of smart cities where designers have implemented smart policies by keeping their regional and cultural value in tact specially in facades. The scope of the study is limited to smart culturally responsive facades for Pune city. This study strongly recommends that the future of the city should be developed with due consideration given to cultural roots. The architecture has to socially sustainable to inspire the next generation as they always learn from past.

1Introduction

Architecture is an expression of culture. The facades give an identity to the buildings & it charactérises a city-scape. It tells stories and influences observer's psychology towards relating the same with lifestyle, values and specific disciplines of the society. The impact of the buildings in the city and surrounding built character, facade and open spaces contribute in giving an identity to the city specially the core city. 'Culture' not only relates with the traditional and historical aspects but also grows through knowledge and experience (Kenney, 1994). Culture, therefore, should be analysed comprehensively not only with the values and needs of a group of people but also with the entire "way of life" of that society.
Architecture of the city plays an important role in creating the bridges between human sociology, psychology, anthropology, appearance, visual expression etc (Shayan, 2011). Therefore, it is important to understand the correlation of behavioural, functional and cultural aspects of the people in the city.
Identity is an aspect which is important in all areas including architecture. The generations of current and future ask the questions like " where do we belong? Who are we? Where are we going?". The answers should be there in a physical environment which includes spaces, buildings, roads and many more. This information is necessary for these generations to develop further with a right and beneficial approach towards the city they live in.

As areas of our towns and cities become increasingly similar, with chain shops and identikit architecture prominent on many urban streets, there is growing recognition that places which retain character and local identity are developing a competitive advantage. The cities be recognised and identified due to these characters. The local authority should be sensitive enough in creating policies, strategies for retaining the city character. There are various cities worldwide like NewYork, London, Paris which have already implemented these kind of norms and regulations for preserving identity of the city. Otherwise there is a possibility of monotonous architectural development in the city which cannot be suitable to the native lifestyle and habits of the society.

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2 Context and Significance of the study

2.1 Context:

The culture of the city is often expressed by language, art & architecture in the city, this especially holds true with the city centre area or the Core City Area of that city.
Core city area is a key element in achieving distinctiveness and citizen attachments and involvements with individual areas is to give them a clear sense of identity. It helps the native society to interpret and understand the essence of the spatial character of cultural spaces. The society can relate their day today activities with a better convenience.
The Pune City has a great historical background from the time of Great King Shivaji & later as the seat of power of the Peshwas from late 17th Century. Peshwa Rulers invited various craftmen & traders & people with specialized skills to Pune & these trades grew & flourished under their patronage. Until 1818, that was when the British conquered the Peshwas & established their rule. Pune also contributed significantly in the India's freedom struggle with different streams of thoughts & concepts emerging from eminent freedom fighters like Gopalkrishna Gokhale, Agarkar & Lokamanya Bal Gangadhar Tilak. During this time the concept of freedom through education was seen in Pune with various prestigious education institutions getting started in the late 19th & early 20th century. It is called as Oxford the East because of this. Post independence Pune saw its rise in mechanical & automobile industries & their administrative offices. A city known for its education, culture & its idyllic lifestyle started changing its face with advent of IT revolution & opening of Indian economy 1991. There was development of industries in IT Sector & automobile Sector because of the availability of skilled man-power in Pune. It became fastest developed city in Asia continent. The real estate & property market also grew and the satellite areas developed around the city.
This development brought an economy which enabled rebuilding the infrastructure of Pune. It influenced the people to migrate Pune due to job opportunities. Currently Pune carries 60% native owned residents population, 25% residents on rent population and 15% floating population from surrounding villages (DP report, 2015). Recently the city is included in smart city mission by Government of India. The metro proposals and work, smart transport stations are in a progressive construction stage. The road widening are reframed and new proposals of roads are incorporated in DP plan. Now Pune is getting identified as a twin city of Mumbai.

In this scenario it is a challenge in front of planners, architects, engineers to cope up with this rapid change and to maintain the city character, identity and qualitative spaces. Smart technologies and strategies also important and has to be designed in relation with essence of a space. The core area of the city includes the peths which are known either by names of the Sardars who established them or by names of Days when they used to hold bazaars. According to the earstwhile "bara Balutedar" system in society various trades & crafts flourished & the "wada" or the mansions were built by the wealthy along with smaller houses. Social & Community related structures like marriage halls, temples of deities were built along with community spaces around them.
With changed times the population density increased These peths need some regulatory framework in case of building structuring, street designing and other allied spaces. Some of the buildings are old and needs to be redeveloped. Therefore, this redevelopment has to be with certain norms which will help in retaining character of the city. As it is cannot be developed with old building material, the application smart facades is important.

Shaniwarwada and surrounding area under fixed radius already contains the norms for heights from corporation authority and heritage conservation department. But there are no clear regulations about façade development, redesign of urban spaces, allied spatial elementary design etc. There are heritage conservation guidelines only for categorized buildings and monumental structures. Therefore, it is a need to think about the future development of core area comprehensively to cope with a urban development and to retain the character of the city.

2.2 Literature Review

A considerable amount of literature has been published on the cultural heritage significance or heritage values.
Various heritage value typologies have been defined by different researchers and organization, including from Burra Charter, Australia ICOMOS, English Heritage, and Malaysian Heritage Act 2005 (Act 645). The typologies may be relevant for particular place or objects, and it differs from one to another.
The ideas of retaining core city character are also thought in some major cities like Ahmedabad, Paris, New York , London etc. The Knowledge of the historical and old buildings needs to be provided in order to create public's recognition of the importance of the historical building's preservation. Most of the public do not have any access to the buildings' background and information so that their emotional attachment to the building can be considered as weak (Galihkusumah, 2010). The suitable environment and cultural roots need to be taught to future generations through region sensitive physical environment. To evaluate a building aesthetically, there are elements of the façade that need to be considered such as colour, the building's material and proportion (Coeterier, 2002). In addition to that Askari and Dola (2009), there are visual elements of façade that affect the image of historical buildings such as architectural style, shape, texture, material, colour, dimension and scale and ornaments of the building. And to evaluate building functionally the aspects like access, visual connection, areas, surrounding side marginal areas, connectivity need to be addressed. The study and analysis of connection of peple or users psychology with the physical environment is important. Products that are the result or a continuation of the behavior and thinking of people in a given society (Shayan, 2011).

The World Bank has also supported cultural heritage in Europe and Central Asia through a variety of activities. A recent review of the operations supported between 1997 and 2006 revealed 17 lending and grant (institutional development fund) operations, most of which focused on physical heritage conservation, with many incorporating a Community Driven Development. Approach (Western Balkans report, 2008). It is very important to involve public participation to spread the awareness and to get efficient result. There are missions or schemes which are runing about developing sustainable urban development. This is possible with consideration of utilisation of old buildings and their character. The identity of the city should remain in tact.

India has already put efforts towards sustainable planning and governance through JnNURM (Jawaharlal Nehru National Urban Renewal Mission, 2005-2014). The program run to implement decentralisation and support urban infrastructure development. The inability is identified to record, and utilise heritage resources as vital elements in urban planning process to achieve sustainable urban development. Therefore, there is a urgency to mainstram concerns of conservation and sustainable development of urban areas.

India cities are in developing stage. It is a right time to propose the policy framework for new developments maintenence work and repairs to old buildings specially in the core city. Also street scape elements adds value to the character of the city, therefore they should also be included under regulatory framework.

3 Methodology

Literature from various contributing fields is considered comprehensively to explain the character, identity, culture of the city. The literature review of previous implemented policies shows a strong affiliation towards retaining the city character. Analysis of Policies and strategies implemented in cities like Ahmedabaad , London to accomodate the change in the urban fabric and yet giving back the city culture to the next generation. This study also follows an observational method and photographic survey of Pune core city areas, existing facades that narrate the historical and cultural background of old Pune The strategies are proposed in consideration with the current Pune municipal corporation (PMC) rules and regulations that accomodate the change in land use.The same are supported by literature références to establish the practicality and possibility in implémentation. This study aims to demonstrate how some of the culturally rich street scapes of Pune city can yet be retained giving the city back to the people.

4 Strategies & Discussions

Considering the change in the urban fabric to accomadate the growing demand of the real estate (FSI), the infrastructural interventions and neglect towards the tangible and intangible characteristics of the city, this paper attempts to list down strategies that could address the concerns of retaining the cultural characteristics which have created a city image in the minds of the people.living or migrating to Pune city. The research limits its study to Steret facdes and the Edge betwen built and unbuilt while proposing the strategies

Street Facades. : The street facade or street-scapes can be considered as an asthetical component of the building which has a direct impact on the human psycology . and reflects the growing economy of the city. However the changed urban form not only rebuilds the city, but changes its relationship with the people. The facades also create an environmental impact due to the use of materilas that are used in the manufacturing of elements to include signboards and displays, enveloping skin of buldings, fenestrations, artificial lumination emphasising on the the built form.

Streets and their sidewalks, the main public places of a city, are its most vital organs (Hartanti & Martokusumo,2012).

Strategies that can be considered for street facades to yet retain the cultural impact.

1. Building facades should narrate the original characteristic of that street , that evolved because of history & culture of that period. While maintaining the harmony of the facade, the functional use of the building can be according to the current need & zoning in the developement Plan of the precinct. Fig 1 shows streetside regional building character at Bhavani Peth, Pune.

Fig 1. Residense at Bhavani Peth, Pune
(Source : Author)

2. Facade elements to include fenestrations, Pillars, Pilasters, door frames, Windows, shading devices that add character can still retain the detailing that was observed in the era in which the building was built. Fig 2.i) Shows the fenestration in facade from Shivaji's era. Fig 2

ii) shows facade style in Peshva era. Fig 3i) explains the building facade character in british era and Fig 3 ii) shows the fenestration of facade at post independence era. Facade and fenestration itself creates a building character, Fig 4 shows the current streetscape and it clearly shows that how much the city is loosing it's own character due to less and insensitive norms and regulations from corpoation in the core city. The language of these different building facades can be retained with different regulations on detailing and facade development specially the elements. The newer material can be adopted to produce a character to a building

i ii

Fig 2 i) Facade development in Shivaji Era
ii) Facade development at Peshva era
(Source : Author)

ii

Fig 3 i) Facade development in British Era
ii) Facade development at post independence era
(Source : Author)

3. Names & Signages at displays/ signboards is primarily a need as it gives an ownership title to the space. Keeping to this functional need it can be included as a fenestration that can solve the purpose and yet maintain uniformity in appearance and thus an asethetically appealling character to the street This can be done adopting vernacular fenestrations. Large signs, in appropriate additions and infill,.. etc, should be removed to highlight the original historic character and enhance the building's aesthetics (Embaby, 2015).

Fig 4 Facade development current stage, Pune core
(Source : Author)

4. Streetscape character generally deals with the appearance and relationship of the exterior features of a city and the design elements of the streets that determine its particular character (Wibisono, 2001).The transition space between the built & unbuilt provides for a pedestrian movement as well as human interactions, this space can thus be enhanced as a continuation of character used in facade in the form street furniture to include benches, water spouts, information kiosks etc. Fig 5. Shows the space between street and building facade is smartly utilised by habitable social spaces.

Fig 5 Edge between built and unbuilt, Satellite area, Pune
(Source : Author)

5. With of change of lifestyle, provision of services to include the advancement of technology an essential component to be incorporated. This can be achieved by integrating facade elements to provide and reach the services at the required places aesthetically.

6. Colour, texture, form of materials lend a visual language & pattern to a building facade. The design, position, quantity, quality and type of street surfaces and furniture can assist in attracting people to public spaces. Selective lighting, paved footpaths, vegetation, seating and other public amenities can add to the ambience

and character of a place (Embaby,2015). The change in the use of these materials has been observed due to reduced availability of the appropriate quality of resources and skill set of labour. However same laungauge can be achieved in the newer materials by changing the surface treatments to replicate materials used in that era. This can provide sustainable maintenance free & cost effiecient, aesthetically apealing character to fenestration detailing there by reviving the character of the city.

5. Conclusion

With rapid urbanisation & change in the urban fabric of the city the historic & cuoltural character of the city takes a backseat while newer rules and regulations accomodate the demand of the growing population. There seems a need for giving importance to architectural componants of the built which can help in retaining the historic & cultural background of the city. This paper demonstrates strategies of street facades that can be implemented by integrating them with prevailing development & conservation policies by the regulatory authority.

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PERMANENCE IN ARCHITECTURE:

CONTEXT AND TIME

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Abstract
An expression of art or craft diminishes with changing philosophy over time, but an architectural expression tends to remain. The built form eventually becomes one of the very few representations of previous civilizations that have stood the test of time. Centuries old buildings have lasted, although they were not specifically designed for timelessness. The act of building is not a temporal one, each one is a representation of its time. The quality of remaining unchanged indefinitely or permanence in architecture can be achieved with the use of enduring construction material and sympathetic regard for the surroundings. Buildings outlive generations and as such need to be resourcefully designed to continue to be effective. A conscious use of the local materials, the local technical skills has allowed these buildings to harmonize with the context. Born of the earth, each of these speaks the language of the people and of the place. On the contrary, in Indian urban centers, a large quantum of the architectural expression today is ignorant of its place and time. There is a diminishing reverence to what the place demands and more attention to what we demand of it. This paper explores the connections between a building's context and time to its longevity. It argues that concentrated efforts made towards rootedness to a place and relevance to its time, will lead to significantly bolstering a building's perseverance. It also enquires into longevity through examples spanning different contexts and times. Significant examples of historic buildings of a place are discussed in comparison with contemporary examples of similar locations. Such a comparison will lead to an understanding of ways of adapting traditional knowledge to current needs and their appropriation to the time. The paper seeks to emphasize the importance of contextuality and close connect to time, in extending the life of a building.
Keywords: Context, Indian architecture, longevity, time, traditional, local materials

1. Introduction

India is a country of diversity with vast variation of terrain that affects the culture. Five thousand-year-old epics *Mahabharata* and *Ramayana*, ancient scriptures like the *veda* form a part of the culture. The text of *Vastushastra* explained in the *Atharva-veda* elucidates the design of buildings with respect to the wind direction and sun path, which are the primary concerns of design today. Indus valley was home to one of the oldest civilisations with a mature architectural expression.

Indian architecture has been affected by different religions, settling down of many dynasties of varying origins and migration of different races into the subcontinent. The architecture of each of these is unique. For example, the Buddhists carved out meditation spaces into the mountains for solitude while Hindu temples catered to communal gathering by building *mandapas,* gathering halls, in front of the *garbhagriha*, sanctum. Although each culture had its own strong expression, use of local material, craftsmen and workmanship led to a development of a different style than its origin. As explicitly seen in the case of Indo-saracenic architecture; Persian influenced Mughal buildings in India incorporated indigenous styles which led to a whole new style of architecture, seen across the breadth of the Mughal empire. All dominant civilizations, dynasties wanted to leave behind their mark of power through an awe-inspiring built form. In doing so, they intuitively presumed that their buildings will last forever, would be timeless, leaving an indelible mark on the history of that land. This is not unique for India but has also proliferated in other parts of the world. These historical landmarks have helped us trace back the development over centuries, forming "the great book of the human race. Man's chief means of expressing the various stages of his development whether physical or mental", as stated by Victor Hugo.

An enduring architectural legacy has been created by various influential civilizations in different parts of the world. One such example is that of the Pantheon in Rome, built in 150 AD. The cylindrical form is not only stable but is also representative of the significant advances in building technology at that time. Pozzolana concrete, an innovative Roman building material, made the large scale of the dome possible. Other prominent examples include the Bibliothèque Sainte-Geneviève, Paris built in 1842 AD by Henri Labrouste, uses cast iron columns and arches to support the structure of the building; relieving the massiveness of its exterior aesthetics. The

temple complex at Angkor Wat, Cambodia, 1113 AD, made in sandstone and laterite represents a building tradition that spanned over five centuries and has been in continuous use since its construction. Timelessness may not have been the primary purpose behind erecting these structures, however they have thrived, making us question the approach taken towards their design. This may not be solely attributed to the building technology as there may have been other influencing factors that need to be analyzed.

The inception of a design is a combined response to its culture, socio-political aspects, climate, topography, etc., in which a response to its time is intrinsic. While the mighty Taj Mahal, 1632 AD, portrays dignity, status and power; Ashwini Kumar Crematorium at Surat, 1999 characterizes the culture and social practices of modern times. Each architectural expression depicts the time in which it was conceived. Contrary to this, it can be observed that in few urban centres of India, there is an ignorance towards the immediate surroundings and the current scenario while pursuing a borrowed image from other cultures. This has led to glass based facades becoming common place. Although, such an external treatment may be suitable in a cooler climate, a tropical country like India demands heat loss rather than heat gain. Direct radiation on these surfaces increases the cooling loads and thereby increasing the consumption of energy to counter it. A building inspired by traditional approaches would respond more effectively in cutting out the harsh weather and creating a comfortable condition inside. “After the Medieval age, the Indian style of architecture that was geographically relevant and that made use of locally available materials started to wane. The art and technique of construction faded away. But still in some states and regions, traditions of good and meaningful architecture are alive.” (Singh & Warkhandkar, 2003).

Image 1: Last rites being performed on the ghats of Banaras

Image 2: Ashwini Kumar Crematorium, Surat, 1999 by Gurjit Singh Matharoo

The term sustainability has been recently coined but the thought behind it has been passed down as a responsibility since the very beginning. In India, an awareness of one’s immediate surroundings and acting in accordance with that has been inculcated as part of our *sanskar,* traditional values. It is considered a good practice to take into account the implications of the local context, material and craftsmanship such that the building is of its time and place. This consideration could lead to a longer life for the building, enabling it to overcome various hurdles. Merging these forces of creating the global image while deliberating on traditional ways, we are endeavoring for the longevity of architecture. This can be demonstrated through certain contemporary architectural interventions that have adapted the traditional knowledge for the needs of their time. This attempt could be a way towards self-realization in the modern context of India.

Image 3: Rudabai Stepwell, Adalaj, 1499 showing multi-layered interactive spaces in the traditional water structure of Gujarat

Image 4: Tata Consultancy Services, Gandhinagar, 2012 by Snehal Shah showing inspiration from the traditional stepwells of Gujarat (Beck & Cooper, 2014)

2. The Genesis

This section discusses the formation of an idea on the longevity of buildings. The theory of architecture has witnessed many concepts pertaining to regionalism, contextualism and so on with the interest of creating an appropriate architecture. Taking this thought forward, such a solution would also be suited for its time and extend its life. There are many factors that affect the design strategies of a building, two of these critical factors have been considered as paramount: Context and Time.

2.1. Significance of Context

Visvakarma Vastushastra, an ancient Hindu text, written in 2nd century BC is an Indian science that helps one to design in harmony with the five basic elements of nature, which are wind, water, earth, fire and sky. All the Hindu temples were built based on the knowledge explained in the *Vastushastra.* These five elements comprise the essence of the context in architecture. The use of context as a major guiding force in design has been a part of the traditional science.

A work never exists in isolation; there is always a context in which it is situated and with which a relationship is established. While a context can be measurable, it is also malleable. (Simitch & Warke, 2014) Architecture is always a part of a context, while itself forming a context. It is dependent on context, but at the same time transforms and interprets it. (Janson & Tigges, 2014) One has the flexibility to interpret the context while addressing the most demanding issues in any project. For every act of building its context can be distinguished into two categories – Physical and Meta-physical. A set of existing characteristics of the place forms the physical context of a building. These may be broadly identified as the topography and surroundings, material and climate. Certain characteristics may not be easy to perceive and may be a part of the spirit of the place. Although ephemeral in nature, these metaphysical aspects are representative of the socio-cultural and traditional character of the society. In some cases, the physical aspects may emerge as dominant while, in the other the metaphysical may take precedence.

2.1.1. Physical Context

Topography and Surroundings: While architecture follows general principles of architectural order or of an architectural type, it is also subject through context to the special features of the topography and the condition of a place. (Janson & Tigges, 2014) Topography is a predominant factor while placing any building on the site. All the factors that delineate the periphery of the site, on which the building is placed, also contribute towards its context, whether man made like existing structures, retaining walls or natural like trees, boulders and water bodies. Surroundings vary greatly depending on the location, be it in the middle of the city i.e. inserted in a pre-existing dense fabric or in the open fields with views from the site or towards the site. A highly innovative architect, Nari Gandhi, worked on Frank Lloyd Wright's ideology of organic architecture. He responded strongly to the landscape and site contours, harmoniously merging his projects with their surroundings.

Image 5: Madh Island House, Mumbai, 1993 by Nari Gandhi

Image 6: Jain Bungalow, Lonavala, 1992 by Nari Gandhi

Material: The scarcity of materials, their use and handling through observation and experience is a rare remnant of continuity with the past. It is a delight today to become aware of the diligence, care and ingenuity of the ancients in the ways they went about using materials. Materials and their use express the character, the attitude towards eternity, and the love of nature, other people and the 'good'. (Antoniades, 1992) The buildings in the vicinity, particularly the vernacular structures, enable one to identify the local material palette. These materials are a part of the ecology and climate of the locale. They may be sourced from the surrounding forests, a nearby quarries or the excavated soil from the site itself.

It would be a mistake, however, to consider the nature of materials as being permanent and unchangeable. An understanding of the behaviors of materials not only plays an important part in protecting the integrity of a construction and ensuring the quality of life of those within, but it can also contribute significantly to the aesthetic qualities of a building. (Simitch & Warke, 2014) A self-taught Indian architect, Didi Contractor, pays great respect towards vernacular traditions and actively adapts them for contemporary sustainability. Her houses built using local materials like mud, slate, river stones are constructed as a tribute to the natural surroundings.

Image 7: Adobe and bamboo at Dharmalaya Institute, Himachal Pradesh, 2012 by Didi Contractor

Image 8: Local slate, adobe and bamboo in Sambhaavnaa Institute, Himachal Pradesh, 2000 by Didi Contractor

Climate: The primary considerations for the weather of a place are the effects of the sun, wind, light and rain. The intensity of the sun and the direction of the wind guide the design strategies. Charles Correa, an eminent Indian architect who had a contextual approach, once said "Form follows climate - to build in India, is to respond to climate, as it has never been possible to squander the kind of money and energy necessary to air-condition a building under the tropical sun." Climate is not static, it is constantly evolving and this must be engaged by any building, allowing it adapt to these changes. At the same time, one must not overlook the possibilities of an extreme variation in the climate, such as floods, earthquakes, etc. Adaptation to the climate may be expressed through various elements within the building such as the orientation, volume, fenestration pattern, wall thickness, wind towers, clearstory windows, etc. Two prominent elements are the brise-soleil or *jaali*s and the characteristic courtyards. A modular kindergarten design in South India employs terracotta jaalis as a perforated external building skin. They facilitate adequate cross ventilation and cut down the harsh western sun. Traditional houses in the arid region of western India typically have a small open to sky internal courtyard that connects these narrow houses with the outdoors, allowing natural light to stream in while drawing out the hot air.

Image 9: DPS Kindergarten School, Bangalore, 2012 by Khosla Associates (Picture Credits: Shamanth Patil J.)

Image 10: Courtyard in Jagatbhai Mehta House, Ahmedabad, built in 19th C and renovated in 2004 (Picture Credits: Nishant Mehta)

2.1.2. Metaphysical Context

Socio-culture: The immeasurable factors that strongly root a project into its surroundings are the lifestyles, customs, and values that characterize the society. It may also include a physical representation in the form of symbols, forms, aesthetics, material culture, and attitudes. Civilizations are known to have their own unique architectural form which is guided by the historically predominant cultural values of the people and their social makeup. On a larger scale, context means the network of interrelationships between the points of reference and public spaces and buildings taken into consideration by urban planning, which also reflect the historic context. (Janson & Tigges, 2014). Different dwelling typologies are driven by forces that give them identifiable characteristics. One such example is that of a traditional Maharashtrian *wada,* Holkar wada in Chandwad. The *wada* within is a large structure with two courtyards, the first internal courtyard is surrounded by the offices, thus a more public space. While the second internal courtyard is adjacent to the kitchen, to maintain the privacy of the women who perform household activities in it. (Raje-Gupta, 2007)

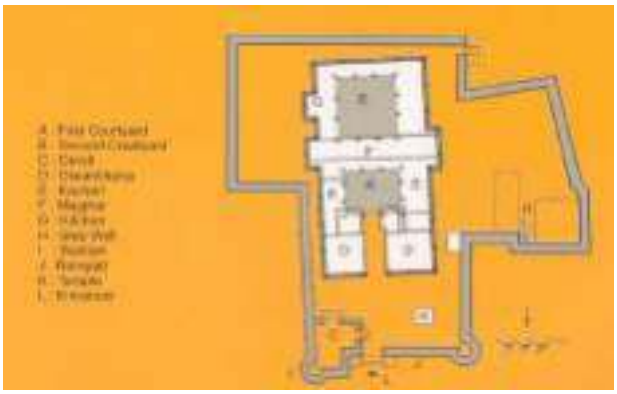

Image 11: Holkar wada, Chandwad, 1760 – Traditional Maharashtrian house form, India (Raje-Gupta, 2007)

Image 12: View of internal courtyard in Holkar wada, Chandwad, 1760

Tradition: It may be defined as an inherited pattern of thought, action or behavior such as a religious practice or a social custom. An adherence to past practices of construction techniques and styles has governed many historical buildings, giving them some similarities. A continuation of these practices in today's scenario may have a different representation while maintaining the language. Certain building elements that have been a prominent part of traditional architecture of a place may now be carried forward with a variation in their form. For example, a perforated screen or *jaali* was a common feature in the dynastic society where women had their own private chambers, creating a visual barrier while allowing the cool breeze to compliment the harsh weather. These screens are still commonly used in various built forms as a response to the climate of that region.

Image 13: Intricate jaali patterns in Mehrangarh fort, Jodhpur, 1460

Image 14: Raas Boutique Hotel, Jodhpur, 2011 by Studio Lotus

2.2. Significance of Time

"Jatasya hi dhruvomrutyur dhrubvam janma mrutasya ch" For one who has taken his birth, death is certain; and for one who is dead, birth is certain.

Linear time is an invention of the West. (Unwin , 2015) Time in the Indian psyche is a cyclic phenomenon. The faith in reincarnation, the cycle of birth, death and rebirth, the unending chain of construction, destruction and reconstruction, all reaffirm the belief in the recurrence of time. However, although cyclic, time is not static. It is helical, evolving continuously. The process of Evolution is not a linear continuity but acts as a helix or a spiral with a still center and a dynamic periphery. (Pandya, 2005) This interpretation of time can be understood with the reference of architecture, wherein, the context is its static center and the changes that occur in the architecture of a place over time, is its dynamic periphery. The essence of the place has to be retained, whether physical or cultural or experiential; while the tools of expression may change with the evolution in technology, material, skills etc. through time. This research interprets time for architecture as a reflection of the past and present, 'of its time' with the subconscious consideration for the future 'for a long time'.

2.2.1. Reflection of the Past and Present - 'of its time'

Any architectural expression is a static form denoting one point in the helical progression. However, at all points every expression needs to have a strong connection with the center i.e. with the essence of the place that it is built in. Advancements in technology and material knowledge should be taken conscientiously and applied only where appropriate. A contemporary Indian architect, Snehal Shah, also believes in making architecture that is 'of its time', as stated in a Gujarati proverb "*vakhat evu vagu"*. History confirms that buildings appropriate to their time, place and climate, endure. (Beck & Cooper, 2014) This is clearly seen in the stepwells commonly found in the western hot and arid parts of India. Scarcity of water led to the making of the stepwells, multistorey subterranean structure to fetch water. Collecting water for domestic, religious and irrigation purposes was a routine and stepwells were made into elaborate structures for the purpose of socializing, interacting and to make the journey relaxing. In the traditional houses of Rajasthan, a desert state, the social set up demands an increased privacy for the women of the house such that, they always cover their face with a veil. An architectural interpretation of the same can be seen on the façade of the house, in the form of a *jharokha,* a sit out with a *jaali*. This allows the visual connect without compromising their privacy while at the same time cooling the breeze as it enters through the small openings. Although the social constraints about privacy are evolving, the *jharokhas* still remain appropriate as a defense against the desert like climate.

2.2.2. Consideration for the Future - 'for a long time'

The quality of timelessness or permanence can be instilled into an architectural expression, through its connection to the static centre, context, of the helical path of progressing time. With the progression in time, the physical and metaphysical contexts are also continuously evolving. The architectural manifestation of this evolution thus becomes a unique response to that moment in time; encapsulating the needs and the knowledge of that time. If a building functions well for that time and in its place, then even with the change in function it can be easily adaptable. Repetition of certain elements in the building, that are culturally and climatically appropriate, lend a building this ease of use. "When we compare our perception of works from various epochs, meanwhile, the relationship between permanence and change becomes visible. Registered in the face of continuously changing styles, forms, materials and methods of construction are ever-recurring spatial configurations, which have stood the test of time." (Janson & Tigges, 2014)

3. Architectural Interventions

An increasing need to develop an architectural language that is appropriate to its place, has generated a strong interest in the traditional architecture. Learnings from the past have guided the reflections of the present. The showcased examples are divided into two categories of Traditional architecture and Contemporary architecture. Building examples from the past show the aspects that need to be assimilated from history. Efforts to adapt these learnings into the present time are seen through the contemporary examples.

3.1. Learnings from History: Traditional Architecture

History teaches us the ways in which various layers of society with respect to culture, social construct, use of technology and material, and climate, etc. have reflected in to the architectural form. Representative examples from distinct regions of the country have been elaborated below.

3.1.1. Bhunga Houses, Banni, Kutchh

Kutchh is located in the desert district of Gujarat, subject to harsh climate and meagre rainfall and is susceptible to earthquakes. The traditional house has evolved in the villages over centuries as a response to these extreme conditions in addition to cyclonic winds and sand-storms. The house is divided into cylindrical free-standing structures capped by a timber trussed thatch roof, called *bhungas*. The roof construction may be intricately detailed or plain. A single-family household may consist of multiple *bhungas* connected to each other with a raised plinth. The cylindrical form is efficient against the earthquake forces and has outlived many modern structures.

The desert landscape has an abundance of mud which is essentially used as a primary construction material. Thick, sun-dried mud block walls provide a protective layer against the high temperature outside. Plastered with mud and cow-dung, the walls remain cool in spite of the intense radiant heat. These *bhungas*, three to five metres in diameter, form the main living space, and the rectangular *choki* is used for cooking, storage and washing. (Kagal, 1986) Wall decorations of clay and mirrors add to the rich ambience and gives the individual *bhungas* an identity.

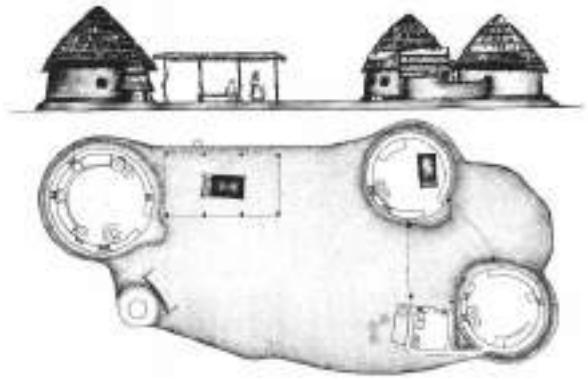

Image 15: Drawing of a typical Bhunga house with a raised platform and covered outdoor activity area (Kagal, 1986)

Image 16: Sloping timber roof of a bhunga covered with thatch and ornamented walls

3.1.2. Padmanabhapuram Palace, Thiruvananthapuram, 1744 AD

Thiruvananthapuram is the capital city of tropical Kerala, located in southern India, it has a hot and humid climate. Two annual monsoons have led to sweeping roof lines with open gables for ventilation. Use of timber is the most developed building craft in Kerala with supremely elegant detailing. The ruling dynasty built Padmanabhapuram palace as their private residence whose design is influenced by the matriarchal system leading to the delicacy.

Buildings in this complex display tiled roofs and timber balconies that have continuous openings. The openings, shaded with deep eaves were filled with movable wooden louvres that could be adjusted with accordance to the tropical climate, blocking out the gushing monsoon rain. The rosewood beams hold up the pyramidal roofs while the lustrous black floors are made up of a combination of egg white, jaggery, lime, burnt coconut husk, charcoal and river sand, so bright as to mirror the surroundings. The entire palace complex derives its architectural orientation from the principles of *vastupurush mandala* with the mother palace being the focal point. (Grover, 2004)

Image 17: Steep sloping tiled roofs with deep eaves covering the verandahs

Image 18: Carved wooden roof beams and louvered openings next to the built-in seating

3.1.3. Vishweshwara Mahadeva Temple, Mahuli, 1735 AD

In west-central India, the rocky Deccan plateau consists of flat-lying volcanic basalt stone which was quarried and traditionally used for the construction of forts, temples, lower storey of *wadas,* bastions, etc. One prominent temple of this region is a heptagonal temple located slightly outside the city of Satara, along the confluence of the rivers Krishna and Venna.

Built entirely in basalt, this temple is enclosed in a paved courtyard and has cloisters of cells built in stone arches and domes. The local character is seen in the flights of steps leading to the temple, and the *ghats* that descend down to the river. Arcades, built in the dark-grey stone, break the monotony of the steps of the *ghats* and create occasional terraces. The arched cloisters around the temple served as ancillary spaces for the activities like garland making, preparation of offerings, chanting mantras etc and moreover as resting spaces for travelers.

Image 19: Steps of ghats descending towards the confluence

Image 20: Arched cloisters forming the periphery of the central paved courtyard of the temple complex

3.2. Reflection into the Present: Contemporary Architecture

Taking inspiration from the past, certain elements or space making principles of building can be readapted for the current needs and not blindly replicated. With time, the architectural style keeps evolving but is always rooted to the place with its climate, cultural values and social structure. A meaningful engagement with the traditional architecture could inspire new designs and provide a point of reference.

3.2.1. Khamir Craft Facility, Bhuj, 2007 by Neelkanth Chhaya

Khamir, meaning 'intrinsic pride' in the local language Kachchhi, is an artisan village to promote the local art and craft heritage. Owing to the fragile ecology of the arid region, any building intervention must tread lightly while respecting the traditional spatial typologies. The complex has been strongly rooted by using regionally appropriate materials. The design makes the buildings permeable to the surroundings while also addressing the social complexities of the locale. This holistic approach has reinforced the region's identity as a rich art and craft resource and also re-instilled pride in the people.

Using a modular plan, the layout of the buildings was optimized to account for the seismic loads. Similarly, heavier materials at the base and lighter on the upper storey reduces the movement of the structure. On the ground floor, the construction is of rammed earth, and on the first-floor walls were made with wattle & daub

panels. These lime-plastered in-fill panels have a wooden framework between light-weight steel columns that extend up to the roof. Neelkanth Chhaya says, “Orientation and configuration are taken into account along with appropriate breeze flow, reduction of thermal radiation exposure and creation of effective daylight conditions.” Stout plinths of random rubble masonry connect individual buildings, not unlike the traditional *bhunga* dwellings. Cool interior spaces are aided by the polished black flooring, dimming the incidence of light inside. Orthogonal plans clustered around small open courts, encourage movement along the diagonal, recreating the winding patterns of the traditional villages. A spatial sequence of harsh outdoors, to narrow shaded streets and courtyards, to covered verandahs leading to the cool and comfortable interiors, echoes familiarity. Encapsulating the spirit of the region, the spaces and experiences reference the everyday memories and preserve the culture.

Image 21: Raised plinth connects the spaces; sloping roofs shade the top storey (Hunnarshala, 2001)

Image 22:Rammed earth walls raised on a stone plinth, wattle and daub panels on the upper floor (Hunnarshala, 2001)

3.2.2. Loyola Chapel and Auditorium, Thiruvananthapuram, 1971 by Laurie Baker

Situated in the grounds of a college, is an interesting interlinking of the two volumes under a single roof, an auditorium and a chapel. The 1000-seater auditorium, a large uninterrupted space, challenged the architect’s skills of creating low cost structures. Avoiding the use of steel and reinforced concrete, Baker chose to use load-bearing walls and a timber roof frame with asbestos-sheet roofing, which proved to be an economical solution. The use of cross-braced cavity walls addressed the issue of ventilation in a tropical climate, while perforated brickwork near the altar brings in light poetically. (Mehrotra , 2011)

The chapel space is lit with indirect light from above, giving it a spiritual existence, whereas the auditorium is lit from both the sides with brick *jaalis* or perforated screens. The architect believed that, proper development can be done if raw material is brought from a place within a few kilometers of the site. With a strong belief in the vernacular knowledge and understanding of the climate, he drew creative sustenance from his surroundings. The forgotten vernacular techniques were used in his designs.

Image 23: Brick cavity walls with jaalis and wooden framed roof (Mehrotra , 2011)

3.2.3. Tata Institute for Social Sciences, Tuljapur, 2004 by Rahul Mehrotra

Located in the hinterland of Maharashtra, this institute visually replicates the local material palette. Basalt, the local stone, is extensively used in most traditional built forms of the region. Responding to the locale, the building is designed as a series of clusters around courtyards, similar to traditional patterns in the region. An appropriate response to the climate of this rural setting is created by providing a variety of open and covered spaces, which

facilitate social communication and are multi-functional. The courtyards and terraces serve as interactive spaces on cool weather days.
The use of appropriate building materials was explored; the buildings were built using local stone for load bearing walls and an inexpensive and innovative ferro-cement vault for the roofing system. In addition, wind towers were introduced in all buildings to integrate passive cooling for the interior spaces. (RMA, 2004). In the architect's words, "The idea is to combine materials, to juxtapose conventional craftsmanship with industrial materials and traditional spatial arrangements with contemporary space organization. In short, to give expression to the multiple worlds, pluralism and dualities that so vividly characterize the Asian landscape." (Mehrotra, 2007)

Image 24: Exterior view showing wind towers (Picture credits: RMA website)

Image 25:Courtyard used as a point of access within the building complex (Picture credits: RMA website)

3.3. Progression Through Centuries:

Looking at the wide vista of architectural form, through the centuries and across the dynasties, a recurrence of certain elements can be observed. Built in different times, each building had a history to look back at and use as a reference. Thus, drawing inspiration and applying it to its own current context. Local climate conditions and available material remained fairly constant while the culture and needs were continuously evolving.
In the rich architectural heritage of northern India, a consistent use of red sandstone is evident. Right from the first Muslim invasion, there is an extensive use of the local material in their religious structures; Quwwat-ul-Islam mosque, 1193 AD. A stepwell also built in the same material, Agrasen ki baoli, 10th c, rebuilt in 14th C is a subterranean structure made as a device to draw water and also serves as a respite from the hot summer months. The wide spread capital complex of the ruling king Akbar, Fatehpur Sikri, 1569 AD had different building types all designed in red sandstone. The political centre of the Mughal state draws its name from the stone, Red Fort, 1639 AD and the current political centre of democratic India, Parliament House, 1921, is also grounded by the same. A new building in the same complex as Parliament House, the Parliament Library, 2003, is both visually and symbolically linked to the heritage building. More recent works in the region still use the same material, albeit in different manners, irrespective of the primary function of the building- Tata Consultancy Services, Noida, 2007-08 by Mario Botta and Lebua Resorts Devi Ratan Hotel, Jaipur, 2010 by Urban Studio. This can be credited to the strong influence of the climate and the local context.

Image 26: Progression through time; (L-R) Quwwat-ul-Islam Mosque (1193), Agrasen ki baoli (10th C), Fatehpur Sikri (1569), Red Fort, (1639)

Image 27: Progression through time; (L-R) Parliament House (1921), Parliament Library (2003), TCS, Noida (2008), Lebua Resorts (2010)

4. Conclusion

The examples discussed here, display a deep-rooted respect towards the traditional techniques and knowledge. Certain building forms and uses of materials were developed because the people understood the climate and how their cultural construct, reshapes their spaces. As seen through the progression of buildings in different centuries, a response to the climate is a constant concern and goes along with the response to the immediate needs and functions, with an underlay of the socio-cultural aspects of that time. Traditional examples of architecture are the inspiration for the contemporary examples, which show an evolved expression through time. To create a meaningful interpretation in the current scenario, architects would need to first have a clear understanding of these various layers working in unison. The strict rules of climate responsive architecture make a building workable, but it becomes welcoming and habitable when softened by a sensitive approach towards the culture and traditions. This attracts an association and instills a sense of belonging amongst its inhabitants. Thus, affirming its place as a re-appropriation and leading to a tendency in the people to preserve the built form for a longer period of time.

History has many examples of monumental load bearing buildings that cannot be replicated in the same way today. In the vast landscape of India, there are a few prominent heritage communities like Ahmedabad, Kolkata, Gwalior, Chennai, etc. that have a dominant architectural language and expression that subconsciously forms the context for newer buildings. We need to design taking learnings from historical examples for today's context by re-appropriating traditions into modern ways of building. Learning from traditions does not only mean imitating its physical form and attributes, but also to get inspired and reflect it into the essence, play of masses, sequence of spaces, etc. Daniel Libeskind summarizes this thought process by saying, "to provide meaningful architecture is not to parody history, but to articulate it."

Primary components like space and place making, with a consideration towards local traditions, reflect the regional attitude through elements that are continually seen in the local architecture. This is not pertaining to a certain region or a certain country, it is applicable to any place at any given point in time. Modern-day design process should incorporate this attitude, along with a sympathetic regard towards the physical and meta-physical aspects of the context. Respect for nature's ways and an understanding of the surroundings has been embedded into our everyday activities and in our psyche. It formed a part of the Indian value system, *sanskar*. Continuing with these values, contemporary architecture should speak of its time, while being anchored to its place, the core of spirally evolving time. As Yatin Pandya says, "the concept of change is inexorably tied to the concept of time". As we evolve, so should our buildings.

Dwindling resources have driven us towards more efficient solutions. There are various ways to achieve this, which all ultimately address the indispensable concerns of the context and its evolution with time. Permanence can be instilled into architectural solutions through careful thought towards these aspects. Longevity of buildings can cater to the multiple pressing concerns of space efficiency, multiple users and changing functions. At a time when things are more temporary than before, permanence of our structures can form the physical anchors of society.

"Karmanye va dhikaraste ma faleshu kadachana, ma karmafala heturbhur ma te sango stva karmani"
Shri Krishna said to Arjuna: you have a right to perform your prescribed duty, but you are not entitled to the fruits of action. Never consider yourself the cause of the results of your activities, and never be attached to not doing your duty. (Chapter 2 verse 47, 400-300 BC) (Bhaktivedanta Swami Prabhupada, 2005)

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Dimensions of water scarcity: A tussle between supply and demand

Ar. Sharduli T Joshi

Abstract— Fifty years ago, the population of the world was almost half than today. Fewer calories were consumed, less meat consumption, and thus less water was required to produce food. There was limited pressure imposed on the environment and hence water consumption was also in control.

Today the struggle for scarce water resources in many places is unavoidable. Many river basins are unable to fulfill all the demands of water even for their rivers to reach the sea. Further extraction of water for human use is not possible because limits have been reached and in many cases breached. Basins are effectively "closed," with no possibility of using more water. The lack of water is thus a cause of worry to produce food for hundreds of millions of people.

When any region suffers from water crowding and have increasing water demands, its first and common most reaction is to tap more water from surface as well as ground by building new hydraulic projects or increase capacity of existing ones.

And so the tussle between supply and demand begins. The objective of the paper is to shed light on driving forces of water scarcity, avoidable and unavoidable aspects, and immediate responses like developing water resources, reallocation between different sectors, conserving water resources, short and long term consequences of the same with respect to developing country like India. The paper will conclude with analysis of demand and supply of water with respect to Indian context and propose strategies for sustainable management of water resources.

Index Terms—Water supply, water demand, water crowding, reallocation, sustainable management

I. Introduction

The struggle for scarce water resources in many countries today including India is inevitable. Many river basins around the world are unable to fulfill all the demands of water even for their own rivers to reach the sea. Further extraction of water for human use is not possible because limits have been reached and in many cases breached. Several river basins are effectively "closed," with no possibility of using more water. The shortage of water is thus a cause of concern for production of food for hundreds of millions of people. Greater competition raises questions between states, countries as well as regions over allocation of water, which is benefited, between those upstream and those downstream.

Also, human beings are not the only ones who are using available water for themselves. The aquatic and terrestrial ecosystems are also dependent on fresh water for living. Ecosystem services are fragile and are vanishing due to the way in which we grow food. The climate is changing, affecting every aspect of neighborhoods, economies and ecological systems. The trend lines shout out that we are not doing the right things. Inequity in the benefits of water use will increase between haves and have-nots to the loss of food production. The pollution and depletion of rivers and groundwater will continue. Also, abundant food grown at the aggregate global level does not mean there is enough food for everyone.

(Molden D., 2007) defined 'physical water scarcity' in regions lacking adequate water to fulfil its demands, specified by circumstances as the amount of water used compared to the available water resource ratio surpasses 70%.

(Molden D., 2007) defines two types of water stresses which are as follows:

"Demand-driven water stress: when there is a high usage compared to the availability of water". (Molden D., 2007). In this situation open basins can accommodate more structures to tap utilizable flows to address increasing demand but after a certain point, a time comes when no more utilizable flow is left in the river basin i.e when the basin is set to be closed. Inspite of this, in many cases of closed river basins over allocation, exploitation continues and the water depletion exceeds the utilizable flow which leads to a potentially unsustainable situation

"Population-driven water shortage: when there are many people dependent on the availability of water". (Molden D., 2007) The rise in population directly affects the consumption of water. This is because even if the demand is incresing the amount of water available naturally does not change but infact goes on reducing day by day. Also, the amount of rainfall received fairly remains the same each year thereby delpeting the water resources with increased consumption. One of the main cause of population explosion is pollution of rivers and lakes which alsoleads to water scarcity.

The management of river basins is going to be more difficult as these basins are moving towards higher form of water crowding. Well defined water policies, water rights, management and governance are required to deal with these closed or closing basins.

II. Driving Forces

According to Figure 1, the driving forces of water scarcity (being the "imbalance between water supply and water demand") comprises of mainly population growth, migration, land use changes, climate change, and changes in economic activities leading to changes in societal needs. These are significant drivers, which exert direct stress by altering water

availability (rainfall, evaporation, evapotranspiration, etc.) or indirectly by upgrading production patterns, changing consumption patterns on water resources, ultimately affect the aquatic environment. (Strosser P., et.al., 2012)

Land use change in the agricultural sector is one of the foremost drivers in water deficit areas. Its share can reach up to 85% of water use as a result of the high dependence on irrigation. Due to the current advanced research and development in the sector of irrigation techniques, effective fertilizers and insecticides, improved seed varieties etc., development of irrigated areas have increased extensively. This expansion in irrigated areas is the reason for series of adverse environmental impacts, viz. over-pumping of fragile aquifers, water logging and increased soil salinity.

Indeed, a WWF and SEO/ Birdlife (2010) study highlighted that the level of subsidies allocated to the agricultural sector in a region is inversely correlated to its environmental situation (in terms of overexploitation of aquifers or nitrate and phosphate pollution originating from agricultural practices), as innovation, motivation and subsidies are given to farmers to use fertilizers and pesticides to increase agricultural produce that imposes higher pressures on the environment. (Strosser P., et.al., 2012)

Along with these, people expect more water for their daily needs like drinking, food production, recreation and aesthetics. There are political as well as other pressures with societal demands, and hydraulic development is at the prime importance of the political agenda. (Falenmark M, Molden D., 2008)

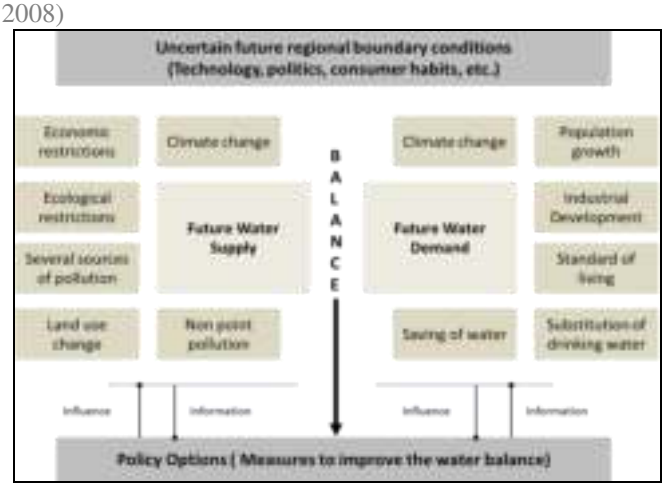

Figure 1: Driving forces of water supply and demand
Source: (Mall R.K, Gupta A., 2006)

A. *Avoidable and unavoidable*

Many of the drivers mentioned above with respect to water crowding are sometimes very tough to avoid. The priorities of developing countries like India are water development for poverty reduction, water for drinking and other purposes, hygiene and health, industrial expansion which is considered to be income and employment generator, also for food production as developing countries need to be self-sufficient and reduce import of food from other countries. To a certain extent neither we can avoid climate change nor control precipitation, discharge or runoff hence. This may lead to increase in the speed of the phenomenon of closure in regions with less rainfall where climate is becoming dry year by year.

Some of these driving forces can certainly be avoided with appropriate planning. Several decisions responsible for over tapping and over building in river basins, supporting extensive use of water due to unsustainable and unfair distribution, highlighted by (Molle F., 2006) are possible to be moderated. (Falenmark M, Molden D., 2008)

III. Consequences

Some of the reasons of acute water scarcity are discussed above, but before approaching to conclusions the difference between increasing water withdrawals and increasing consumptive water uses which deplete the water resources should be analysed. As drivers lead to increase in water demands, huge amount of water is tapped and withdrawn from the resources. On the other hand, waste water generation an over consumption of water leads to depletion of river flows and reduces its self-cleansing capacity, shrinking the water resource because of depletive water use and pollution due to increasing water demands. (Falenmark M, Molden D., 2008)

Most of the Effects of basin closure are not experienced immediately, they are long term and irreversible. Yet, long term social, environmental costs are rarely acknowledged. For example, Krishna River basin central in India started closing in and around the year 2007-2008 and during the year 2011 it was completely closed. Along with directly visible adverse effects of bad water quality and constantly decreasing water quantity on aquatic and terrestrial ecosystems, estuaries and coastal aquifers are suffering from sea water intrusion, ground water levels are falling down significantly, delta region is eroded and wetlands have degraded which can be clearly observed through the imageries in the figures 2 and 3.

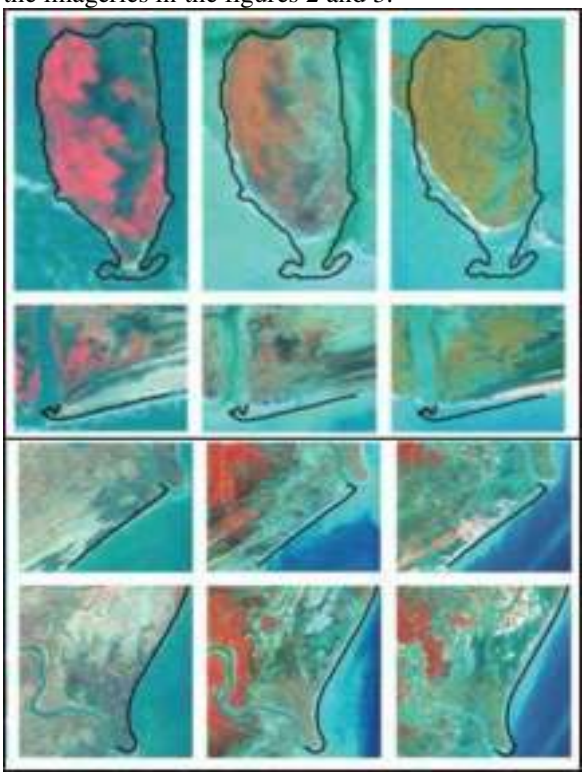

Figure 21: Google imageries of Krishna delta
Source: (Bharati, 2008)

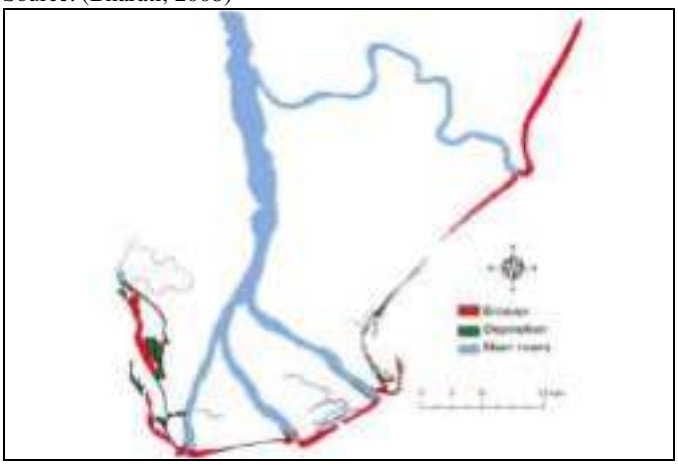

Figure 3: Krishna delta erosion over the years
Source: (Bharati, 2008)

(Smakhtin, Bharati L., 2008) inferred in his study with the help of Google imageries that river is unable to carry sediment load to the sea which is one of the functions of a river because of settlement of sediment load at the bottoms of dams and barrages. He further quotes that because of over tapping of water; river cannot maintain its speed which is also a reason for reduced sedimentation loads at deltaic regions.

The case of lower Jordan River Basin explained by (Aken, Molle F., Venot, 2009) states how land cover of the basin changed from 1950 to 2009. Earlier in 1950's even if surface water was used for irrigation extensively, there was abundant water flow to the sea as the irrigated area was only about 28% of the basin. Over the period, as development happened in irrigation sector, ground water was tapped, and almost total control over water resource was established. In 2009, 79% of basin was under irrigation, almost every drop of surface water was stored and ground water was also extensively tapped.

(Falenmark M, Molden D., 2008) says that lower Jordan basin is a closed basin where all the water users are inter connected and every drop of water is used by them and almost zero water flows from river. There is no water left for future generations and future demands will have to be met by either re allocating water within its users or transferring water from another basin by interlinking the rivers. If the current situation is not resolved, there will be no water left for environmental services which will lead to a disastrous situation.

IV. Responses to Acute Water Scarcity

Within various sectors, agriculture and irrigation are the largest users of water in the world. Approximately 80% of the water is consumed and unfortunately misused or poorly managed by this sector.

Misuse of water in any of the sectors like domestic, industrial or agricultural, is a threat to sustainable development. Today, most of the countries are suffering from water crisis and question of averting the water crunch without hampering the development, rises in front of planners, leaders and policy makers.

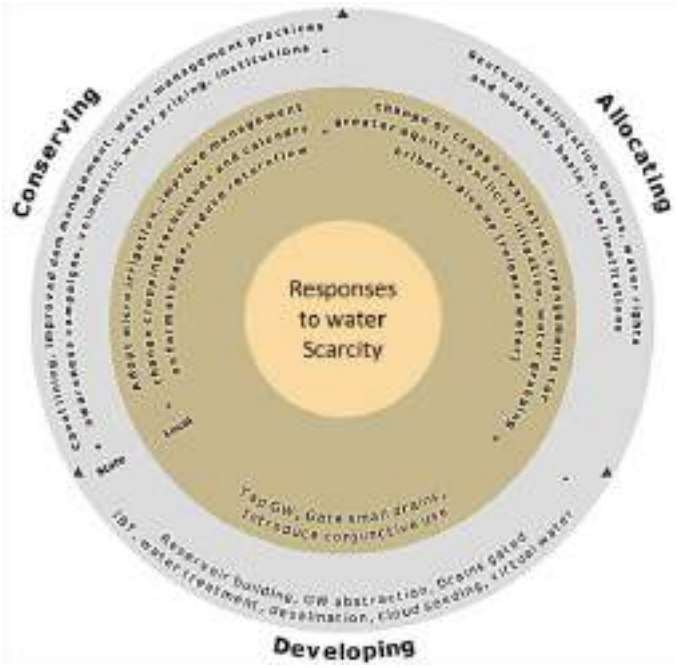

Figure 4: Three types of responses to water scarcity and the level
Source: (Wester H, Molle, 2007), (Molle F., 2006)

A. Development and Increasing Water Demands

When any region suffers from water crowding and has increasing water demands, the first and foremost reaction is to tap more water from surface as well as the ground by building new hydraulic projects or increasing capacity of existing ones. (Molle F., 2006) also mentioned this situation of overbuilding of the basin as silent driver. The time required for construction is less for such project; the response is easier politically but in a long run leads to basin closure of rivers.

As stated earlier, state governments, private developers, development agencies are interested in mega hydraulic projects which are prestigious projects portraying concern for the people and vote bank. Socio economic aspect to develop water for overall economic development is normally the reason for approval of such projects without conflicting opinions. Huge amount of financial support and subsidies are given to irrigation schemes without sanctioning, which leads to illegal land use changes and it is capped under the name of development by implementing agencies.

These kind of unclear water rights and accounting systems may lead to over allocation of water to some of the influential water users, for personal profits. This happens because there is skewed governance, lack of enthusiastic participation, no transparency in the system to know the actual availability, sources, supplies, etc.

Private developers see a huge commercial gain in these projects. (Vennot, 2008) They turn these opportunities into very attractive projects and forget their long term effects.

B. Water allocation

(Molle F., 2006) suggests that reallocation of water is another important response to basin closure in basin management. Cities where more water was allocated earlier, and some of the water allocated is conserved then, the saved water can be reallocated to some other use or to environment considering equity, efficiency and economic development.

As drinking water has first priority in water allocations, there has been a trade-off in many river basins by agricultural to domestic use. Sometimes in over allocated basins, upstream users have to give up some part of their supply and usually this leads to disputes among the users both upstream and downstream. (Falenmark M, Molden D., 2008)

When disputes arise, strong institutional set up is essential to solve them as well as distribute water equitably among the users. This process is tedious and needs substantial amount of negotiations. These processes don't always succeed because sometimes these processes are manipulated financially by taking advantage of unclear water rights. Well defined water rights are very important while re allocating water resource equitably. But they are fussy most of the times to act as foundation of negotiations. (Falenmark M, Molden D., 2008) suggests that if water rights are properly transcribed, it will be easier for the institutions to mechanise capping trading, transferring of rights with less disputes among the users.

C. Water conservation and accounting

According to Figure 4, the most significant way towards finding solution to water crowding and scarcity is to conserve water. Along with conservation, accounting of the scarce water supply is required in order to understand the complex water flow network as well as to support the negotiations.

In the water flow network it is essential to understand the rate of water depletion through evaporation, evapotranspiration, polluted water etc. along with water availability and supply. The percentage of water which should be recycled or reused to keep utilisable flow for other important functions can affect reallocation of utilisable flows according to depletion. (Falenmark M, Molden D., 2008)

V. Demand and Supply side approaches

A. Demand management

Demand management is difficult to execute and according to (Falenmark M, Molden D., 2008) a proper way towards water saving is demand management with respect to water users which can minimize over use of water and hence can reduce water crowding. It is the only way to achieve water resource management.

This approach also gives some of the motivations like capping or taxing the amount of water used or supplied or water trading. Some of the water saving mechanisms in agricultural irrigation is drip, sprinkle systems and also policies which regulate flow of water in different sectors.

But in closed basin, most of the times, amount of actual saving retrieved is very less. (Molden D., 2007), (Venot,et.al., 2008)

In order to save some amount of water through irrigation sector, pressure on agricultural produce to curtail demands of population which is constantly increasing and consumption patterns with less water is unavoidable. When water is regulated, and some amount of water is allocated to some other sector instead of agriculture, then research and development regarding advance technologies should be provided to the farmers to increase the productivity with less water.

Demand management thus seems to be a way to slow down process of basin closure, but to compensate this water; some basins might have to use more water in order to fulfil ever increasing food and energy demands. (Fraiture, Molden D., Wichelns D., 2009)

B. Supply side approaches

Supply side solutions are those in which availability of water in a region is increased by using different sources to borrow or divert the water, inter basin water transfers being one of the examples. Closed basins are refilled with water from water rich or open basins with the help of canals or underground pipelines to minimize water crowding. This is quite an expensive option and has negative environmental impacts too. Nevertheless there are IBT (Inter Basin Transfer) proposals are approved, executed and operated.

India's NRLP (National river linking project) is said to be solution to droughts in some regions and floods in other at the same time. It could also be a way to reopen closed river basins. (Hall S., Slover, 2011)Some of the environmentalists on the other hand strongly oppose such grand schemes as they might alter hydrological patterns, ecosystem and endangered species of flora and fauna depending on original hydrology and ultimately lead climate change. Though such schemes have potential to provide the given region an economic uplifting it would be at the cost of ignoring social, environmental, hydrological considerations. (Biggs T.,Gaur A., 2007),

VI. Conclusion

In order to fulfill demands of population increase, uncertain weather, etc. obvious response of the governing bodies is to tap whatever water available without using it carefully. In order to bridge gaps between demands and supply, different practices are undertaken which do not sustain in the long term. Because of these long term practices, irreparable environmental losses have started emerging. The key challenge is to manage the available water resources in an environment friendly way without compromising the environmental requirements.

The authorities often try to concentrate on identifying potential gaps between water demand and water supply keeping in mind the needs of the future. Comprehensive plans are then prepared to strike a balance between the available supply and the anticipated societal demands, to remove the gap. These plans normally include predictions of anticipated levels of water use based on population growth, per capita and per hectare water use, and other variables that affect the demand. These estimates of future use are then compared with existing levels of available water, and the time when the disparity between anticipated levels of use and existing levels of supply is

identified. Based on the magnitude and timing of this gap, measures and actions are then identified to close the gap and strike a balance between the supply and the expected demands.

The critical issue for planning, to be precise, is not closing any gap in the most literal sense as the quantity of water supplied always equals the quantity demanded or used. It is not practically possible for anyone or the population to use more water than what is actually available. The issue is rather that the amount of water requires for many purposes might exceed the available supplies in the future. For example, in many Middle Eastern households, water supply is severely controlled for most of the time, and such restrictions will grow with growing economies and populations. The places where current levels of water use are very low compared with the levels needed to avoid high economic and social cost, attention clearly focuses on closing the water supply "gap" between current and minimum acceptable levels of use. Also, where current levels of supply include sources that cannot last for longer period like mined ground water, it is impossible to strike a balance between supply and existing patterns of use forever. In these types of conditions to balance the demand and supply requires reallocation among different uses or developing newer supplies. Both of these steps may require significant environmental, social, or economic costs.

Since hydrological cycles, water users, aquatic and terrestrial ecosystems are interconnected; it is difficult to administrate river basins. Instead of giving scope to the development of the water, important fact is to give more emphasis to the water management. Instead of making new policies and governing bodies, collaboration and synchronised working of existing bodies is important. Grass root level actions in individual sub basins and water sheds, should lead to basin level priorities.

Well defined water policies, water rights, management and governance are required to deal with these closed or closing sub basins. Any plan for dealing with water scarcity should identify a range of alternatives for enhancing water supply and managing demand, provide cost estimates of every alternative, and distinguish alternative levels of water use where supplies and demands are in unison.

In developing countries like India evaluating broad policies to manage scarce water supplies is vital to identify the variables that have significant influence on the level of water use. It is equally important to understand the degree to which these variables can be managed or controlled, or whether to modify by doing the required research and development.

Finally, problems will intensify unless they are addressed and now.

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Learning and Practice as Pedagogy for Architecture

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ABSTRACT

India has witnessed rich tradition of Architecture and Planning since the time of Indus Valley civilization. Architecture as a profession has been sustained since then in the nation, and there is much scope for future generations too. The training of architecture as professional education had also undergone varied phases of informal and formal type of education systems. Authors have studied scenario of development of architecture and architectural education in India. They observed the changes happening in the society and architectural response as a solution and symbolic evidence of the time. This paper highlights on the theories and processes of training that are applicable for architectural education. It also highlights the experimented and possible options of adopting these theories in present day scenario.

Keywords: *Architectural Education, Architectural Practices, Pedagogy Contemporary Issues, Teaching Methodology.*

1. INTRODUCTION

Theory and practice of teaching the professional courses has been perceived in different ways from time to time. History of India and even the present India has evidences that the skill based professions had been transferred from the previous generations to the next generations by hands on experience, practice and training. Regarding Architecture and Planning, in India history of architecture sets the best examples of architectural landmarks and town planning. These developments had happened even without formal schools of Architecture and Planning. India has rich history of culture and civilization. However the formal education of architecture and planning profession had started only since last century. Country witnessed varied conditions of changing economies, and urbanization. In each of the decades there was a distinct demand from same profession, which in tern reflected in the education system. This paper identifies the trends of education and knowledge of architecture and planning for last four decades.

2. BACKGROUND

The tradition of documenting 'History' had started in India in the second half of eighteenth century. Though the nation has rich history of Art, architecture and planning, the written reference material had come into existence when country had rule of Britishers. Sir William Jones (1746-1794) who was a British Orientalist and jurist had put foundation of education system in India[1]. He founded the Asiatic Society of Bengal to encourage oriental studies in 1784 .

Education is India was further influence by " *English Education Act 1835*"[2]. This act was designed by a legislative Act of the Council of India in 1835 giving effect to a decision in 1835 by Lord William Bentinck, the Governor-General of British India, to reallocate funds of East India Company on promotion and education and literature in India.

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Regarding practices in architecture, the design and construction of the buildings and infrastructure was taken up by the government by means of Public Works Department (P.W.D.). PWD in India was founded by Lord Dalhousie, Viceroy of India, 1854. The department was established for developing infrastructure and easy communication in each of the presidencies, Bengal, Bombay, Madras and Calcutta. Calcutta had the Central Public Works Secretariat. Each presidency consisted of two branches, i.e., Civil Branch and Military Branch. Civil branch mainly dealt with civil works (canals, roads, railways). Military Branch was responsible for military facilities (military cantonments, military hospitals). There were mainly engineers qualified in Europe in both these departments[3].

Very first initiatives in the area of architectural education were seen at Kalabhavan in Baroda (1890), Sir.J.J. School of Arts in Mumbai (1936), and Lalit Kala academy in Delhi (1954). Sir J.J. School of arts was founded in year 1857. The professionals were trained after the "English Education Act" had come into existence and there was a lot of British influence on the profession. These professionals carried forward the practices that were prevalent in the western part of the world and hence they had major role to replace the traditional native construction practices. With the beginning of industrialization and western influence the rulers and authorities invited foreign city planners and architects to plan the cities and design the buildings. Sir Pattick Geddes was invited by Maharaja Yashwant Rao Holkar for planning of Indore city in year 1925. In the same period (1920-30) Edwin Lutyen had given plan for New Delhi.

There were 200 to 300 qualified architects, and about 5000 degree level engineers and thousands of technically trained construction assistants[4] at the time of independence in 1947.

Le Corbusier was invited by Prime Minister Jawaharlal Nehru for Planning of Chandigarh city in year 1950. Fig. 1 presents a picture of Le Corbusier with Jawaharlal Nehru.

Having these changes towards city planning and architecture, it was practically difficult to separate the practice and education. Hence this western influence did come on architectural education too. Fortunately in the next few years movement was towards realizing our own values, heritage and connecting the same with the present demand of that time.

Figure 1 Left Le Corbusier, right Prime Minister Jawaharlal Nehru

2.1. **Approach of Architectural Pedagogy towards dealing with Contemporary Issues**

Delhi has witnessed the beginning of architecture education in independent India. The School of Planning and Architecture was founded in 1941 as a Department of Architecture of Delhi Polytechnic.

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It was later affiliated to the University of Delhi and integrated with the School of Town and Country Planning which was established in 1955 by the Government of India to provide facilities for rural, urban and regional planning [5]. Another landmark in architecture education was established by Government of India, in the form of Lalit Kala Academy in Delhi in year 1954. The very first kind of Seminar on Architecture was organized by this institute in year 1957. In this seminar the eminent professionals and decision makers were present and the sessions had opened the new horizons in Architectural pedagogy. Union Minister of Scientific Research and Cultural Affairs, Professor Humayu Kabir, Prime Minister Jawaharlal Nehru, Ar. Charles Correa, Ar. Achyut Kanvinde and many other distinguished professional of this area were present. Though these architects were trained outside India, they understood the legacy of the past and they could relate it with demand of the time. Ar. Achyut Kanvinde, who was also the editor of the seminar, realized and conveyed the fact that *the "architectural solutions to the present have to be different than the past. Society changes and scientific and technological developments happen. These changes have deep connection with the humanities and visual arts and consequently it impacts the present day culture and therefore, on architecture"* [6].Though stated in year 1957, statement is applicable to today's context too.

Works of Ar. Charles Correa, Ar. Raj Reval, Ar. Achyut Kanvinde, Ar. B.V. Doshi etc. have set the landmark examples of architectural solutions to contemporary issues in the form of timeless buildings. There had been rapid changes in the society since the time of Independence. The focus areas also kept on changing, and architecture of that time responded to same. After the kings and rich landlords, the government was the prime developer of that time and there was no public participation in major construction activities.

The government's role to deal with contemporary issues of that time can be well observed by the five years plans. Both first and second five years plan were focused on agriculture, irrigation, power and transport. These plans aimed at creating the base for more rapid economic and industrial advance in the future[1]. The words housing and infrastructure were mentioned for the first time in fourth five year plan in year 1970. And this was a beginning time when focus of the policies turned towards architecture.

The country has also been witnessing various trends of urbanization, and hence the scope of works of architects also kept on changing. The kind of clientele was also different.

3. FUNCTIONS SERVED BY ARCHITECTURE AND FOCUS OF ARCHITECTURAL EDUCATION IN LAST FIVE DECADES

Authors have interacted with the professionals qualified in consecutive decades since year 1970, to know the trends and pedagogical approaches of their time. They interacted with them to know that how do they relate their education with their practice. It is evident that the students of the previous decade had also become the teachers of the next decades. They could better relate the societal requirements with pedagogy. Their experience in the profession has been the base of education for the next generations. Every decade had got exposure to newer demands, and the senior generations with the new architects have together dealt with these challenges. Certainly there are overlaps in margins of these decades, but there were some distinct observations for these decades. Hence the consecutive decades have been chosen for study. Decade of 1970-80 was selected as start of study for three basic reasons. First reason is that, that till this decade there were only few schools of architecture. And the trends were totally different than the present. As it has been already mentioned, the government was

[1] In the first five years plan (1950-55) the resource assessment and need for initiating process of development were identified. The plan outlined the close relationship between the rates of development and the requirements of resources in the public and in the private sectors.The second five years plan (1956-60) was intended to carry forward and accelerate the process of development initiated in the first plan period.

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also focusing more over agriculture, irrigation, power and transport, till year 1970, hence the scope of architecture was limited at national level. The main clientele for the architects were elite businessmen in urban areas and white collar worker [7]. The second reason is that the constitution of 'Council of Architecture' had happened in year 1972, and since that time the country is following certain norms in area of architectural profession, standards of education, recognized qualifications and standards of practices in profession. The third reason is that this is the senior most generation of practicing architects of this decade.

3.1. Pedagogical Development in the Decade of 1970-1980

3.1.1. Pedagogy in Schools

Eligibility criteria for admission to course of architecture was maths and science background and interview. The ratio of practicing architects and academicians as teachers in schools of architecture was 70/30 i.e. 70% practicing architects and 30% academicians. Architecture was taught as a balanced discipline of design, technology and humanities. The students did not learn only in the schools but also by training under the various practicing architects. Most of the students used work after school time in the offices. The very basics of the technology were taught in details. For example load bearing wall is also a technology and pre-caste is also a technology. But while proposing any of these two the main aim of the design was to give a permanent solution and make life better and happier for the client.

This was the period when Louis I Kahn with his associate architects, B.V. Doshi and Anant Raje had designed and completed the campus of IIM Ahmedabad. The works of these architects are being followed and read by the architectural community since that time.

This period is also known for green revolution in India. Since this time the food and grain demand of the country has been fulfilled by its own agricultural industry. Indian economy was not much strong at that time. Nation had witnessed the days of scarcity. And with the limited resources people valued whatever they had in life. There was dedication, sincerity and keenness to urge knowledge in the students. There were no computer tools available, but the sketching and hand drafting skills of this generation are still matchless. The pedagogy did have impact of value system. The value system, holistic approach, and focus on professional education was too strong, that it was just sufficient to fulfill the architectural demands of that time. The percentage of the students going for higher studies was extremely low [8].

This is the decade of major reforms in the nation with respect to architecture. Year 1970 marks as a foundation year for CIDCO (City and Industrial Development Corporation)[9] and HUDCO (Housing and Urban development Corporation)[10]. Council of architecture was also formed in the same period. As these were the initial years of establishment, these reforms did not have direct impact on architectural education immediately.

3.1.2. Relating Pedagogy with Practice

There were 20 plus schools of architecture in India[11] at the end of this decade . In year 2016, India has 2207 registered architects in the age group of 56-65 years [12]. Most of these architects had graduated during this decade. These people started architectural practice right from scratch, as architecture was not inherited business from their parents. There was role of government in formalization of policies, as government departments were in place, and architects were essential parts of these set ups too. Parallel to this the private architectural firms were also evolving, and had great pool of talented architects. Ar. B.V. Doshi's office had been one the largest firm in India was a dream place to work for learning after graduation for the architects at that time. Timelessness of the design was the unique identity of this

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period's pedagogy, and it is also clearly observed in the buildings designed by these architects. Common people were clients for architects. The scale of projects varied from residential bungalows, institutions, cultural centers, museums, administrative buildings and townships. And the client were common people, industrialists, business people and also the government.

3.2. Pedagogical Development in the Decade of 1980-1990

3.2.1. Pedagogy in Schools

In the decade of 1980-1990, the pedagogy was more of giving importance to the principles and theory to create Architecture The syllabus of architecture differed by including subjects like Introduction to the total scope of Architecture, Basic Design, ,Building Technology, Engineering and Economics, etc. The basics were taught in the schools and it was expected from the students, to relate this knowledge with practices. The students use to work with practicing Architects/Structural Engineers from their Second year itself. This strengthened their theoretical base in terms of Design principles, technology structural systems and the role of economics and architectural profession. The pedagogy was thus oriented on conceptual development and developing an analytic and research based attitude. This generation architects were trained to design the services in detail. The services oriented designs like, hospitals, commercial buildings/ plazas were being developed. There was no use of computer tools and software in the curricula, however this generation has trained themselves well in use of software tools.

3.2.2. Relating Pedagogy with Practice

Majorly schools of architecture were established by government This era marked the introduction of private organizations establishing Architectural educational Institutes in India to house the demand/need of Architects in profession. As per records found with Council of architecture in year 2016, there are 4916 registered architects of age group of 36-45 years in India. These architects belong to architectural education of this decade.

Focus of government policies during this period was on elementary education, developing infrastructure like water, waste management, primary health facilities including immunization and also giving importance to the Hospitality Industry, strengthening the economics of the country.

Hence the public sector had built schools and hospitals, and private sector concentrated more on commercial activities. This lead to the beginning of the need of specialization in Architectural Education. However there were very few schools in India offering post graduation courses and the students had to apply to overseas institutes offering the desired course.

A majority chose to enter the Profession and worked on an area of expertise like Schools and Institutes, Hospitals, Hotels, Industrial Buildings, Residential etc. They would work on all details from concept to execution of a particular typology [13].

3.3. Pedagogical Development in the Decade of 1990-2000

3.3.1. Pedagogy in Schools

Teachers of this time used to sensitize the students towards humanitarian ground of architectural design. Vernacular architecture, site sensitive design and use of newer materials and structural systems was given emphasis. Use of computer tools during education was introduced in the end of this decade. Students were taught to broaden their thinking perspective for large scale projects like mass housing, slum rehabilitation, etc. Large scale projects in the profession had started since last two decades, but in academics these were given importance. Though the admission criteria for architecture

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was maths and science background, in this period architectural education was considered as an interface between other streams of humanities and technological development. Students were encouraged to associate the knowledge and application with various users from different culture, region, profession and physical abilities. With the advancement in communication and transportation services, a number of transportation terminals were built in last two decades, and the need of universal accessibility was realized in this time. Tourism of India was also taking boom in this period, hence it influenced the architectural education in related fields like hospitality, conservation, preservation and advancement of design of transportation terminals etc. Other than this the site sensitive and climatically responsive designs were appreciated in the schools. These topics were taken as topic of research in the different forms by different schools of architecture. In the contrast, there was shift in the use and availability of the unconventional building materials. In all Indian cities, people had started building metal and glass buildings. Hence students were encouraged to use newer material. However the holistic analysis of these materials were not done at the time of selection. For example use of glass as wall element was accepted. Glass walls were accepted as glamorous elevations, and faster construction for the commercial buildings. Information technology (IT) was at its peak and most of the offices IT industry had been built in glass wall without realizing its ill-effects on energy consumption of the buildings [14].

3.3.2. Relating Pedagogy with Practice

There were 100 plus schools of architecture in year 2000 in India. In year 2016 the 12542 registered architects in India are of age group of 36-45 years. Hence it can be said that output of these schools was more than 12500 architects. This generation architects had the major challenge to deal with the newer clientele and newer challenges. With the encouragement of public private partnership in government policies, growing population and land scarcity, the construction activities in the larger cities had gone in the hands of private developers. In the same decade the slums were also pulling attention of community of architecture. The demand for housing was increasing for all the sectors of economy, and there was need of development of services and infrastructure too. With the growing needs of the time, the students started pursuing higher education and specialization. In general 8-10 percent of the students pursued post graduation immediately after architecture. The foreign universities were also attracting them for post graduation. After getting specialization, the architects started practicing not only architecture, but also entered in the areas of planning, construction management and design. Focus of architects shifted to a number of diversified fields. The government policies like JNNURM (Jawaharlal Nehru National Urban Renewal Mission) attracted a great pool of the specialized architects and engineers in a number of cities in India. Under the single mission BRTS (Bus Rapid Transport System), IHSDP (Integrated Housing and Slum Development Plan) like schemes engaged a number of architects to show their innovative and technological appropriate roles.
Many architects had turned towards glamorous fields of design like product design, set design, interior design, exhibition pavilions etc. Many moved in the areas of planning, urban design and construction management too. Remarkably for this generation the scope of practices has been much varied than what was taught at school. However a research based attitude was developed that supports these professional for experimentation.

3.4. Pedagogical Development in the Decade of 2000-2010

3.4.1. Pedagogy in Schools

The eligibility criteria for admission to architecture education was broadened. In the end of this decade the students with arts and commerce background also got admission to architecture along with the maths and science students. This decade witnessed increase of technological component in

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teaching. Teachers had started doing experimentation in the technical subjects like building materials and technologies. There were newer materials in market, hence students got more exposure to experimentation with the newer and sustainable materials.

Sustainability and energy efficiency were the rising concerns of this time. In the same period Indian Green Building Council's green buildings rating systems, and TERI GRIHA (now Govt. Of India's GRIHA) came into existence and it put a lot of impact on education too. More thought were given to integration of renewable energy systems in the buildings. For studying sustainability, TERI's Retreat building in Gual Pahri, and CII-Sohrabji Godrej Green Business Center building in Hyderabad had been the favorite case studies for most of the schools of architecture.

Gujarat earthquake in year 2002 and Tsunami in year 2004 grabbed attention of architects for building earthquake resisting structures, temporary shelters and low cost housing solution for the victims of disaster. These all issues are again demanding in terms of technological advancement. Teaching all these things was not possible in the classroom, hence experiential learning was more. Component of exposure tours in academic took an essential place.

The research activities in this period focused more on urban design, redevelopment, campus design, architectural solutions for disaster prone areas, and sustainability. In this decade percentage of students going for higher studies increased to 30%, and these people had given preferred to go to foreign universities for higher education. Also these highly qualified architects entered into specialized fields.

3.4.2. Relating Pedagogy with Practice

There were 200 plus schools of architecture in India in this decade. As per the records of council of architecture in year 2016 there are 23992 registered architects, in the age group of 26-35 years. This is the so far the largest number in history of India. The maximum architects of today have learned architecture in this decade. The impact of changed clientele in the last decade was clearly seen in this decade. The clients were not owners, but the developers in the previous decade. People in the cities preferred buying flats instead of buying land and building bungalows. But the common people again became clients of architects for interior designing projects. Also as in the last decade the developer community had come up, they started educating their next generation. It is noticeable that more than 20% of the students of architecture were the children of builders and architects.

Since this time innovation in architecture has also moved towards design of industrial premises, advanced building materials and systems, prefabricated building elements etc.

3.5. Pedagogical Development in the Present Decade 2010 -2016

3.5.1. Pedagogy in Schools

The schools of this decade have got fortunate or unfortunate advantage of computer tools. In the previous decade these tools were used after third year, but now there is scope of using these tools right at first year. There is slight shuffle in the contents of syllabus, but the basic content is same. The skill tools have also taken shape of design tools. In metro cities the travel time for students is more and hence it demands most of the academic works for the limited period, when students are in school. This time requires pedagogy of rich content of basics concepts and encouraging the urge to explore and evaluate the available options. For example if the student has clear concept of materials and structure, he or she may explore the other materials in market and evaluate their suitability for the desired purpose. The important point here is to make them conceptually strong and to equip them with research based attitude.

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3.5.2. Relating Pedagogy with Practice

This generation is yet to pass out. As per the official site of council of architecture, there are 452 schools of architecture in year 2016. This number is more than double of the last decade. As per this information the number of architects of age 25-30 years at the end of this decade is going to be more than 2,50,000[2]. About 30-40% of these students belong to the families of architects, planners and builders. The availability of financial resources is more and also a lot of information is available on internet. The distracting things like electronic gadgets, social networking websites, online shopping are also increased. Naturally with this background the focus of the students towards academics is less as compared to the previous decades. However the profession is much demanding. Scale and types of works are going to change. Now architects are required to go beyond Architecture. They are required not only to design and make the buildings but also to provide solution at urban, regional and national level. There is very fine common line between planning, urban design and architecture. Housing sector is also undertaken by the private developers and government. Unlike the previous decades, the developer community is becoming educated and equipped with larger set up of qualified professionals in the fields of engineering, finance, management and architecture. Hence now architects are not only working in architectural firms but also in the developers' firms. They are working in integration with all these professionals from strategic planning to implementation. Hence the pedagogy demands team spirit, discipline, and integral and holistic approach[15].

4. CASE STUDY OF TEACHING ACOUSTICS IN BRICK SCHOOL OF ARCHITECTURE

This is a case study of teaching a part of syllabus in the subject '*Services*' to third year batch of architecture in year 2015-16 in Brick School of Architecture. The subject was jointly conducted by authors. As there are students from arts and commerce background too, teaching the scientific and technical subjects has been a challenge. Acoustics is one such subject. The teachers had taken a different approach to develop the understanding of the subject by means of experiential architecture through reflective study. University of Pune has defined the broader parameters of the subject and that have tremendous scope of pedagogical innovations. The subject was introduced with experiments done on properties of sound. The wavelength, amplitude, loudness, frequency, etc were taught by audio visuals and musical experiments. The defects of sound like Eco, Reverberation, Reflectance, Acoustical Shadows, etc. were taught in the campus by doing calculations for various types of indoor and outdoor spaces. The codes and standards were introduced and later after having the technical knowledge of the subject further understanding was developed by experiencing the response of the spaces. Multiple space typologies including the indoor and outdoor spaces had been taken for study. The outdoor spaces included the stadiums, amphitheater, festival grounds. The indoor spaces included the educational buildings, health care services, transportation terminals, religious spaces, museums etc. For the good examples of remote sites the book case studies have been done, and the live case studies were also done. The basic framework along which the students had to document the work was comprised of four basic topics, i.e., observation, inferences, comparison with the codes and recommendations. It was a pleasant surprise to see all the case studies, as students made good use of their resources and modern technologies. They were through in the basics before going to the sites.
After reaching there they viewed the premises, interacted with people, and observed the positive and negative points on site. They did recordings in their smart phones, used the apps for noting the decibel levels, and with the help of computer tools they come up with good technical presentation.

[2] Annual out put with average number of 60 students in a batch= 60 X 452= 27120, and for ten years this number would be 27120 X 10 =271200

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Through this exercise faculty at Brick demonstrated adapting to the appropriate use of technology can bridge the gap between teaching and learning and also broaden the research based attitude in studies. In such case the method was not only teaching but collective learning by students and faculty. Similar reflective approaches can be adopted in understanding of other subjects as well.

5. CONCLUSION

Each of the decades has shown a very much varied and diversified journey of architecture. Along with this each decade has introduced unique and essential component of pedagogy. The lesson to be taken from decade of 1970-80 is timelessness of design and value system. Decade of 1980-90 has brought concept of services oriented design and specialized designs. Decade of 1990-2000 emphasized more on humanitarian ground of architecture. Teaching of Sustainability concepts began well with the decade of 2000-2010. And 2010 onward the challenges are more for orienting students towards the basics. Technologies have made the works easier, but the precaution to be taken to not to kill the creativity. The challenge for teachers of architecture is about resolving tension between tradition and modern aspirations [16].

With availability of a number of resources and technology *it will be unfair to say that teachers teach architecture, but indeed with the help of schools and their co-faculties they make an environment where a student learns about architecture*. This is very much similar to the act of helping a child morally, physically and with some basic resources at stages when he starts crawling, walking or talking. Child's organ system is naturally developed to do all these activities, but the parents have to support him during all these development processes and stages. Parents have to be present to give conducive environment to develop these skills. It includes taking care in giving right diet, following a schedule, bringing in the discipline, and helping and protecting him at the difficult situations and inculcating human values. Similarly the right diet in teaching is the content of the teaching, and remaining two i.e., schedule and discipline is principally same universally.

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Study of Sustainability Practices Ingrained in Indian Culture

Shraddha Mahore Manjrekar

Abstract**—**Culture has been an integral part of the civilizations in the world. Architecture is artistic expression of culture and civilization in material form of buildings and urban landscape. Author has observed and thought about the relation of Indian traditional cultural beliefs and their relation to the sustainable environment. There are some unwritten norms regarding the use of resources and environment in Indian continent, that have been commonly accepted by the people for building houses and settlements since the Vedic period. The research has been done on the chanting and prayers done in a number of houses and temples in Madhya Pradesh and Maharashtra. After doing some research, it was also found that resource assessment had also been done for entire country, and idea of conservation of these resources was imbibed in the common people by means of some traditions, customs and beliefs. The sensitization and gratefulness about natural resources has been observed in the major beliefs and customs. This paper describes about few of such beliefs and customs that are directly linked with the built environment and landscape.

Keywords**—**Indian culture, sacred groves, sustainability in built environment, sustainability practices

I. Introduction

Traditional Indian built environment has its deep association with culture. The cities and villages have some public spaces which are culturally important parts of lifestyle. On one side these spaces are occupied during certain calender time and on other side these spaces follow some codes that have not been mentioned in a single code book, but are part of a number of beliefs and customs and also day to day livelihood requirements. Examples of these spaces are river ghats, holy forests, sacred groves, mountains, spaces around some distinguished trees, step wells water-bodies, temple tanks etc. These spaces are not just spaces, but are derived from deeply grounded research, done on climate, natural resources, and their sustainability in long run.

II. Glimpses of Natural Resource Assessment Done in Ancient India

India is a rich country for natural resources. Indian national song 'Vande Mataram'[1] has mention of the resourcefulness of the country through phrase "Sujalam Suphalam, Malayaja Sheetalam" . Word to word translation of this phrase is given here- **Sujalam** *means Ample of potable water,* ***Sufalam****- means Fertile Land, and* ***Malayaj Sheetalam*** *means hilly, picturesque with fresh and oxygen rich air quality."*

Security and sustainability becomes prime concern after realizing value of resources. It was well understood by the people of Ancient India that if the life of settlement is dependent on some natural resource, the next generations will also need it in the same form and quality. Perhaps this would have been the reason that the natural resources and ecosystem have been regarded in many forms and terminologies.

Example of Shiva, fits suitable for this topic. Shiva is the prime deity of all the Indians, and is also known as "Pashupatinath"[2]. Fragmentation of the three words in this name lies in three words, i.e., Pashu(Animals), Pati (Plants), and Nath (Owner, protector or God), hence Pashupatinath has been regarded as the Protector of whole ecosystem including organisms and plants.

Kailasa, a part of Himalaya has been considered as the abode of Lord Shiva. Mansarovar lake (water body) is also of religious importance. Mythological belief is to give importance to the land, water, plants, and animals.

There are many instances where the importance of nature, resources, ecology have been associated with some customs, traditions, culture or beliefs. The further research on these instances indicates that this association is directly or indirectly linked with the health and sustainability of the ecosystem too. Any rich natural resource which was understood as valuable resource and considered to be preserved for consecutive next generations with the same quality, had been considered as holy and auspicious or connected with something on which common people have deep trust.

The early morning prayer of Hindus is called Pratah Smaran and part of it states

"Samudravasane devi, Parvata Stanya Mandite, Vishnupatnim Namastubhyam Padasparsham Khshamasvame"[3]

Sanskrit script of this Shloka is given in figure 1.

समुद्र-वसने देवि, पर्वत-स्तन-मण्डिते ।
विष्णु-पत्नि नमस्तुभ्यं, पाद-स्पर्शं क्षमस्व मे ॥

Fig. 1 Sanskrit script of morning prayer for motherland

This means *"Oh Motherland Bharatmata, you are wearing the cloths of Samudra, i.e, ocean, you feed us by pure and mineral rich water flowing in auspicious rivers. These waters that originate from the mountains (Sahyadri and Vindhya) which are like your breasts. Oh wife of Vishu (Laxmi- goddess of wealth), please accept my regards, and forgive me, because even after knowing that you are holy, I start my day by keeping my feet on you".* Figure 2 represents an image of Bharatmata. It

Author is an architect and planner by qualification, and has been working for sustainable built environment. She has knowledge of the various rating systems that are practiced Globally, and hands on experience of facilitation for rating and implementation of sustainability norms in construction projects. At present she is teaching in Brick School of Architecture and Brick School of Interior Designing, in Pune as an Associate Professor. In this paper she has given a thought on some Shlokas that are chanted in the morning and their relevance with sustainability and architecture.

is an artist's imagination and representation that show country as resourceful motherland.

Fig.2 Bharat Mata [4]

The next part of the prayer the regard has been given to the rivers. It states ***"Ganga Saraswati Sindhu Brahmaputrashch Gandaki, Kaveri Yamuna Reva Krishna Goda Mahanadi"*** Sanskrit script of this shloka given in figure 3.

गंगा सरस्वती सिंधु ब्रह्मपुत्राश्च गंदकी
कावेरी यमुना रेवा कृष्णा गोदा महानदी ॥५॥

Fig.3 Sanskrit script of morning prayer for rivers

The rivers that have been mentioned here are Ganga, Saraswati, Sindhu, Brahmaputra, Gandaki, Kaveri, Yamuna, Reva, Krishna, Godavari, and Narmada. These are the main rivers of India, and main sources of water in throughout the country. Most of the Indian cities have been built over river fronts and rivers have been the cradle to civilizations. India is the only country where the Ghats have been built on river fronts, and have been regarded as auspicious places. Ghats have become a prominent feature of city or village's built environment. The household activities, farming and many small scale industries had been dependent on the river water, and hence these ghats had become multiple use spaces for the civilizations. These have been the gathering spaces, and ports too. People used to commute by boats through these ghats.

Maheshwar, Varanasi, Kashi, Haridwar, Hrishikesh, Ujjain, Nashik, Pandharpur, Rajmundri, Tryambakeshwara, Kushalnagar, Mysore, Srirangapatna, Tiruchirapalli, Thiruvaiyaru, Kumbakonam, Mayiladuthurai, Poompuharare are the cities where the Ghats are visited by the pilgrims all around the year even today. Figure 4 shows a brief map of ancient Indian rivers and regions along them.

Fig. 4 : Indian cities along river banks [2]

The river ghats were designed with architectural and civil engineering excellence. Nowadays many of them have become the attraction points of tourism. Few examples along Ganges river are in Hrishikesh, Haridwar and Varanasi, along Yamuna river there is Keshi Ghat in Vrindavan and along Narmada River there are Ghats in Omkareshwar and Maheshwar. Figure 5 represents the Keshi Ghat in Vrindavan. Figure 6 represents Sethani Ghat, of Hoshangabad. These Ghats act like the controlled approach points to the rivers.

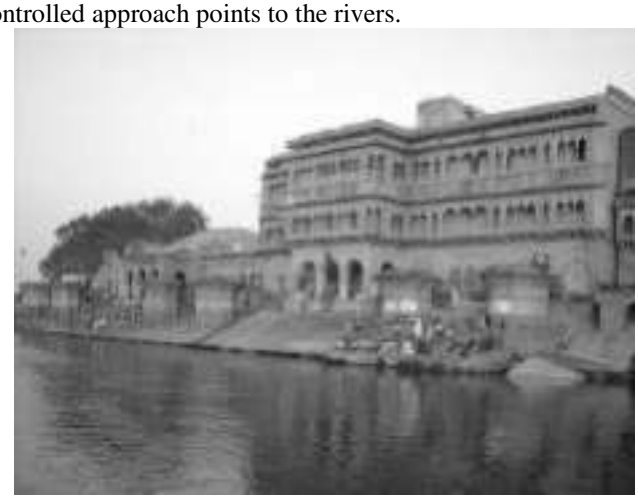

Fig. 5: Keshi Ghat of Vrindavan [i]

Fig. 6 Sethani Ghat, of Hoshangabad [ii]

The settlements, that are not close to any river fronts, had built tanks, and these tanks acted like water reservoirs for the non-rainy seasons. Example is Chennai city. The city has rich history of temple tanks, because they had tanks closed to the temple and it would have been expected that the way people regard god, they regard water bodies too and conserve their existence with purity.

Most of Hindus chant Ekatmata stotram too in Morning. This prayer narrates the united character of the nation. Author has tried to see these connections through geography, cities, and great historical characters. A part of 'Ekatmata Stotra' is about paying regards to the mountains of India.

As per this Mantra, the most regarded mountains are Mahendra (now part of Cambodia), Malay (in Orisa), Sahyadri (in Maharashtra), Himalaya, Raivatak (now known as Girnar in Gujarat), Vindhyachal (in Middle India), and Aravali (Rajasthan). Sanskrit script of this shloka is given in figure 7.

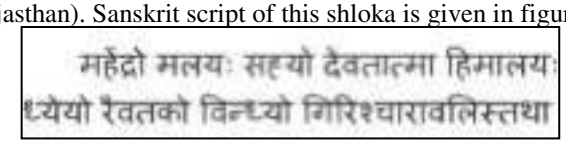

Fig.7 Sanskrit script of morning prayer for mountains

These mountains have dense forests and rich ecosystem. It is physically difficult to build the settlements over these mountains and they are habitat for endangered animal species too. These are the breathing spaces of the region and are also origins of some rivers. Paying regard to these mountains does indicate the responsibility towards the preservation of topography, flora, fauna and rivers on these mountains.

There is concept of sacred groves in India. These are ecological sensitive areas. People worship these groves and keep them untouched for any kind of human activities. Typically, such groves are associated with the concept of a "Presiding Deity". Most of these sacred deities are associated with local Hindu gods. There are some sacred groves of Islamic and Buddhist origins, and some are based on smaller local and folk religions (like the folk deities *Ayyanar* and *Amman*). The culture has been evolved for relating the deities with the forests. God Aiyappa has been considered as forest god, and by his name a number of forest had been preserved and conserved in Kerala and Karnataka states [5].

Forests are necessary parts of likelihoods of mankind. In ancient India there were concept of '*Sreevanam*', '*Upavanam*' and '*Tapovanam*'. Conceptually these are the peripheral forests located around the village or village located at the certain distance from the forests. *Sreevanam,* which means, "forests of prosperity", consists of dense forests and groves. *Sreevanam* used to be in immediate surroundings from the village. People had right to use the forest products (e.g. limited amount of dead wood, fruits, flowers, leaves, forest produce etc.) required for the livelihood. The law of limited use of these products clearly indicated that one has guided to use forest without disturbing its eco-system. Enriching the existing ecosystem was also ingrained in the culture. This fact can be understood by the customs and religious rights that happen in groves. Many people had considered it their duty to planting and nurturing the trees in these groves. They had spent their time for recreation and celebration of festivals too in these groves [6].

Vrukshayurveda, is a branch of Ayurvedam. It describes the science of medicinal system for the benefit of plant life. This subject had been deeply studied to take care of the plants in these sacred forests [7].

After the Sreevanam the next peripheral layer of forest is called Mahavanam, which is a kind of reserved forest, and people do not have right to touch or cut the trees in this area. Tapovan and Mahavan are the forests are the safeguarded areas for flora and fauna. Hence there were no human interventions. Tapovanam are the densest forest, where only the great saints could go for doing meditation and austerity.

III. Ancient Indian Cities

A part of Hindu morning prayer includes names of holy cities, i.e., Ayodhya (birth place of lord Rama in Uttarpradesh) , Mathura (birth place of lord Krishan in Uttarpradesh) , Maya (Combodia), Kashi, Kanchi, Avantika (Ujjain), Vaishali (nowadays known as Tirhut in Bihar, birth place of Gautam Buddha), Dwarika (Gujarat, the capital city of Krishna), Takshashila (an ancient university place, now is part of Ravalpindi district in Pakistan) and Jagannathpuri.The sanskrit script of this Shloka is given in figure 8.

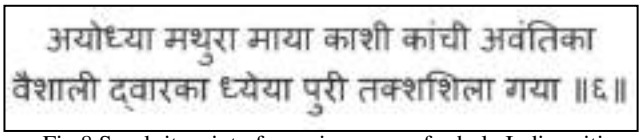

Fig.8 Sanskrit script of morning prayer for holy Indian cities

These are several thousand years old shlokas and are chanted in throughout the India. Other places that have got religious importance are Chaardham, and twelve Jyotirlingams [8] and Nine Shaktipeetham [9]. Geographically these are uniformly spread prominent locations on map of India. Putting all these names in the prayer means that the authors knew the geography and history of India very well, and wished that Indians shall respect all these rivers, and places wherever they stay or travel through throughout their lives.

Indian mythology has been acting like building codes of these days, and would have guided people to do the development with due consideration of preservation and conservation of these natural resources. There are ancient cities

and these have been mentioned in many scriptures. There had been a planned approach in planning of these cities. The examples of the planned cities are Jaipur, Indraprastha, Sonipat, Vijaywada, Mysore, etc.

The above mentioned is about the places of geographical importance and people regarded these rivers, mountains and cities and have been regarding these from wherever they stay.

IV. Plant Elements in Built Environment

There are some plant elements which are symbols of some belief and have become of part of the houses and settlements too. These are 'Plant elements' and are called as 'Vanaspati' in Sanskrit language. These have been associated with some typical open spaces in the houses or towns. There are some traditional names of these open spaces in Sanskrit Language. These are Aangan, Muktangan, Kridangana, Vatika, Upavan, Prangan etc. Aangan is a courtyard or front yard in houses. Muktangan is an open space receiving pleasant breeze. Kridangan is a space in city or town where people play. Vatika or Baug is a garden space near temples, houses and palaces too. Upavan is the revered forest in city or town. Prangan is the playground and is a generally part of school or educational campuses. These had been spaces where the royal family kids used to get training for war. Right from ground covers, to shrubs to small trees, and the huge trees, there are variety of plants that have got religious importance and have become part of these open spaces, or buildings and landscape. These species are native species; hence they grow well in tropical climate without much maintenance and watering demand. These have environmental benefits too. Having these trees in surroundings is economical and sustainable option for landscape in built environment. Other than this there are health benefits too attached with these plants. Following is the association of the respective plant species with various beliefs and customs [10].

Ganesha is regarded as the first god and is worshiped in the beginning of any auspicious work. Durva, is a type of grass, or land cover that is offered to Ganesha. It is very indigenous grass, can be grown in almost parts of India.

Other than Durva grass there are some indigenous flowers that have been associated with the various deities. Shoe flower, (Jasvant), is an ornamental, red color flower and is considered as a favorite flower of Ganesha. Goddesses are worshiped by flowers of fragrance, Jasmin, Mogra, Kunda, Shevanti are the flowers that are offered to the goddess.

Shiva is offered white flowers and Belapatra, and Krishna is offered Tulsi leaf seeds and Yellow flowers. Parijat is also a flower that is favorite to Krishna.

Some of the plant species have some great importance in buildings or as a space element. Planting these plant species in the surroundings have been generally accepted by many people in the country. Unique example is Tulsi Plant. This is a medicinal plant and has become an essential part of the traditional Hindu houses. In many of the houses there is dedicated open space, which is a breathing space for house (generally a central courtyard or front yard) around this plant. In most of the cases Tulsi planter and courtyard supplement each other. Figure 9 shows a picture of Tulsi seeds that are offered to Krishna. Figure 10 shows an example of Tulsi Planter that is part of most of Hindu houses in India.

Fig. 9 Tulsi Seeds and leaf that is offered to God Krishna [iii]

Fig. 10 Tulsi Planter [iv]

Similar to Tulsi, Champa (Pulmeria Alba)[1] tree is considered as 'Temple tree' in Indian Mythology, and it also considered as an essential part of temples and houses. The flowers of this tree blossom throughout the year and its fragrance makes environment pleasant. As this is a small tree, it is even planted in a small court. One may observe this tree has been part of landscape design of many of the housing clusters and also in the commercial buildings.

Gandhi Memorial Museum in Ahmedabad, designed by Ar. Charles Corea has courtyards that are landscaped with these trees. Figure 11 represents a picture from Gandhi Smarak Sangrahalaya or Gandhi Memorial Museum in Ahmedabad.

Fig. 11 Use of Plumeria Alba in Gandhi Samarak Sangrahalaya, Ahmedabad

V. Day to day customs

The next hierarchy of Plant elements, which are connected with Indian culture are Banana, Coconut, Mango, Neem, Banyan, Peeple etc. These trees are planted near houses and their products are used for many purposes in day to day life. People used to dine over Banana leaf and later keep these leaf as for food for cattle. Banana stems are essential part of many rituals. Mango tree's fresh leaf and marigold garlands are very common type of door decoration. These are also called as Toran. These are very eco- friendly customs and have accepted countrywide. Figure 12 represents a picture of a conventional Toran, i.e., door decoration comprised of mango and neem leaf and marigold flowers. Figure 13 represents a picture of a *South Indian* traditional meal served on banana leaf.

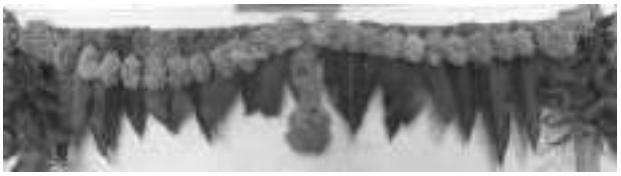

Fig. 12 Conventional Toran [v]

Hindus have a convention ritual called as "Vaastu Pujan" at the time of housewarming. A ritual that is directly connected to built environment during this is -the worship of Sun, Moon and nine Planets, Waters collected from the seven rivers, Soil samples collected from seven sources, nine types of food grains, five types of fruits, etc. This all is done for getting the blessings from the resources from where these samples have been collected. The worshiper prays for sustainability of these resources so that he and his family shall get ample *Sunlight, Breeze, Water, Material and Food* throughout their stay in the premises. In this way, the ownership of the premises is also linked with the responsibility to sustain the resources.

Fig. 13 South Indian traditional meal served on banana leaf [vi]

There were times when all the bi-products of farming, kitchens and other household activities were reused for some other purpose. And eventually there was no solid waste generated through kitchen and dining.

VI. Health Benefits Of The Beliefs And Teaching Ecology Through Mythology

The beliefs are connected also with some health benefits and also with ecological balance. Ecologically important tree in settlements is Banyan tree. This tree is occasionally worshiped and has been a part of outdoor areas in cluster of houses. Combination of Neem, Banyan and Peepal tree is called *Triveni*, and is considered as a very holy combination in landscaping near buildings. People have planted these three trees together. Scientifically it has been proven that banyan trees produce more oxygen and purifies air. Fruits of this tree are eaten by multiple birds and insects, and it is also habitat for many birds. Hence having one banyan tree in vicinity is like having a complete ecosystem in the surroundings. People have been worshiping banyan tree. The intention was there to have this tree in the surrounding, to preserve it and also to remain closed to it for breathing more oxygen. Planting of Banyan tree is believed as equivalent of getting abode of Siva. Similar beliefs have been linked with plantation of Tulsi in house, *Mango* trees in garden or in farms, *Neem, Bilva, and Audumbar* etc. trees in anywhere.

Plantation of these trees is not only restricted till the botanical gardens or villages of India but has been accepted by landscape designers of many of the university campuses, industrial campuses and mass housing projects throughout the country.

There are many other ecologically important trees that have got cultural significance and also have been related with god. For example, Kadamba (Neolamarckia Cadamba) tree was a very dear tree to Krinsha. This tree has been a part of many paintings portraying stories of Krishna, and there is mention of this tree in scriptures too.

VII. Relation of indian Arts and Crafts with Ecology

Love for nature and ecosystem has been reflected in the arts and crafts of India. Example is a style of paintings, called Madhubani paintings. These are the paintings done with natural colors and fine brush. Most of the Madhubani paintings, in

which Krishan's stories are depicted, include clean and beautiful river (Yamuna river), Peacocks, Cows, birds, monkeys, flowering plants, Kadamb trees and mountains (Govardhan Parvat). These all facts represent a culture to pay respect to nature.

(a)

(b)

Figure 13 (a): Kadamb Tree, (b): A Madhubani Painting showing Krishna and Radha under Kadamb Tree

Figure 13 (a) represents picture of Kadamb tree and figure 13 (b) shows its artistic expression in form of a scene in Krishna's life. This style is Madhubani style of painting. Painting also shows monkeys, cows, peacock, peahens. It is believed that Krishna was associated with all these plants and animals. Similar instances are seen in God Dattatrya's picture. Tree of Ficus racemosa (syn. Ficus glomerata Roxb.), i.e, Audumbar is a tree under which god Datta used to sit. God Datta's painting are also full of Cows, dogs, deer and birds similar to God Krishna's paintings.

Warli style painting is an art originated in tribal areas of Maharashtra. Bagh is a style of painting originated in tribal areas of Madhya Pradesh state of India. In both these paintings, folk life is painted. Folk dances are painted with backdrop of plants, and animals are necessary elements. The plants are generally parts of these paintings are Tulsi, marigold etc., the trees that are painted are mango, banyan etc. The animals that are included in these paintings are tiger, lion, deer, elephant, cows etc. Once can see deep association of the nature and ecosystem with human life and architecture in these paintings.

These paintings have become popular and also have got importance in art galleries, museums and also in architecture. The prints of these paintings are accepted by the fashion designers and there are traditional fabrics printed on these themes.

VIII. Conclusion

Sustainable architecture worldwide emphasizes on preservation the topography and vegetation. Whereas in Indian mythology topography (mountains, i.e., Govardhan Parvat, Kailas Parvat or sacred groves) is worshiped. Sustainable architecture gives importance for consideration for conservation of ecosystem, and similarly mythological stories beautifully portray the birds, flowers and plants.

There are a number of beliefs and customs in the various cultures. It is difficult to understand the logic behind all of them, but the ones that are mentioned in this paper have direct or indirect relation with conservation and optimal use of resources, and maintaining balance of ecology and enhancement of bio-diversity too. The traditional social interactive and recreational spaces act as breathing spaces for the built environment bonding of society and also for cultural sustainability.

Most of the Green buildings rating systems talk about prevention and conservation of existing natural features of the site, optimization of water use, use of native landscape species in design, use of local materials, thermal, visual and audibility comfort, indoor environment quality etc. This sensitivity has been there in the culture since the ages. These are very similar points between the sustainability and the beliefs. These beliefs incorporate sensitivity towards existing natural resources on site. Considering these points development is possible without touching or causing minimal harm to the nature. Though the lifestyle is changing, but still there is scope of use of conventional construction methods and landscape design concepts. Traditional ideology to respect the natural resources may remain unchanged even with the development in society.

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Public Architecture and Role of Local Contractors in Late Nineteenth Century Case of Poona

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Abstract: ***Role of local engineers is largely neglected in the context of late nineteenth century due to lack of archival resources and primary sources. Though the Royal engineers were key persons worked in several parts of India they implemented their western ideas in collaboration with local engineers and masons at grass root level in the process of establishing British rule in India. Diverse projects from basic architectural interventions, railway, bridges, basic infrastructure, and services they coordinated in India. They worked on European models in local context with successful and unsuccessful efforts. [1] Till early nineteenth century simple and function based structures were built for residential and religious purposes. Engineers were experimenting and modifying European models considering local climatic conditions. From mid nineteenth century building construction activity received more attention as vocabulary of Raj. Which kept on changing adapting local climate, material and incorporation of local traditional art forms in architecture. Vasudev Bapuji Kanitkar worked with Charles Mant, Chishom [2], Trubshaw [3] and Walter Ducat in towns like Baroda, Bombay, and Poona as Indian local contractor. He was nominated as Rao Bahadur by British government for his important role in construction activity in Deccan. [4] Laxmi vilas Palace in Baroda, Secretariat Building, High court in Bombay and Reay or Phule market Poona are some of his major contributions in architectural development under Bombay Presidency as an Indian local contractor. His self executed projects in Poona left his mark as significant designer and engineer in late nineteenth century. Educational, official, Public, and domestic buildings show his advancement from local contractor to designer with his intricacy of work. His influences originated from the earlier work experiences of varied projects amalgamated with local traditional workmanship lead into the development of style could be named as local Indo-Saracenic architecture or in few cases local Indo-Neo Gothic architecture. This could be perceived in his own designs executed in Poona such as Fergusson College, Anandashram [5], Sangamashram [6] and Pune Nagar Vachan Mandir or Poona Native Library [7] and so on. His contribution as a local contractor and designer working in collaboration with Royal Engineers and local social reformists like Bhandarkar [8] and Apate [9] is underlined in the further discourse. Main focus is on his role in the development of architectural vocabulary in late nineteenth century Poona which is quite neglected in the pages of architectural history of Poona.***

Keywords: Local contractors, Nineteenth Century Architecture, Royal Engineers, Vasudev Kanitkar, Anandashram, Sangamashram, Reay Market

1. Introduction

It is important to know what was the background of engineering and architectural education in Indian context. How the western knowledge perpetuated in Indian soil and reached to royal engineers and local contractors. The image and vision of British officers had in their mind tried to manifest in a real sense could be termed as "Indian colonial Public landscapes". There are several evaluations about the works shaped by royal engineers during British reign in India. Perhaps the criticism was quite negative from the point of view of architects and artists like J.L. Kipling during late nineteenth century. Indeed these royal engineers right from establishment of East India Company have helped to build British India. They were the key persons to handle local engineers, labor and several local communities in the process of building British sovereign. Sandes call these royal engineers, as "Excellent products of Addiscombe" [10] though this sounds a superfluous glorification of the ruling agent to some extent probably was quite a datum from ruler's point of view. Right from presidency towns, important trading towns, princely states, harbors to smaller towns the traces of their works could be seen at various levels in numerous types of tangibles in 19th century. Their intervention could be observed at various levels such as roads, bridges and railways to connecting towns for vigorous transportation and command on regions, services such as drainage, water supply, and government structures such as offices, hospitals, GPOs, mint, Railway stations, markets around us as a important architectural layer in 19th century. Western and eastern scholars while writing about this specific period consider it as early modern period in Indian context. Many western concepts reached Indian subcontinent via these agents.

Standardization in the colonial educational patterns tried to inculcate in various ways in local engineers. They followed western patterns in larger context in all parts of India supported colonial construction activities. Numerous articles published in *Professional Papers on Indian Engineering* by Indian local contractors such as Teekaram who worked majorly in Lucknow, Babu Shumbhoo Dass works could be seen in Bahwalpur Pakistan, Rai Bahadur Kunhya Lal's and Sir Ganga Ram's [11] legendary projects in Lahore Pakistan, Muncherjee Beyzunjee at Hyderabad under Nizam reign are great resources indicating their contribution in architectural vocabulary in this period. Researchers such as Preeti Chopra states extraordinary works of Murzbaan in Mumbai in her book. On the other hand local engineers such as Narso Ramchandra, Vasudev Kanitkar from Poona and some other towns in Deccan were never got recognized and documented extensively for their contributions in the development of architectural character. These are important unexplored figures in the context of Poona. Their names and associations transiently appear in the history of Poona. This paper seeks to review account of who built Poona in colonial context on ground. Further discourse tries to detail out development of Vasudev Bapuji Kanitkar as an engineer and designer. Perhaps lack of resources and primary sources related to his own opinions for his projects he executed may

lead in missing links in the few of descriptions. This is due to the negligence in documenting biographies of local engineers and exploring their influences in their social contexts.

2. Works of Vasudev Kanitkar

I could uncover details of Vasudev Kanitkar's family and his background, perhaps his contribution as a engineer to some extent with the help of books *Kanitkar Kul Vrittant* [12] by Shankar Kanitkar published in the year 1948 and *341 Sadashiv va amhi* by Moreshwar Kanitkar published in 1992. As per the records mentioned in the book it had documented names and brief background of members of Kanitkar family in Maharashtra their decedents and family tree. The books refer to details about Vasudev Kanitkar and his involvement in the field of architectural landmarks in brief though he was not formally trained as an engineer or architect. Vasudev Kanitkar was born in Baroda Gujarat in the year 1829 or 1830. His father was in the service of Patwardhan the then minister of the princely state of Baroda. It is indispensible to mention that he had never went through formal engineering training like Murzbaan who was trained as an engineer in Poona Engineering College. Vasudev Kanitkar completed his education till old matriculation. He had good knowledge of engineering. He stayed in Karachi now in Pakistan for larger period of time where he worked on several construction sites and must have gained experience in the field of construction activity. Unfortunately this part of his life couldn't be traced much, due to lack of resources. [13]

Vasudev Kanitkar was honored as Rao Bahadur because of his proficiency in the field of architecture. The title was given to him as personal distinction on 1st January 1877, on the occasion of the Proclamation of Her Most Gracious Majesty as Empress of India. [14] This was great honor, which was received by very few local engineers during the period for their best service for colonial government. Preeti Chopra in her book mentions Vasudev Kanitkar's name contemporary to Murzbaan as one of the important personalities in the building of civic structures during the 19th century.

As per the brief document by author Shankar Kanitkar there were almost 15 important projects those could be listed down where Vasudev Kanitkar shared responsibilities at various levels. Those were of several typologies such as residential, public and temporary structures for public meetings as well. Perhaps it was difficult to trace exact details of his overall contribution in all projects but very important residential kinds were Laxmi Vilas palace at Baroda, Sangamashram residence of Dr. Bhandarkar. Whereas to mention cases of civic edifices significant to mention are Elphinston High school Mumbai, Secretariat building Mumbai, some part of High court. There were religious structures such as Sabhamandap of Tulashi Baug temple and Kasaba Ganpati temple considered as most paramount deities located at the heart of old core of Poona. Despite the fact that he worked on so many prestigious projects in the core cities of Bombay and Poona he is not well known in the field of architectural studies. Further emphasize is given on his works and the architectural language he followed in the 19th century as the unique contribution in Deccan region.

To take a detailed review of landmarks of Kanitkar we need to understand his glorious career started in Bombay during Frere's administration. Bartele Frere the then Governor of Bombay and Conybeare (1823-1892) an architect and engineer had a great impact on the colonial image of Bombay built in the 19th century. Afghan Memorial Church (1847-58) imagined and built by both of them became prototype Gothic revival building in Bombay. Conybeare Gothic revivalist was the first architect to use polychromatic exterior facades using local Kurla and buff Basalt stone. Visiting British architect Thomas Roger Smith designed High Gothic dream around Maidans of the city based upon guidelines by George Gilbert Scott in the year 1870 and 1880. [15] While this image building was in process there were local crafts people, artisans, contractors were getting involved in the activity for actual site works, and out of those very few were recognized in the colonial historiography.

Major civic structures in the Fort area around *Maidan* of Bombay were actually implemented by the exclusive efforts of local engineers such as Mukund Ramchandra, Murzbaan, Vasudev Kanitkar and so on. These structures defined the skyline and contributed in building Frere's imperial colonial language in neo-gothic style some examples are Secretariat building (1867-1874) designed by Clair Wilkins, David Sassoon Library and reading room (1867-1870), University building (1868-80), PWD office (1869-72), High court (1871-1878) designed by J.A.Fuller. [16] These high Victorian Gothic erections expressed in Indo-European style followed European forms in terms of models and overall scale whereas details and materials were local to larger extent. This very unique image in Indian context was an effort by the ruler and local people. Very important of the sequence in Mumbai significant presidency town were built by Vasudev Kanitkar such as Secretariat (1867-74), High court (1871-78) and Elphinston College.

Vasudev Kanitkar is given credit for supervising the construction of the Secretariat. As discussed in the earlier chapter the symbolism and the language mainly adopted by Clair Wilkins for the Secretariat building (1867-1874) was Neo-Gothic in style. Sir Clair Wilkins was a royal engineer employed under PWD was the mastermind behind the project. This was Frere's initiative intently desired to avoid the import of materials and expertise from Britain. Indian craftsmen and local resources were utilized in the whole process of execution to establish that the government could rely upon these resources that were extensively experimented in later phase of development of the city. The building was situated at the edge of *Maidan* facing west running north to south with a plan following the shape of inverted alphabet 'E, a simplistic flat façade and spatial configuration encouraged building a solid mass. Narrow width of the building similar to Barrack plans allowed breeze to penetrate in all parts of the building. Main emphasis was given upon façade treatment, use of polychromatic stones, arches and central staircase tower intervened forming skyline of the area. Central tower above the staircase is of 170 feet high that marks its presence

predominantly. Polychromatic effect was achieved by the use of local stones such as buff colored Porbandar stone, Kurla basalt, local blue basalt, Poona red basalt, and Ransome's Patent stone. Minton tiles used for paving and Terracotta Broomhall tiles roofed over teakwood joists and planks. [17] Scant original resources and correspondence between the designer and Vasudev Kanitkar are missing links in understanding architectural development. Perhaps Vasudev Kanitkar in his own designs in Poona such as Reay market, Fergusson College, followed Bombay Gothic models. Architectural elements, material and techniques, Anandashram extensively shows his proficiency in workmanship.

Second iconic structure partly worked out by Vasudev Kanitkar was High court Mumbai (1871-1878). John Augustus Fuller R.E. prepared design with Massive central tower, Turrets and Basalt rock resembling much to medieval castle. Earlier chapter discusses project in detail to understand the model followed and iconography it represented. The prominent central tower is covered with steeply sloped roof with number of dormer windows. Main access is through porch on western façade adjacent to which two octagonal towers of spiral staircase and pinnacles are located. Christopher London criticizes the overall composition as "exaggerated massing in the muscular neo-gothic style". [18] Col. Fuller proposed Vasudev Bapuji Kanitkar, Mukund Ramchandra and Muncherji Cowasji Murzban to be designated as assistant engineer in 1869. Local engineers in colonial hierarchy were the important link between rulers and local workers, helped in the process of empire buiding. Vasudev Kanitkar might have borrowed inspiration from prominent central tower with dormer windows, finials at top and use of polychromatic scheme from High court and Secretariat for the model of Reay Market in Poona. Both of these examples mark their significance metaphorically as supremacy of sovereign. Being purely colonial structure built at the heart of the old town Reay Market followed similar language of prominence. [19]

Very unique structure designed and built by Vasudev Kanitkar was Reay market (1884-1886). It was the sixth market in the series of covered markets built in pre-independent India. [20] It is one of the best examples of colonial urban landscapes in late nineteenth century followed the western language under Victorian reign. Despite a lot of opposition from local communities the project was successfully raised at the heart of native town. Reay market later named as Phule Mandai was a unique design for a market in India. Spatial organization of market majorly resembles plan of a Jail. After studying various typologies and models followed in 19th century especially from *professional papers on Indian Engineering* and *Roorkee Treatise*, it could be observed that very simple plan of barrack and jail was preferred for designing this market. Its prominent central tower and rectangular flanges projecting out of eight sides indicates image of jail. Perhaps this was chosen with the concern of capturing ample light and cross ventilation in structure. Its probably expression of a bigger model of Lambert Market, Karachi detailed out in Indo Neo-Gothic style. As Lambert market was located at the center of town at a junction of roads market accessible from all sides must have been the criteria in selection of that particular model. Unfortunately no much information is available on Lambert Market of Karachi so cant be discussed beyond certain point. Detail discourse on Reay market is explained in the next chapter. Prevailing form and fine stonework mark its exceptional presence in the medieval town of Poona. Grippingly, the building is visible from long distance on the main axis of old town connecting to the fortress of *Peshwas.* Residence of Vasudev Kanitkar is located at a close distance exactly behind Vishrambag Wada. [21]

On the same axis of the street a very important public library or *Nagar Vachan Mandir* (1884-1890) is located. Designed and built by Vasudev Kanitkar the library contains immense archival documents, books and various resourceful materials written in Marathi and English. In all the archival documents it was named as Poona Native General Library. As a part of inculcating modern education and governance amongst locals Sir George Clark the then governor of Bombay presidency proposed establishment of a library named as Poona Native General Library in the year 1848. Initially located in Budhwar Wada. The mansion was burnt down in 1879 that boosted a need for a separate space allocated to the library. Eminent personalities such as Justice Mahadeo Govind Ranade [22], Lokhitwadi Gopalrao Hari Deshmukh [23], Krishnashastri Chiploonkar and so on contributed largely in the process of establishment and running of the library. The location was selected after long discussions and the space was borrowed from Belbagkar family [24] on 15th May 1882 at the cost of Rs 4000/-. Vitthalrao Vasudev Gujar proposed initial plan and estimate for the library. Later V. B. Kanitkar reworked on design and execution of the project. Library building was started in the year of 1887 and in two years two-storied building was completed. Symbolism of using clock as modern age and industrialization in front facades of public buildings was becoming trend in all parts of the country.

Institute of Anandashram was the next important project completely designed and constructed by Vasudev Kanitkar in the year 1891. The edifice is located in the same premise close to Reay market and Shaniwarwada. Reformist and Philanthropist Mahadev Chimanaji Apte founded the institute at the heart of old town. It comprises administrative office, library, and hostel for Brahmin boys from economically weaker families from nearby towns. Along with that a large temple of Sachchidananda Shiva a local deity is located at the center of complex. A property and trust record of institute shows Vasudev Kanitkar was one of the trustees of the center. Stone and iron building built is one of the fine works in the vicinity and credit was solely given to Vasudev Kanitkar. [25] He was involved in designing and execution of the project. Overall plan follows introvert spatial planning. Which include typical Wada plan with central courtyard followed as a model for design. The Architectural details are Indo-western in at several levels. Construction materials such as Iron, lime concrete, colored glass, imported Minton tiles and local stone are wonderfully amalgamated in the composition. Exclusive woodwork in front façade and on temple reminds indigenous floral forms worked out by local craftsmen. Very important spiral staircase built in stone and finished with Marble tiles is

exactly the same as one built in Reay market in wood. External façade of the whole institute resembles a Wada or royal mansion in Poona, whereas temple built in rectangular form with central nave and aisle on both sides. Minton tiles and glass windows remind old colonial structure in Bomaby. Wooden arches at the joining point of columns and ceiling follows *Mahirap* or Maratha Style cusped arch form typically used in Royal mansions of Maratha ministers. Entry point to ground floor library adorned with segmental arch covered with ornamented overlooking gallery and three-arched door. On top of the sloping roof a small scale Shikhara is placed as representation of temple. It is interesting to note though Vasudev Kanitkar worked on restoration works of Tulasi Baug and Kasaba Ganpati temples he has not followed same pattern of language in this Shiva temple located at the center of the institute. As it was built entirely in stone, it has a very strong presence in the complex.

Two landmark structures built during the last decade of the century were residence of reformist Dr. Bahndarkar [26] was known as Sangamashram [27] (1892) and Fergusson College main building (1892-1895). Enterprise of education as an effort of the Government and Indian people resulted at the dawn of new education system that could be termed as formal Indo-western style perhaps reflected in architectural style. Education policies initiated by British Government in India and focus was upon creating more workforces to support empowerment of colonial empire. But eventually it appeared that educational empowerment helped in increased number of reformists who fought in the freedom movement in various ways. Poona was the education hub during the 19th century. Wood's Educational Despatch (1854) [28], the Educational Commission of 1882 and the Hunter Commission (1891) were suggestive of collective efforts of British Governemnt and locals as enterprise of education. Several names of reformists such as Mahatma Phule, Maharshi Karve, B.G. Tilak, G.G. Agarkar and so on were associated in educational reforms focusing on philosophy of education for all despite of cast, class and gender of communities. One of the very important examples of those was Deccan Educational Society established by Vishnushastri Chiplunkar, Lokmanya Bal Gangadhar Tilak, Gopal Ganesh Agarkar, Mahadev Ballal Namjoshi, and Vaman Shivram Apte in 1880. In the year 1891 land of 37 acres was acquired at outskirts of old town on lease. Foundation stone was laid in the year 1892 was named after the then governor of Bombay James Fergusson (1880-1885). He donated Rs 1200/- for the construction of main building.[29] Fergusson College was one of earliest institute in Poona that was run in collaboration with Government and locals. Vasudev Kanitkar carried out design and execution of the main building.

Similar to other contemporary institutional models in India simple form of C shape was adopted. Porch is projected little out highlighted as entrance gateway. Semicircular arches are used throughout the structure. Rose windows are used on ground and first floor highlighted with lime plasterwork. Segmental arches are used at entrance porch. Unfortunately, as like the other structures designed by Vasudev Kanitkar original handmade drawings are not available to see. But one of the finest works in the institutional typology that is fortunately preserved well by the management of institution that is in good condition. English tracery is used for window details and façade treatment. Decorative wrought Iron and wooden railing are used for upper floors adorning the elevation. Decorative elements such as windows arches and overall composition in elevation are very similar to the Reay market building.

3. Conclusions

In spite of not being architect or engineer Vasudev Kanitkar worked on landmark structures those represented urban public spaces in Bombay and Poona. While looking at the typology of projects both have carried out, mainly public oriented projects in association with government and local philanthropists. Reay market in Poona being a first of its kind stands out in whole, which marked its presence dominantly in old town that later triggered further extension of town towards south. It was built at the peak of career of both. This structure has importance in the context of urban landscape of Poona, as it changed the skyline and brought covered market as an important typology for citizens in the context.

Name of Vasudev Kanitkar was mentioned in the Bombay University Calendar [30] under the list of faculty of civil engineering in the year 1868 and 1874 simultaneously. Ascending graphs of him is noteworthy in the Bombay Presidency those are important cultural heritage sites in the context. I find works of local contractors are noteworthy in the context of late nineteenth century who built colonial Indian edifices later helped to produce Indian scholars nurtured concept of freedom and social reforms.

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[3] Lieutenant colonel Trubshaw appointed on Bombay Rampart removal committee and worked on several remarkable projects in Bombay such as General Post Office, Elphinston College(1975), High court (1878), Plan for Bombay.
[4] Lethbridge Roper, *The Golden Book of India*, (London, Macmillan and Co., 1893), 566. This is Genealogical and Biographical dictionary of the ruling princes, chiefs, nobles and other personages, titles or decorated of the Indian Empire.
[5] *Anandashram* (1888) trust located in Poona, founded by Mahadev Chimnaji Apte for providing residential facility for middle and economically weaker class students. It also publishes books for Sanskrit and has collection of manuscripts.
[6] *Sangamashram* was house of Bhandarkar built in Poona by Vasudev Kanitkar in the year 1890.
[7] *Pune Nagar Vachan Mandir* (Poona Native General Library 1889) this was an effort of eminent scholars

and gentlemen for collection books of local writers and providing facility of library for people around
[8] Dr. Sir Ramkrishna Gopal Bhandarkar welknown in late 19th century for his research work on Indian history and connected with freedom movement.
[9] Mahadev Chimnaji Apte was a leading advocate of Bombay High Court, founded the Institute *Anandashram* in Poona.
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[11] Preeti Chopra in her Book *A Joint Enterprise* on the page number 76 mentions name of Sir Ganga Ram as legendary figure who worked for PWD in Lahore now in Pakistan.
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[20] Before partition of 1947 Pakistan was part of India. Earlier examples of covered markets built were Lambert Market in Karachi (1864), Tollinton Market Lahore (1864) earlier built as community hall later converted in market by Rai Bahadur Gangaram well known local government engineer, Crawford market (1867) Mumbai designed by architect Sir William Emerson, Hogg Stuart Market Calcutta (1872) and Bolton Market Karachi(1883). Commencement year of Empress Market Karachi was probably same as Reay market (1886) it was 1884. In later decade of the century Connaught or Shivaji Market (1885-1886) and Moore market Madras (1898-1900) were built.
[21] As Earlier residence of Kanitkar family was located behind Vishrambag Wada close to Pushkarni tank
[22] Ranade: Mhadev Govind Ranade was social reformer, founding member of Indian National Congress, was judge in Bombay Highcourt
[23] Lokhitwadi: Gopal Hari Deshmukh part of Freedom movement, scholar, social reformer. Taken strong stand against child marriages, dowry, caste system
[24] Belbagkar Raosaheb Mahadev Ballal Phadnis was one of the Ministers of Peshwas was one of the owners of precious land in the old town.
[25] Schedule "A" in will by Mahadev Chimnaji Apte, , Schedule "B" written in 1891, page no. 7, 11.
[26] Bhandarkar: Dr. Sir Ramkrishna Gopal Bhandarkar welknown in late 19th century for his research work on Indian history and his extensive contributions in freedom movement in terms of literature, lectures he conducted in several Indian communities.
[27] Name "Sangamasham" residence of Dr. Bhandarkar suggests its picturesque location of site near the confluence of two rivers in Poona. *Sangam* is confluence and *Ashram* is a secluded building generally used as religious retreat or instruction in Hinduism.
[28] Wood's Educational Dispatch (1854) speaks about right to education for all and discourse on inculcating western knowledge in "Natives". This was in order to create a class of civil servants for empire. Charles Wood was the President of the Board of Control of the East India Company.
[29] http://www.fergusson.edu/upload/document/77939__History.pdf Sundaram M.S., "A Century of British Education in India 1857-1957", Journal of the Royal Society of Arts, Vol.107, No.5035, (June 1959), 491-507, Stable URL: http://www.jstor.org/stable/41368746.
[30] The Bombay University Calendar for the year 1874-75, (Bombay, Thacker Vining & co., 1874)

TITLE

PUBLIC ARCHITECTURE AND ROLE OF LOCAL CONTRACTORS IN LATE NINETEENTH CENTURY CASE OF POONA

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Abstract

Role of local engineers is largely neglected in the context of late nineteenth century due to lack of archival resources and primary sources. Though the Royal engineers were key persons worked in several parts of India they implemented their western ideas in collaboration with local engineers and masons at grass root level in the process of establishing British rule in India. Diverse projects from basic architectural interventions, railway, bridges, basic infrastructure, and services they coordinated in India. They worked on European models in local context with successful and unsuccessful efforts.[1] Till early nineteenth century simple and function based structures were built for residential and religious purposes. Engineers were experimenting and modifying European models considering local climatic conditions. From mid nineteenth century building construction activity received more attention as vocabulary of *Raj*. Which kept on changing adapting local climate, material and incorporation of local traditional art forms in architecture. Vasudev Bapuji Kanitkar worked with Charles Mant, Chishom[2], Trubshaw[3] and Walter Ducat in towns like Baroda, Bombay, and Poona as Indian local contractor. He was nominated as *Rao Bahadur* by British government for his important role in construction activity in Deccan.[4] Laxmi vilas Palace in Baroda, Secretariat Building, High court in Bombay and Reay or Phule market Poona are some of his major contributions in architectural development under Bombay Presidency as an Indian local contractor. His self executed projects in Poona left his mark as significant designer and engineer in late nineteenth century. Educational, official, Public, and domestic buildings show his advancement from local contractor to designer with his intricacy of work. His influences originated from the earlier work experiences of varied projects amalgamated with local traditional workmanship lead into the development of style could be named as local Indo-Saracenic architecture or in few cases local Indo-Neo Gothic architecture. This could be perceived in his own designs executed in Poona such as Fergusson College, Anandashram[5], Sangamashram[6] and *Pune Nagar Vachan Mandir* or Poona Native Library[7] and so on. His contribution as a local contractor and designer working in collaboration with Royal Engineers and local social reformists like Bhandarkar[8] and Apate[9] is underlined in the further discourse. Main focus is on his role in the development of architectural vocabulary in late nineteenth century Poona which is quite neglected in the pages of architectural history of Poona.

Introduction

It is important to know what was the background of engineering and architectural education in Indian context. How the western knowledge perpetuated in Indian soil and reached to royal engineers and local contractors. The image and vision of British officers had in their mind tried to manifest in a real sense could be termed as "Indian colonial Public landscapes". There are several evaluations about the works shaped by royal engineers during British reign in India. Perhaps the criticism was quite negative from the point of view of architects and artists like J.L. Kipling during late nineteenth century. Indeed these royal engineers right from establishment of East India Company have helped to build British India. They were the key persons to handle local engineers, labor and several local communities in the process of building British sovereign. Sandes call these royal engineers, as "Excellent products of Addiscombe" [10] though this sounds a superfluous glorification of the ruling agent to some extent probably was quite a datum from ruler's point of view. Right from presidency towns, important trading towns, princely states, harbors to smaller towns the traces of their works could be seen at various levels in numerous types of tangibles in 19th century. Their intervention could be observed at various levels such as roads, bridges and railways to connecting towns for vigorous transportation and command on regions, services such as drainage, water supply, and government structures such as offices, hospitals, GPOs, mint, Railway stations, markets around us as a important architectural layer in 19th century. Western and eastern scholars while writing about this specific period consider it as early modern period in Indian context. Many western concepts reached Indian subcontinent via these agents.

Standardization in the colonial educational patterns tried to inculcate in various ways in local engineers. They followed western patterns in larger context in all parts of India supported colonial construction activities. Numerous articles published in *Professional Papers on Indian Engineering* by Indian local contractors such as Teekaram who worked majorly in Lucknow, Babu Shumbhoo Dass works could be seen in Bahwalpur Pakistan, Rai Bahadur Kunhya Lal's and Sir Ganga Ram's[11] legendary projects in Lahore Pakistan, Muncherjee Beyzunjee at Hyderabad under Nizam reign are great resources indicating their contribution in architectural vocabulary in this period. Researchers such as Preeti Chopra states extraordinary works of Murzbaan in Mumbai in her book. On the other hand local engineers such as Narso Ramchandra, Vasudev Kanitkar from Poona and some other towns in Deccan were never got recognized and documented extensively for their contributions in the development of architectural character. These are important unexplored figures in the context of Poona. Their names and associations transiently appear in the history of Poona. This paper seeks to review account of who built Poona in colonial context on ground. Further discourse tries to detail out development of Vasudev Bapuji Kanitkar as an engineer and designer. Perhaps lack of resources and primary sources related to his own opinions for his projects he executed may lead in missing links in the few of descriptions. This is due to the negligence in documenting biographies of local engineers and exploring their influences in their social contexts.

I could uncover details of Vasudev Kanitkar's family and his background, perhaps his contribution as a engineer to some extent with the help of books *Kanitkar Kul Vrittant*[12] by Shankar Kanitkar published in the year 1948 and *341 Sadashiv va amhi* by Moreshwar Kanitkar published in 1992. As per the records mentioned in the book it had documented names and brief background of members of Kanitkar family in Maharashtra their decedents and family tree. The books refer to details about Vasudev Kanitkar and his involvement in the field of architectural landmarks in brief though he was not formally trained as an engineer or architect. Vasudev Kanitkar was born in Baroda Gujarat in the year 1829 or 1830. His father was in the service of Patwardhan the then minister of the princely state of Baroda. It is indispensible to mention that he had never went through formal engineering training like Murzbaan who was trained as an engineer in Poona Engineering College. Vasudev Kanitkar completed his education till old matriculation. He had good knowledge of engineering. He stayed in Karachi now in Pakistan for larger period of time where he worked on several construction sites and must have gained experience in the field of construction activity. Unfortunately this part of his life couldn't be traced much, due to lack of resources.[13]

Vasudev Kanitkar was honored as Rao Bahadur because of his proficiency in the field of architecture. The title was given to him as personal distinction on 1st January 1877, on the occasion of the Proclamation of Her Most Gracious Majesty as Empress of India.[14] This was great honor, which was received by very few local engineers during the period for their best service for colonial government. Preeti Chopra in her book mentions Vasudev Kanitkar's name contemporary to Murzbaan as one of the important personalities in the building of civic structures during the 19th century.

As per the brief document by author Shankar Kanitkar there were almost 15 important projects those could be listed down where Vasudev Kanitkar shared responsibilities at various levels. Those were of several typologies such as residential, public and temporary structures for public meetings as well. Perhaps it was difficult to trace exact details of his overall contribution in all projects but very important residential kinds were Laxmi Vilas palace at Baroda, Sangamashram residence of Dr. Bhandarkar. Whereas to mention cases of civic edifices significant to mention are Elphinston High school Mumbai, Secretariat building Mumbai, some part of High court. There were religious structures such as Sabhamandap of Tulashi Baug temple and Kasaba Ganpati temple considered as most paramount deities located at the heart of old core of Poona. Despite the fact that he worked on so many prestigious projects in the core cities of Bombay and Poona he is not well known in the field of architectural studies. Further emphasize is given on his works and the architectural language he followed in the 19th century as the unique contribution in Deccan region.

To take a detailed review of landmarks of Kanitkar we need to understand his glorious career started in Bombay during Frere's administration. Bartele Frere the then Governor of Bombay and Conybeare (1823-1892) an architect and engineer had a great impact on the colonial image of Bombay built in the 19th century. Afghan Memorial Church (1847-58) imagined and built by both of them became prototype Gothic revival building in Bombay. Conybeare Gothic

revivalist was the first architect to use polychromatic exterior facades using local Kurla and buff Basalt stone. Visiting British architect Thomas Roger Smith designed High Gothic dream around Maidans of the city based upon guidelines by George Gilbert Scott in the year 1870 and 1880.[15] While this image building was in process there were local crafts people, artisans, contractors were getting involved in the activity for actual site works, and out of those very few were recognized in the colonial historiography.

Major civic structures in the Fort area around *Maidan* of Bombay were actually implemented by the exclusive efforts of local engineers such as Mukund Ramchandra, Murzbaan, Vasudev Kanitkar and so on. These structures defined the skyline and contributed in building Frere's imperial colonial language in neo-gothic style some examples are Secretariat building (1867-1874) designed by Clair Wilkins, David Sassoon Library and reading room (1867-1870), University building (1868-80), PWD office (1869-72), High court (1871-1878) designed by J.A.Fuller.[16] These high Victorian Gothic erections expressed in Indo-European style followed European forms in terms of models and overall scale whereas details and materials were local to larger extent. This very unique image in Indian context was an effort by the ruler and local people. Very important of the sequence in Mumbai significant presidency town were built by Vasudev Kanitkar such as Secretariat (1867-74), High court (1871-78) and Elphinston College.

Vasudev Kanitkar is given credit for supervising the construction of the Secretariat. As discussed in the earlier chapter the symbolism and the language mainly adopted by Clair Wilkins for the Secretariat building (1867-1874) was Neo-Gothic in style. Sir Clair Wilkins was a royal engineer employed under PWD was the mastermind behind the project. This was Frere's initiative intently desired to avoid the import of materials and expertise from Britain. Indian craftsmen and local resources were utilized in the whole process of execution to establish that the government could rely upon these resources that were extensively experimented in later phase of development of the city. The building was situated at the edge of *Maidan* facing west running north to south with a plan following the shape of inverted alphabet 'E, a simplistic flat façade and spatial configuration encouraged building a solid mass. Narrow width of the building similar to Barrack plans allowed breeze to penetrate in all parts of the building. Main emphasis was given upon façade treatment, use of polychromatic stones, arches and central staircase tower intervened forming skyline of the area. Central tower above the staircase is of 170 feet high that marks its presence predominantly. Polychromatic effect was achieved by the use of local stones such as buff colored Porbandar stone, Kurla basalt, local blue basalt, Poona red basalt, and Ransome's Patent stone. Minton tiles used for paving and Terracotta Broomhall tiles roofed over teakwood joists and planks.[17] Scant original resources and correspondence between the designer and Vasudev Kanitkar are missing links in understanding architectural development. Perhaps Vasudev Kanitkar in his own designs in Poona such as Reay market, Fergusson College, followed Bombay Gothic models. Architectural elements, material and techniques, Anandashram extensively shows his proficiency in workmanship.

Second iconic structure partly worked out by Vasudev Kanitkar was High court Mumbai

(1871-1878). John Augustus Fuller R.E. prepared design with Massive central tower, Turrets and Basalt rock resembling much to medieval castle. Earlier chapter discusses project in detail to understand the model followed and iconography it represented. The prominent central tower is covered with steeply sloped roof with number of dormer windows. Main access is through porch on western façade adjacent to which two octagonal towers of spiral staircase and pinnacles are located. Christopher London criticizes the overall composition as "exaggerated massing in the muscular neo-gothic style". [18] Col. Fuller proposed Vasudev Bapuji Kanitkar, Mukund Ramchandra and Muncherji Cowasji Murzban to be designated as assistant engineer in 1869. Local engineers in colonial hierarchy were the important link between rulers and local workers, helped in the process of empire buiding. Vasudev Kanitkar might have borrowed inspiration from prominent central tower with dormer windows, finials at top and use of polychromatic scheme from High court and Secretariat for the model of Reay Market in Poona. Both of these examples mark their significance metaphorically as supremacy of sovereign. Being purely colonial structure built at the heart of the old town Reay Market followed similar language of prominence. [19]

Very unique structure designed and built by Vasudev Kanitkar was Reay market (1884-1886). It was the sixth market in the series of covered markets built in pre-independent India.[20] It is one of the best examples of colonial urban landscapes in late nineteenth century followed the western language under Victorian reign. Despite a lot of opposition from local communities the project was successfully raised at the heart of native town. Reay market later named as Phule Mandai was a unique design for a market in India. Spatial organization of market majorly resembles plan of a Jail. After studying various typologies and models followed in 19th century especially from *professional papers on Indian Engineering* and *Roorkee Treatise*, it could be observed that very simple plan of barrack and jail was preferred for designing this market. Its prominent central tower and rectangular flanges projecting out of eight sides indicates image of jail. Perhaps this was chosen with the concern of capturing ample light and cross ventilation in structure. Its probably expression of a bigger model of Lambert Market, Karachi detailed out in Indo Neo-Gothic style. As Lambert market was located at the center of town at a junction of roads market accessible from all sides must have been the criteria in selection of that particular model. Unfortunately no much information is available on Lambert Market of Karachi so cant be discussed beyond certain point. Detail discourse on Reay market is explained in the next chapter. Prevailing form and fine stonework mark its exceptional presence in the medieval town of Poona. Grippingly, the building is visible from long distance on the main axis of old town connecting to the fortress of *Peshwas.* Residence of Vasudev Kanitkar is located at a close distance exactly behind Vishrambag Wada.[21]

On the same axis of the street a very important public library or *Nagar Vachan Mandir* (1884-1890) is located. Designed and built by Vasudev Kanitkar the library contains immense archival documents, books and various resourceful materials written in Marathi and English. In all the archival documents it was named as Poona Native General Library. As a part of inculcating modern education and governance amongst locals Sir George Clark the then

governor of Bombay presidency proposed establishment of a library named as Poona Native General Library in the year 1848. Initially located in Budhwar Wada. The mansion was burnt down in 1879 that boosted a need for a separate space allocated to the library. Eminent personalities such as Justice Mahadeo Govind Ranade[22], Lokhitwadi Gopalrao Hari Deshmukh[23], Krishnashastri Chiploonkar and so on contributed largely in the process of establishment and running of the library. The location was selected after long discussions and the space was borrowed from Belbagkar family[24] on 15th May 1882 at the cost of Rs 4000/-. Vitthalrao Vasudev Gujar proposed initial plan and estimate for the library. Later V. B. Kanitkar reworked on design and execution of the project. Library building was started in the year of 1887 and in two years two-storied building was completed. Symbolism of using clock as modern age and industrialization in front facades of public buildings was becoming trend in all parts of the country.

Institute of Anandashram was the next important project completely designed and constructed by Vasudev Kanitkar in the year 1891. The edifice is located in the same premise close to Reay market and Shaniwarwada. Reformist and Philanthropist Mahadev Chimanaji Apte founded the institute at the heart of old town. It comprises administrative office, library, and hostel for Brahmin boys from economically weaker families from nearby towns. Along with that a large temple of Sachchidananda Shiva a local deity is located at the center of complex. A property and trust record of institute shows Vasudev Kanitkar was one of the trustees of the center. Stone and iron building built is one of the fine works in the vicinity and credit was solely given to Vasudev Kanitkar.[25] He was involved in designing and execution of the project. Overall plan follows introvert spatial planning. Which include typical Wada plan with central courtyard followed as a model for design. The Architectural details are Indo-western in at several levels. Construction materials such as Iron, lime concrete, colored glass, imported Minton tiles and local stone are wonderfully amalgamated in the composition. Exclusive woodwork in front façade and on temple reminds indigenous floral forms worked out by local craftsmen. Very important spiral staircase built in stone and finished with Marble tiles is exactly the same as one built in Reay market in wood. External façade of the whole institute resembles a Wada or royal mansion in Poona, whereas temple built in rectangular form with central nave and aisle on both sides. Minton tiles and glass windows remind old colonial structure in Bomaby. Wooden arches at the joining point of columns and ceiling follows *Mahirap* or Maratha Style cusped arch form typically used in Royal mansions of Maratha ministers. Entry point to ground floor library adorned with segmental arch covered with ornamented overlooking gallery and three-arched door. On top of the sloping roof a small scale Shikhara is placed as representation of temple. It is interesting to note though Vasudev Kanitkar worked on restoration works of Tulasi Baug and Kasaba Ganpati temples he has not followed same pattern of language in this Shiva temple located at the center of the institute. As it was built entirely in stone, it has a very strong presence in the complex.

Two landmark structures built during the last decade of the century were residence of reformist Dr. Bahndarkar[26] was known as Sangamashram[27] (1892) and Fergusson College main

building (1892-1895). Enterprise of education as an effort of the Government and Indian people resulted at the dawn of new education system that could be termed as formal Indo-western style perhaps reflected in architectural style. Education policies initiated by British Government in India and focus was upon creating more workforces to support empowerment of colonial empire. But eventually it appeared that educational empowerment helped in increased number of reformists who fought in the freedom movement in various ways. Poona was the education hub during the 19th century. Wood's Educational Despatch (1854)[28], the Educational Commission of 1882 and the Hunter Commission (1891) were suggestive of collective efforts of British Governemnt and locals as enterprise of education. Several names of reformists such as Mahatma Phule, Maharshi Karve, B.G. Tilak, G.G. Agarkar and so on were associated in educational reforms focusing on philosophy of education for all despite of cast, class and gender of communities. One of the very important examples of those was Deccan Educational Society established by Vishnushastri Chiplunkar, Lokmanya Bal Gangadhar Tilak, Gopal Ganesh Agarkar, Mahadev Ballal Namjoshi, and Vaman Shivram Apte in 1880. In the year 1891 land of 37 acres was acquired at outskirts of old town on lease. Foundation stone was laid in the year 1892 was named after the then governor of Bombay James Fergusson (1880-1885). He donated Rs 1200/- for the construction of main building.[29] Fergusson College was one of earliest institute in Poona that was run in collaboration with Government and locals. Vasudev Kanitkar carried out design and execution of the main building.

Similar to other contemporary institutional models in India simple form of C shape was adopted. Porch is projected little out highlighted as entrance gateway. Semicircular arches are used throughout the structure. Rose windows are used on ground and first floor highlighted with lime plasterwork. Segmental arches are used at entrance porch. Unfortunately, as like the other structures designed by Vasudev Kanitkar original handmade drawings are not available to see. But one of the finest works in the institutional typology that is fortunately preserved well by the management of institution that is in good condition. English tracery is used for window details and façade treatment. Decorative wrought Iron and wooden railing are used for upper floors adorning the elevation. Decorative elements such as windows arches and overall composition in elevation are very similar to the Reay market building.

In spite of not being architect or engineer Vasudev Kanitkar worked on landmark structures those represented urban public spaces in Bombay and Poona. While looking at the typology of projects both have carried out, mainly public oriented projects in association with government and local philanthropists. Reay market in Poona being a first of its kind stands out in whole, which marked its presence dominantly in old town that later triggered further extension of town towards south. It was built at the peak of career of both. This structure has importance in the context of urban landscape of Poona, as it changed the skyline and brought covered market as an important typology for citizens in the context.

Name of Vasudev Kanitkar was mentioned in the Bombay University Calendar[30] under the list of faculty of civil engineering in the year 1868 and 1874 simultaneously. Ascending graphs of him is noteworthy in the Bombay Presidency those are important cultural heritage sites

in the context. I find works of local contractors are noteworthy in the context of late nineteenth century who built colonial Indian edifices later helped to produce Indian scholars nurtured concept of freedom and social reforms.

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[1] Sandes E. W. C. Lieut. Colonel, Preface *The Military Engineer in India, Vol II*, (Chatham: Institution of Royal Engineers, 1933), 35.

[2] Architect Robert Fellowes Chisholm famous for Indo-Saracenic works in India. To mentions few of his important works are Bombay Yatch Club, execution of Laxmi Vilas Palace after Mant, University of Madras(1874-79), Lawrence Asylum building(1865)

[3] Lieutenant colonel Trubshaw appointed on Bombay Rampart removal committee and worked on several remarkable projects in Bombay such as General Post Office, Elphinston College(1975), High court (1878), Plan for Bombay.

[4] Lethbridge Roper, *The Golden Book of India*, (London, Macmillan and Co., 1893), 566. This is Genealogical and Biographical dictionary of the ruling princes, chiefs, nobles and other personages, titles or decorated of the Indian Empire.

[5] *Anandashram* (1888) trust located in Poona, founded by Mahadev Chimnaji Apte for providing residential facility for middle and economically weaker class students. It also publishes books for Sanskrit and has collection of manuscripts.

[6] *Sangamashram* was house of Bhandarkar built in Poona by Vasudev Kanitkar in the year 1890.

[7] *Pune Nagar Vachan Mandir* (Poona Native General Library 1889) this was an effort of eminent scholars and gentlemen for collection books of local writers and providing facility of library for people around

[8] Dr. Sir Ramkrishna Gopal Bhandarkar welknown in late 19th century for his research work on Indian history and connected with freedom movement.

[9] Mahadev Chimnaji Apte was a leading advocate of Bombay High Court, founded the Institute *Anandashram* in Poona.

[10] Sandes E. W. C. Lieut. Colonel, *The Military Engineer in India*, *II*…cit.,87.

[11] Preeti Chopra in her Book *A Joint Enterprise* on the page number 76 mentions name of Sir Ganga Ram as legendary figure who worked for PWD in Lahore now in Pakistan.

[12] *Kanitkar Kul Vrittant* the name of book suggests tidings of Kanitkar

[13] Kanitkar Shankar Ramchandra, *Kanitkar Kul Vrittant, (Pune, 915/1 Shivajinagar Vitthal Hari Barve, Aaryabhushan Mudranalay, 1948),* 146; Kanitkar Moreshwar, 341 Sadashiv *va amhi/* 341 Sadashiv and us, (Pune, Moreshwar Kanitkar, 1992), 89

[14] Lethbridge Sir Roper, *The Golden Book of India*, (London, Macillan and co.,1893, reprinted 2013), 566-7, https://archive.org/details/bookofindi00lethgoldenrich

[15] London Christopher W., *Bombay Gothic*…cit., 17,18,128.

[16] Ibid 37-53.

17 Chopra P.N. and Chopra Prabha, *Monuments of the Raj: British buildings in India, Pakistan and Myanmar*...cit.,27-29; Christopher W., *Bombay Gothic*…cit., 38,39; Samita Gupta, *Architecture and The Raj, Western Deccan, 1700-1900*...cit.,89.

18 London Christopher W., *Bombay Gothic*…cit., 53.

19 Kanitkar Shankar Ramchandra, *Kanitkar Kul Vrittant* ...cit.,146; Mehrotra Rahul and Dwivedi Sharada, *The Bombay Highcourt The story of the building 1878-2003*...cit.,39.

20 Before partition of 1947 Pakistan was part of India. Earlier examples of covered markets built were Lambert Market in Karachi (1864), Tollinton Market Lahore (1864) earlier built as community hall later converted in market by Rai Bahadur Gangaram well known local government engineer, Crawford market (1867) Mumbai designed by architect Sir William Emerson, Hogg Stuart Market Calcutta (1872) and Bolton Market Karachi(1883). Commencement year of Empress Market Karachi was probably same as Reay market (1886) it was 1884. In later decade of the century Connaught or Shivaji Market (1885-1886) and Moore market Madras (1898-1900) were built.

21 As Earlier residence of Kanitkar family was located behind Vishrambag Wada close to Pushkarni tank

22 Ranade: Mhadev Govind Ranade was social reformer, founding member of Indian National Congress, was judge in Bombay Highcourt

23 Lokhitwadi: Gopal Hari Deshmukh part of Freedom movement, scholar, social reformer. Taken strong stand against child marriages, dowry, caste system

24 Belbagkar Raosaheb Mahadev Ballal Phadnis was one of the Ministers of Peshwas was one of the owners of precious land in the old town.

25 Schedule "A" in will by Mahadev Chimnaji Apte, , Schedule "B" written in 1891, page no. 7, 11.

26 Bhandarkar: Dr. Sir Ramkrishna Gopal Bhandarkar welknown in late 19th century for his research work on Indian history and his extensive contributions in freedom movement in terms of literature, lectures he conducted in several Indian communities.

27 Name "Sangamasham" residence of Dr. Bhandarkar suggests its picturesque location of site near the confluence of two rivers in Poona. *Sangam* is confluence and *Ashram* is a secluded building generally used as religious retreat or instruction in Hinduism.

28 Wood's Educational Dispatch (1854) speaks about right to education for all and discourse on inculcating western knowledge in "Natives". This was in order to create a class of civil servants for empire. Charles Wood was the President of the Board of Control of the East India Company.

29 http://www.fergusson.edu/upload/document/77939__History.pdf
; Sundaram M.S., "A Century of British Education in India 1857-1957", *Journal of the Royal Society of Arts*, Vol.107, No.5035, (June 1959), 491-507, Stable URL: http://www.jstor.org/stable/41368746.

30 The Bombay University Calendar for the year 1874-75, (Bombay, Thacker Vining & co., 1874)

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Panel construction systems in Prefabricated structures: A smart way for Affordable Housing

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Abstract. There is a need of a new adoption for a measurable change in the affordable housing. *Prefabrication* mechanism can be a real gear in especially for mass housing sector in developing countries like India. The study aims to introduce and gain more knowledge about prefabricated structures. The research discusses the useful qualities of prefabricated structues for affordable housing. The scope of the research is limited to various panel construction technologies in *prefabricated structures*. It explains the mechanisms & materials with merits of respective panel prefabrication technology. This research further analyses and compares *prefabricated structures* with conventional buildings on the basis of some defined parameters from qualitative literature. This study supports & recommends prefabricated panel technologies in the affordable mass housing to earn basic right of living *i.e.* affordable shelter for deprived part of the society in a smart way.

Keywords : Prefabrication, panel, smart, affordable, housing

1Introduction

1.1 The concept of Prefabricated Structures

Prefabricates structures are pre-engineered buildings. A prefabricated structure encompasses several different types of structures such as industrial, commercial, institutional & now residential also. Technically, any home that has sections of the structure built in a factory and then assembled on site can fall under the 'prefab' designation. (Paudel et.al, 2016). The adoption of prefabricated system depends upon type and function of a space. Preabrication system involves fabrication, assembling, transportation and erection processes. Generally, masonry wall is replaced with framed light gauge panels and deck slabs as floors. The structural composite combinations can be worked out on site as per requirement. Pefabricated components require firm foundation of civil work on site. Therefore, these components can be fabricated in parallel with on site civil work. It results in overall time and cost saving of the project. Prefabricated structures involve 3 major components as floor, wall and column. These can be assembled by bolted connections which could be effective in earthquake situations. Flexible connections offer the scope for altérations inside the structure.

1.2 Need and Significance of the study

The world economy is developing at a fast pace. In deprived countries like Africa, the authorities have already started the construction practice with prefabricated buildings. In this competitive world, no countries want to be backward and less developed than any other. The countries which possess a great population are facing the challenge of providing shelter to all. Government of India also declared various schemes under Housing for all 2022. Therefore, it is important to have future growth with sustainable practices & technologies.

Considering the above scenario Prefabrication technology can be a great tool for having shelters at a rapid rate. India needs more than 50 million houses by the year 2022 and also there are more than 90 smart cities being planned. To achieve such a large scale in a short time, industry experts point out that offsite construction and pre-fabricated structures, will play an important role. A prefab structure reduces construction cost, manpower cost, material cost, water consumption and labour cost significantly (Karthikeyan et.al, 2018). The prefabricated structural components can be standardized and customized. It includes a definite stages and methods in construction schedule. There are current projects in India which are built 20 floors high using paneling prefabrication techniques.

Although such offsite prefabrication technologies are at a nascent stage in the Indian market, the demand for them is gaining momentum. This technology was developed in european countries at the time of industrial revolution. But when the world faced the housing shortage then these technologies implemented for housing sector majorly. The experts suggested this technology as an alternative to conventional construction. Stefan et al (1990) stated that the production of prefabricated housing under controlled conditions using mass production technology and employing a generally semi-skilled workforce would result in a product less expensive to that of conventional construction. The rates of material in conventional construction have risen from the last several years. Jain (2012) explained that how the construction cost in India is increasing at around 50 per cent over the average

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inflation levels. The author stated the fact that there is increase up to 15 per cent every year, primarily due to cost of basic building materials such i.e. structural material, formwork material, masonry material and other inputs as well as cost of labour. Therefore, he suggested applying modern construction materials and techniques with efficient inputs leading to economic solutions. Villaitramani (2014) stated that Prefabrication of houses, an innovation that has potential to address environmental and sustainability concerns at a rapid pace, mechanizes the construction process, enabling mass manufacture of affordable houses.

Prefabrication has the potential to bring a noticeable change within the Indian construction industry in economic, social and environmental terms. BMTPC (2015) explained how there is too much of dependency on cement, aggregates and water in these traditional constructions. Now a days the availability of fine sand and water are also becoming difficult. Therefore, they categorized the mass housing requirements into 3 categories such as quality, time & cost of construction. They enlisted & described different building technologies as Precast construction, Tunnel form, EPS Panel construction, CFS housing systems, GFRC building systems, Lightweight concrete constructions etc. Mittal (2016) suggested the prefabricated structure as a future of India in housing sector. In results the author also suggested that the design should be for deconstruction, flexible and demountable precast building systems & easy repair and maintenance.

2. Methodology

Literature from various contributing fields is considered comprehensively to explain *Prefabricated Structures*. The literature review of prefabricated structures suggests a strong affiliation towards prefabricated structures. This technology will definitely ensure the tome & cost effective projects leading to the profit of financial institutions & increasing the interest of private developers. The selected literature is reviewed to identify the various technologies in panel prefabrication with their mechanism & advantages. The application of prefabrication is explained in the context of technology & design. The mechanisms are discussed with the use of qualitative literature & construction sketches, photographs etc. The purpose of this analysis is to suggest possibilities in prefabrication which are advantageous in affordable housing projects.

3. Preliminary Data Collection and Observations

3.1. Glass Fiber Reinforced Gypsum Panel & Floor Construction

Glass fibre reinforcement in concrete improves quality of concrete. Typically, a panel is casted n factory under controlled environment. Rapidwall (present manufacture) produces a panel of size 12.0mX 3.0m X 0.124m. Each 1.0 m segment consists 4 cavities of 250 mm wide. These panels can be used as a load bearing wall, a partition wall, compound wall and floor, roof slabs. It is recommended that every third or fourth cavity has to be filled with M20 concrete with 8mm reinforcement bar inside.

This panel can be used as stair waist slabs and for sloping roofs. In case of roof slabs micro beams should be provided to stand with intensity of imposed loads. Laying 50 mm thick screed with 100mm X100mm reinforcement mesh is required. It acts as T system with embedded concrete creates strength against loads. (Structural Design Manual, IIT Chennai, 2013)

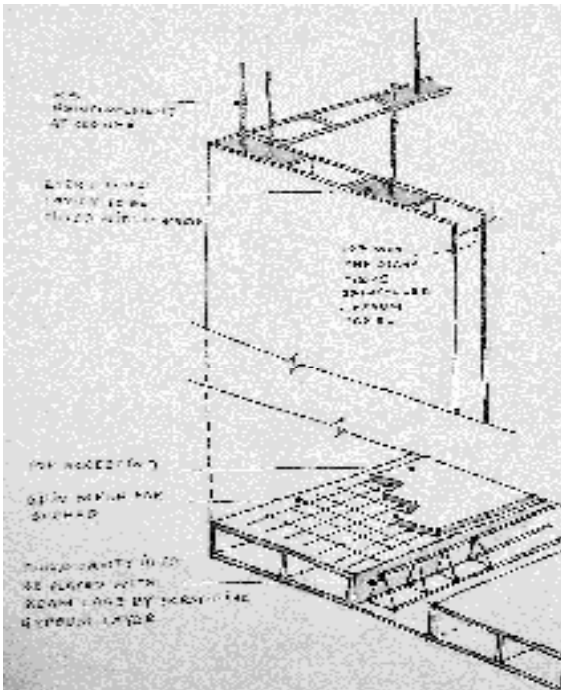


Fig 1 Glass Fiber reinforced Gypsum (GFRG) Construction in schematic view

(Source: Author)

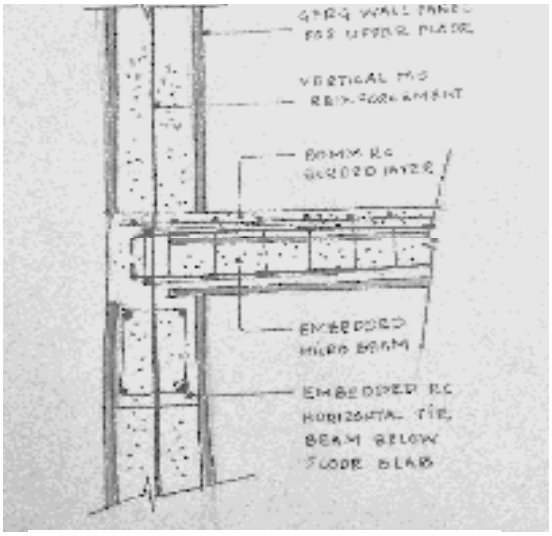


Fig 2 Sectional detail of GFRG wall panel & floor junction

(Source: Author)

3.2 Aerated autoclaved light weight concrete technology

Aerated Autoclaved (AAC) light weight concrete is very effective technology specially for masonry wall construction. It is a light weight concrete due to removal of hydrogen in the manufacturing process. Therefore, AAC has obvious advantages of higher strength to weight ratio and better tensile strain capacity. The reduction in the dead weight of the construction materials using lightweight concrete, could result in a decrease in cross-section of concrete structural elements (columns, beams, plates and foundation). This helps in reducing the sizes of structural components thus achieves affordability in construction. This concrete has lower coefficient of thermal expansion, and enhanced heat and sound insulation characteristics due to air voids in the concrete. AAC components can be customised in various sizes and forms. It helps housing projects in reducing rigidity in planning. Also cost affordability is achieved due to standardisation of components to a mass scale. The cellular concrete is considered more durable compared to traditional insulating materials. It also provides flexibility in providing masonry wall panels irrespective of column-beam grid if required. It is also a recyclable product. This benefits in economy when it is applied at the project like mass scale housing.

This technology provides block as well as panel construction for masonry walls. Wall panel is mounted on aluminum channels which are fixed on slab. 8 mm bars are used to bind the panel with floor slab. Additive cement mortar is applied on the base surface before placing on the channels. This layer is also applied at adjacent surfaces to have a connection with side panels also. The joints between the panel are filled with special putty to have a finishing coat and to seal the joints. This construction saves 1/3 time in comparison with traditional masonry wall construction. Fig 3 shows the onsite construction of AAC wall panel and block construction at MMRDA rental housing scheme at Mumbai.

Fig 3 Aerated autoclaved concrete wall & block construction at MMRDA rental housing, Mumbai
(Source: Aerocon, 2016)

3.3 Dry wall construction

This system is made of durable galvanized steel, which usually uses gypsum board and calcium silicate board or FCB (Fibre Cement Board) as surface material. In this system the cold rolled steel C sections are used as framing members. The sheet lead layer gets fixed as a primary layer on the framing followed by a gypsum board. It can greatly reduce the self weight in comparison with brick masonry. In this thermal and acoustic insulation product can also be used as in-fill material in partition frame to create a safe, quiet and comfortable environment.

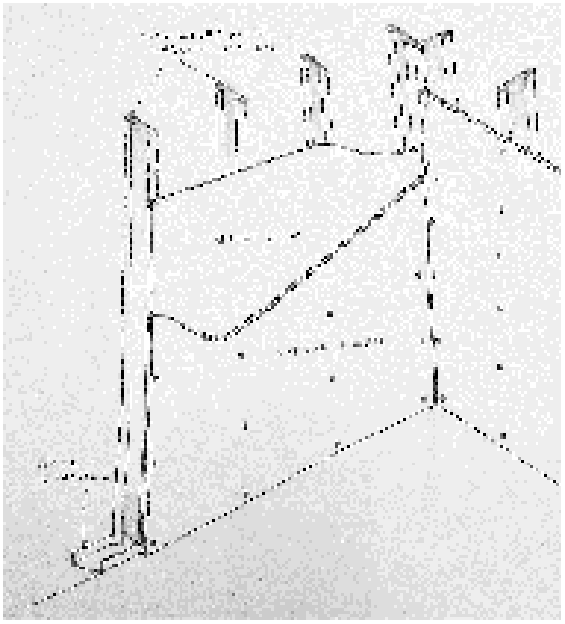


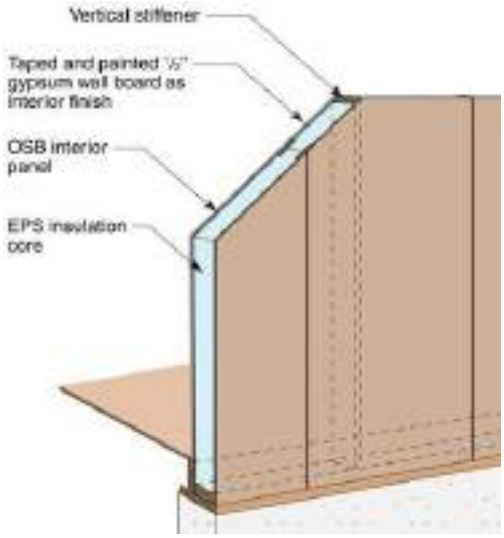
Fig 4 Schematic view of Dry wall construction
(Source: Author)

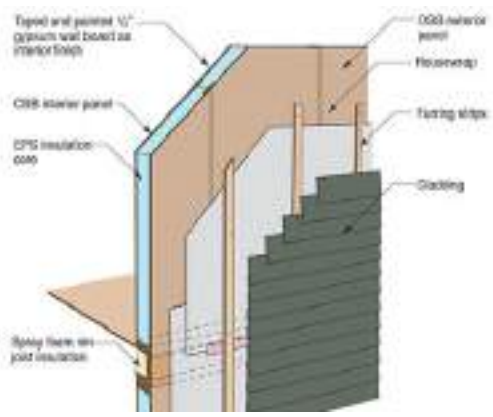
3.4 Structural insulated panel with cold steel section framing

Structural Insulated Panels (SIPs) are prefabricated insulated structural elements. These can be used as building walls, ceilings, floors and roofs. They replace conventional masonry or frame construction. They are fabricated in factory and transported to the site, where they are connected together to construct a building.

A SIP is a sandwich panel which includes solid foam core 125 to 200 mm thick and finishing or sheathing layer on both sides. Due to lesser thicknesses carpet area can be increased inside the structure. The sheathing layer is glued to the central foam core. The whole assembly is either pressed or placed in a vacuum to join the sheathing layer and core layer together (Paudel et.al, 2016). These panels are installed on the steel or wooden frame. Generally cold rolled steel sections are used. The most common types of external layer materials are oriented strand board (OSB) and plywood. Nowadays

gypsum boards are also used for sheathing. The exterior and interior sheathing materials can be customised according to customer requirements by manufacturer. The sheathing material can be sound proof and fire proof also depending upon the facility use and overall economy of the structure. They can be produced in various sizes or dimensions. It possesses very high strength to weight ratio. Gypsum board panelling provides enough escape time in case of fire situations. For insect-proof boric acid insulated boards are also available. This technology can be applied with composite construction. It adds speed to the construction. It is very effective in achieving sound insulation specifically required in urban areas now a days.





(ii)

(i)

Fig 5 (i) & (ii) Schematic view image of Structural insulated panel technology
(Source: buildingscience.com)

Fig 5 (i) and (ii) shows the formation of structural insulated panel technology with all layers. Fig 6 shows the cladding tiles with cladding channels with core sectional layers.

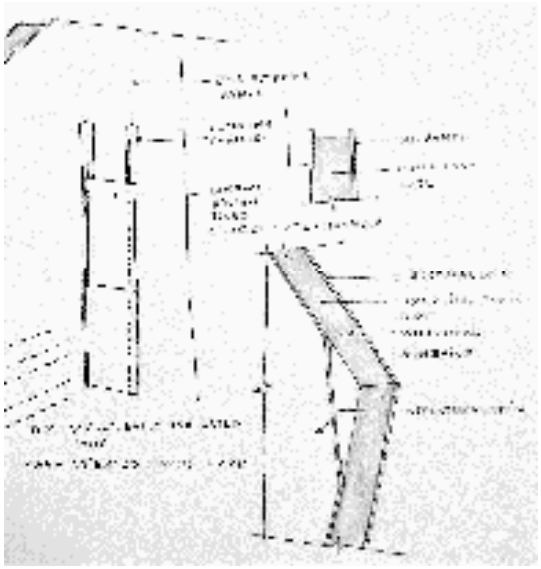


Fig 6 Schematic view of cladding detail in Structural insulated panel technology
(Source: Author)

4 Results & Discussions

The comparative rating is given in table 1. These ratings and parameters are derived from literature survey by comparing their qualities and applications with conventional construction methods. It clearly shows that the conventional construction has limitations in some aspects like speed of construction, cost of constructon, flexibility, standardisation, site establishment, etc. This analysis recommends the composite construction with prefabricated panel technology as per the convenience.

Table 1 Comparative Rating analysis of various prefab technologies with conventional construction

Sr. No.	Aspect	Conventional Construction	GFRG system	SIP system	AAC system	Dry Wall system	References & Logistics
1	Speed of Construction						Parallel activities are possible in all technologies other than conventional (BPMTC, 2015)
2	Cost of Construction						Mass scale and standardization reduces cost in Prefab technology (Jain, 2012)
3	Quality of Construction						Mixing and Casting under controlled condition (Dinesh Kumar et al, 2015)
4	Site Establishment & development						No need to plot fabrication shed as all technologies are factory made other than conventional (BPMTC, 2015)
5	Flexibility in Construction						Flexibility according to the design, less dependency on structural system (Weidemann , 1990)
6	Fire Rating						Fire rating high for conventional (3hrs) & some concrete based systems (NBC, 2015)
7	Acoustical Rating						Porous and infill panel can be treated as high sound insulator (Aerocon, 2015)
8	Seismic Design						RCC frame construction is best against seismic loads (BPMTC, 2013)
9	High rise adoption						Composite structure is suitable for high rise (BPMTC, 2015)
10	Standardization						Mass scale and standardization reduces cost in Prefab technology (Jain, 2012)

Low Moderate Good Excellent

The Prefabricated structures have merits over the traditional construction. It includes technical merits such as quality, flexibility in design & construction, etc. It also constitutes social merits as less site disruption and safe construction due to standardized procedure. It is one of the important aspect especially in mass scale projects. There are some merits from economy point of view also. The speed of construction is increased and due to light weight properties the sizes of structural members reduces resulting in cost saving (Krishnanunny et al,2018). Many designers and engineers are adopting these technologies due to its sustainability merits. Eco-friendly, recycleable construction is a value addition in future energy crisis scenario. Even wastage needs to be reduced.

5 Conclusion

An attempt has been made in this paper to analyse prefabricated panel construction techniques considering its possible application in affordable housing in a smart way. Basically parallel casting and of structural element is possible in prefab structures with on-site construction activities. Therefore, it reduces overall time of construction. The float period generated due to time effective construction can be utilised to complete the construction before the decided schedule. This further saves the machinery cost on project. The comparative studies conclude that any panelling system can be selected with composite construction for affordable construction. This study also supports and recommends implementation of these techniques for high rise buildings. Prefabricated technology also enables the maximum carpet area for the same plinth area by the use of lesser thickness of wall panels. Also it offers flexibility in planning, surface treatments and construction. There are some challenges can be raised while handling in construction industry with prefabricated structures especially in developing countries. Transportation inconveniences could be there as we are struggling with efficient road widths, designated lanes. The structural components require heavy duty cranes and accurate measurements on site to achieve precision while placing on decided positions. But looking towards the housing demand, the government has to take this challenge of developing suitable infrastructure. Cast-in-situ construction is not adequate to meet such huge housing demands. So prefabricated construction technology is feasible that can be adopted for affordable mass housing projects to meet the housing demand.

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Study of the concept of 'Green Buildings': Practices from the past and its applicability today

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Abstract: The paper aims at understanding green building and its interpretation over the years. The objectives are to study green building, to find similarities and differences between different terminologies. The methods used are to summarize understanding from literature review and case examples; to study the similarities between old cultural practices related to climate and new concepts; to understand way of living in the past, needs and today's fast pace changing lifestyle.

Keywords: *Climate, Green, interpretation, lifestyle, practices.*

1. Introduction

In today's world, there is a trend of putting old things in a new shoe. Currently in architecture and civil industry, experts and philosophers are talking about green architecture very frequently. Remaining close to nature is an old concept. It is also traditionally bound in various countries with their respective lifestyles.

Today's Architecture faces a dilemma; adopting a modern lifestyle, urbanization and absorbing westernized concepts or appreciating traditional values and leading a more sustainable and green or zero waste lifestyle. With the global warming looming as a constant threat we need to achieve a golden mean between the two.

Building industry plays a vital role in the economics of a nation, but on the other hand has a significant impact on the environment. Due to its large scale, building industry, is a major user of energy, materials, resources such as water and a great polluter too. Thus a few people thinking differently than the ongoing trend set an example for many to follow.

The aim of paper is to understand the meaning of concepts that are close to green building and its interpretation over the years. The objectives are to study the definition of green through literature review; to find similarities and differences between different terminologies close to green–do they lead to the same thing and how.

2. Literature review

For the past few years, the word 'Green' is increasingly in the limelight in the building industry. Many organizations have defined 'Green buildings' as sustainable, climate responsive, vernacular, net zero, smart, renewable, low embodied energy, low carbon, etc. The concepts that are expressed already exist in the Indian lifestyle for several centuries. The Intergovernmental Panel on Climate Change (IPCC) has identified Building sector as one of the largest energy consuming and carbon emitting sector, thus having the larger opportunity or potential to tap the energy conservation and reduce on the carbon emission leading to substantial economic benefits (IPCC, 2007).

2.1 Existing mechanisms or tools functioning presently in India

There are measurement tools such as rating certifications which define the greenness of a building. The present rating systems in India are National building Code (NBC), GRIHA, Indian green building Council (IGBC), Energy Conservation Building Code (ECBC/BEE). These rating systems definitely provide a guideline to achieve the greenness goal, but certain aspects of lifestyle inclusion, innovation are considered in a very superficial manner. The teachings which are already with us from traditions are being reframed in different words (in a packaged/ glamorized way) today. But we must admit that this reframing has provided us with measurable parameters.

2.2 What Makes a Building Green? / Different facets of Green

Table 1. Definitions and objectives of different terminologies that speak about greenness of a building

S. no	Definition	Objective
1	**Green /sustainable/ high performance building-** Green building is the practice of creating structures and using processes that are environmentally responsible and resource-efficient throughout a building's life-cycle from siting to design, construction, operation, maintenance, renovation and deconstruction. (https://archive.epa.gov/greenbuilding/web/html/about.html) Green Buildings are defined as structures that ensure efficient use of natural resources like building materials, water, energy and other resources with minimal generation of non-degradable waste. (www.greencleanguide.com, Shailesh, August 22, 2012) **Bioclimatic design-** Response to nature with climate as basic parameter of design and comfort as a critical issue.	• To protect occupant health • Provides healthier spaces using resources in an efficient manner • Reduce impact on environment • Optimizes energy efficiency • Conserves natural resources • Generates less waste
2	**Climate responsive or passive design-** Passive design is design in which the form, fabric and systems of a building are arranged and integrated to maximize the benefits of ambient sources and sinks of energy for heating, lighting and cooling in order to reduce the consumption of conventional fuels and the emission of greenhouse gases. (Cardiff University, Environmental Design of Buildings, Introduction to Passive Design, 2007) Passive design is design that takes advantage of natural energy flows to maintain a building's thermal comfort, and reduces the need for mechanical heating or cooling.	• To best take advantage of the local climate • To collect, store, and distribute solar energy or reject heat
3	**Sustainability-** It can be defined as the continued ability of society, an ecosystem or any such interactive system to function without exhausting key resources and without adversely affecting the environment. "It is the development that meets the need of the present without compromising the ability of future generations to meet their own needs" (Bruntland commission-1987) "Green or sustainable building is the practice of creating healthier and more resource-efficient models of construction, renovation, operation, maintenance, and demolition." (EPA)	• To treat all waste products into nutrients • To replace man's dominance over nature with a better relationship with harmony • To generate no toxic waste • To use safe, healthful materials
4	**Vernacular/Native/traditional architecture-** Vernacular construction tends to meet the most pressing basic needs of a culture and a region in manners that are tied closely to climate and other local conditions. Vernacular buildings are built by ordinary people who possess principles, or patterns, that have traditionally been handed over from generation to generation. (Steve Mouzon)	• Takes into account the climate of the region and social and economic conditions of the people • To consider in technology, locally available materials, environmental adaptations
5	**Zero waste building -** Zero Waste is a goal that is ethical, economical, efficient and visionary, to guide people in changing their lifestyles and practices to emulate sustainable natural cycles, where all discarded materials are designed to become resources for others to use. (Zero Waste International Alliance ZWIA) Zero Waste means designing and managing products and processes to systematically avoid and eliminate the volume and toxicity of waste and materials, conserve and recover all resources, and not burn or bury them.	• The goal is for no trash to be sent to landfills or incinerators • To emphasize waste prevention • Discarded materials are resources for others to use. • To use materials that can be recycled
6	**Low-carbon buildings (LCB) -** A LCB is a building which emits significantly less GHG than regular buildings. (Jain A, Cooling India, Jul 15, 2017)	• Engineered with GHG reduction in mind. • Maximize recovery of materials for reuse
7	**Smart /intelligent Building-** Smart buildings deliver useful building services that make occupants productive (e.g. Illumination, thermal comfort, air quality, physical security, sanitation, and many more) at the lowest cost and environmental impact over the building lifecycle. (www.institutebe.com, 6th May 2015)	• To create Productive spaces • Comfortable spaces • Low environmental impact

Fig. 1. Zero waste philosophy

Fig. 2. Commonality of Smart Buildings and Green Buildings

3. Method

The study is aimed to take an overview of all above mentioned definitions, concepts and try to find a common link between them. An attempt is made to relate our habits and lifestyles to the futuristic built environment that we need. The scope of the study is limited to Indian case examples where conscious owners have taken steps towards moving towards green rather than studying designed residences by architects or by green building consultants. Selection of the residence will be on the basis of different areas depicting varied cultural background and geographical location in India. Each individual residence has its own particular peculiarities that need to be documented. Parameters to study case examples are to study Lifestyle and Building design (materials, planning, services).

4. Analysis of case studies

4. 1 Case study 1-Kachra Mane, the house of scrap (trash house), Bangalore

Owner: GV Dasarathi, **Architect:** Vijay and Dimple, architects from Maya Praxis, Vismaya Interiors. Completed in 7 months

Fig. 3. House exterior

Lifestyle- second hand appliances are used like fridge, microwave, stove, etc. All products were bought at approximately 15% of what a new one would cost. The owner is an environmentalist and uses a cycle to commute.

Building design- Simplicity is the essence of the house. The house is constructed on an existing building, keeping the structure intact and altering interiors with wooden plank flooring, bamboo corrugated roof, timber windows. Instead of regular 1 inch plaster, ¼ inch plaster is used. Dasarathi has quoted in an interview that "Windows are for letting the weather in and walls are for keeping them out." So there is more window to wall ratio than conventional residences to allow more light and ventilation.

Recycling- The owner has found new meaning and purpose of various trash items, the philosophy behind his house is based on the 4Rs - "Reuse, Reduce, Recycle and Rethink". Materials that he has reused and recycled are glass for windows, wooden staircase, kitchen cupboards, cane chair, book shelves from discarded Pinewood packing cases. So the house was built at half of the cost than what a conventional house would cost. The owner believes that "This is the 'new' way or rather the 'old old' way of looking at things instead of the 'old new' way where everything is being built from scratch using new material which causes extreme stress on the environment," (Dasarathi G, 2013).

Services- All bathroom fittings (Jaquar) and kitchen sinks are from demolished buildings. The owner is involved in sustainable transport and garbage segregation not only limited to his own house but also motivates his locality. Rainwater harvesting and Grey water recycling is adopted.

Fig. 4. Reused sanitary fittings

Fig. 5. Rain water sump

Fig. 6. Reused wood furniture

Fig. 7. Large reused windows

4.2 Case study 2-Gaud Desh, Kolhapur 1725 sq. ft. Total area

Owner and designer: Mr. Rahul Deshpande

Lifestyle- Traditional methods such as mud fridge, mud flooring to keep the interiors cool are used. The Owner is an eco spiritualist and environmentalist.

Building design- "Simplicity is Prosperity", says Mr. Rahul Deshpande. The house is designed to act in tune with Mother Nature. Using mud allowed Mr. Deshpande to save substantially on cement and steel and avoid painting totally. The house is built with the local material such as mud used for flooring. Such roof tiles make spaces for various birds to build their nest.

Recycling- All the wooden elements in the house are from the wood obtained from demolished buildings. The house was built at almost 50% cost of a RCC house. All the waste generated is recycled. Thus the house is a true example of reduce, reuse and recycle.

Services- Rainwater is harvested and stored during the rainy season. All kitchen waste is recycled to produce biogas which provides cooking gas up to 3 hrs daily and also manure for the garden.

Fig. 7. Exterior view

Fig. 8. Interior view

Fig. 9. Mud Fridge

Fig. 10. Roof lights

4.3 Case study 3- Homebelaku, Bangalore

Owner: Karunaprasad Kanavi, Completed in March 2006

Lifestyle-Lifestyle in 'Homebelaku' is very close to nature. As the name suggests, maximum day lighting is used in the structure. It

creates a pleasant ambience by providing natural diffused light.

Building design-Total built up area of a structure is around 2700 sq. ft. The structure is designed in a way that the relation of a building with nature could be achieved. The structure has a blend of steel and use of of traditional material like compressed mud blocks, etc. The structure is built using compressed stabilized mud blocks on rammed stabilized earth foundation. Stabilized earth plaster for walls exposed to rain and sun and stabilized earth mortar. Locally available stone has been used for the foundations and a few walls to accentuate for architectural purposes. Roofing channels, precast sills, *Hourdi* block (Hollow blocks) are used in the structure to reduce solid concrete and acts as a heat insulator- the heat transferred into the indoors is reduced by 4^0 C with this kind of roofing system.

Recycling- Existing site was lower than the road level before construction. Therefore the wastage from site itself and the surrounding site is used to fill the site. Plastic in the surrounding was used. In roofing also In-situ jack arch panel roofing elements are used to reduce on steel and cement consumption. All materials sourced within 25-30 kms from Bangalore helped in reducing transportation cost and pollution.

Services- Rainwater harvesting is done to utilize the rainwater for gardening and utility purposes. Solar Lights are used which gets functioned during power shutdown. The user has adopted solar water heater (No electric geysers and UPS). Structure welcomes day lighting throughout the day by provision of skylights. For night time Only CFL bulbs are fitted to minimize electrical consumption. *Sadarahalli* stone and slab used for bathroom flooring and compound wall Kadapa slabs used as shelves instead of wood. No bore well water is used. Rainwater is used for all purposes, including drinking after filtering. (6000-8000 litres of fresh rain water collected from 25 minutes of heavy shower) Soap water from washing machine is used to flush commode and to wash car.

Fig. 11. In-situ Jack arch roofing panels

Fig. 12. *Hourdi* blocks as heat insulator

Fig. 13. Day lighting - Skylights

Fig. 14. Double height courtyards – Natural Light and Ventilation

Fig. 15. Provision of Rain Water Harvesting Filter

4.4 Case study 4- Good Villa, Bangalore

Owner: Mrs. Kanimozhi and Mr. Deenadayalan designed by Sathya Consultants in 2012

Building design- Bangalore city is a congested place, but in this structure in spite of having adjacent structures day lighting is achieved effectively. The private spaces, the bedrooms and the baths, are woven around a large open space that defines the living, dining and family spaces. The ground plus first storied structure is punctured by light in two major nodes that bathes the interior in natural light. (INSIGHT, 2014) A small garden area is designed at ground floor. Living is connected to the garden area by sliding folding door to have an inside garden effect on a habitable space. The offsets in the plan allow the interiors to open into private gardens. Even in enclosed bedrooms, the diagonal placement of tall windows provides maximum light and ventilation throughout the daytime.

Recycling- Chapadi Stone and Hollow Clay Blocks are used for external masonry walls. Filler slabs are used for roofing. All materials act as a heat insulator in summer season. The use of natural elements in design and construction the structure conserves energy and becomes self sustainable at a greater extent.

Services- Solar energy oriented fixtures are fitted to conserve and utilize maximum solar energy throughout the year except rainy months. *Jali* fenestration in the facade brings cooling effect on structure. (INSIGHT, 2014)

Fig. 16. Front View

Fig. 17. Green spaces in the landscape

Fig. 18. Internal Ambience with day lighting

5. Summary

The common findings from the case studies are-

Reuse of materials, use of on-site resources as raw materials, detailing of fenestrations and skylights to allow natural light and ventilation techniques, use of alternative construction techniques, use of low maintenance finishes, maximizing use of rainwater harvesting, using waste as a resource. The case studies display a mix of all the concepts mentioned in the literature review in varied proportions. The core intent of all is common to utilize resources and save energy by efficient design and material use. Along with a conscious, environment friendly building design inclusion of our ancestral value systems is the need of the day.

5.1 Recommendation

Building plan and orientation- as per taking advantage of the winds and cutting down heat in the building

Materials and Technology- adaptive and experimental approach using zero waste/ low energy embodied or local materials

Daylight and Ventilation- skylight, atriums and properly designed windows (corner windows, strip windows)

Alternative resources- solar, biogas, rain water harvesting, vermin-composting

Landscape- green spaces, trees, intermediate spaces

6. Conclusion

With the advancement of globalization and technology, there is less response to climate, while designing buildings. If we compare our country with the other Asian countries like Bhutan, China, Japan and Nepal the traditional wisdom is not carried forward in the urban centres. India is so rich with practices and lifestyles that should be marketed as a brand. Right from the culinary art to the fashion, present architecture also needs to be considered. Going back to the traditional architecture will give us solutions to cater to energy crisis today and in the coming future. There is a lot of scope of reviving age old principles of climatic controls that can be applied in today's world. The five principles of reduce; reuse, recycle, reproduce, and use renewable sources of energy if followed in a strict fashion, the environment around us would be a better place to live in.

Acknowledgement

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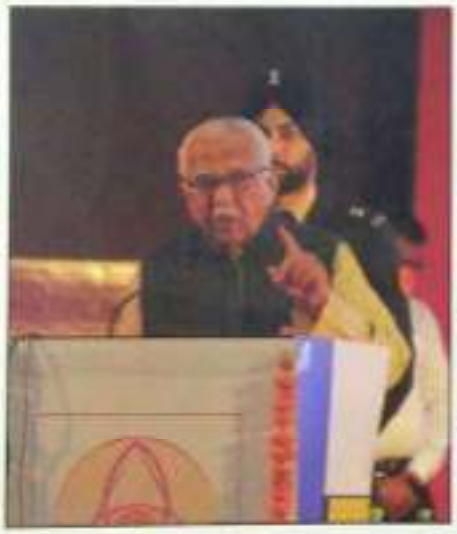











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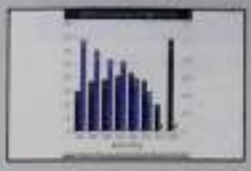

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Bringing flexibility in design of affordable house prototypes *for Pune city*

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ABSTRACT

The capability to adapt, to change or accommodate change is a basic and fundamental requisite for the future of city. The traditional design practice for housing is challenging in an uncertain changing context. Currently, Pune is growing city and demanding flexible affordable housing. It is due to rapid rise in population and migration of people from varied and distinct cultural backgrounds. In this paper the concept of flexibility is discussed and examined from the theoretical as well as practical point of view. This study also identifies the addressees of flexible design viz. architectural layout, structural systems, service spaces and flexible interior furnishing. This research suggests strategies like addition-deletion, neutralization and joining-segregation that ensure both the adaptability of the space in response to changing usage and affordability.

Key Words: *Flexibility, affordability, space, neutralization, usage*

1. Introduction

The capability to adapt, to change or accommodate change is a basic and fundamental requisite for the future of city. The traditional design practice for housing is challenging in an uncertain changing context. A process of area optimization is critical in a rigid design. Therefore, flexibility concept is introduced all over the world. It is very important to introduce innovative concepts in design to create flexible physical environment (Blackman, 2003). Flexibility is the ability of a system to convert or modify built or open elements as per need of the user (Celluci, 2015). It provides an effective alternative to psychological perceptions of the user. (Klaufus, 2000). The study of sociological pattern helps

to assess need-based users in a community viz. i) Young families who benefit from the re-configuring of rooms to meet their changing spatial requirements over time. They can afford their first home as a flexible home. ii) Single adults who may want to use some spaces communally and other spaces independently. iii) The people who need some space for their commercial activity in the housing society itself by additional or convertible shops, office in their proposed prototype only. iv) Persons with disabilities may require flexible housing designed to be fully wheelchair-accessible, including wide corridors and special features for visually impaired and physically disabled (Graham, 2016).

The concept of flexibility is dependent upon some aspects of design viz. architectural layout, structural systems, services and furnishings as shown in Fig. 1. Architectural layout enables the quality of multifunctional use of a space. Flexible structural design system enables the architects to separate the interior from structure (Estaji, 2017). Construction technology & services are inseparable part in affordable flexible housing. The observed perception of the user about services is based on convenience and maintenance. Flexible service locations enable effective space planning inside the unit. The furnishing in interior will provide extra carved storage spaces in the unit without increasing the area. The interior should be flexible enough to adjust with changes as per convenience of the user (Inani, 2014).

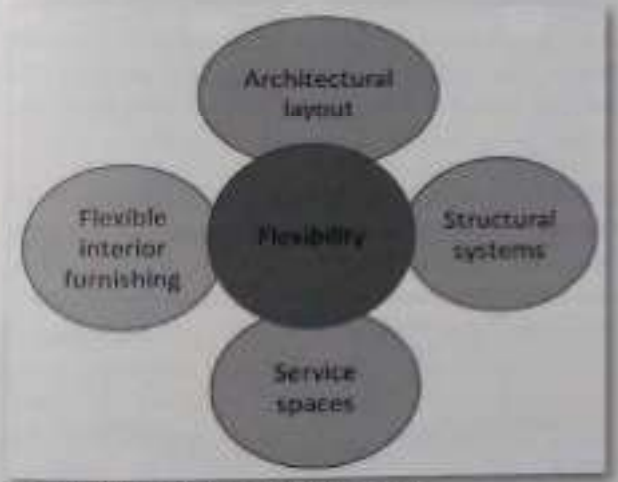

Fig. 1 Addressees of flexible design (Source: Author)

Flexibility should be practiced effectively in developing metro cities. Pune is one of the fastest urbanizing cities in India due to rapid rise in population and migration of people from varied and distinct cultural backgrounds. The challenge facing Pune Municipal Corporation is to supply homes at affordable cost in response to the increasing demand. This population includes job seekers, college students, small scale businessmen, etc.

It also includes the population from Wada's, Gaothan, dilapidated buildings or extremely cramped regular housing. It is due to lacking of alternatives which offer better space for housing (Mashal Project Team, 2010). Therefore, the flexibility concept can be implemented in different ways for Pune city. It is categorized under some attributes/ parameters. Effective design of a space is one of the primary addressee in providing flexibility (Schneider, 2007). Application of complementary construction technology is also important for flexible designs. (Estaji 2017, Arroyyo 2017, Yadav 2013). Effective Space and Technology should provide the flexible and adaptable physical design to the user (Inani, 2014, Narendran 2014).

2. Methodology

Literature from various contributing fields is considered comprehensively to define flexibility and flexible design. The selected literature is reviewed to identify the attributes of flexibility in an affordable housing. The studies selected are limited to those pertaining to the meaning of flexibility and needs & expectations of the user from a home. The probable users are defined in the study. The application of flexibility concept is explained in the context of space, construction technology & design. The design strategies are discussed to make the unit as flexible. The purpose of this analysis is to standardize and create a thought process for application of flexible design in an affordable housing.

3. Preliminary data, findings and discussions

In order to provide a new and flexible approach in design & construction for affordable housing in Pune city, a suitable prototype design is proposed. In the following section the strategies for affordable prototype design is studied under three primary domains namely (i) flexibility in space (ii) flexibility in construction technology (iii) flexibility in design.

3.1 Flexibility in Space:

Flexibility in space offers more functions to the prototype design (Danko, 2013). It also plays a part in three-dimensional volume of space. It gives flexibility to accommodate more

Fig.2 Multi Functional common space

Fig.3 Separation of areas with furniture arrangement
(Source: Kolte Desi Chawl, Goregaon Chawl, Mumbai Chawls and People anecdotes, Mumbai)

space in a vertical way and to have comfortable height inside the tenement. Many designs in apartment buildings possess a large non-utilization factor in the tenement. This factor could be reduced by means of flexible space planning.

There is a correlation between space and flexibility. The space should not be rigid in occupying secondary functions into it. The history and lifestyle of people in Pune was very much different in earlier period. Many functional activities like communication, sitting, playing, and allied activities of cooking took place in the social spaces. It improved space optimization in tenements. It can be easily observed from Fig.2 that the social space could be designed as multifunctional. The Fig.3 shows the use of furniture for the separation of areas. It savet space by accommodating furniture as storage and partition.

3.2 Flexibility in Construction Techniques:

There is also a relationship between construction techniques and flexibility. Flexibility requires reduction in rigidity by providing complementary construction technology. Certain logic of construction and provision of services allows flexibility of configuration, which in turn enables flexible use and occupation (Graham, 2016). The material and construction methodology should be flexible in terms of providing different building typologies such as high rise, midrise, low rise, single modular homes and quadruplex. The standardization of structural components is very much important in flexible construction. The components should possess less self-weight, minimum self-occupied space, favorable for different surface treatments as per choice and customized in terms of containing service rails on or inside the surface. This is possible with precast and prefabrication technology. Prefabricated housing is now growing all over the world and style of composite construction is suitable for flexible mass scale housing. The composite construction could include the precast concrete, structural steel, aluminum form-works in a very comprehensive way (Yadav,

Fig. 5: Surface Paneling system
(Source: Swetland Brian, British Columbia Institute of Technology, Canada, 2015)

2013). Fig.4 shows precast paneling construction (in place of masonry) in the apartment scheme at Bangalore.

A complete precast paneling system in Canada is shown in Fig.5. It offers quick construction and hence saving in cost. Also, quality of construction gets enhanced due to casting in controlled environment.

3.3 Flexibility in Design

The flexible design plays an important role in providing flexible interiors inside the prototype. The design & placement of external staircases, internal staircases, lifts, entrances, service lobbies enables effective planning and space optimization inside the house. The Fig. 6(i) shows the design of low-level windows with extended sills that could be utilized as sitting in drawing room. It also could be a place for relaxation as shown in Fig. 6(ii). It could be worked out as a traditional way of planning like 'katta' seating which was found in traditional houses and in public places.

Some strategies in flexible design that could be implemented are namely i) Provision of undefined neutral space inside the house for multifunctional utilization. The design can adapt the functions without any physically change (Celluci, 2015).

Fig 6 (i) and (ii) : Low level window design for formal and informal seating (Source: Author)

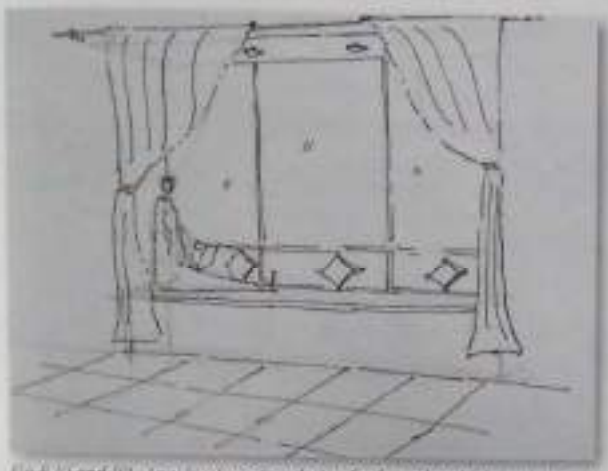

Fig 6 (i) and (ii) : Low level window design for formal and informal seating (Source: Author)

This is possible either by neutral sizing of the living units to accommodate any function and elimination of hierarchy between them (e.g bedroom can be converted into a study, etc.). It is shown in Fig. 7 (i) and (ii) that the wall between living room and bedroom could be adjusted during day and evening time. It could be a good interactive space and dining space for family users.

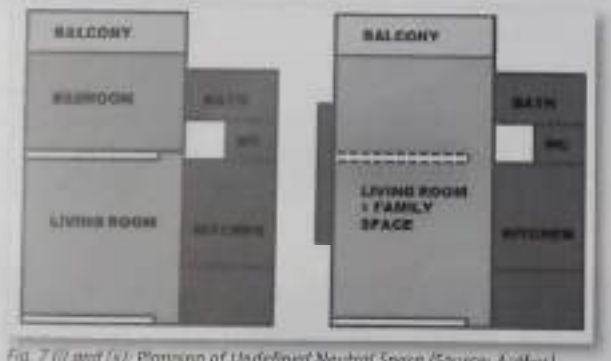

Fig. 7 (i) and (ii): Planning of Undefined Neutral Space (Source: Author)

ii) Use of balcony during the day time as a common family habitable space.iii) Provision of part mezzanine floor that can accommodate 1-2 people at night for sleeping or can provide storage space iv) Provision of lofts for storage. v) Smooth conversion of a building by providing regular grid for laying flexible structural system. vi) Use of materials that ensure maximum reversibility of the system in addition to the flexibility of the internal space viii) Assembling and disassembling of the structural component and the use of hollow or rectangular beams capable of integrating the installation system inside the structural form. The internal space should be designed as a completely flexible and should be complementing to its convertibility.

As seen in Fig. 8, the ability of space should be flexible towards addition or removal. This potential should be explored in the

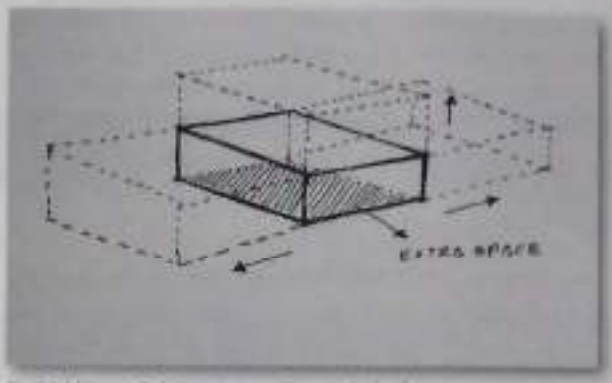

Fig 8 Addition or Deletion strategy (Source: Author)

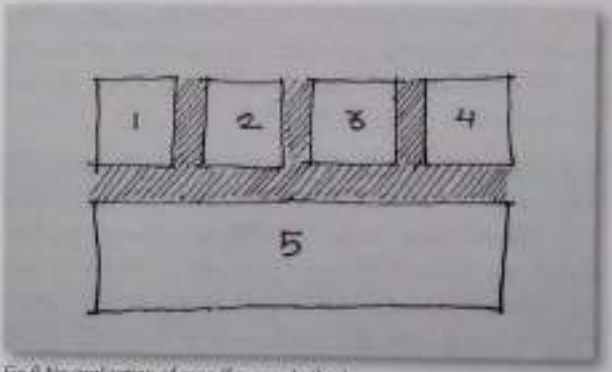

Fig 9 Neutralization of area (Source: Author)

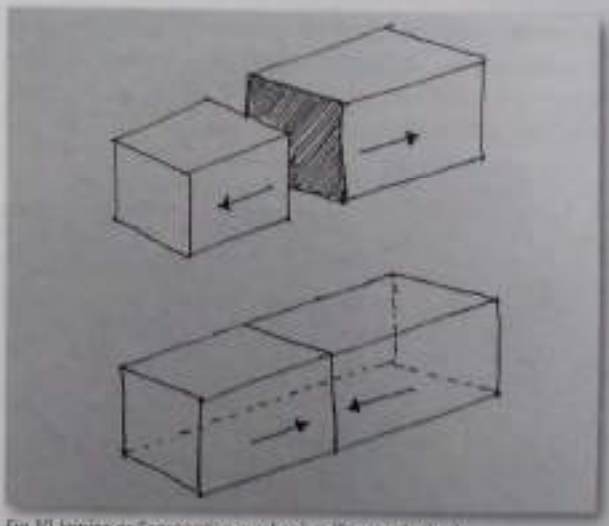

Fig 10 Joining or Segregation mechanism (Source: Author)

design phase itself rather than post-construction phase to allow for simple alterations to structural and service systems. This provides quality in flexibility as per the need of the end user.

The flexible design also should possess neutralization of area except service areas as shown in Fig. 9. It explains that there will be no clear intended use for any room. The end user can decide the internal planning as per the needs and

functional activities. It is a new idea and could be effective considering current trend and aspirations of the user. The elements like sliding doors and screens can greatly increase the spatial configurations of a house and allow spaces to be used for numerous different uses. The vertical walls could be adjustable in nature to have space dimension as per functional requirement.

The concept of joining and dividing space generally becomes critical for multifamily apartments. As shown in Fig. 10, joining and segregation mechanism allows increase or decrease in a volumetric space. It also enables 'change in ownership' in case of an adjacent tenement in an apartment building. This method need not be limited to horizontal plane and projects that are flexible in three dimensions typically offer the most options for adaptability.

4. Conclusion

The study shows that there is a need of 'change in perspective' towards the affordable prototype design in Pune city. This paper further identifies the addressees of flexible design i.e. architectural layout, structural systems, service spaces and flexible interior furnishing. The proposed research has suggested flexibility strategies like addition-deletion, neutralization and joining-segregation which ensure the adaptability of the space in response to changing usage and affordability. These flexibility strategies can be applied effectively only with the combined efforts of Architect, Engineer and Developer.

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Fig 4: Mid rise precast panelled scheme at Bangalore (Source: NBM Media Publication, 2015)

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Built And Un-built Interface

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***Abstract*— Connecting with Nature is the basic instinctive need of any human; but at the same time shelter too is a human necessity. First is a psychological need where as the other being more of a physical nature. A house or an enclosure of any nature for that matter has to cater to both the needs. One should be able to enjoy open spaces and the natural environment, without any compromise with a protective shelter with modern amenities. The connection with outdoor provides a continual changing scene which intrigues the user. A cutoff with the outdoors i.e. Nature, stalls the development of an individual creating a very dull and lifeless atmosphere. The ever rising heights of todays' structures makes necessary to cater to this need and consider "the outdoor" from the concept stage itself. Outdoors is not always physically out of the structure; it can be a connect to the outside from indoors. The aim is to explore the various built and un-built interfaces in a building. The objectives are to define the edge of space, to establish various ways/ parameters of connections between indoors and outdoors, to understand the impact of various elements on the quality of space, to study the functional connect, visual connect, transition from indoor to outdoor, complementary spaces in building that connect indoor to outdoor. Hypothesis- Connection between the outdoor natural environment and indoor spaces enhances the experiential quality of indoor space. Method- Book case studies, observation, pictorial documentation. Proposed outcome is to provide a ready reckoner on means to enhance a connection between indoors and outdoors.**

Keywords—indoors, outdoors, connection, space, experiential quality, natural environment

I. INTRODUCTION

Space refers to the atmosphere, distance, or expansion that can extend vertically, horizontally and in- depth. Space need not be defined by an enclosure of walls and roof, but it can be outlined by the presence of any element that provides a sense of enclosure; e.g. area beneath a tree also provides a sense of enclosure though tree being a single element. Space need not be measurable every time. Space quality can be experienced. Space can be modified/ designed for a desired experience and rest of the elements/ *tatvas* have its own properties. All other *tatvas* can be felt in some sense of touch, smell etc.

Humans spend most of its time indoors either in their houses, workplaces or educational buildings. A pleasant environment in proximity to nature can enhance the living or working conditions in a positive way. Habitable Spaces can be indoors and outdoors, but there is a very fine line/ edge that define those. A mean balance between both entities is to be sought. Though we can physically define indoor and outdoor spaces separately, they have a considerable effect on each other and cannot be treated as individual entities.

A. Significance of topic

There are many specialized consultants for interiors, landscape, façade design, etc., which increases the architect's responsibility even more to coordinate and seamlessly bind the design. This topic tries to bring in awareness in architects to initiate this process.

II. LITERATURE REVIEW

Getting close to nature is an underlying agenda while designing contemporary spaces. A meaningful architecture creates a bridge between internal & external environment directly or indirectly. The literature selected supports the need of the connection between indoor & outdoor. It also, takes into consideration the mental health of users simultaneously.

Saifi (2013) defined open spaces as 'that can be considered a body or material, while the social relations, or well-being, are the soul'- both of them reinforce each other. It is very important to have a strong connection, i.e. physical as well as visual with functional built mass. We do not just 'exist' within a physical environment but we interact with it and derive important meaning from it (Altman 1993). User psychology gets positively influenced when the edge element between inner & outer environment gets designed effectively.

Saraswat (2015) stated that the usage of un-built spaces may be planned, incidental, or ancillary. They also act as climatic aids by regulating the micro-climate through differential heating and cooling, as well as transitional spaces between two built forms. Un-built space is an extension of open space which aids the function of built spaces. Comprehensively, it helps to connect internal environment with external.

Earon (2016) emphasized the relationship between the user and the surroundings by a small space, where the proportion between the size of the space and the size of the body is a comfortable human scale. In all cases the user has the authority. The user controls the space and not the opposite. Connection with the green has to be studied from user's point of view & their respective comfort buffer spaces.

III. METHOD

The method used is case studies and photographic/ pictorial documentation of examples that shows built and unbuilt interfaces. The two variables of study are built and un-built space.

IV. ANALYSIS

There are 3 spatial relationships that need exploration

1. *Space within space*
   The built form is an enclosure with smaller space within its volume. This internal space is sometimes designed to mimic the outside world which brings in some elements from outside in the interiors thus differentiating the internal space into two types- a. The actual working space and b. The internal landscaped courts or atriums.
2. *Space overlapping a space*
   When two spatial fields overlap, they form a third space which is interlocked between the two spaces. Such space can be achieved by overlapping in the horizontal or vertical plane. Such overlapping space either merges into one of the space or can retain its identity by acting as a link between the two spaces.
3. *Space abutting a space*
   This is the most common type of relationship between two spaces. The only connection is the visual continuity from one space to the other with a physical barrier. Such kind of space becomes more interesting when the interiors and exteriors flow seamlessly into each other, thus merging the two kinds of spaces and blurring the lines.

From the literature review certain building elements which are the interface between the built and the un-built are listed as follows and are studied in detail further.

A. Physical connect

- Open spaces-courtyards, terraces, balconies, patio, verandah, decks, sitouts
- Extension of Roof as an element in the outdoors
- Doors (French doors, collapsible doors),

B. Visual connect

- Fenestrations- windows (bay window, corner window, ribbon windows), skylights
- Screens-green walls, *jaali*/ lattice walls (material, glass curtain walls)

V. CASE STUDIES OF THE INTERFACES

A. Physical connect

1. Courtyards

Depending upon climate type a courtyard in the Indian context has plantation or water body serving the purpose of indirect lighting & ventilation. It has a character of being open to sky space, but still enclosed on all sides by the habitable rooms. Thus, it is an extension of the indoors to the open where lot of activities take place leading to introvert planning.

Fig 1. Ar. Geoffry Bawa Resort Bali water body in court

Fig 2. Ar. Charles Correa *Chapha* tree in court

Fig 3. Ar. Laurie baker courtyard

2. Terraces & balconies

Terraces attach to the built but open to the sky. Landscaped terraces at higher floors give a feeling of connection to the ground. It is an extension of indoors to outdoors.

Fig 4. Ar. Charles Correa, Kanchanjunga, Mumbai- terraces

Edgar J. Kaufmann residence- The use of stone as a material is getting merged into the natural rocky outcrops with waterfall. The cantilever concrete terraces provide views of the surrounding forest.

Fig 5. Ar. Frank Lloyd Wright, Falling water Pennsylvania-terrace

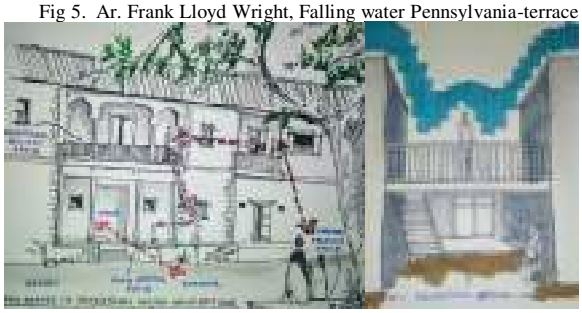

Fig 6. Balconies as transitional spaces in traditional architecture

3. Verandah

Verandahs, patios, sitouts are the transition spaces which lead one from outdoors to indoor spaces. More smooth the transition better it becomes for the user to acclimatize. The importance of such spaces is felt when the climate inside and outside presents a stark contrast, such as in hot and dry spaces or cold spaces.

4. Extension of Roof as an element

Buildings are planned inside–out. Spaces extend beyond their primary function fusing interpenetrating spaces of in & out. The spaces under the roof overhangs form in-between zones. It is difficult to differentiate between inside & outside.

Fig 7. House for the Jains, Bushy, Lonavla- overhanging roofs

Fig 8. Pergola extended from RCC slab

5. Doors

Various types of doors provide visual as well as physical connectivity of the indoor and outdoor. For e.g. French doors, sliding folding door, collapsible doors etc.

Fig 9. Glass Door

B. Visual Connect

1. Fenestration

Openings frame the natural landscapes in any structure. Openings like arches, windows, and skylight provide transparency to the solid structure. Natural light filters in through openings, creating comfortable ambience.

Fig 10. Arches framing the courtyard

Fig 11. Lower cill window

a. Window

Depending upon the indoor light quality required window is an element which has to be carefully designed for the required outcome. Following parameters of window design are to be considered with respect to the façade orientation- Window to wall ratio, window placement, window size, type, cill & lintel level, material. French windows, full-height corner windows, floor-to-ceiling sliding or folding openable glass panels are options for fenestrations.

Fig 12. Ar. Laurie Baker-opening design

b. Skylight

It is a form of top/roof lighting. Placement of skylight plays a crucial role in the lighting of interiors. Direct view of the sky is visible through it, thus adding dynamism inside the structure throughout the day and seasons.

Fig 13. Skylight

2. Screens

a. Lattice wall/ Jaali/ pergola

Jaali is a physical barrier providing a glimpse of the outside world. *Jaali* prevents heat gain & glare avoiding dust from entering inside.

Fig 14. Karan Grover & Associates A traditional *jaali*, or lattice wall

Fig 15. Ar. Legoreta- use of pergolas and colonnades to enhance the light effect inside

b. Glass as a material

Building's solid walls can be replaced by glass elements. Glass provides a physical barrier, but provides a visual connectivity instantaneously. Glass opens up the interior to the outdoor environment by providing views and light. Glass has ability to visually amplify the space, making it look larger. In the workshop building by Ar. Renzo Piano the facades utilize glass to the maximum extent to create the illusion that the greenery growing inside and outside is lifting the roof of the structure above the slope creating the feeling of unity with nature.

Fig 16. Renzo Piano building workshop, Genoa.

C. Seamless transition

1. Optical Illusion

Having long sight lines creates an optical illusion of a much larger space. This can easily be achieved by keeping the indoor and outdoor floor level same by eliminating any steps or level variation.

Fig 17. Optical illusion and detailing in plan

2. Detailing in the plan

Seamlesness can be achieved by studying the floor plans and working in detail the flooring layout of abutting interior and exterior space. The floor can be matched by using the same material, pattern or color for a seamless effect

3. Echoing the Design elements

The design elements such as lighting, furniture, finishes, etc. used in the interiors can be repeated in the adjacent exteriors or vice versa to achieve the effect of oneness. This is helpful in maintaining the same ambience on both sides of the border and blurring the edges.

VI. RECOMMENDATIONS

Summary of all the interfaces that are necessary to be well thought of in designing spaces in order to achieve relation of built with the un-built is stated as follows in the tables below

The tables, elaborate on a ready reckoner on means to enhance a connection between indoors and outdoors and its applicability in the Indian context considering its various climate zones.

TABLE I. PHYSICAL CONNECT OF INDOOR AND OUTDOOR

Sr. No.	Design element	Climate zone (Indian Context)	Climate policy
1	Terraces and Balconies	-As extension of activities from the built -green space in highrise	
		Hot and Humid, Hot and Dry	To invite wind & cut down harsh heat
		Cold and cloudy	To invite sun
2	Verandah/ Sitouts	-Covered but not completely enclosed -Seating and communication areas	
		Hot and Humid	Ventilation as a strategy
3	Extension	-Roof plane continued in the outdoors, thus achieving continuity physically -Partial shading -Extension of activities	
		Hot and Humid, Hot and Dry	On western or Southern sides
4	Internal Courtyards	-Traditional Indian architectural integral planning component	
		Hot and dry	Introvert planning to aid ventilation with combination of water body or trees
		Hot and Humid	Introvert planning to provide mutual shading
		Cold dry	Introvert planning to avoid heat loss

TABLE II. VISUAL CONNECT OF INDOOR AND OUTDOOR

Sr. No.	Design element	Spaces in built form	Purpose
1	Windows	-creates transparency to acieve light & ventilation -acts as vision & daylight window	
	Tall Windows	Deep seated spaces	To gain light inside for more depth
	Long/ Ribbon/ corner windows	Rooms at the edges	-To provide an undisturbed view of the surroundings -To achieve larger expanse of exterior
2	Skylights	Internal spaces on last floor	-To gain a view of sky and provide light -space within space looks big as sky is framed by skylight
		Over Atriums	-To Protect from weather and gain a view of sky and provide light -Applicable in highrise structures
3	Jaali	-Traditional element in Indian style architecture -Suitable in hot dry climate as it acts as natural cooler & dust control element	
4	Glass	-Utilization of its maximum area suitable if placed in north or shaded with roof element -Maximum use appreciated in cold climate	

VII. CONCLUSION

There are breathing spaces required in a city or town. Green spaces act as breathing lungs of such crowded development. Similarly, in case of a single building, the immediate adjacent areas act a visual and psychological relief. The more we mechanize our living the more our architecture tries to integrate with nature. As Architects the responsibility of achieving the balance between the built and unbuilt space must responsibly shouldered and the interface or the borders carefully designed for the desired positive outcome.

ACKNOWLEDGMENT

The authors acknowledge the institute for its support in conducting the research.

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UNDERSTANDING HERITAGE POTENTIAL OF SASWAD, "A HISTORIC MEDIEVAL TOWN OF DECCAN"

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Abstract :
Further discourse attempts to identify heritage potential of town, along with that it investigates how this character could be protected in the context of changing time. First part of the research paper will cover the origin and development of a historic town of Saswad. In second part methodology developed to rediscover the Cultural Significance of Saswad in terms of its built heritage. Further discourse, unfolds various historical factors involved in the development processes and understand the town as a cultural resource. Concluding part will examine issues concerning heritage at risk in Town and brief guidelines to formulate a comprehensive Conservation Policy for Saswad. Study is carried out with observation and visual analysis methods instantaneously mapping, drawings, and inventories supported the arguments developed in the process of analysis. Interview of historians, architects and local people helped in understanding the forms and meanings of various historic elements and a town as a whole.

Keywords : Medieval town, Historic Town, Heritage, Cultural heritage, Conservation policy, Historic settlement, Cultural significance

I. Introduction

Historic town of Saswad well known medieval town in Deccan[1] flourished in later Maratha period under local philanthropist Sardar[2] Purandare marks its presence in various ways. Numerous tangible and intangible historic elements define distinctive character of Saswad. Its unique character in terms of its setting in the landscape, the shape of the settlement and the nature of its edifices emerged over the period of time, are the assets and qualities that are most valued by its inhabitants and visitors. Its scenic location at the confluence of two rivers Chambali and Karha relates association of settlement, with the important natural element "water" manifested in the built form of Sangameshwar Temple located right at the convergence. Apart from this, Saswad is important base town to Purandar fort geographically important in the historic events. Saswad is located north side of river Karha and 40 KM away from Pune city on its southeast side. The Sangameshwar temple is adorned with exclusive Yadav era sculptures depicting various stories related to *Purankatha*[3]. Other important nearby places, such as Jejuri, Pandeshwar, Morgaon, Bhuleshwar, and the forts of Vajragad, Rajgad and Torana establishes the socio-historic and cultural context of Saswad.

Historic town of Saswad is well known for its special architectural character. Various architectural typologies such as Residential, Religious, commercial, and mixed use are still unharmed to a larger extent which needs extra protection from conservation point of view.

Meandering road pattern segregating several communities such as Shimpi *Ali*, Borate *Ali*, Jagtap *Ali*, Brahmin *Ali* and so on according to their professions and years they established developed in town. Alignment and locations of these houses their character tells the story of town and fits eudal setup of characteristically developed in medieval period. Main axis of town connects both the important parts of town those are open market space at one end whereas riverside on the other. Royal mansion of town Purandare Wada Grade II structure in the context located on this axis articulates story of the period and its importance in Deccan region. This mansion was the model used to build Shaniwar Wada in Pune under Bajirao Peshwa. [4] Maratha town planning system emerged was outcome of political will of

[1] Deccan plateau is the largest region located in southern part of India situated between western and Eastern Ghats or mountains

[2] Word *Sardar* denotes nobleman or commander from Maratha army

[3] *Purankatha* are glorifying stories from ancient scriptures related to various deities

[4] Sowani Avinash, Maratha Town and City planning with reference to the systems of Village development during 17th and 18th centuries, (Unpublished thesis work submitted to Tilak Maharashtra Vidyapeeth, Poona 2011), 48. Original contribution in the Maratha town planning systems in Deccan region explained with several examples of administrative and economic systems developed over the period of time. This includes sketch maps of Towns such as Baramati, Kolhapur, Poona and other small towns around Poona.

various Maratha Ministers till early nineteenth century. They followed pattern of Organic planning and probably similar architectural character followed in various typologies such as evolution of Wada Architecture with cortile planning.

The Shaniwar Wada was the most magnificent and stately mansion that was ever built in Poona by the Peshwas in the 18th century. Bajirao I (1720-1740) laid the foundation stone of the building on Saturday, the 10th of January 1730, being an auspicious day. Palace was completed in 1732. Purandare family supported Bajirao I in the establishment of his rule in Pune.

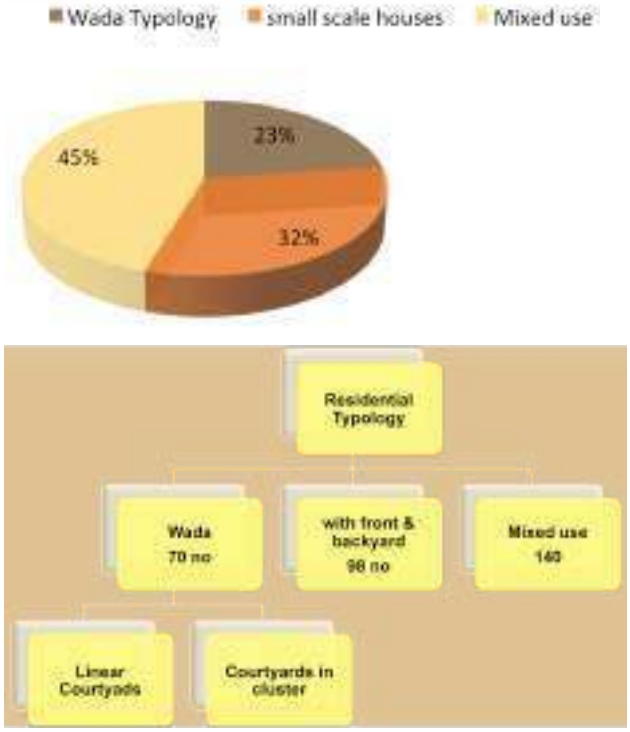
Several traces of history are evident in lanes of Saswad. Various layers of those are left in built form such as courtyard mansions, temples with intricate carvings and specific locations spread out in whole town.

II. Heritage potential of Saswad as a important Medieval town in Deccan

Residenctial typology

Various typology structures such as residential, religeous, mixed use along with important community spaces such as market spaces, Par areas, and open spaces along with the temples are distributed in the old core of town. This establishes importance of Saswad town as an important historic town located on Warri route as well its existence as a strategic base village of Purandar fort.

Under residential typology typical Wada houses with cortile planning, small houses with front and backyard and mixed use with shop on ground and residence on top are observed.



Total 70 numbers of cortyard mansions in Brahmin ali are identified as per 2009 survey for M.Arch. Studio work. Purandare family being the main philanthropist of Saswad appointed by Peshwe Balaji Vishwanath developed the town to its peak. Large wadas of ministers like Bokil, Gokhale, Mehendale, Haladkar, Damle and so on were built around Purandare Wada near the confluence of rivers Karha and Chambali/Bhogavati and the part was known as Brahmin ali.

Particular character of cortile mansions observed such as staggered accesses for each court. Primary court adjacent to entry was called as Phadacha Chowk used to be public area where offices were located and that was accessible to public. Inner courtyard was called as Khajgicha Chowk[5] that was mainly used by women in house. This Khajgicha Chowk mainly surrounded by Women's Rooms and Pooja[6] Room. Service area mainly consists detached toilets and servants Rooms usually located on left side of Wada towards south. Out of these very few have survived at the moment.

In Jagtap ali 98 small houses with front and backyard are observed with same characteristic. Jagtaps[7] were farmers in occupation. Instantaneously architectural vocabulory evolved has its own flare such as Hierarchy of spaces developed considering its utilitarian circumstances.

Compound wall is observed for the protection of the house. *Padvi* is the important Semi open Seating area used as welcoming public space in house allowed for all guests.

Sopa is the closed living area as seating. Outsiders are generally not allowed to cross this space.

Majghar is storage area quite dark used by ladies in the house. *Swaympak Ghar* or kitchen located at the back, used for cooking by ladies. Water tank, toilet , bath are detached from main house. Parasbag Backyard open space at back utilized as drying area and so on.

Mainly locally available Materials are used for construction. Ground floor is constructed with thick stonewalls whereas first floor mainly constructed in flat brick walls. Composite structure using load bearing stonewalls and timber framed structure. Introvert planning is observed in mansions.

In Shimpi ali and other comercial alis 140 numbers Mixed use houses are seen with shops with display platforms on ground and residential areas on first floor. Arrangement of spaces is like first you arrive at *Padvi* area adjacent to road. This interface used for commercial purpose earlier still serves the purpose to some extent. *Osari* is the Seating area for visitors. Similar hierarchy such as Majgharas storage area, Kitchen mainly located at the back, separate services area and backyard is seen in all houses. Similar construction techniques and materials applied for these houses. But the

[5] *Khajagicha Chowk* is Private courtyard with surrounded rooms usually used by women in the house.

[6] *Pooja* room is a worship room where deities are placed according to Hindu religion

[7] Jagtap is a surname from Hindu Maratha community. In the context of Saswad they are settled since shivaji period

scale is smaller with an extrovert planning. Segregation/ planning of Saswad clearly indicates hierarchy of casts and class.

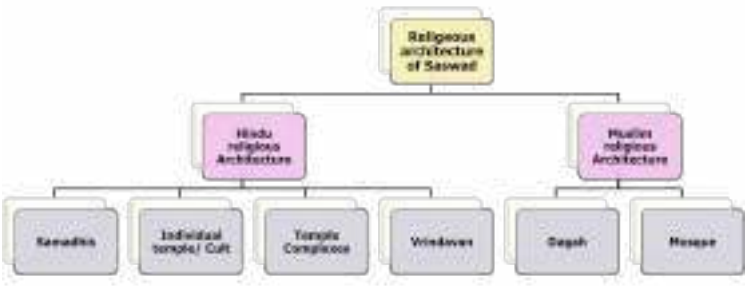
Religious Typology

Religious architecture is concerned with design and construction of places of worship & sacred or intentional space, such as churches, mosques, stupas, temples, etc.

Intention of group worshiping of natural elements like sun, moon, rain, trees and so on, were origin of human worshiping sources which letter get converted into idols this leaded to space for idols which could be identified according to type of idol, myths related to that. Evolution of small menhir to large temple complex tells stories related to origin of temples & eras & layers of history ruled in region.

From 11th century onwards Deccan region was suffering from unstable political conditions due to invasions from north parts of India as well from southern region. One concret referaance what we have is 'Sopandev's samadhi', brother of saint Dnyaneshwar near river side of Saswad of 11th century. Then *Samadhi* of Baji Pasalkar one of the ministers during Shivaji period in 15th century is located right in the core city of historic city of Saswad. Near by temples like shiva temple at 'Hiware' and Shiva temple on Narayanpur road known as 'Vateshwar' are the good examples of 'Vesara style' indicating vocabulary emerged from both Nagar and Dravidian style. Diverse empires have always besieged religion and religious places for destruction as well as construction as political strategy.

As per types of temples two basic types could be categorized as,
1 Individual Temples
2 Temple complexes
In individual temples could be categorized as private, public. Other religious elements observed are Samadhis, Individual Cults and so on. Examples form Muslim and Christian could be located very rarely.



As per survey of Saswad the region is dominant hindu community so more number of hindu religious structures are found are as follow

List of temples

1 Sangameshwar
2 Ganpati
3 Nagareshwar
4 shani
5 Kalabhairav
6 Karabai
7 Munjaba temple
8 Murlidhar temple
9 Vateshwar
10 Maruti
11 Durga

List of Samadhis

1 Sopandev
2 Baji Paslkar
3 Godaji Jagtap

III. Grading of Heritage structures in town

After understanding criteria for grading as per UNESCO world heritage sites and locally formed guidelines by INTACH existing heritage sites could be categorised in specific way after filling the relevant inventories.

Heritage Grade-II (A&B) comprises of buildings and precincts of regional or local importance possessing special architectural or aesthetic merit, or cultural or historical significance

though of a lower scale than Heritage Grade-I. They are local landmarks, which contribute to the image and identity of the region. They may be the work of master craftsmen or may be models of proportion and ornamentation or designed to suit a particular climate.

1. Purandare Wada
2. Sangameshwar Temple
3. Vateshwar Temple
4. Tahsildar Kacheri
5. Kalbhairav temple
6. New shimpi ali
7. Brahin Ali comprising big scale courtyard wadas
8. Wari in town – Cultural landscape
9. Karha river side – Natural Heritage

Heritage Grade-III comprises building and precincts of importance for townscape; that evoke architectural, aesthetic, or sociological interest through not as much as in Heritage

Grade-II. These contribute to determine the character of the locality and can be representative of lifestyle of a particular community or region and may also be distinguished by setting, or special character of the façade and uniformity of height, width and scale.

1. Sopandev temple
2. Godhaji jagtap samadhi
3. Baji Pasalkar samadhi
4. Pars in historic town
5. Samjai Temple in Brahmin ali
6. Gansh temple near Purandare wada

IV. Brief Policies and guidelines

The main objectives of the policy are to,

- Maintain and enhance the unique heritage character of Saswad
- Preserve significant buildings and building features, and ensure new designs contribute to the Saswad heritage character
- Ensure that changes to Contributing Buildings enhance the Saswad Heritage Character

- Maintain identity of Saswad
- Support pedestrian amenities by maintaining human-scaled development, connections to adjacent neighborhoods, and a welcoming, interesting sidewalk environment
- Encourage the redevelopment and revitalization of underutilized sites to enhance Saswad heritage Character
- Involve area residents, property and business owners, and interested individuals in the process of evolution of the Saswad

Changes in legislations

- FSI should be restricted to 1.5 or less in old historic core
- Change in bye laws according to scale & proportions of existing heritage buildings should be made
- Heritage committee – If opinion of the Heritage Conservation Committee, such demolition / reconstruction /alteration is undesirable then it is mandatory for owner of heritage structure to stop reconstruction/ demolition. The Heritage Conservation Committee shall have the power to direct, especially in areas designated by them, that the exterior design and height of buildings should have their approval to preserve the beauty of the area .
- Widths of buildings
- Road widening
- Pedestrianization
- Preparation of list of heritage sites including heritage buildings, Heritage precincts and listed natural features areas. A concentration of heritage buildings, which contribute to the overall heritage character of the street. These are identified individually in the Inventory sheets
- Alteration / Modification/ Relaxation in development norms
- Road widening - Widening of the existing roads under the Master Plan of the City or Town / Zonal Development Plan or in the Layout Plan shall be carried out considering the existing heritage buildings

IV. Conclusions

Though historic core of Saswad is full of built heritage sites its suffering through urban pressures such as population growth, modernization and so on. From the conservation point of view its very much issential to implement policies to enhance local character and use it in today's context with the understanding of new generations.

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Colonial public landscapes of POONA, India "Western notions in Indian Rocks"

Image 1 Reay Market Source: *Kimaya Pune*

Vaidehi Lavand

Colonial urban edifices of Pune make political statement and demarcate commencement of early modern age in the setting of "native" Maratha architectural character. Those were key elements helped in building image of the city in late 19th century. Rather those religious structures, educational buildings and offices built, were the first of its kind emerged as colonial public architectural landmarks in Pune context utterly following western notions. The concept and its manifestation in architectural form both could be called as out of context in a typical Maratha-Peshwa town in various ways. There were several oppositions from local reformists and communities for constructing structures such as covered market at the heart of indigenous town. Which was eventually constructed under supervision of local contractor Vasudeo Kanitkar under the guidelines of royal engineer, Walter Ducat. Paper tries to emphasis on architectural models followed as a powerful symbol during the reign of British, in Pune especially in case of public architectural edifices eventually intervined strongly as colonial public landscapes.

Colonial rule had influenced 19th century monumental Architecture as a form of imperial expression in India. European concepts of architecture reached the Asian subcontinent through visuals, literature, paintings and pattern books. Various examples from this neoclassical and neo gothic phase, also referred as Anglo-Indian, Indo-Sarasanic, Indo Gothic, Mughal Gothic, Neogothic, Hindoo or Hindu Gothic architectural style that could be experiential at various levels and scales. This new vocabulary tried to reach not only to the major cities under colonial rule but it also reached to the smaller towns and countryside instantaneously.1 Calcutta, Madras, Bombay procured their identity during the late eighteenth and nineteenth century beginning with neoclassical era. These three presidency towns developed with monumental, out of the context indications of the colonial rule. This was an effort of collaborative works amongst locals and British officials. Comparatively smaller towns like Poona2 tried to nurture its space as a part of this wave in its own way. Notably these emerging urban patterns gave rise to new public realm and social spaces.

Royal engineers were the key persons worked in collaboration with local engineers and masons at grass root level in the process of establishing British rule in India. Many of them came from middle and lower class families but reached at greater heights by their performance. Diverse projects from basic architectural interventions, railway, bridges, basic infrastructure, and services were coordinated in India by them. They worked on European models in local context with successful and unsuccessful efforts.3 To explain this further, till early nineteenth century simple and function based structures built for residential and religious purposes. Engineers were experimenting and modifying European models considering local climatic conditions. From mid nineteenth century building construction activity received more attention as vocabulary of Raj4. Which kept on changing adapting local climate, material and incorporation of local traditional art forms in architecture.

This argument extends with the cases of changed town level or urban level planning too. Typical medieval town comprising meandering roads for warfare strategies with fortress at a central location of main axis of town, those were extended with grid Iron pattern. This could be grasped prominently in case of various historic towns where cantonments were developed under colonial rule like Ahmadnagar, Sholapur now Solapur, Kolhapur,5 and Poona in Deccan context under Bombay presidency. Multiethnic, cosmopolitan

[1] Morris Jan, Simon Winchester, Introduction to Stones of Empire: The buildings of the Raj, (Oxford University Press, 1983); Das Pradip Kumar, Henry Irwin and the Indo Saracenic Movement reconsidered, (Partridge Publishing, 2014),5.

[2] Poona is pronounced as 'Pune' in colloquial language. For research writing purpose it is used as Poona as the name used earlier in 19th century.

[3] Sandes E. W. C. Lieut. Colonel, Preface *The Military Engineer in India, Vol II*, (Chatham: Institution of Royal Engineers, 1933), 35.

[4] Word *Raj* indicates British hegemony in India.

[5] Ahmadnagar, Sholapur, Kolhapur are few of important historic towns of western Maharashtra developed under Bombay presidency in 19th century

settlements took place in these newly developed areas.6 Cantonments flourished with residential units for British Officers and market space known as Sadar Bazar mainly involving migrating communities like Parsi, Bohara, Tamils and Gujarati7 to serve British residential colonies. This mixed culture of Anglo-Indian society reflected in the development of architectural language emerged in the vicinity in several typologies.

Building activity at an early stage of colonial expanse was mainly utility based. But later officers in East India Company implemented policy of getting connected with local rulers so they beheld for architectural style that will impress locals and reflect power of colonial rulers. European surveyors and engineers procured and adapted various elements, details and layouts from pattern books for particular site requirements.8 Native philanthropists were inspired by Enlightenment9 and progress that; they tried to implement Neo-gothic revival style at urban level in late nineteenth century.10 Colonial government with local elites shaped cities with new urban infrastructure. European and Indian engineers, architects and artists made designs, whereas Indian labourers, craftsmen and artisans worked on actual execution. In the process, the local teams left their mark on the vocabulary at different levels right from selection of materials, construction techniques, features, and ornamentation. Examples such as Governors bungalow, Deccan College, College of Engineering, Reay Market and number of churches erected in Poona are very evocative. These monumental scale buildings are still reminiscent of the colonial presence in Poona.

Contribution of Walter Ducat and Vasudev Kanitkar

This discussion will try to elaborate more on Walter Ducat's work being a "product of Addiscombe"11 trained for different situations in India, and works carried out by Vasudev Kanitkar a local contractor though not formally trained as engineer extensively expressed his knowledge in the field of architecture. Various elements such as Language, climate, and cultural variations turned out to be advantages and hurdles at the same time for the new "technocratic regime" for their catalysts in India. On the other hand set parameters of manuals, treatise, professional papers and major involvement of local artisans and contractors probably tried to contribute to the architectural vocabulary with their modified Indigenous solutions in local context.

Walter Ducat after passing out from Addiscombe Chatham started his career in Bombay as probationary assistant engineer, on special duty in 1859. Further to brief his works under Bombay presidency he had employed his knowledge he gained during his military training and probably successful to large extent as technical expert and designer. During his service years till 1886 he held executive charge of public works in different parts of the Bombay Presidency. He joined as Special Assistant Engineer in Khandesh, Dhulia 12th June 1861. His major proposal of work for Bombay-Trombay land reclamation in 1862 got sanctioned for actual execution with lot of critique on project. His analysis of site, proposal and estimate made was a meticulous work admired and printed with plans in a volume of selections from the records of the PWD. He worked on Dockyards during his service in Bombay, and a significant landmark project that he designed and detailed out was Prongs lighthouse Bombay till 1868.

Walter Ducat was involved in Gokak12 Water Power Cotton Mills project from 1875 till 1889 his letters and documents related to the purpose and prospects of the project explains its importance as a significant centre producing cotton on great water resource and cheaper labour available in the vicinity as important trading place for British government.13 These confidential letters and papers were written in order to elucidate details of the project and use of surrounding natural resources for better product to support establishment of British hegemony in the region by improved trade and commerce.

No significant information is available on the works he supervised as acting Executive Engineer in Aden when he joined there on 28th April 1871. He was later upraised as major on 5th July 1872 there. Further he was shifted as Executive Engineer to Kolhapur on 6th December 1872. Works he carried out in Kolhapur such as Construction of Rajaram College (1869-1874), garden designed and executed for Town hall (1877) both the buildings were designed by Charles Mant14, additional water supply and restoration of Rankala Lake (1877) and bridge over Panchganga River (1878) was documented in Professional papers for Royal Corps in Chatham. Addition to this very important project of road connecting Kolhapur to Amba (48 Mile) and Amba Ghat connecting it further with the sea at Rutnaghiri was completed under his supervision. His service in Poona mark the end of his tenure in Indian PWD with the two important projects he proposed and executed along with the team of British officers and local contractors. Those were Reay Market (1882-1886) (Image 1) in the heart of historic town of Poona and Connaught Market (1885-1886) (Image 2) in cantonment area.

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[6] Deddee Jaymala and Samita Gupta, *Pune Queen of the Deccan,* (Poona, Elephant Design Pvt. Ltd, 2000).

[7] *Parsi, Bohara, Tamils* and *Gujarati* are different trading communities settled in parts of India. *Parsi* belongs to Iran, *Boharas* are Muslims from parts of Pakistan and Gujarat, *Tamils* and *Gujarati* are from state of Tamilnadu and Gujarat in India simultaneously

[8] Das Pradip Kumar, *Henry Irwin and the Indo Saracenic Movement reconsidered*…cit.

[9] Enlightenment is used for awareness of science, western technologies and art getting widespread in elites from India in nineteenth century architecture context. They tried to imitate to some extent for their construction activities.

[10] Preeti Chopra, *A Joint Enterprise: Indian Elites and the Making of British Bombay,* (University of Minnesota Press, April 2011), 90. Muncherji Cowasji Murzban as assistant engineer worked on several projects in Mumbai in association with royal engineers and local philanthropists.

[11] Directors of East India Company in January 1809 founded an academy at Addiscombe near Croydon in England to cater insufficient supply of officers for scientific arms in India.

[12] Gokak is a town in Karanataka one of the states of south part of India located at the confluence of two rivers Ghatprabha and Markndeya. Gokak falls 6km near the town is beautiful site was major economic source for the city. As hydraulic power plant set up here was oldest in the region.

[13] The catalogue of papers of col. Walter Mardon Ducat (1837-1902) (1875-1889) (Mss Eur F425) British Library: India office records and private papers, Source: British Library London UK.

[14] Charles Mant famous Indo-sarcenic style designer designed landmark structures such as Laaxmi Vilas Palace Baroda, New Palace Kolhapur, Rajaram College, Edwards Hospital, Town Hall Kolhapur and so on.

In the process of actual implementation of public structures on site many Indians were involved in the decision making at various levels. There were hurdles in the process of actual execution such as opposition by social reformists, communities and availability of funds and so on. To some extent the colonial sovereignty was based on "democratic principles". Perhaps documents such as old newspapers and municipal records are evident enough to ascertain that decisions appear to be implemented democratically with the consent of local leaders and communities. Municipal and PWD records show correspondence between officers and commissioners regarding decisions made in the selection of appropriate sites for particular projects and its character in general. Detailed estimates, selection of materials and local communities responding in the process of actual accomplishment appear in overall documentation, but very rarely names of local contractors seem to be recorded in papers related to public edifices erected.

Numerous articles published in Professional Papers on Indian Engineering by Indian local contractors such as Teekaram who worked majorly in Lucknow, Babu Shumbhoo Dass works could be seen in Bahwalpur Pakistan, Rai Bahadur Kunhya Lal's and Sir Ganga Ram's15 legendary projects in Lahore Pakistan, Muncherjee Beyzunjee at Hyderabad under Nizam reign are great resources indicating their contribution in architectural vocabulary in this period. Researchers such as Preeti Chopra states extraordinary works of Murzbaan in Mumbai in her book. On the other hand local engineers such as Narso Ramchandra, Vasudev Kanitkar from Poona and some other towns in Deccan were never got recognized and documented extensively for their contributions in the development of architectural character. These are important unexplored figures in the context of Poona. Their names and associations transiently appear in the history of Poona. This discussion seeks to review account of who built Poona in colonial context on ground. Further discourse tries to detail out development of Vasudev Bapuji Kanitkar as an engineer and designer. Perhaps lack of resources and primary sources related to his own opinions for his projects he executed may lead in missing links in the few of descriptions. This is due to the negligence in documenting biographies of local engineers and exploring their influences in their social contexts during the period.

With few primary and secondary sources available, almost 15 important projects could be listed down where Vasudev Kanitkar shared responsibilities at various levels. Those include diverse typologies such as residential, public and temporary structures for public meetings and so on. Perhaps it was difficult to trace exact details of his overall contribution in all projects but very important residential kinds were Laxmi Vilas palace at Baroda, 'Sangamashram' residence of Dr. Bhandarkar. Whereas to mention cases of civic edifices significant to mention are Elphinston High school Mumbai, Secretariat building Mumbai, some part of High court. There were religious structures such as Sabhamandap of Tulashi Baug temple and Kasaba Ganpati temple considered as most paramount deities located at the heart of old core of Poona. Despite the fact that he worked on so many prestigious projects in the core cities of Bombay and Poona he is not well known in the field of architectural studies.

To take a detailed review of landmarks of Vasudev Kanitkar we need to understand his glorious career started in Bombay during Frere's administration. Bartele Frere the then Governor of Bombay and Conybeare (1823-1892) an architect and engineer had a great impact on the colonial image of Bombay built in the 19th century. Afghan Memorial Church (1847-58) imagined and built by both of them became prototype Gothic revival building in Bombay. Conybeare Gothic revivalist was the first architect to use polychromatic exterior facades using local Kurla and buff Basalt stone. Visiting British architect Thomas Roger Smith designed High Gothic dream around Maidans16 of the city based upon guidelines by George Gilbert Scott in the year 1870 and 1880.17 While this image building was in process there were local crafts people, artisans, contractors were getting involved in the activity for actual site works, and out of those very few were recognized in the colonial historiography.

Major civic structures in the Fort area around Maidan of Bombay were actually implemented by the exclusive efforts of local engineers such as Mukund Ramchandra, Murzbaan, Vasudev Kanitkar and so on. These structures defined the skyline and contributed in building Frere's imperial colonial language in neo-gothic style some examples are Secretariat building (1867-1874) designed by Clair Wilkins, David Sassoon Library and reading room (1867-1870), University building (1868-80), PWD office (1869-72), High court (1871-1878) designed by J.A.Fuller.18 These high Victorian Gothic erections expressed in Indo-European style followed European forms in terms of models and overall scale whereas details and materials were local to larger extent. This very unique image in Indian context was an effort by the ruler and local people. Very important of the sequence in Mumbai significant presidency town were built by Vasudev Kanitkar such as Secretariat (1867-74), High court (1871-78) and Elphinston College.

Vasudev Kanitkar is generally given credit for supervising the construction of the Secretariat and during the same period assistant engineer Rao Bahadur Mukund Ramchandra was working on sculptures on the Rajabai Tower (1868-1880) that represent the various castes of Western India.19 As discussed in the earlier chapter the symbolism and the language mainly adopted by designer for the Secretariat building (1867-1874) was Neo-Gothic in style. Sir Clair Wilkins was a royal engineer employed under PWD was the mastermind behind the project. This was Frere's initiative intently desired to avoid the import of materials and expertise from Britain. Indian craftsmen and local resources were utilized in the whole process of execution to establish that the government could rely upon these resources that were extensively experimented in later phase of development

15 Preeti Chopra in her Book *A Joint Enterprise* on the page number 76 mentions name of Sir Ganga Ram as legendary figure who worked for PWD in Lahore now in Pakistan.

16 *Maidan* is open space purposely kept vacant to create foreground for monumental structures built under colonial regime

17 London Christopher W., *Bombay Gothic*,(Mumbai, India Book House Pvt. Ltd., 2002), 17,18,128.

18 London Christopher W., *Bombay Gothic*…cit., 37-53.

19 Chopra Preeti, A Joint Enterprise: Indian Elites and the Making of British Bombay NED - New edition, (University of Minnesota Press, 2011), 75.

of the city. Narrow width of the building similar to Barrack plans allowed breeze to penetrate in all parts of the building. Main emphasis was given upon façade treatment, use of polychromatic stones, arches and central staircase tower intervened forming skyline of the area. Central tower above the staircase is of 170 feet high that marks its presence predominantly. Polychromatic effect was achieved by the use of local stones such as buff colored Porbandar stone, Kurla basalt, local blue basalt, Poona red basalt, and Ransome's Patent stone. Minton tiles used for paving and Terracotta Broomhall tiles roofed over teakwood joists and planks.20 Scant original resources and correspondence between the designer and Vasudev Kanitkar are missing links in understanding architectural development. Perhaps Vasudev Kanitkar in his own designs in Poona such as Reay market, Fergusson College, followed Bombay Gothic models. Architectural elements, material and techniques implemented in Anandashram21 extensively show his proficiency in workmanship.

After a brief discussion on careers of both the significant figures several points could be highlighted. It is quite evident that after looking at overall graph of works carried out by Walter Ducat, he was majorly involved in service-oriented large-scale projects and was a decision maker as an urban designer in many towns under Bombay presidency. Whereas in spite of not being architect or formal engineer Vasudev Kanitkar worked on landmark structures those represented urban public edifices in Bombay and Poona. While looking at the typology of projects both have carried out, all were public oriented projects executed in association with government and local philanthropists. Reay market in Poona being a first of its kind in the context stands out in the list, which marked its presence dominantly in old town that later triggered further extension of town towards south of historic settlement. It was built at the summit of career of both. This structure has importance in the context of urban landscape of Poona, as it changed the skyline and brought covered market as an important typology for citizens in the context. Along with this at the same period of time another covered market was proposed and built by Walter Ducat in British town of Poona that is cantonment area.

Covered markets in India and Poona

Various typologies such as public buildings, residential bungalows and palatial edifices were in depth studied by various researchers. Less importance was given to covered markets emerged in Indian subcontinent in 19th century which marked history of monumental scale covered shopping culture developed to large extent in the 20th century India after open market system. But in the context of 19th century development of "hygienic" covered market was symbolically represent capitalist agendas of British sovereignty. All these covered central markets emerged specifically in major trading towns connected with sea links, railways and trade routes such as Calcutta, Bombay, Madras, Karachi, Lahore and Poona. These were well-planned public interventions in terms of urban colonial landscapes of these towns.

Before this public intervention, open central Bazaars22 weekly or monthly, were fulfilling the needs of small settlements, villages, towns or cities. These were components of Market morphology of specific town as named by Saxena P.B.23 In case of Poona; locals at various wards organized such open Bazaars or markets to cater neighbourhood around. Till late 19th century huge open Bazaar was organized in an open space opposite Shaniwarwada twice in week it was on Wednesdays and Sundays. Besides that there were small scale neighbourhood shopping areas serving basic food, grain needs of small communities around. The revenue generated from these commercial areas was more than agricultural income, so such commercial activity was always promoted in the process of development of the town. Importance, scale and population of town were influential factors for the number of established Bazaarpeths and frequency of centrally organized Bazaars.24

Emergence of covered market as a separate typology is very symbolic in terms of colonial public landscape as it changed the earlier Market morphology followed over the century in terms of architectural statement in historic cores.

Models adapted for Covered markets in Poona

Emergence of central covered market was a result of accessibility by means of railway routes to various towns at various places in Indian subcontinent. This was a one point regulatory body on prices in wholesale and retail market and transporting and supplying large quantity of perishable food. 25 Looking at various locations of covered markets in India they emerged at central locations of towns accessible for locals and closely connected to railway routes. The process of promoting trade in fresh food was possible due to connectivity between towns.

Victorian markets in England were considered as icons of civic culture of society. Especially iconography, cast iron ornamentation was used to bridge the gap between functional and aesthetic values of the structure. It was commonly seen, that for the purpose of large spans and getting maximum light in markets, iron columns and glass were used. Market buildings were much like railway stations, exhibition halls and warehouses. From the point of view of Paul Dobraszczyk, the term civic is used in relation to market halls in England "the representation and enactment through a combination of spatial reorganization, architectural aesthetics, public ceremonies and legislation of a certain set of middle

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[20] Chopra P.N. and Chopra Prabha, *Monuments of the Raj: British buildings in India, Pakistan and Myanmar*, (New Delhi, Aryan Books international, 1999), 27-29; Christopher W., *Bombay Gothic*…cit., 38,39; Samita Gupta, *Architecture and The Raj, Western Deccan, 1700-1900,* (B. R. Publishing corporation 1984), 89.

[21] Anandashram is an institute built by reformist Mr. Apate in Poona specially to promote study in Sanskrit.

[22] Bazaar is a Persian word used for market place in Indian context, this majorly refers to traditional open markets in towns.

[23] Saxena, P.B. (1974), *Kota: A study in Market Morphology*, Geog. Rev. Of India, 36-1.

[24] Bhagwat H.R., Pune Shaharache Varnan,(Mumbai, Oriental press, 1868), 60.

[25] Helen Tangires, Public Markets, (New York, W.W. Norton & company, 2008), 231.

class values that came to dominate the planning of municipal buildings from 1840 onwards."26

Case of Reay Market is evocative to understand the basic inspiration behind model for this landmark project. Eight flanges coming out of the central octagonal tower having clock at one of its face is the model implemented for this particular market. It is imperative to mention about the materials largely used was Iron and Glass this followed the Victorian market style developed in England. As said by Helen Tangires Architects and designers improved their designs considering functional, aesthetic and economic qualities of iron and glass in covered markets. This was purposely to achieve desired height for light and air with minimum interior supports to get unobstructed floor space for better visibility and clear usable space in markets.27 Reay Market shows elements from Neo Gothic structures of Bombay following polychromatic stone used for its façade with pointed arches and exclusive tracery work. Column capitals carved in sandstone with floral pattern along with motif of lion face at four corners. Only one gargoyle survives at the moment, which was carved depicting face of a monkey. Rose window pauses your eye at the end of gable end. Rooftop decorated with stone carvings, cornices. Iron, glass and Minton Tiles brought from Bombay whereas fine quality stone was used from local quarry near Chinchwad area. Roof tiles imported from France name engraved on tile is GRANDE ECAILLE POUR TOILURE BREVETS D.G.D.G. SIHENRY-MARSEILLE ROUX-FRERES.28 Large quantity of Ironwork used in the building. Whole has been made in India by Messrs. Sorabjee Shapurjee, Iron founders of Bombay. Messrs. Garlic & co. engineers & tile manufacturers Bombay presented Minton tiles in market. Various patterns are used in several rooms of office in central octagonal tower. Pent roof truss in wood supporting remarkably high sloping roof cap of octagonal tower is just the same one used in Charles Mant's Surat Highschool at double storey foyer. After going through several treatise, manuals and professional papers Barrack and Jail Plans made during the period shows similarities in the unique plan made for Reay Market. Unfortunately original drawings and correspondence of Reay Market are not available to refer.

Whereas in case of Connaught Market or Shivaji Market Architectural model followed square form with neo-gothic façade closer to Covent Garden Market at London. Iron, colored glass, north light truss and two fountains are important characters of Market. Ashlar stonework followed similar character used in other constructions around. St. Xavier's catholic church built in neo-gothic style in 1865, is located just opposite to Connaught Market. It was marked on the schematic plan drawn in the year 1889 attached to one of the correspondence.29 It shows character of a typical English Parish church. Several ornamental features such as ornamental column capitals in local basalt stone, acroterions and bargeboards in wood are some of the exclusive examples of workmanship and craftsmanship. One of the important features used at the junction of arch and pier is face sculpted in basalt rock very similar to the face seen at the entrance of Deccan College main building designed by Clair Wilkins. It seems after discussion with historians that this is probably symbolic representation of Queen Victoria as this was built under her reign. It is important to note this sculpted face of queen is not seen anywhere in Reay Market as it was built in core city of Poona.

There are several differences in the process of execution and vocabulary of two projects. The land selected for the Connaught market was owned by government30 Whereas Mr. Khasgiwale one of the landlords and important personality under Peshwas was the owner of land which was proposed and later occupied for Reay Market. There were minimum hurdles faced by officers in execution committee in the process of designing and actual construction of Connaught Market as located in British occupied area of Poona that is cantonment. Duke of Connaught inaugurated Reay market. Whereas not much evidence is available about any big event of opening ceremony at the Connaught Market though it was named as Connaught market. There is just a reference of visiting a place for a while and the local traders in the vicinity organizing welcome arrangements on streets and roads.31 Very different models adapted for two different contexts which underlines how tangible form in public space, symbolize administration system and cultural differences. Reay market has adorned with more decorative work as compared to Connaught Market. Reay market specially designed to deal with vegetables and fruits and several other commodities. Connaught Market designed with two separate sections one with all vegetables, fruits, and other commodities and second with Meat and Beef. (Image 3 and Image 4)

Conclusions

So phenomena of two covered markets coming in two towns of Poona was a result of cultural background of two areas developed under Peshwa and Colonial reign. Form of Bazaars as discussed in research on market morphology by T.D. Gajar, morphology and centrality of market centres such as rectangular/ square form, circular or oval pattern, and star pattern at the nodal junction of several roads converge at a site are relevant forms tried to followed by designers for Reay and Connaught Market. Monumentality, overall treatment and detailing were elements of purely colonial language in all sense.

Along with that after going through several archival documents, treatise and professional papers it is observed that plan of Reay market followed model of a jail with a central watchtower as a prominent feature typically used in almost all public structures in colonial context. Whereas Connaught market followed square

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26 Paul Dobraszczyk, Victorian Market Halls, ornamental Iron and Civic Intent, Architectural History, Journal of the society of Architectural Historians of Great Britain Vol 55, 2012, 173, 194

27 Helen Tangires, Public Markets, (New York, W.W. Norton & company, 2008), 21.

28 D'Ayala Diana, Enrico Fodde Edith., Structural Analysis of Historic Construction Preserving safety and Significance Vol I, (NewYork, CRC Press Taylor & Francis Group, 2008), 1002. Book mentions various materials and their origins. The roof tile shown on the page is exactly same in form and name engraved in Reay market.

29 Letter from Executive engineer to the secretary of cantonment committee Poona, 17th Oct. 1893

30 As mentioned in the document from cantonment board 0.88 acres of land given for the purpose of covered market was owned by cantonment committee was a separate body governing newly developed town near old Poona.

31 "The Opening of Reay Market at Poona", The Times of India Archives Mumbai, Oct 7, 1886.

model largely seen in most of the civic centres developed in 19th century Europe. Similar Square or rectangular market forms adapted in other places in important trading towns of India.

Architecturally the original form of covered markets emerged in western and Eastern context were fairly similar in 19th century. Right from selection of public squares those were traditionally used for open Bazaar and commercial activities, were enclosed with walls in the model of square, rectangular or quadrangular form. The form followed in Reay market though at first glance appeared to be circular; it is opened up from all outer sides. There is hierarchy of open semi open, closed space that is maintained in spatial organization. Perhaps openness and absorbent quality of new system implemented in old very orthodox context of Poona is represented in various forms. Lightness and transparency is attained from use of various materials, modern techniques and tasteful minimum ornamentation. But very contradictory to this is the centrally located prominent 80' tower demarcates existence of authority controlling the communities around. This very unique form is a symbolism of control over old administrative and economic systems at the same time. Distance between ruler and the subject was though maintained by the scale and architectural vocabulary but at the same time creation of such public civic culture was very symbolic to notify commencement of democratic space breaking earlier feudal setup of Poona. Likewise this represents modern economic system implemented through government agents and local philanthropists in Indian towns. Reay Market as an important cultural heritage proposed and built by Walter Ducat and Vasudev Kanitkat though neglected, as colonial past of town should be emphasized as an important colonial urban landscape of town. These two markets are significant examples from colonial architectural history in Indian context as vibrant public space.

Introduction

1. State of art through Literature review
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1.2 Studies on Poona
1.3 Studies on Royal Engineers and Local contractors

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2.1 Change in town planning system in India and Deccan during 19th century
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Letter from Executive engineer to the secretary of cantonment committee Poona, 17th Oct. 1893 Source: Elphinston College Archives Mumbai India

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Colonial Public Markets of Poona: Hegemony of British Raj

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Abstract

Colonial urban edifices of Poona mark political statements and demarcate commencement of the early modern age in the setting of "native" Maratha architectural character. Those were key components helped in constructing the image of the city in late nineteenth century. Rather those religious structures, educational buildings, and offices built, which were the first of its kind, emerged as colonial public architectural landmarks in the Pune context utterly following western notions. The concept and its manifestation in architectural form both could be out of context in a typical Maratha-Peshwa town in various ways. There were several oppositions from local reformists and communities for constructing structures such as covered markets at the heart of indigenous towns. Which was eventually constructed under supervision of local contractor Vasudeo Kanitkar under the guidelines of royal engineer, Walter Ducat. The paper emphasizes the architectural models followed as a powerful symbol during the reign of the British, in Pune especially in the case of public architectural edifices eventually intervened strongly as colonial public landscapes. These religious, educational structures ultimately helped British "Raj" to build an image as ruler and to control on existing economic, social, and cultural system. These colonial landmarks are neglected from their significance as vital cultural resources and seen as alienated structures from the locals' point of view. With the help of qualitative research methods and archival resources, this paper examines the importance of these erections as a manifestation of power by sovereign imposed on numerous classes, castes of Pune.

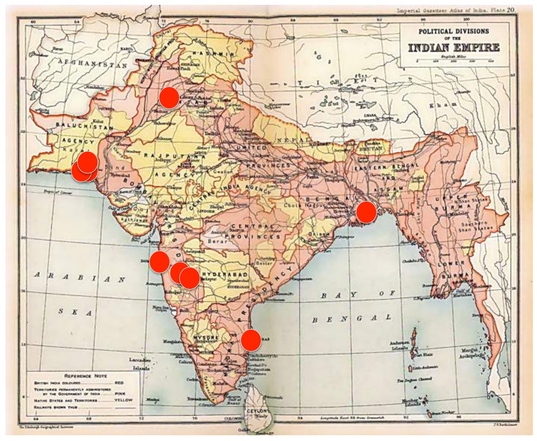

Figure 1, Map showing locations of 9 covered market built during 19th century in India before partition.

Figure 2, Open market opposite to fortress tin early 19th century, Ref: Pune Queen of Deccan, Diddi J., Gupata S.

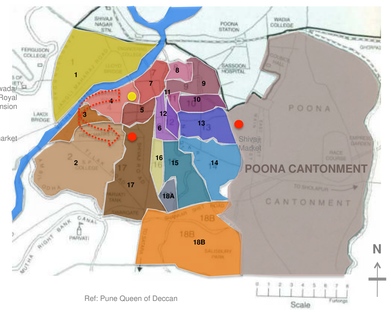

Figure 3, Covered Markets of Poona- Reay Market context

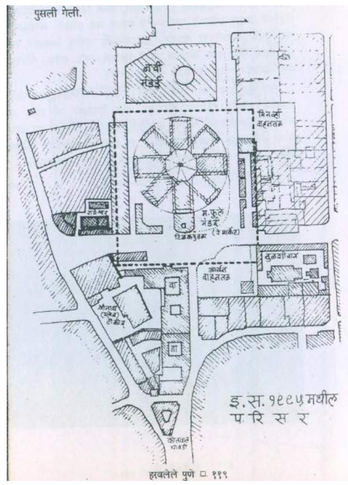

Figure 4, Conjectural map showing Open Space in *Shukrawar Peth*/ Ward with Reay Market, Ref: Sowani, *Haravlele Pune,* 1995 map

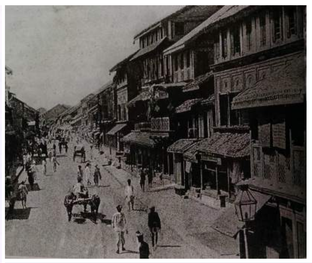

Figure 5, Mixed Use street markets in early 19th century Ref: Pune Queen of Deccan, Diddi J., Gupata S.

Figure 6, Areal view of Reay Market courtesy to Kimaya architects, Pune

Figure 11 Areal view of Connaught/ Shivaji Market

Figure 12 Vasudev Kanitkar Local contractor

Figure 7, 8, 9 Classical Façade treatment, central watch tower and wrought Iron ornamental bracket and columns supporting roof

Figure 10, Plaque above and its text on right, at Reay Market on its inaugural day

**THE REAY MARKET
OPENED BY HIS ROYAL HIGHNESS
THE DUKE OF CONNAUGHT AND STRATHERN K.G.
ON THE 5TH OF OCTOBER 1886.
NAMED AFFTER HIS EXCELLENCY THE RIGHT HONOURABLE LORD REAY LLD.
C I E GOVERNOR OF BOMBAY
PROJECTED BY THE MUNICIPALITY OF POONA IN 1882
J.G. MOORE ESQ. BEING PRESIDENT
COMPLETED IN 1886 KHAN BAHADUR DORABJEE PUDUMJEE BEING PRESIDENT
DESIGNED BY COLONEL W M DUCAT R.E. AND CARRIED OUT BY RAO BAHADUR WASUDEV BAPUJI KANITKAR C.E.
RAO SAHEB NARASO RAMCHANDRA GODBOLE SECRETARY P.M.**

Conclusion

19th century covered markets in west and east shares similarity. Such as selection of public squares. Reay Market with Octagonal form with 80 feet tall tower at centre, this very unique form symbolises colonial control over old administrative and economic systems. Distance between ruler and the subject was though maintained by the scale and architectural vocabulary but at the same time creation of such public civic culture was very symbolic to notify commencement of democratic space breaking earlier feudal setup of Poona. Likewise this represents modern economic system implemented through government agents and local philanthropists in Indian towns. Reay Market as an important cultural heritage proposed and built by R.E. Walter Ducat and Local contractor Vasudev Kanitkat though neglected, as colonial past of town should be emphasized as an important colonial urban landscape of town. Connaught and Reay markets origianted by R.E. Walter Ducat and executed by local contractors are significant examples from colonial architectural history in Indian context as vibrant public space.

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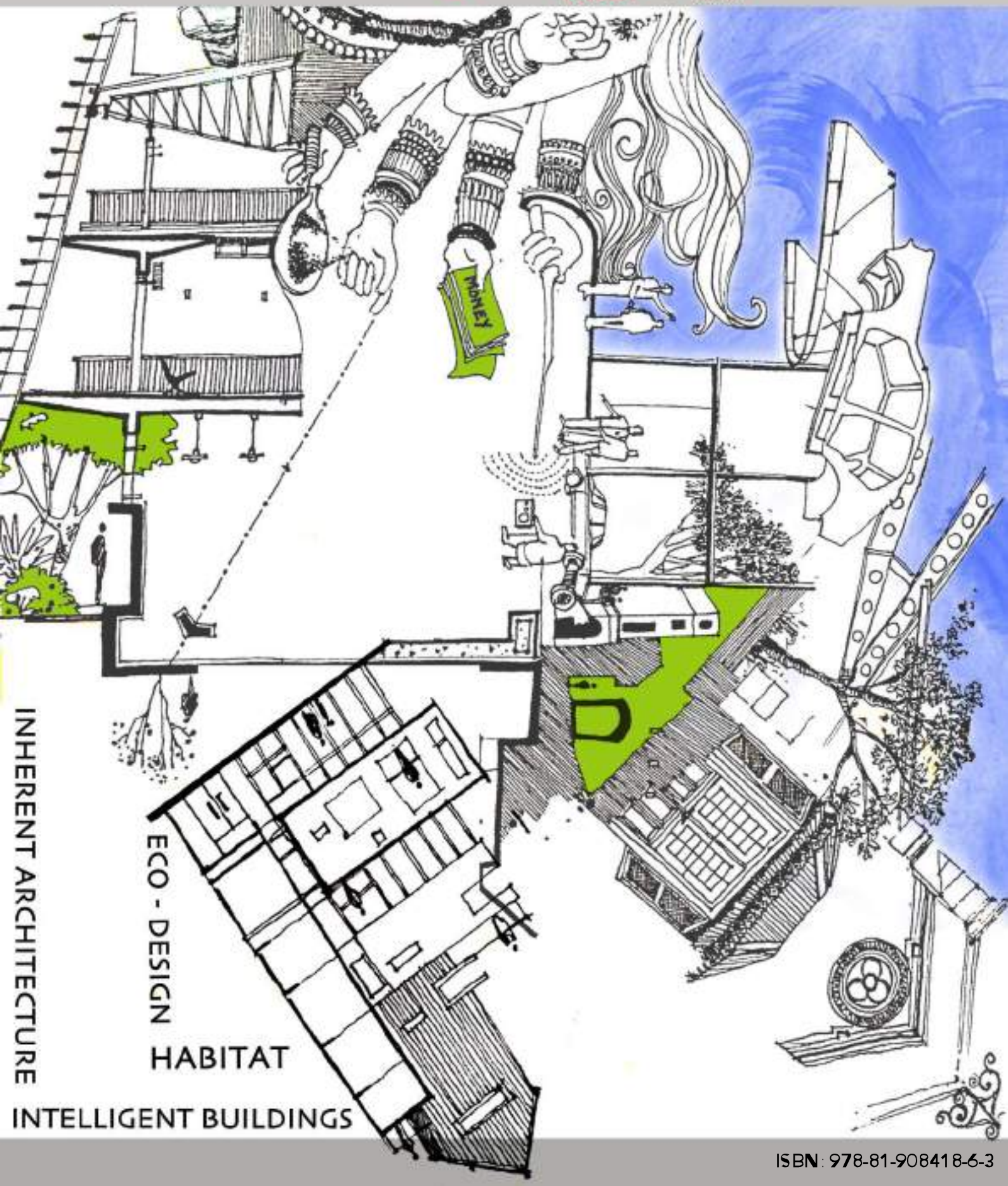

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Track 4:
Habitat

Lessons From Traditional Indian Housing

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ABSTRACT

Planning and Housing design in India date back to Indus Valley Civilization of 3000 B.C. Settlements had evolved in various parts of country since then with different characteristics everywhere. Housing had been an integral part of these settlements. Author has visited and studied the traditional housing in various parts of country. These traditional Housing designs or evolved forms are not mere group of buildings, but in integration they have various forms and typologies. They are success stories of chemistry of built and un-built spaces, human interaction, and spatial experiences. They have much scope of personalization and adaptation and have sustained since long time. This paper gives light on several such traditional housing forms and the specific points that can be learning for timeless and sustainable design of housing.

Keywords: Housing Form, Personalization, Socio-cultural characteristics, Spatial Experience, Traditional Housing

1. Introduction

The distinctive character of housing can be seen in India. Ar. Yatin Pandya11 says that Indian architecture is all about Resilience, Caring and Sharing, Pluralism of existence, vitality and response to climate. Every part of India has such character of architecture in housing. The rural and urban both types of areas have such characteristics. The architecture of Wadas of Maharashtra, and Mandya Pradesh, Mohallas of Madhya Pradesh and Uttarpradesh, Havelis of Rajasthan and Gujarat, Kothis of all north Indian states, Pols of Gujarat, Chetiar houses of Chettinad or in Portuguese and Brahmin colonies of Goa are some examples to observe all these qualities. These typologies have been studied as background for this paper and the learning has been listed down.

2. Observations in traditional housing forms

This portion of this paper throws light on the differences that present day housing and the above mentioned housing types in general. The studied typologies have been called as traditional housing form and present day housing refers to high density, medium rise apartment housing coming in fringe areas of growing Indian cities in this paper. Following are the distinct characteristics that are gradually disappearing from present day housing. The different characteristics have been observed under following headings.

2.1. Sense of security

Right from the Prehistoric time, man has understood his social nature, and his sense of security was strengthened by society. The housing was in the form of inward looking Ephemeral of Transient dwellings (Schoenauer, 2000). They had built it and later abandoned however with inward layout people had sense of belonging with each other. The Harappan civilization also had inward planning (Singh, 2006) where the dwellings surrounded a courtyard and acted as common part between single and multiple family units.

[11] Notes taken from Ar. Yatin Pandya's workshop during 3-days workshop on Housing at Brick School of Architecture, June 2018

The Wadas of Maharashra (Gupta, 2013) or Pols of Gujarat are similar cases where housing has functioned as sense of togetherness. Like gated communities of present they had one common gate for the premises. In spite of not having locks, security checking, or CCTV cameras the crimes like suicides, theft, murders were less in these areas. Also there were no cases of depression or mental illness.

2.2. Architectural language and respect to the surroundings

The language used by traditional housing form lies in use of locally available materials, construction technologies, structural system, ornamentation and climatic responsiveness. The architecture never dominated nature, but had become integral part of it. The selection of mud, thatch, wood, stone or bricks in these typologies was based on availability in the location. The rock cut architecture12 is one such example, where monks stayed in caves that were beautifully carved with ornamentation and settled in their origin. The natural topography was taken care and respected by design.

2.3. Human scale, and modular design

The spaces have been worked out to fit the human scale. The Vedic villages (Korotskaya, 1980) were based on modular system. Human height, i.e., measurement of 180 cm has been called as Danda, and Human hand, i.e., measurement of 45 cm has been called as Hasta. The length and breadth of streets, plots, rooms and open spaces, all are based on these two units of measurements. Dwelling units of all ancient settlements are not more than 2-3 storied heights. The sizes of doors, windows and openings also have proportional relation with each other. These modules were not restricted till one house but the area had followed the same modules and proportions.

2.4. Transition spaces

The gradual transition through spaces has been given utmost importance at housing cluster level and also at dwelling unit level. The transition through outdoor areas to semi-covered and then to enclosed areas help in giving time to human body to get conditioned gradually from extreme climate of outdoors to comfortable climate of indoors. The design of openings with shading devices like Jharokha etc, are also similar examples.

2.5. Experiential architecture

The architecture of these areas is expressive and inclusive for all the activities and people. These housing types create experiences in throughout its lengths and breads. The pauses and human interaction in terms of walking through the streets, and courtyards and then entering13 to a house are the unique experiences that one can sense in these housing. There are multiple common areas where spaces give opportunity to people to pause, talk, and work together for common reasons. All human senses to experience the space, i.e., hearing, vision, smell, and texture have been thoughtfully considered in the traditional housing. The tradition of washing the feet right at the entrance of house and then walking bare feet in court is very common culture in most of the parts of India. Every flooring material in various areas can be experienced by touch of feet in these areas. The visual tour is an experience, as the spaces are combination of open, semi-open and covered areas, and transparency is maintained through semi-open spaces. Similarly, the hearing environment is governed by the placing the activities in vicinity, sounds of people, bells of temple or Azans in mosques, etc. The attempts were made to respect the activities happening in housing instead of hiding them with architectural barriers. The buildings and spaces can be identified by sounds and aroma of the places like kitchens, or place of worship or work places etc.

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[12] Observations done in Ajanta Caves, Pandav Leni at Nashik and Karla caves on Mumbai Pune Expresss highway

[13] As experienced by Author in the ancient housing of Jodhpur city

2.6. Spaces for domestic animals

Animals have been domesticated since ages, and the housing in traditional areas had specific areas for them. Even in the prehistoric time, a dog was essential member of group (Schoenauer, 2000). The pattern of domestication is changed now. Cattle or horses are not domesticated nowadays. But human nature is to love pets, and in the present day the housing may take lessons to be pet friendly architecture.

2.7. Scope for personalization and Aesthetic sense

The traditional housing forms had adopted a language, but there were no repetition and every house had scope of personalization. The door designs, design of Tulsi planter in front of house14, the plants at the doorstep, color selection, everything had a unique character and define the space as per personalization. The present day housing is missing upon this area and hence there is risk of loss of direction for the people visiting the area. Figure 1 shows an example of such personalization done in a house in Tryambakeshwar, Nashik.

The Vedic villages are known for use of sculpture as essential element of architecture. The art in the architecture can be observed also in the ornamentation of steps, balconies, capitals, ceilings and also in wall paintings. Perhaps this is the reason why these buildings still act like a set for a number of cultural activities.

Figure 1: A house in Tryambakeshwar, Nashik

3. FINDINGS AND DISCUSSIONS

The housing in these areas follows some architectural language, and the built environment is settled in the surrounding landscape and nearby buildings. The human scale has been given utmost importance and hence they are comfortable to eyes of people of all age groups. The use of local materials and technologies are the primary means of sustainability. Modernization of such use to suit today's climatic conditions and changing lifestyle is the area where profession of architecture may help. Housing must be designed with sense of belonging and inclusiveness. Though there were some private areas, but the life of community has been imagined at dwelling level and also at community level. The gated communities of the present have brought a culture where the privacy has been given utmost priority. In order to maintain privacy, sometimes human interaction is just ignored and it raises sense of loneliness and metal diseases governed by it. The up gradation of the housing in terms of advanced services, technologies is need of the hour, but not at cost of physical and mental health of people. The common part between the past, present and future housing are human beings, comfort conditions, and community. The design considerations for human nature and feelings can be learned from past and incorporated in the present.

[14] As observed by author, that every house in Ponda area of Goa have different design of Tulsi Planter

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Light Weight Concrete

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***Abstract*: This paper presents an overview on light weight concrete.**

***Keywords*: light weight concrete**

1. Introduction

One of the disadvantages of conventional concrete is the high self-weight of concrete. Density of the normal concrete is in the order of 2200 to 2600 kg/m³. This heavy self-weight will make it to some extent an uneconomical structural material. To reduce the self-weight of concrete to increase its efficiency as structural member, attempts have been made in the past. A concrete whose density varies from 300 to 1850 kg/m³ is called as light-weight concrete.

A. Advantages of light- weight concrete

1. It helps in reduction of dead load.
2. Increases the progress of building.
3. Lowers haulage and handling costs.
4. Reduces weight of building on foundation-in the case of weak soil and tall structures the weight of the building on foundation is an important function in design. If the floors and walls are made up of light weight concrete it will result in considerable economy.
5. Having low thermal conductivity which will be of considerable advantage from the point of view of thermal comforts and power consumption in extreme climatic condition.
6. Gives an outlet for industrial wastes like clinker, fly ash, etc.

B. Methods of making light weight concrete

1. By replacing the usual mineral aggregate by cellular porous or light weight aggregate.
2. By introducing gas or air bubbles in mortar. This is known as aerated concrete.
3. By omitting sand fraction from the aggregate. This is called no fines concrete.

There are mainly three main groups of light weight concrete, no fines concrete, light weight aggregate concrete, and aerated concrete. The detail of groups is given in table 1. Out of these groups, the light weight aggregate concrete and aerated concrete are more often used than the no fines concrete. Light weight concrete can also be classified on the purpose for which it is used, such as structural light weight concrete, non-load bearing concrete and insulating concrete. The aerated concrete which was mainly used for insulating purposes is now being used for structural purposes in conjunction with steel reinforcement.

C. Light weight aggregates

Light weight aggregates can be classified into two categories namely natural light weight and artificial light weight concrete.

Natural light weight aggregate	Artificial light weight aggregate
Pumice Diatomite Scoria Volcanic cinders Sawdust Rice husk	Artificial cinders Coke breeze Foamed slag Bloated clay Expanded shales Sintered fly ash Exfoliated vermiculite Expanded perlite thermocole beads.

Table 1
Groups of light weight concrete

No fines concrete	Light weight aggregate concrete	Aerated concrete	
		Chemical aerating	Foaming mixture
Gravel Crushed stone Coarse clinker Sintered pulverized fuel ash Expanded clay Expanded slate Foamed slag	Clinker Foamed slag Expanded clay Expanded shale Expanded slate Sintered pulverized fuel ash Exfoliated vermiculite Expanded perlite Pumice Organic aggregate	Aluminum powder method Hydrogen peroxide and bleaching powder method	Preformed foam Air-entrained foam.

2. Light weight aggregate concrete

Very often light concrete is made by the use of light weight aggregates. Different light weight aggregates have different densities. Naturally when these aggregates are used, concrete of different densities are obtained. Table 2, gives the typical

properties of light weight aggregate concrete.

Strength of light weight concrete depends on the density of concrete. Less porous aggregate which is heavier in weight produces stronger concrete particularly with higher the cement content. The grading of aggregate, the water/cement ratio, the degree of compaction also affects the strength of concrete.

Most of the light weight aggregate with the exception of bloated clay and sintered fly ash are angular in shape and rough in texture. They produce a harsh mix. Particular care should be taken to improve workability with the addition of excess of fine materials, pozzolanic material or some other plasticizer admixtures.

Use of air-entrainment will greatly improve the workability, and the tendency of bleeding. But the use of air-entrainment will result in further reduction in strength also. Most of the light weight aggregates have a high and rapid absorption quality. This is one of the important difficulties in applying the normal mix design procedure to the light-weight concrete. Coating of aggregate by silicon compounds does not impair the bond characteristics unlike the bitumen but at the same time makes it non-absorbent.

Light-weight concrete being comparatively porous, when used for reinforced concrete, reinforcement may become prone to corrosion. Either the reinforcement must be coated with anticorrosive compound or the concrete must be plastered at the surface by normal mortar to inhibit the penetration of moisture and air inside.

3. Structural light weight concrete

The structural light weight concrete is going to be one of the important materials of the construction. It is more economical than the conventional concrete as it is light in weight and strong to be used in conjunction with steel reinforcement.

Structural light-weight concrete is the concrete having 28-day compressive strength more than 17 MPa and 28-day air dried unit weight not exceeding 1850 kg/m. the concrete may consist entirely of light-weight aggregates or combination of light-weight and aggregates and normal-weight aggregates. For practical reasons, it is common practice to use normal sand as fine aggregate and light-weight coarse aggregate of maximum size 19 mm.

Light-weight concrete exhibits higher moisture movement than the normal-weight concrete. Concrete while wetting swells more and the concrete while drying shrinks more. Due to high drying shrinkage and lower tensile strength it shows shrinkage cracks. But higher extensibility and lower modulus of elasticity help to reduce the tensile cracks.

A. Design of light-weight aggregate mix

Mix design methods applying to normal weight concrete are generally difficult to use with light weight aggregate concrete. The lack of accurate value of absorption, specific gravity, and the free moisture content in the aggregate make it difficult to apply the water/cement ratio accurately for mix proportioning.

Light-weight concrete mix design is usually established by trial mixes.

B. Aerated concrete

Aerated concrete is made by introducing air or gas into a slurry composed of Portland cement or lime and finely crushed siliceous filler so that when the mix sets and hardens, a uniform cellular structure is formed.

A common product of aerated concrete is Siporex in India.

There are several ways in which it can be manufactured:

1) By the formation of gas by chemical reaction within the mass during liquid or plastic state.
2) By mixing preformed stable foam with the slurry.
3) By using finely powdered metal with the slurry and made to react with the calcium hydroxide to give out large quantity of hydrogen gas which when contained in the slurry mix, gives the cellular structure.

Aerated concrete with low density is used for insulation purposes, medium grades are used for the manufacture of building blocks and higher grades are used in the manufacture of prefabricated structural members.

C. No-Fines Concrete

No-fine concrete is a kind of concrete from which the fine aggregate fraction has been omitted. This concrete is made up of only coarse aggregate, cement and water.

No-fines concrete is becoming popular because of some of its advantages like light in weight and it offers architecturally attractive look.

No-fines concrete is generally made with the aggregate/cement ratio from 6:1 to 10:1. Aggregates used are normally of size passing through 20 mm and retained on 10 mm. the strength of no-fines concrete, is dependent on the water/cement ratio. Aggregate cement ratio and unit weight of concrete.

Drying shrinkage of no-fines concrete is considerably lower than that of conventional concrete. It is used in large scale for load bearing cast in situ external walls for single storey and multistoried buildings. It has been used for temporary structures because of low initial cost and also for the ease with which it can be broken and reused as aggregate.

Use of lightweight concrete as a roof decking and insulation system has expanded in the past five years. Increased usage can be attributed to the recent industry-wide insulation shortages and delamination deficiencies. The increase can also be attributed to the economic and environmental advantages that lightweight insulating concrete (LWIC) provides in roof assemblies.

There are several benefits for the use of lightweight concrete on current roof applications. When provided with insulation, a thermal R-value of R-30 can be easily achieved without insulation delamination, warping or attachment concerns. An example can be seen in Miami where lightweight concrete is used on the Miami postal facility, not only provides a sound substrate for membrane application, but it can be formed to

achieve proper slope without adding tapered insulation.

In addition, lightweight concrete provides the building owner with long-term cost savings. Since the lightweight construction becomes part of the structure, replacement is not required during remedial roofing applications, as is the case with insulation. Rather, only the membrane removal is required. This frees space in landfills and substantially reduces removal costs, which can be as high as 50 percent of the total project costs.

D. Disadvantages

Lightweight concrete applications do have limitations and associated liabilities. The system is installed on site and a successful application depends on the skill of the installing contractor. Lightweight concrete has additional constraints because the success of the system is based on the proper mix ratio. An improper mix can create voids in the concrete that lead to deficiencies.

One of the major disadvantages of lightweight concrete has been the inability to provide consistent compressive strengths and density throughout the entire area.

4. Case study

Use of light weight concrete on the bridge deck: Benefits;

- Reduced dead load of structure.
- Reduced handling and transportation costs for precast components.
- Enhanced durability.
- Resistance to chloride intrusion.

A. San Francisco Oakland bay bridge

Deck constructed with light-weight concrete in 1936, still in service today. No spalling was found in cores of light weight upper deck unlike the cores of normal weight upper deck where spalling was found.

B. Sebastian inlet bridge, FL

After more than 30 years wear of the light-weight concrete deck was essentially the same if slightly not less than the adjacent normal weight decks.

Fig. 1. Sebastian inlet bridge, FL

C. Suwannee river bridge, FL

- Indicates no increase in flexibility over time.
- Structural light-weight aggregate concrete used in the deck and girders have met expectations and performed satisfactory. Still in service after 41 years.

Fig. 2. Suwannee river bridge, FL

Table 2
Typical properties of light weight concrete

Type of concrete		Bulk density of aggregate kg/m³	Mix proportion by volume Cement: aggregate	Dry density of concrete kg/m³	Compressive strengths MPa	Drying shrinkage	Thermal conductivity Jm/m²s°C
Foamed slag	Fine	900	1:8	1700	7	400	0.45
			1:6	1850	21	500	0.69
Rotary kiln expanded clay	Fine	100	1:11	650-1000	3-4	-	0.17
			1:6	1100	14	550	0.31
Rotary kiln expanded slate	Fine	950					
			1:6	1700	28	400	0.61
			1:1.45	1750	35	450	0.69
Sintered Pulverized Fuel ash	Fine	1050	1:6	1450	28	400	0.47
			1:4.5	1500	36	500	0.49
			1:35	1550	41	600	0.50
Pumice		500-800	1:6	1200	14	1200	-
			1:4	1250	19	1000	0.14
			1:2	1450	29	-	-
Exfoliated Vermiculite		65-130	1:6	300-500	2	3000	0.10
Perlite		95-130	1:6	-	-	2000	0.05

5. Conclusion

The use of light-weight concrete over conventional concrete has proved advantageous. As it reduces the dead load of each member, it reduces the building load on the foundation which in turn proves economical as compared to conventional concrete. By using light-weight concrete the strength and stability of structures also improve. Hence after looking at all its advantages it has become more popular these days.

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GREEN COVER AS A SOCIAL CATALYST FOR A CITY – CASE STUDY: PUNE

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Abstract - A city's social status is defined by how its resources and its conditions, make it comfortable for its inhabitants to thrive. A social condition in a city is mostly governed by its physical features, the availability of resources, climate, etc. Climate being one of the major influential factors for a thriving social life in the city. However, the green cover would define the micro climate and the social pattern in the city. The social well-being would indirectly be influenced by the percentage of green cover in the city moderated by the trees. Trees are a vital part of any city's landscape and green cover. They help in pulling down pollution levels, reduce sound levels, bring down temperatures and invite rain. The green cover in Pune, a suburban city in west India is fast depleting, due to the urban sprawl and fast paced development. Earlier, trees could be found shading the roads in public spaces, sidewalks, by the windows in residential complexes etc. But as one drives along the city - it's a dry landscape; a concrete jungle, glass facades, tall buildings, un-shaded pathways, concrete and tar roads, hoardings, traffic!! . The lack of green cover in the city has caused the ambient temperatures to go up. The city has seen an average minimum temperature rise up to four degrees in the past decade. Additionally, it has been observed that city dwellers prefer to stay in areas with more green cover, walk on shaded footpaths and drive on shaded roads. There seems to be a constant competition between the BUILT and the GREENS in the city for land. Left to it, the BUILT will win its way. In effort to save the GREENS, the National (Indian) Forest Policy was conceived in 2016, to maintain 33% of the country's geographical area under forest and green cover. This paper explores the acts/policies and citizens' participatory ACTIONS in Pune (Maharashtra, India) that focus their efforts towards maintaining the GREEN in the city. Through a case study approach we discuss the hurdles for implementation of these policies as well as highlight some successful initiatives that show a way forward.

Keywords - Climate, Green Cover, Social Well-Being, Trees.

I. INTRODUCTION

As early civilizations developed, they profoundly changed pre-existing natural environments. Indigenous cultures cleared forests, managed landscapes by setting fires, domesticating, and dislocating species, by hunting, thus driving many of the non-human species to extinction. Human contact left few landscapes undisturbed causing a catastrophic effect to them. Writers beginning with Aristotle put forth the term such as "second nature" to refer to elements of the natural world that had been influenced by interaction with humans. [1]
The balance of nature has been disturbed and the result affected climate - extreme natural calamities, unbearable rising temperatures, depletion of the ozone layer and the list is never ending. The mass awakening to conserve nature and to hence forth follow the path of responsiveness to the environment and living in harmony with nature - hence causing it lesser harm was in true sense sustainability, was called upon.

Why does a city need green areas?

The rapid spread of urban sprawl has caused the green cover in the city to be encroached upon. In the most recent decades, urban areas have been increasing in population and thus footprint. People migrate to the cities in search of a vast number of opportunities, which, in rural areas, are not so accessible, turning cities into centers of concentration for infrastructures, recreation and markets, among other elements.

II. NEED FOR MORE GREEN COVER

Vegetation plays a vital role in urban environments. Aside from the aesthetic benefits, trees and other vegetation help mitigate the effects of an urban heat island (UHI) by increasing the latent heat flux through evapotranspiration, preventing the near surface air from heating up during the day and providing evaporative cooling during the night. Shadowing street canyons and buildings, trees prevent them from accumulating more heat, thus reducing the total energy surplus of an urban environment [2,3]. Vegetated roofs and facades can help to reduce the cooling demand in summer and also contribute to insulation in winter, leading to less heat loss into the atmosphere and savings in energy consumption for the immediate environment. [4]
Trees are amongst the most important and significant features in the landscape in the rural and urban areas. They play an important role in enhancing the environment and micro-climate. Trees intercept particulate matter and absorb gaseous pollutants such as ozone, sulphur dioxide and nitrogen dioxide, thus removing them from the atmosphere. Trees also emit various biogenic volatile organic compounds, such as isoprene and monoterpenes that can contribute to ozone formation in cities.

By transpiring water and shading surface, trees lower local air temperatures. Because trees lower air temperatures, shade buildings in the summer, and block winter winds, they can reduce the consumption of the building energy and consequently reduce the emission of pollutants from power generating facilities.

However, even a minor reduction in the oxygen content of the air will cause a large percentage increase in its carbon dioxide content, which would reinforce the greenhouse effect thus leading to a rise in the global temperatures.

Large number of studies exists analyzing the effects of vegetation on microclimates [4-10]. Having a known impact on urban air temperature, and as such urban heat island mitigation and climate adaptation potential, many authors advise increasing the amount of vegetation in urban environments [3,11,12] and recommend trees to provide ecosystem services to urban areas [13]. Planting trees, therefore, should be extended in general guidelines for sustainable urban planning [14].

III. DEVELOPMENT OF GREEN IN PUNE

Pune alone has seen a steady rise in the highest temperatures recorded for the last 10 years. This year in April, Pune recorded the highest temperature of 43^{o} C in 52 years owing to the reduced GREEN cover and increased BUILT spaces. Various initiatives have been brought into practice by the local governing bodies to help maintain the city's green cover.

Built Green Areas:

1) Road widening and beautification (Roadside tree plantation)- Budgetary provision has been made for road widening and its beautification.. Garden department carries out the road side plantation all along the city. Plantations are done in the area bifurcating roads or the edge of the roads. Depending upon the road widths, every 1 km of running road is planted with more than 200 to 260 no.of trees.

Green Areas around water bodies:

Figure 1: A green belt developed along a Nala

1. **Nala (canal)** development and beautification - Nala development is being proposed by using the treated waste water from sewage treatment plant. Beautification proposals have also been suggested along Mutha river (a major river in the city) from Sangam bridge to Mhatre bridge stretch (distance in Km), with many other viable sites being modified for beautification.

Landscape oriented Green areas - These include landscape conservation areas, nature conservation areas, public open spaces and private playing fields.

1) Garden development - Garden development at various locations in the city has been initiated at a very large scale, 35 more gardens in addition to the existing 62 are being proposed. Each garden is developed with a specific theme like rose garden, Ayurvedic park, Nakshatra Udyan, energy park, railway museum etc.

2) Landscape conservation areas - Areas of open space which have been assessed as containing inherent landscape value and/or provide important green space and natural breaks in the urban environment.

3) Nature conservation areas - Areas of importance for conservation within the city, have been identified through the nature conservation strategy and have been given a grading A, B, C or D to reflect the wildlife value and the conservation efforts in the site.

4) Public open space - land that is freely available for public use of a size and location suitable for recreational activity have been identified and marked.

5) Private playing fields - land used for recreation purposes owned by a private individual or organization and usually reserved for their own use and not publicly available.

IV. ACTS AND POLICIES RELATED TO GREEN COVER

A. The National Forest Policy - In consonance of the public participation, the Maharashtra Forest Department has initiated the 'Maharashtra Harit Sena'/ 'Green Army' which is a body of dedicated volunteers to participate in the plantation, protection, and activities in forest, wildlife, and related sectors around the year.

Preservation of tree Act, 1975 - This act is a manual for every citizen on - how to protect a city's green cover. This act, among other things, categorically defines what constitutes felling. It includes burning or cutting or in any way damaging a tree. The Maharashtra (Urban Areas) Preservation of Trees Act, 1975 states that, "a tree is any perennial woody plant, whether in the seeding or sapling stage or fully grown

stage, and includes shrubs whose branches spring from the ground level". The act defines rules around chopping of trees-Even if the tree is in private premises; it cannot be hacked without prior permission of the Tree Officer.

Even government bodies require permission from the Tree Authority (Pune local authority) for any developmental purpose. There is a time schedule too. On receiving an application, a tree officer has to personally inspect the tree sought to be chopped and submit a report to the Tree Authority within 30 days. The officer has to give adequate public notice in local newspapers as well as by affixing a notice on a conspicuous part of the tree.

The Tree Authority then decides within 60 days whether or not to permit the felling. But even after permission is given, the tree cannot be chopped for 15 days. However, if the authority does not inform its decision within 60 days, the permission applied for shall be deemed to have been granted.

Citizens' rights - As an Indian citizen, we have the right to raise objections. It is not necessary to be residing in the same area where a tree is being hacked. For example, a Mumbai resident can take objection to a tree being felled in Nagpur or even Delhi provided the Union territory has a tree act.

If documents show that the municipal authority had failed to decide, a citizen can demand an explanation from the respective municipal council under the Right to Information Act, 2002. Till an explanation is forthcoming from the authorities, the tree cannot be felled.

Penalty -Every act of chopping at different points of time, whether it is the same tree or different trees, constitutes a separate offence. The penalty includes a minimum fine of Rs.1,000 and maximum of Rs.5,000 with imprisonment from a week to a year.

Other provisions -Bye-law No. 162 of the Maharashtra Cooperative Housing Societies Model Bye- laws says: No member of the society shall destroy, deface or cut down any trees in the society's compound. A violation may render the member concerned liable for action.

There is another act—The Maharashtra Felling of Trees (Regulation) Act, 1964—that deals with protection and preservation of some select trees like Teak, Mango, Mahua, Sandal and Tamarind including mangroves.

Town planning norms for providing green areas in urban centers located in plain areas –

Area extent and Population	Green areas
Small towns (having population less than 50,000 persons)	12% - 14%
Medium towns having population (between 50,000 to 5 persons)	18% -20%
Large cities having population (between 5 lakhs to 10 lakhs persons)	18% -20%
Metro cities (having population more than 10 lakhs population)	20% - 25%

Table 1: Town Planning Norms

Planning principles for providing green areas in urban centers at master plan level -

1) Provision of green belts along national highway/ expressway/ and other major roads/ arteries of the town: Green belts ranging from 100 meters to 30 meters (i.e. 100 mts wide or 60 mts wide or 45 mts wide or 30 mts wide) green belts are proposed along both sides of national highways or expressways or other major arteries of the town.
2) Provision of green areas along river fronts/nala/drain/ canal: the width of such green belts can vary according to the topographical features of the area generally ranging from 30 mts. To 250 mts.
3) Provision of green areas around historical monuments and religious places: about 100mts wide green belts/ areas are provided around historical monuments and religious buildings for the maintenance of their sanctity.

V. GREEN BELT

Figure 2: Green Belt: Green line maintaining an area as Green area.

Green belt policy retains areas that are largely underdeveloped, wild, or agricultural land surrounding urban areas to be developed as green areas. Similar policies include the green ways or green wedges which have a linear extent and may run through an urban area instead of around it.

A green belt is basically an invisible line that goes around a certain area (Figure 1), stopping people from building thereto preserve the integrity of the agricultural land and the wild life.. Green Belts help protect natural or semi natural environments, improve air quality within urban areas, ensure that urban dwellers have access to the countryside, with consequent educational and recreational opportunities

and protect the unique character of rural communities which might otherwise be absorbed by expanding suburbs.

Biodiversity Parks- Biodiversity is the variation of life forms within a given ecosystem or biome-, the main habitat for urban plants and animals. Older, well-established installations attract, for instance, birds and mammals, the natural habitat of which is the forest. Since an increasing part of the population lives in urban areas and receives its daily perception of nature therein, it contributes towards environmental awareness and understanding for humans. While the role of urban forests in terms of carbon sequestration is limited in relation to forests in rural areas, urban trees do play a role in controlling global climate change byindirectly decreasing the use of fossil fuels for infrastructure heating and cooling. By lowering air temperatures and shading buildings, they can reduce energy consumption by air conditioners in the summer, and through blocking winter winds, they can reduce the consumption for heating.

Following are a few of the guidelines for greening of urban areas and landscaping - (Tree Policy- Pune)

1. To avoid the use of excessive tiling of pavements: porous materials to be used - to increase the ground water table levels and reduce surface runoff
2. Tiling should be done only on pavements with heavy pedestrian traffic - to help recharge as much ground water as possible.
3. Growth of grasses to be encouraged – to help control fertile soil erosion.
4. Excessive pruning to be avoided – this stunts the growth for a few species.
5. Adequate space to be left around trees – to help the roots and the bark or branches breathe.
6. Digging near trees to be avoided- this could cause harm to their roots.
7. Use of organic compost- organic fertilizers and manure has known to have more positive effects compared to chemical ones.
8. Planting of second line of trees to be encouraged – increased number of trees would mean more benefits.
9. Compactness of soil near the trees to be avoided – trees often house habitat at their roots which help them survive longer. Compacting would destroy this micro habitat.
10. Public participation to be ensured – to help make more people aware.

VI. ORGANIZATIONS WORKING TOWARDS CONSERVING THE GREEN COVER

Campaigns (2005-06) for Environmental Justice in India – Critiques and facilitates inputs on various environmental laws and policies, campaign on community control over biodiversity, the open letter campaign, Postcard campaign against the National, Environment Policy, MoEF (Ministry of Environment and Forests) Suno and Chalo!

Focus Areas – Biodiversity, community conservation, environment and development, eco-sensitive alternatives, education.

Kalpavriksh – "Kalpavriksh believes that a country can develop meaningfully only when ecological sustainability and social equity are guaranteed, and a sense of respect for, and oneness with nature and fellow humans is achieved." They operate mostly out of Pune and Delhi. Some of the issues worked on in these areas include dams & environmental impact, conflict between army and villagers in Nagaland, hunting and wildlife depletion, tsunami-related work in the Andamans, urban greening in Pune and Delhi. [15]

Tree Watch – This group is formed under the Kalpavriksh, to bring together people that are concerned about the dwindling tree cover of Pune. This group aims to monitor, act and protect the trees that harbour a variety of fauna and provides its citizens with various ecological benefits. This group would include concerned citizens, and NGO's of Pune.
Since their inception in July'05 the group has saved more thousands of trees and has been a support group for concerned Pune citizens.

The group has initiated many activities around urban greening as stated below:[16]

1) **Preventions and Surveillance:** Preventing illegal tree felling, surveying the trees to be cut.
2) **Enforcing Policy:** Working on the policy level like the Maharashtra (Urban Areas) protection and preservation of Trees Act, 1975. Tree plantation programs.
3) **Planning and Implementation:** Collection of seeds and its distribution at time of meetings. Media interaction in case of unwarranted cutting of trees. Identifying possible areas for tree plantations like roads, nalas (streams) and riversides or barren lands.
4) **Awareness:** Creating public awareness about relevant laws and policies among general public through participation in exhibitions, presentations in public programs or just word of mouth. Regular interaction with the concerned authorities.

VII. INITIATIVES WORKED ON

Pune is a city rich in natural resources spread along the banks of two rivers Mula and Mutha and surrounded by hills on all sides forming a green belt. These hills naturally limit the growth of the city. But growing urbanization made this budding metropolis to invade

the neighboring suburban and fringe areas resulting in a sprawl. We list the main factors contributing to the diminishing green cover in the city.

Slums/Hutments contributing damage on hilltops and river banks: The sprawl encroached upon the hills surrounding Pune, are recklessly clearing the forest cover. The deforestation and drastic loss of trees also resulted in soil erosion, reducing the hill tops. It is observed that, many hill slopes are encroached by illegal temporary hutments contaminating the soil, demolition of these encroachments is extremely difficult negating the alternative of replanting trees on the hill slopes. Slums are not only seen on the hilltops but also near river banks and nala sides.

Construction sites contributing damage to river banks: The river and nala banks had green cover due to which the direct entry of industrial by-products and garbage was obstructed. But today construction sites are getting too close to the river ultimately causing the tree cover to vanish and allowing the waste entering the river water, making it stagnant and dirty.

Population explosion contributing damage to air: Increasing population has led to the increase in the number of vehicles, creating a congested and polluted city center. This pollution is usually absorbed by the trees, but now due to depleting tree cover, air pollution has become a threat to the city's air quality. Previously the hills which added to the scenic beauty and landscape of the city have started to lose its glory.

In a recent attempt to build supporting infrastructure to satisfy the growing population, a proposal to clear the hilltop was approved. Due to active participation of citizens and NGOs this hill was saved from the massacre. To save the existing tree cover and to increase them, the city government has implemented some measures and to avoid such situations in the future, the concept of Bio-diversity Park reservation came into existence.

Present Day Scenario, Effect of depleting green cover in Pune –

Rivers - The two main rivers Mula and Mutha according to the policy should have a minimum 100m green belt by their sides. The increasing development has led to channeling the river, forcing it to swell in the rains and destroy its surroundings. The disposed garbage and industrial waste further act as an obstruction for the river.

Green belt near the river helps maintain a relation between the manmade and the natural environment. Thus the main intention of green belt is to maintain a balance with the adjoining water body. Open space for planting local species of plants and shrubs should be provided by the sides of rivers and nalas. This helps conserve the biodiversity of the area and its surroundings. These green belts have been observed in a few places, but they are gradually being consumed due to the increasing pace of construction and development.

Figure 3: Earlier and present-day pictures of the river

Figure 4: Earlier and present-day pictures of the river

Canals or nalas- the policy proposes 7.5 m of green belt on both sides of the canal. The concreted canals or nalas further reduce the chances for an ecosystem to strive in or around them. Nala development is one of the few schemes taken up by the local governing body in Pune. The nala near Sarasbaug garden is one such example. The canals are originally are streams which carry the rain water or the water which flows down from the hills and merges into the rivers. These are now flowing carrying unhygienic waste and garbage.

Figure 5: A section through the Parvati hill slum area and the adjoining area

Hills – As Pune sprawled, hills were susceptible to urban sprawl and deforestation. The green cover in the city had to face the brunt.

The hills have been encroached upon by slums and other buildings. The beauty of the hill which provided visual relief earlier is now a disturbing mess with buildings and diminishing greens. It seems to be a heap of concrete which is increasing day by day. The hills need to be conserved, for which the Pune Corporation has been working towards reserving

stretches of these as biodiversity hotspots. This is a step forward to save the green cover in Pune.

Figure 6: A future projection of the slum encroachment on the Parvati hill

Figure 7: An older photograph of the Parvati hill (far behind)

Greens on the roads - This is one of the initiatives taken by the Pune local governing body. They have conserved trees which are older than 15 years on the road side, which also overlaps with the tree policy. The Chimaji appa road, Sinhagad Road, Jangli maharaj road, Bajirao road are few of the road stretches where these trees have been conserved. Most of these trees are evergreen trees.

Figure 8: A forest of hoardings and signages with no visual relief – Karve Road Pune

Figure 9: Jangli Maharj Road Pune – Evergreen Rain trees conserved, with a spread of 15-30 mt.

VIII. CONCLUSION

Trees and green zones have become a vital part of urban areas and the cities today. We are in a constant search for visual and mental relief from the pollution, the crowd, the continuous arena of buildings and masses of concrete which have taken us away from our natural habitat. We have created a self-owned and self-made habitat of which environment isn't an integral part. It should have been the other way around. Nevertheless, attempts have been made via the mentioned policies and acts. Initiatives have also been taken by various participatory groups, NGOs and other organizations to conserve and help revitalize the city of its green cover.

The tree policy is another step towards conserving and monitoring the green cover in the city. Since the policy has come into being, few attempts have been made to follow it. But to start somewhere is important and as we say, the rest follows.

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Role of Creative Exercises in Design Process:
Documentation of first year design Studio

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Abstract - **Design is both the heart and the soul of architecture education. Design studio is a place where students learn the most important aspects of design that is composition and facilitation for aesthetics of forms and ease of function. However, How to teach design or introduce an appropriate method for the design process is the most challenging aspect in Architecture Design Studio. Students struggle to find appropriate Method to start and reach the desirable creative composition, form and spaces as final goal of design. This paper states that creative exercises based on elements and principles of design and creative technique for enhancing creativity can act as a stimulation and provides a starting point for every stage of design. Creative exercise plays a very important role in understanding the rules of composition and facilitation which eventually helps to increase the level of creative performance and confidence to design in the students. To explain this, the paper showcases the documentation of explorations done in two consecutive years at SMEF'S Brick school of architecture, Pune, India.**

Key words: Creative exercise, Design Process, Design Studio

INTRODUCTION

Primary concern in the design studio is to produce a creative form and composing the space for human activities. The main aim of design studio teaching is to make learning basic of design possible and simplified for every student. The student should feel confident and curious towards design. The job of a teacher is to understand what and how to teach. As Edward De Bono in Lateral thinking puts in "nothing is taught unless it is learnt." The first step of teaching is to learn how to teach. The challenge lies in taking students to the logical creative world, opportunities to invent new ways of seeing and doing things. Teacher has responsibility to develop creative strategies in design studios. These strategies cover the length and breadth of the design process. Mostly creative activities are very casually conducted in the course, students never know why they are learning composition of line, shape or making color wheel. The fragmentation between creative exercise and space design creates confusion in a student's mind. It is also a belief that design cannot be taught, one has to be creative to design. To elevate this confusion creative activities should become the central process of design and design studio.

Virtually, Design is considered both the heart and the soul of architecture education. However the term design is commonly used by designer and design educators on limited connotation, focusing on aesthetics and theoretical design theories than cognitive nature of the process. The measure of learning is evaluated on product of design rather than the learning process or skill. With this sometimes it happens that students struggle in school and face the profession without the awareness and understanding their own cognitive process of design. To overcome this challenge, we at SMEF's Brick School of Architecture propose the use of creative techniques and basic principle of design in the form of step by step creative exercises as strategies for design process.

The Main objective especially in the first year of architecture of introducing of these creative exercises was to establish the link between basics of design and Architecture design. Also to establish an understanding where students understand that for every stage of design there are some techniques which can help in taking the right decision for their design process.

It is an observation that introduction of process right from the first year not only enhances the understanding and awareness of design process but it also increases their ability to create novel solutions. Here creative exercises at every stage becomes the basis of powerful understanding of sequential process of design. All creative exercises are designed in a way that they always precede the actual design activity. Here it is a process which is more important than the solution; although the end result is never underemphasized. Students are always guided on the basis of what they already know to what is not so known to them. Actual design problem is introduced only when students have all required techniques to solve.

TOWARDS A DESIGN PROCESS

The process in the context of design is understood as systematic steps directed to some end. Architecture design is a process, where we develop skills to bring our conceptual or metal ideas on paper so that others can read and react. In other words it is also a product of creative mind brought out through skill and dexterity to suit the purpose. So it is a question that if we can set a method or a process where by using that even an average student can be successful, if not remarkable. Can it also be stepping stone for becoming average to extraordinary geniuses? In design studio it is teacher's task to develop a method or process which liberate the mind from set patterns the method should be stimulating, enjoyable and simple. At the end the student should be surprised by his/ her own creativity. We in our studio found that introduction of

creative exercises as stimulation has helped us in achieving the above stated objective.

Christopher John, explains why design is difficult. Christopher John in his book Design Methods: Seeds of Human Futures says, the basic problem is that designers are indebted to use present information to foresee a future state that will arrive only if their predictions are correct. The final result of designing has to be expected before the means of succeeding it can be explored. Christopher Alexander (1977), Broadband (1973) Wade (1980), considered to be the pioneer in architecture design process study. Karl Popper (1967) developed the epistemology of thinking and Edward De Bona has promoted lateral thinking (Creating alternatives). Learning from these masters can be brought in design studios for creating an effective teaching and learning design process.

CREATIVE EXERCISE

It is psychological input that to obtain a creative output a creative stimulus need to be introduced. Therefore introduction of creative exercises at every stage of design is important. It is general belief if a particular process in followed than creativity is lost whereas Research in the field suggest that guided decision help in enhancing the creativity.

William Gordon and George M. Prince an educationist in 1961 has developed the method for enhancement of creativity –'Synectics'. Their basic assumption was that creative process in not mysterious or emotional it is rational and can be taught. With the help this view the process is developed at SMEF"S Brick School of architecture, Pune by using 'Synectics' process are known as Creative exercises. From the experience of over five years this process is both interesting and possible for reproduction.

DESIGN STUDIO OBJECTIVE: FIRST YEAR

First year studio teachers are dealing with fresh, tender and sensitive mind of students. Building a confidence to explore and design is the key role of the teacher here. Design flows the total duration of architecture course, progressively it becomes complex. When students take entry in the course they are totally raw and unaware of the process of design, the first teacher has to do the hand holding at every stage of design process so eventually in coming years they can become independent learners. It has been observed that a careful structured planning can save them from getting confused and lost. Thus the students are taken from what is known to them to what is not so well known field. The old maxim of teaching- Known to not so known, simple to complex and concrete to abstract is used for right from selecting the project to deciding the process. Creative exercises are the main creative trigger in the process. The first year design studio demands to work on a project that is around 25 sq. m. of area. Design studio has to be interesting enough to keep first-year students engaged throughout the semester and has to give challenges from time to time.

Thus the objective and the level of complexity is set for the first year students and project has been identified to meet the interest of entry level students. Expected input and output at every level was known to the teachers. Support from allied subjects is valued and following objective is set for first year design studio at BRICK school of architecture, Pune.

OBJECTIVES:

· Introduction to the basic language of architecture through elements and design principles

· To understand the space and architecture around them

· Relation between form and function

· Understand anthropometry

· Understanding of scale and proportion

To serve the above objectives a guided method has been applied to the design process, and all the designs of the first year are done in the following sequence.

COMPOSITION – FACILITATION- CIRCULATION

The sequence here is the basic steps of design. To first year this stage has been deliberately introduced and compulsorily followed. Later years mind becomes habitual of it.

APPLICATION OF THE DESIGN PROCESS IN THE STUDIO: STUDENTS' WORK

I. Documentation of Design Studio First Year, 2017-18

Example: Book cafe

Objective: Book cafe as a design project is been decided keeping the youngsters in mind. An activity that is well known and provides multiple activities at one place i.e. read, explore, play, drink etc and at the same time can be a stimulation in itself for designing. To arrive at the final design solution multiple creative exercises are designed as stimulators.

Allen R.G. Isaac who served in the local government as deputy chief architect suggests in his book Approach to Architecture Design, the more simple and regular shape, the more easily it is perceived and probably with the greater degree of accuracy. Starting from the basics; platonic forms are well known to the first year students, a basic form 'cube' is being decided to explore. Three different explorations are done to understand the cube and its behavior. Transformation, understanding positive and negative through cube and scale & proportion are the explorations done to understand how a form can be designed. Explorations based on Transformation

and Positive-Negative are a prerequisite for the final exploration.

Transformation: Students have to draw 40 squares of 12 x 12 cm on the high density sheet, and they have to transform each shape by changing the inner edges or inner vertices and by attaching each of these 40 squares to each other in the series leads to a 3D form i.e. a cube in the end.

FIGURE 1
TRANSFORMATION OF CUBE

- **Positive and Negative**: This is being done in two stages, in stage one students had to draw and cut 6 squares of 12 x 12 cm. Students have to draw grid and then cut and fold portions to create projections and recessions i.e. positive-negative spaces in 3D.

FIGURE 2
POSITIVE AND NEGATIVE SPACES IN THE CUBE

FIGURE 3
REPRESENTATION ON THE SHEETS SHOWING THE PROCESS

- **Scale and Proportion**: Understanding of the golden proportion is crucial here, and students have to study 'The modular' of Le Corbusier based on golden proportions.

Vitruvius, Leonardo da Vinci, Leone Battista Alberti have discovered mathematical proportions in the human body and how the knowledge of proportion to use to improve both the appearance and the function of architecture based on the proportions of 'The Modular man' of Le Corbusier.

In the first stage, Students are given to draw golden rectangle followed by the limitless numerical values of red series and blue series from Le-Corbusier's 'THE MODULAR' to draft. The series are then superimposed on each other and their points of intersection are to be read new basic values of golden rule. These values can be used to deal with lengths, surfaces, or volumes, which are directly from the human stature i.e. Le Modulor.

The second stage leads to the final design where Students do COMPOSITION- FACILITATION-CIRCULATION based on the understanding from the first stage. Panel designing, defining the appropriate activities and fitting the given function in the achieved form with appropriate circulation are the later activities. Modular is to be used as a tool for the final design.

Objective:

1. A means to understand scale and proportion in composition

2. A way to generate unlimited possibilities in restricted options

3. A way to learn from the master's work

Thus, students have to make a 'panel exercise', till student gets the satisfactory composition to work with. Student should study a pattern which can be applied to a book cafe. Design of the book cafe based on the form that is achieved from the combination of the six panels brought together. The Doors, Windows and even inside spaces are based on the panels that are designed through the above process. Important objective here was also to observe each panel carefully and decision is to be made regarding which side of the cube can

take up floor space, ceiling space and walls etc. Students then to Draft superimposed red and blue series, alternatives of panel exercise, and 2-D detail Drawings for the designed cube and make model for the book cafe.

FIGURE 4
PANEL DESIGNING BASED ON RED-BLUE SERIES OF CORBUSIER

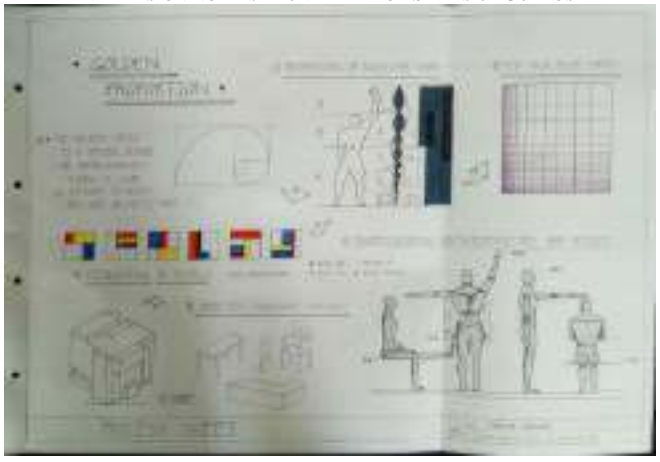

FIGURE 5
COMPLETE PROCESS SHOWCASING THE DESIGN

FIGURE 6
BOOK CAFE BASED ON CUBE: INTERIOR

FIGURE 7
BOOK CAFE BASED ON CUBE: EXTERIOR

Modular method was finalized to design the book cafe and to arrive at final exploration few essential exercises to be done like understanding color, organization of spaces and Anthropometry.

- **Anthropometry**: Students to list down various activities of the Book cafe like, people having coffee, billing counter activities, storytelling sessions, activities of Pantry. Students to act out each of these activities in the group with space and furniture arrangement. Measurements to be taken of the required space for each of the activity and spaces to be understood.

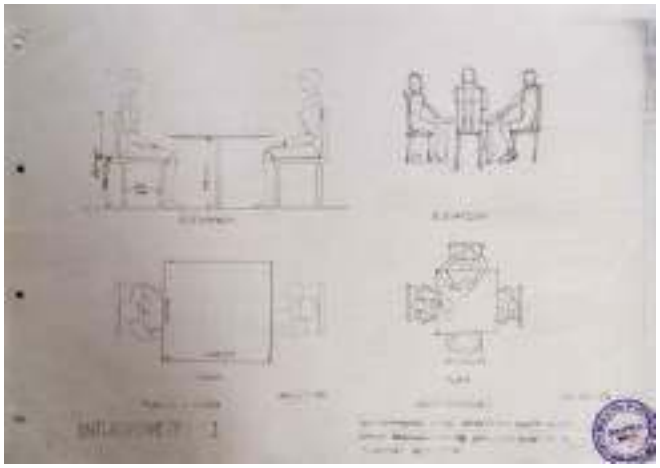

FIGURE 8
FACILITATION: THROUGH UNDERSTANDING ANTHROPOMETRY

• **Organization of Spaces**: To understand the importance of each space and its organization, students have to go through various arrangements of their own studio where they have to experience various emotions and feelings. Few arrangements can allow them to have group interactions and few arrangements can allow them only to pay attention to their own desk and individual work. This activity can lead to the understanding of all the positive and negative sides of every type of arrangements.

FIGURE 9
FACILITATION: THROUGH ORGANIZATION OF SPACES

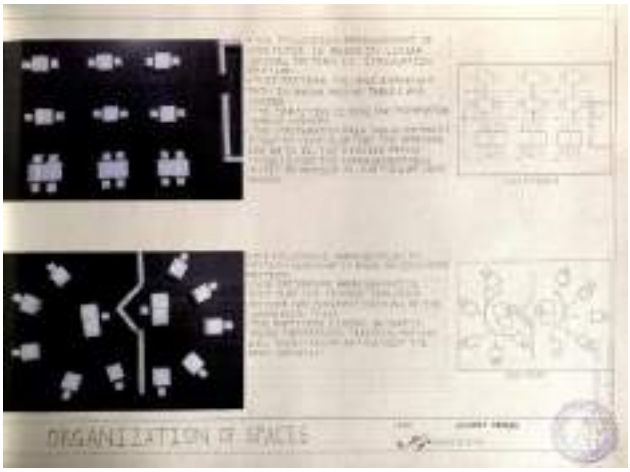

FIGURE 10
APPLICATION OF ORGANIZATION OF SPACES FOR GIVEN ACTIVITIES

• **Understanding Color**: This innovative exercise is being done to understand the behavior of colour while mixing, how two colours mix and forms the third different colour. Inks of primary colours are to be taken and mixed in water to record the mixing of the two colours at a time. Colour mixing is being recorded by making videos as well as clicking multiple pictures as various stages of mixing. Various frames are being selected by students for each colour mixing, various colours are being noted from the selected frame and recreated to match the shades from the photographs.

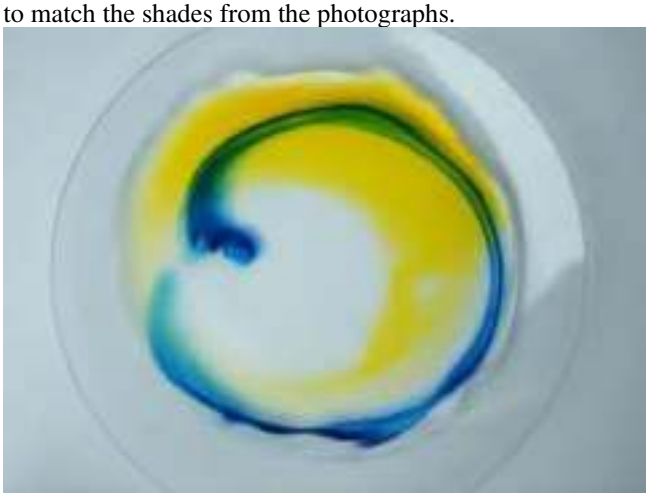

FIGURE 11
FACILITATION: MIXING OF COLOURS RECORDED THROUGH PHOTOGRAPHY

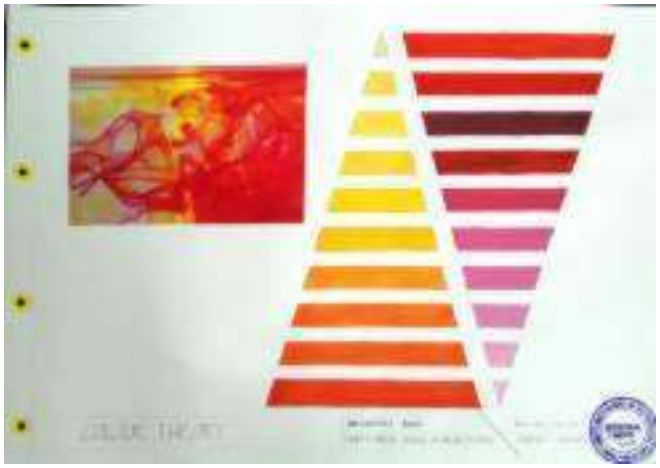

FIGURE 12
RECREATED COLOURS FROM THE SELECTED FRAME

II. Documentation of Design Studio First Year, 2018-19

Example: Hobby space for different age group using shipping containers

Objective: The objective is always achieved from what student wants to learn to what we as design teacher wants to teach. It's an observation that new generation is always interested, excited and curious to learn the Modern emerging trend and technology around them. With lots of discussion and consideration shipping container is being considered for two reasons; first, use of shipping container architecture is a growing trend and second, it is simple in its form for first year students to understand. Hobby as a function has been chosen because it brings joy and enrich the lives and is close to the youth's heart.

Students indulge into various explorations for assembly of shipping containers for the final design; going back to the basics; COMPOSITION- CIRCULATION-FACILITATION are the stages to be used in the design process

Composition:

Objective: bring together shapes for facilitation and circulation

- **Shape Grammar**: A shape grammar is a set of shape rules that apply in a step-by-step way to generate a set, or language, of designs. Shape grammar has been used to make the composition and the final assembly of the shipping containers.

Objective:

1. A means of abstraction for understanding the composition.

2. A way to describe a particular composition

3. A way to design a new composition.

At first Students are asked to make cuboids of three different sizes of shipping container at 1:100 scale. At the second stage the student explored three different rules of composition. Initially one rule at a time was applied. In the next stage any two rules of their choice were applied for final composition.

Rules: 1. face to face, 2. Mid to mid, 3.Centre to Centre, 4. Rotation at 45 degrees.

FIGURE 13
SHAPE GRAMMAR: RULE 1: FACE TO FACE

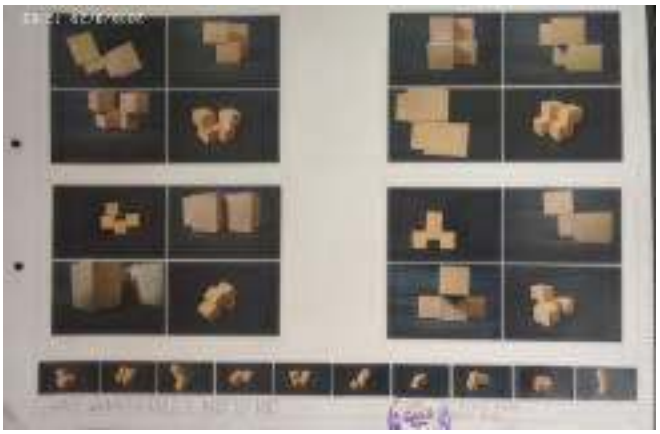

FIGURE 14
SHAPE GRAMMAR: RULE 2: MID TO MID

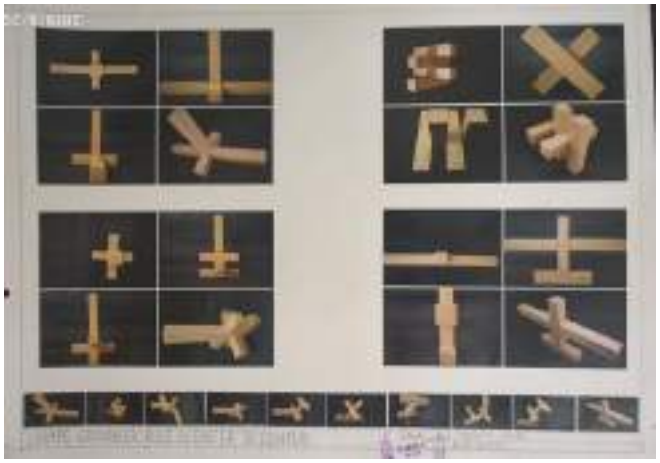

FIGURE 15
SHAPE GRAMMAR: RULE 3: CENTRE TO CENTRE

FIGURE 16
SHAPE GRAMMAR: RULE 4: ROTATION AT 45 DEGREES

Students were informed that they are actually working on actual container size. And they will convert their composition into hobby space.

Four different users were introduced - every student got one client from each of the different age groups through random selection and were asked to develop the client profile in detail, understand the hobbies of each client and design the hobby space for them. In addition to the hobby space they were to provide a resting space and gathering space for all four clients together. Following are the clients with various age groups as mentioned above;

- A Child (7 to 15 year) 1. Who loves to read and play video games. 2. who loves to paint 3. who loves to do Pottery 4. Who loves solving puzzles
- A young women (25- 35 year) 1. Who likes to read and has a collection of 50 books 2. who writes children's story books 3. Who participates in master-chef 4. Who is Fashion designer
- A young man (25- 35 year) 1. Who is A health trainer 2. Who is Magician and traveler 3. Who loves Carpentry 4. Who is an Architect and loves to make models
- Elderly person (65- 75 year) 1. Who is a Bharatanatyam Dancer and also plays sitar 2. Who is a Botanist and also loves gardening 3. Who is An entomologist 4. Who Likes to do knitting.

Considering all of the above, in various permutations the whole studio got various combinations of the users and the hobby spaces. They have to provide appropriate spaces for each of the user of the house. The compositions of container blocks are done in such a way that students could go two floors vertical. With respect to the variety of age, gender and occupation students have to design best suitable hobby space.

FIGURE 17
HOBBY SPACE DESIGN MODEL

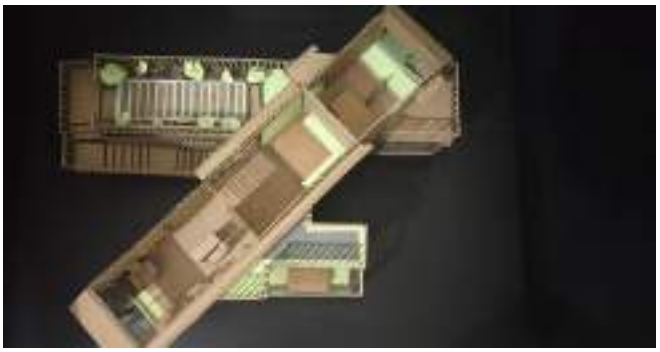

FIGURE 18
HOBBY SPACE DESIGN MODEL

FIGURE 19
HOBBY SPACE DESIGN MODEL

FIGURE 20
HOBBY SPACE DESIGN MODEL

FIGURE 21
HOBBY SPACE DESIGN MODEL

Circulation: Connection of spaces horizontally as well as vertically.

Objective: Orientation and placement of composed block is decided based on the enhancement and highlighting of the entrance and staircase as an element is introduced for vertical circulation.

Facilitation: to realize that for comfortable use space arrangement is required

Objective:

· Understanding the role of anthropometry in design

· Understanding of the scale and proportion

· Understanding of the 'quality of space'

Objective: Shapes to be brought together for facilitation and circulation

• **Organization of Spaces**: Students were asked to choose any two Architectural elements like walls column etc. and one emotion like happy, scared etc. from given list. They did a space arrangement using the element to create the chosen emotional feeling for a human scale. The aim was to learn the role of scale and proportion and architecture elements in space organization.

FIGURE 22
ORGANISATION OF SPACE

FIGURE 23
ORGANIZATION OF SPACE

• **Anthropometry**: Every Student were asked to write four different narrations on four different clients based on their hobbies. Narration leads to activities to understand the dimensions required for each space.

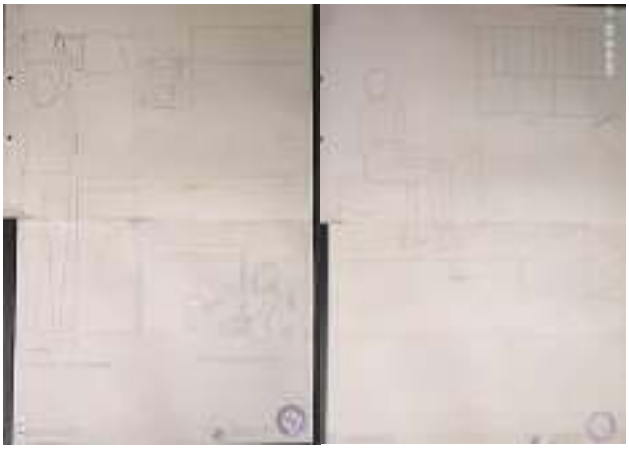

FIGURE 24
ANTHROPOMETRY

CONCLUSION

Design project comes up with multiple questions in students mind like how to start, where to start etc, and we feel that if there is a design methodology or process; mysticism and subjectivity associated with teaching-learning of design can be minimized. It is a teacher's responsibility to propose various design strategies time to time in the form of exercises which can help students develop creative thinking.

There are well known authors and designers have offered solution, and techniques which cannot be taken as it is for strange situation but as a teacher we can always learn from it and can mould it to suit the situation. In both the years we tried to follow the established and suggested techniques for designing creative exercises and introduced this step by step to the student for their design in process . Both the years we found that creative exercises has played a vital role in decision making at every stage of the design process. The inference here is even an average student could achieve extraordinary design and in some cases this systematic way of introducing creative exercises made an ordinary student achieve an extraordinary output. This has also helped enhance communication between students and teachers as well as establishing a confidence in students. A good well defined process can lead to creative and functional end result.

Thus, creative exercises plays a very important role in the design process and systematic way of introducing creative exercises makes the process of designing simplified. Final Design form becomes easy to achieve with above showcased method. Eventually it helps not only in achieving the final form but also takes care of all the three domains of education i.e. cognitive, psychomotor and affective.

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Exploring societal participation in making cities smart

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Abstract. The word 'Future' has been synonymous to 'Development' for most of the people. Architects of the Nation strive for a well-developed state, where it reaches towards enhanced living conditions than the present. In this regard of development, structure of Indian government is well defined. The policies designed at central level envision the total development. These policies make the local bodies function on the same lines. They make an impression in common people's life that there are some positive changes in the cities. These policies also mark an identity, e.g., after implementation of city Development Plans under JNNURM (Jawaharlal Nehru, National Urban Renewal Mission), the buses bought for BRT (Bus Rapid Transport) had become identity of this policy. The meaning of Smart Cities in India also has been interpreted by people in many ways. For cities to become smarter it needs a holistic approach in developing a sustainable urban eco system and thus the roles of various stakeholders become very important in executing this mission. Not only the investors, financial organizations, planners, architects and people in construction industry but the citizens too have role in making cities smart. People of all age, gender, ability and disability are responsible in making a city smart. Education and awareness is the key for making them aware of their participation in the process of development. This paper also mentions the role of educational institutes to make people understand the essence of development.

Key words: *Smart, Futuristic, Sustainable, Public participation, Education*

1. Introduction

The objective of the Smart Cities Mission is to promote cities that provide core infrastructure and give a decent quality of life to its citizens, a clean and sustainable environment and application of 'Smart' Solutions. The local governance and various stakeholders are involved in this process. In line with the objectives of the mission, the project typology too has a common pattern in these cities. The categories of the works are, riverfront development projects, open spaces development, housing, App based projects for systemization of the administration, infrastructure and transportation etc. Dashboard of official website of the smart cities mission states that there are 100 winning proposal from various cities and estimation of 99,630,069 people getting affected by this mission [1]. The impact is also much visible in these respective cities. For example Coimbatore city is working on desilting, bund strengthening, removal of weeds, turfing and lining, drains development, inter-linkages boating and water sports facilities, other amusement and recreational facilities, theme parks, medicinal gardens etc. Kochi city is working on upgradation of infrastructure in housing through credit linked schemes under the same mission. Pune city is working on intelligent government service for Bus System Intelligent Traffic Management System (ITMS), where the Smart Public is going to be equipped with Real time tracking of buses using GPS, maintenance using vehicle health monitoring system, Passenger Information System (PIS) with LED screens in buses and bus-stops and Mobile app to track -bus location and ETS real time, Ride quality monitoring using smart sensors, in -bus wifi and entertainment systems, etc. Digital India has reached till the limit where even a small vendor does digital transactions. Technologies have made the tasks easier. However it cannot be said that the urban life has become easier with technologies. The complications, difficulties and the side

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effects of this technological up gradation have also been realized by people. Question that arises here is about total smartness, and its real perception in people. Smartness is not only about the superficial aesthetic quality or speed of works, but it is also about up gradation of civilization done together by people, places, things and systems. For example the beautification of streets is a cosmetic surgery, as its going to add only into aesthetic part of it. ITMS, PIS, public screen may bring impression of technological up gradation but the convenient last mile connectivity of the mass rapid transport, and good quality of roads, pedestrian safety on these roads etc., will bring real smartness in the system.

This paper is based on a qualitative research, an attempt to identify and analyse of various parameters defining smartness with examples. It points out the gaps, between the policies and public participation. As a next step to this, the areas have been identified where people and education system can contribute to make their lives smarter. The role of education and educational institutes in conceiving the real essence of smartness has been elaborated in the further part of the paper.

2. Defining smartness in urban context

Smartness is both about the tangible and intangible aspects. Aesthetics of the city are important for cities to look smart, at the same time the functionality, efficiency and nearness to human values automatically represent smartness. A city can be smart with its people, places and systems. The various parameters defining smartness in the urban areas are:

- Efficient systems in place
- Intellectual smartness (people and system)
- Empathy for environment and people
- Value system for places and practices
- Futuristic, Sustainable and healthy
- Vibrant, Dynamic and Culturally alive

2.1. Efficient systems in place

The systems are of two types the administrative systems and infrastructural system. The urban local bodies and their functioning both have major role. Though there are similar systems of administration, however few cities have adopted some policies and set goals that have taken them till a level. Management of system with upgraded technologies and people's participation too have equal role in these systems.

For example, Indore city has been winner of 'Swachha Bharat Award' since three consecutive years (2016-19). The major reason for its success is healthy competition between the wards. Every ward competes with each other in order to maintain their areas clean and beautiful. The efficient system of collection and transportation of garbage, processing and disposal of waste, clean sanitation (public toilets, proper drainage, etc.), people's participation and making people aware of cleanliness have worked well for Indore [2] (The Indian Express n.d.). City schools too have oriented the students to keep their surroundings cleaner.

Fig. 1 A street in Indore city with its prototype waste collection system (India today 2019)

2.2. Intellectual smartness (people and system)

City is made with people. The knowledge, education and intellect of people to understand the surroundings is a must in executing the smart city mission. To develop these qualities, city's system should have infrastructure like educational institutes, libraries, laboratories, art schools, auditoriums, concert halls etc. For example city of Oxford is known for its University, but other than that its identity is made also by theatres, concerts and other events. East oxford is the area with students' population and related infrastructure, press building, etc. The Plain, Cowley Road in East Oxford is the preferred place for trendy, both old and young, with a cinema, music venues, tattooists, and many good ethnic shops. West Oxford is full of a diverse landscape of waterways and islands (Oxford city n.d.)[3]. Figure 2 is a picture of a street in Oxford, showing prestigious institutional building, bicycle stand and people using bicycles.

People in oxford generally prefer walking and bicycling. They indulge in academics, arts, theatre, etc. Most of their activities are eco- friendly and add into character of the city. Hence other than buildings, streets and infrastructure, it is the people who have made an identity of the city.

Fig. 2 A view of Oxford city (Source: UKtourcentre.com)

Fig. 3 Cowley Road, Oxford city (Source: UKtourcentre.com)

Ladakh, India is another example of smart citizens. Known by the name and works of Sonam Wangchuk, the area got its 'Education and cultural movement' for young kids in year 1988. Sonam Wangchuk[a] has come up with the uniquely systematic, collaborative & community-driven reform of learning systems in remote Ladakh region. This system has helped to improve life opportunities for youths (Examrace n.d.)[4]. Education with strong application base has changed the picture of the area. Pune based activist Sarang Gosavi has also taken help of science and education to change people's lives in the same area. At one hand the area got good leadership by well qualified social reformer, and at the other hand it had been smart participation of local people to introduce better living conditions.

2.3.Empathy for environment and people

The developed state of civilization is sensitivity for humanity and environment. People should have value for fellow citizens and environment. Knowing about surroundings, owning, and taking care of it, makes area sustainable. Very good example here is of Central Park, New York City. New York City felt the need of a breathing place for people in year 1853. After city's joint call, the New York State Legislature enacted into law the setting aside of more than 750 acres of land central to Manhattan Island to create America's first major landscaped public park [5] called Central Park (July 21, 1853). Since then there were several ups and downs in operation and maintenance of park, but the park sustained with people's efforts. (Central Park Conservancy n.d.) Today also with private public partnership the park is in good condition and visited by many people every day. The separate zones in this park are maintained by different groups of people. This zone management system has brought accountability, pride of workmanship, and clear and measurable results to the Conservancy and Parks Department staff.

Fig. 4 Cental Park, New York

Central park is an example of being sensitive about environment, however having sense of ownership to the surroundings has been culture of ancient India too. Sacred groves were actually the reserved forests and people regarded the trees and forests as almighty. Ironically, today in Indian cities, there are concrete walls around reserved forests to safeguard them from people. In the same lines, enforcement of 'Tree act' in Maharashtra state is a consequence of anti-environmental incidences in the past. At present there is Tree act, however there is a long way to sensitize people about total environment and ecology.

People are also part of environment; they have different abilities and disabilities, and city's ecosystem need to have respect for them and their convenience. Kautilya's Arthashstra has mention of city to have arrangements for looking after the aged, the children and informal people. Our built environment needs to be redesigned to meet the needs of physically challenged people. The vulnerability of the younger generation and senior citizens is more in present Indian cities, as they are not safe in terms of commuting on road because of heavy and unmanaged traffic and inappropriate road designs. Lessons need to be learnt from the cities that offer better living conditions to all. For example in Singapore city, a six year old can alone commute in metro to go to school. Also, a senior citizen can

[a] Works of Sonam Wangchuk have been acknowledged by a Bollywood movie, "Three Idiots", in which Amir Khan has enacted Sonam in the character of Phunsukh Vangdu.

commute anywhere in the city without any manual help. City's roads, public transport system, digitization of services support their easy life. At the same time, the people share these amenities, respect each other and give warm gestures while using these public amenities, and infrastructure.

Fig. 5 Marina Bays, Singapore, an urban space having favourable commuting facilities for all

2.4.Value system for places and practices

Some places in the urban context have environmental, ecological or historical importance. Smartness of citizens includes having knowledge about these places, appreciating and valuing these. For example, Rome is a city of monumental buildings, monuments, sculptures and also of the ruins. The city administration and people have regarded and preserved the ruins equally like other historical undamaged buildings. The buildings and cityscape reflects the Christian culture and also history of war and victory over the enemies. A number of buildings in Rome have been built in memories of victories. After Second World War, the city grew in different fashion and had developed a vision to attract the world to appreciate the city through tourism. In order to make city ready for hosting international tourists, the new buildings have been built. However it is noticeable to see that these newer buildings too have taken a distinct place in the harmony of entire city. Every new building has been built with due regard to its surrounding areas and the existing architecture. Figure 6 represents a picture from a Roman street where people have maintained the same façade to meet the street character.

Not only the construction but day to day activities too matter a lot in valuing the heritage component of the city. In Indian context there are old temples, residences, market places, open spaces, which need respect from daily commuters. The very first attempt is needed to make people aware about the context of the area. The heritage of the area is first respected by the locals than the tourists.

Indore city, India has demonstrated a good example of giving respect to historical monument, Holkar's Rajwada, by matching the façade character of the surrounding buildings with it. The uses of the surrounding buildings are different but they together make a market place with cultural identity.

Fig. 6 A Street in Rome

2.5.Futuristic, Sustainable and Healthy

The historical places with good construction are still part of city and are lively, with their timeless character. The design of the spaces needs integrity that would be appreciated by future generations too. The resources are depleting, and the present time has complete liability to leave resources for the future. The design of buildings and urban spaces should be functional, aesthetically acceptable and at the same time energy and resources efficient. Climate is changing and dependency on mechanical means of comfort is increasing, however the building design has capacity to reduce the need of mechanical means of comfort. There are a number of Green buildings rating systems (LEED, GRIHA, Eco-Housing, etc.) that give recognition to the sustainability of buildings; however sustainability feature can be adopted as an accepted norm for being futuristic. Regarding urban spaces, too much dependency on mechanical means (lifts, motorized vehicles, etc.) has affected lifestyle and in turn it has degraded the public health. The cities need to be healthy. A simple example is pedestrian friendly roads with clean, and shaded walkways with lush green vegetation encourage people to walk, reduce fuel usage and keep the environment pollution free. Also when people walk they interact and the social life on streets is also seen. Pedestrian-priority street design is need of the hour, which is an urban public space with the highest priority for pedestrians and in some cases cyclists [6]. It has equivalent

terminologies such as; a car-free street, a pedestrian zone, a pedestrian mall and a walk-able street (Basil Kamel 2017)

City of Bogota the capital of Columbia has set an example in world by reducing motorized vehicles on streets. The initiative that changed city in many positive ways is called Cyclovia that began in year 1974. Though implemented much later in year 1982, it is a success story. They started with a car free day event. Later when walking had become popular, people have accepted changed cityscape with promoted systems of walking and bicycling. Cyclovia brought a lot of environmental, health, economic and social benefits. Also the social interaction between individual was significant, that resulted in increased sense of place and equity among the different classes of public realm. [7] Also a lot of economic benefits are obtained due to program investments and medical cost savings (Yassin 2019).

2.6.Vibrant, dynamic and culturally alive

Vibrancy in the urban environment can be brought both by spaces and people. Space design has potential of bringing vibrancy in the environment. The urban fabric is formed with vistas between buildings, sky and land. The landscape naturally changes with season. The vegetation in the area attracts birds and butterflies. Urban spaces integrated with landscape design have vibrant character. Cities must have pause points, where people stop and experience this vibrancy of the urban environment. Urban design may include water fountains, changing building facades, light and sound show elements to make the urban environment more vibrant.

Indian culture has many festivals that make streets lively. Keeping culture alive adds value to vibrancy of the area. Festivals change cityscape by decorations, festive markets, processions, and dance and music. Figure 7 represents a procession during Ganesh festival in Pune city, India. During the festival people and activities make the city colorful and vibrant. Any area full with people of different age, gender and communities make city vibrant.

Law garden is a park in Ahmedabad, is another good example of vibrancy. The street gets converted into market space in the evening time, and hence it has different character at day time and in the evenings. In the evenings, its souvenir shops, visitors and shopkeepers wearing traditional Gujarati costumes add a lot of vibrancy in the space. In the same city, Manek Chowk is a good example of space dynamics. This dynamism happens with people and their activities. The area is fully crowded with eateries and people since the evening to late nights. Early morning people get cattle in this area to feed the fodder. After this all the spaces are cleaned by municipal workers and by 10:00 am the shopkeepers open their jewellery shops. A same space offers environment for different activities and is dynamic in nature. The changes are so different in nature that a new person cannot imagine the next use of the space.

Fig. 7 Procession of Ganeshotsava, Pune

3. Roles of various stakeholders in making cities smart

India is a huge country and is known for its diverse topography and culture. Still the nation is united in many aspects. Indian government has remained successful in implementation of central policies with its efficient hierarchical system. The Niti Ayog, formerly ‘Planning Commission’ of India, has been working on a number of plans that have set language of translation at various stages. The administrative system of government is comprised of Central, State, Regional, District, and then respective local authorities. These function and title of these authorities depend on population, area and population density of the area (municipal council, municipal corporation, or Gram Panchayat). The census of the country done in every ten years is a detailed and systematic survey that conveys status of various socio-economic, cultural and environmental status of the

country. The central plans like five year plans, ten year plans are result of the thoughtful process of National development based on these surveys.

For any mission of the central government there is healthy competition between the local authorities and at their level they work in the line with mission. For example JNNURM was a nationally accepted mission and local authorities were the most active role players in the same. Smart cities mission is also on the same lines.

However for any governance to be successful in all regards, people's participation is must. Indian constitution has very well defined the roles and rights of the citizens. However it has always remained a challenge to convey the responsibilities of the citizens. The perception of responsibility as a citizen is limited to giving vote to select the government, attending national festivals and paying tax on time. The other duties towards nation and environment are not so well defined, and hence peoples' contribution in making area smarter does not remain united. Every individual thinks about self development but not for the area development. A general awareness about smart cities is also not evident, as people have noticed only the superficial component of the mission. As the previous part of paper conveyed the real essence of smartness, the next part of the paper highlights that how educational institutes play role in making area smarter with public participation.

4. Contribution of Education and educational institutes to make cities smart

Implementation of government policies aspiring to provide an enhanced infrastructure thus plays a vital role in the comprehensive development of a city. It can happen by involving organisations at a ward-level as a responsible instrument and will help in sensitizing the local people in respecting their neighbourhood and improving the urban eco-system. These organisations include educational institutes like secondary schools, undergraduate colleges, universities, and also non- profit organisations, government and semi government institutes in that ward. However as the students constitute the majority of the population of any neighbourhood, it is best suited to involve the educational institutes in propagating the smart city mission and work towards the long term goal of developing a sustainable urban eco -system.

Winner of the Magasasy award of year 2018, Engineer turned into Educationist Sonam Wangchuk says that the Education needs to be linked with life and should take into count the ground situation in different parts of India [8]. Various projects with an aim to respect their neighbourhood and improve the living environment can be included as part of their curriculum which addresses the responsibility of an individual to societal concerns. These points can be imparted in educational system.

4.1. Traffic and transportation

The areas near the periphery of the schools have a number of student and parents commuters. In order to control the use of single occupancy cars, the commuting to school can act like a key. Institutes may formulate policies that govern commuting to schools/institutes by use of public transport, bicycles or walking. The defined area around school can make an identity by demonstrating reduced use of private cars.

4.2. Sensitization about heritage sites, and environment

Knowledge of the area and valuing it can be imparted best in schools. The academic lessons conducted in the premises of these structures and projects that trigger their thinking. It can also help in relating it to the literature taught, thus generating a sense of ownership and pride about the location. Pune, India has been a place for organizations like Balbhavan where cultural sessions are conducted for social interaction between different age groups (elderly and toddlers). Such organization can play a vital role in Smart cities by involving people in awareness sessions. This can remain instrumental in up keeping and regarding the heritage of the area.

Schools and institutions can promote activities to make people aware about the bio-diversity, natural resources and their role to respect and preserve it. The field trips and outdoor teaching can include these topics. At the same technical and professional education institutes can orient their pedagogy for area development through technological support. As an application of advancement in technology in the advanced sustainable infrastructure that needs to be incorporated. Projects dealing with smart solutions with emphasis given to energy and resource management can help in sustainable infrastructure and maintaining a better living environment. The development of technologies developed- robotics, sensory equipments to support this mission can encourage.

4.3. Ownership of public spaces

Urban spaces include parks and amenity areas. These spaces have major role in health and happiness quotient of the area. Areas could involve activities related to toddlers and elderly at the grass root level, e.g. Nana-Nani Park concept of Maharashtra, India. This is a concept of parks that has an intention of playful and caring interaction between elderly and toddlers. It gives a platform of learning and sharing of cultural intellect as well as newer versions of systems. This could help instil a sense of ownership and pride in respecting the culture along with the basic need of state of play for both the elderly and young. International Play Association (IPA) has wisely identified 'play' as right of every individual and an activity that improvises health and intellect. Giving priority to play can happen only when the urban areas and spaces support the safe and playful activities. IPA is approaching schools and neighbourhoods for this mission. Such missions can be clubbed with smart cities mission to activate institutes' participation for area development.

4.4. Festivals and Cultural events

Culture and festivals bring vibrancy in urban environment. Institutes can be actively involved during festivals in maintaining the balance of the cultural events with urban systems. The traffic management, waste management are common concerns during festive times. The voluntary roles of the institutes in this may include, supporting the assigned government officials in traffic management, spreading awareness for eco-friendly practices, etc. Educators and students together can play major role to educate the people for eco-friendly celebration of all the festivals. These activities can be helpful in making students smart, active and realistic. For institutes and smart cities mission it can be a win-win situation in the process of educating and making cities smart.

5. Findings and Discussions

Educational institutes play a vital role in strengthening the gap between the strategic planning in making smart cities. The study opens up the thought process for the institutes on how they can contribute to the area in which they are located. The various parameters of defining smartness in this paper convey that smartness is also about being aware of responsibilities as an individual in urban system. Reiterating on democratic approach- 'city of the people', citizens need to actively participate and share the responsibility to make an area smart. Educational institute have strength to unite the people and their efforts in multiple ways. A win-win situation between the governance and educators is in educating the younger generation about the land, ecology, environment, health, heritage, culture and festivals and their roles in developing a sustainable model in implementing the smart city mission.

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"SASWAD" A HISTORIC MEDIEVAL TOWN OF DECCAN"

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Abstract :
Saswad well known for its significant location on Wari route and exclusive architectural vocabulary developed over the period of time since Satvahana period. It has population of 1,31821 covering administrative area of 2256 hectares/ 22.56 Sq km/ 5574 acres. It's located on state highway no. 36 on Pune-Saswad-Neera road[1] Major population is dependent on agriculture and urbanization leading to change in occupational trends such as industry-based economy. Development plan report studied in the year 2008 explains shift in population and occupational trends in Saswad. Expansion trends on Western Side of town towards Pune due to natural barriers on north & south side of town. On north side high terrain & no agricultural land are found. On south side Karha River is located. (No space for spread of town). Industrial development – Kirloskar Pneumatics Pvt. Ltd. Plant is coming on north west side which is pulling major crowd for secondary & tertiary source of Income. Many industries are arriving in the region. Dependence on Primary sector is reducing tremendously. (Migrating crowd could be shifted in old core.)

Further discourse attempts to identify heritage potential of town, along with that it investigates how this character could be protected in the context of changing time. First part of the research paper will cover the origin and development of a historic town of Saswad. In second part methodology developed to rediscover the Cultural Significance of Saswad in terms of its built heritage. Further discourse, unfolds various historical factors involved in the development processes and understand the town as a cultural resource. Concluding part will examine issues concerning heritage at risk in Town and brief guidelines to formulate a comprehensive Conservation Policy for Saswad. Study is carried out with observation and visual analysis methods instantaneously mapping, drawings, and inventories supported the arguments developed in the process of analysis. Interview of historians, architects and local people helped in understanding the forms and meanings of various historic elements and a town as a whole.

Keywords : Historic Town, Heritage, Cultural heritage, Conservation policy, Historic settlement

[1] http://saswadnagarparishad.org/

I. Introduction

Historic town of Saswad well known medieval town in Deccan[2] flourished in later Maratha period under local philanthropist Sardar[3] Purandare marks its presence in various ways. Numerous tangible and intangible historic elements define distinctive character of Saswad. Its unique character in terms of its setting in the landscape, the shape of the settlement and the nature of its edifices emerged over the period of time, are the assets and qualities that are most valued by its inhabitants and visitors. Its scenic location at the confluence of two rivers Chambali and Karha relates association of settlement, with the important natural element "water" manifested in the built form of Sangameshwar Temple located right at the convergence. Apart from this, Saswad is important base town to Purandar fort geographically important in the historic events. Saswad is located north side of river Karha and 40 KM away from Pune city on its southeast side. The Sangameshwar temple is adorned with exclusive Yadav era sculptures depicting various stories related to Purankatha[4]. Other important nearby places, such as Jejuri, Pandeshwar, Morgaon, Bhuleshwar, and the forts of Vajragad, Rajgad and Torana establishes the socio-historic and cultural context of Saswad.

Historic town of Saswad is well known for its special architectural character. Various architectural typologies such as Residential, Religious, commercial, and mixed use are still unharmed to a larger extent which needs extra protection from conservation point of view.

Meandering road pattern segregating several communities such as Shimpi *Ali*, Borate *Ali*, Jagtap *Ali*, Brahmin *Ali* and so on according to their professions and years they established developed in town. Alignment and locations of these houses their character tells the story of town and fits feudal setup of characteristically developed in medieval period. Main axis of town connects both the important parts of town those are open market space at one end whereas riverside on the other. Royal mansion of town Purandare Wada Grade II structure in the context located on this axis articulates story of the period and its importance in Deccan region. This mansion was the model used to build Shaniwar Wada in Pune under Bajirao Peshwa.[5] Maratha town planning system emerged was outcome of political will of

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[2] Deccan plateau is the largest region located in southern part of India situated between western and Eastern Ghats or mountains

[3] Word *Sardar* denotes nobleman or commander from Maratha army

[4] *Purankatha* are glorifying stories from ancient scriptures related to various deities

[5] Sowani Avinash, Maratha Town and City planning with reference to the systems of Village development during 17th and 18th centuries, (Unpublished thesis work submitted to Tilak Maharashtra Vidyapeeth, Poona 2011), 48. Original contribution in the Maratha town planning systems in Deccan region explained with several examples of administrative and economic systems developed over the period of time. This includes sketch maps of Towns such as Baramati, Kolhapur, Poona and other small towns around Poona.

various Maratha Ministers till early nineteenth century. They followed pattern of Organic planning and probably similar architectural character followed in various typologies such as evolution of Wada Architecture with cortile planning.

The Shaniwar Wada was the most magnificent and stately mansion that was ever built in Poona by the Peshwas in the 18th century. Bajirao I (1720-1740) laid the foundation stone of the building on Saturday, the 10th of January 1730, being an auspicious day. Palace was completed in 1732. Purandare family supported Bajirao I in the establishment of his rule in Pune.

Several traces of history are evident in lanes of Saswad. Various layers of those are left in built form such as courtyard mansions, temples with intricate carvings and specific locations spread out in whole town.

Built Heritage in Saswad

1. **Residenctial typology**

Various typology structures such as residential, religeous, mixed use along with important community spaces such as market spaces, Par areas, and open spaces along with the temples are distributed in the old core of town. This establishes importance of Saswad town as an important historic town located on Warri route as well its existence as a strategic base village of Purandar fort.

Under residential typology typical Wada houses with cortile planning, small houses with front and backyard and mixed use with shop on ground and residence on top are observed.

Total 70 numbers of cortyard mansions in Brahmin *ali* are identified as per 2009 survey for M.Arch. Studio work. Purandare family being the main philanthropist of Saswad appointed by Peshwe Balaji Vishwanath. Large wadas of sardars like Bokil, Gokhale, Mehendale, Haladkar, Damle were built around Purandare Wada near the confluence of rivers Karha and Chambali/Bhogavati which is called as Brahmin ali.

Perticular character of cortile mansions observed such as staggered accesses for each court. Primary court adjacent to entry was called as Phadacha Chowk used to be public area where offices were located and that was accessible to public. Inner courtyard was called as Khajgicha Chowk[6] that was mainly used by women in house. This Khajgicha Chowk mainly surrounded by Women's Rooms and *Pooja*[7] Room. Service area mainly consists detached toilets and servants Rooms usually located on left side of Wada towards south. Out of these very few have survived at the moment.

[6] *Khajagicha Chowk* is Private courtyard with surrounded rooms usually used by women in the house.

[7] *Pooja* room is a worship room where deities are placed according to Hindu religion

In Jagtap ali 98 small houses with front and backyard are observed with same characteristic. Jagtaps[8] were farmers in occupation. Instantaneously architectural vocabulory evolved has its own flare such as Hierarchy of spaces developed considering its utilitarian circumstances.

Compound wall is observed for the protection of the house. *Padvi* is the important Semi open Seating area used as welcoming public space in house allowed for all guests.

Sopa is the closed living area as seating. Outsiders are generally not allowed to cross this space.

Majghar is storage area quite dark used by ladies in the house. *Swaympak Ghar* or kitchen located at the back, used for cooking by ladies. Water tank, toilet, bath are detached from main house. Parasbag Backyard open space at back utilized as drying area and so on.

Mainly locally available Materials are used for construction. Ground floor is constructed with thick stonewalls whereas first floor mainly constructed in flat brick walls. Composite structure using load bearing stonewalls and timber framed structure. Introvert planning is observed in mansions.

In Shimpi ali and other comercial alis 140 numbers Mixed use houses are seen with shops with display platforms on ground and residential areas on first floor. Arrangement of spaces is like first you arrive at Padvi area adjacent to road. This interface used for commercial purpose earlier still serves the purpose to some extent. Osari is the Seating area for visitors. Similar hierarchy such as Majgharas storage area, Kitchen mainly located at the back, separate services area and backyard is seen in all houses. Similar construction techniques and materials applied for these houses. But the scale is smaller with an extrovert planning. Segregation/ planning of Saswad clearly indicates hierarchy of casts and class.

2. Religious Typology

Religious architecture is concerned with design and construction of places of worship & sacred or intentional space, such as churches, mosques, stupas, temples, etc.

Intention of group worshiping of natural elements like sun, moon, rain, trees and so on, were origin of human worshiping sources which letter get converted into idols this leaded to space for idols which could be identified according to type of idol, myths related to that. Evolution of small menhir to large temple complex tells stories related to origin of temples & eras & layers of history ruled in region.

From 11th century onwards Deccan region was suffering from unstable political conditions due to invasions from north parts of India as well from southern region. One concret referaance what we have is ‘Sopandev’s samadhi’, brother of saint Dnyaneshwar near river

[8] Jagtap is a surname from Hindu Maratha community. In the context of Saswad they are settled since shivaji period

side of Saswad of 11th century. Then Samadhi of Baji Pasalkar one of the ministers during Shivaji period in 15th century is located right in the core city of historic city of Saswad. Near by temples like shiva temple at 'Hiware' and Shiva temple on Narayanpur road known as 'Vateshwar' are the good examples of 'vesara style' indicating vocabulary emerged from both Nagar and Dravidian style. Diverse empires have always besieged religion and religious places for destruction as well as construction as political strategy.

As per types of temples two basic types can be clearly categorized as
1 Individual Temples
2 Temple complexes
In individual temples could be categorized as private, public. Other religious elements observed are Samadhis, Individual Cults and so on. Examples form Muslim and Christian could be located very rarely.

As per survey of Saswad the region is dominant hindu community so more number of hindu religious structures are found are as follow

List of temples

1 Sangameshwar
2 Ganpati
3 Nagareshwar
4 shani
5 Kalabhairav
6 Karabai
7 Munjaba temple
8 Murlidhar temple
9 Vateshwar
10 Maruti
11 Durga

List of Samadhis

1 Sopandev
2 Baji Paslkar
3 Godaji Jagtap

Grading of Heritage structures in town

After understanding criteria for grading as per UNESCO world heritage sites and locally formed guidelines by INTACH existing heritage sites could be categorised in specific way after filling the relevant inventories.

Heritage Grade-II (A&B) comprises of buildings and precincts of regional or local importance possessing special architectural or aesthetic merit, or cultural or historical significance though of a lower scale than Heritage Grade-I. They are local landmarks, which contribute to the image and identity of the region. They may be the work of master craftsmen or may be models of proportion and ornamentation or designed to suit a particular climate.

1. Purandare Wada
2. Sangameshwar Temple
3. Vateshwar Temple
4. Tahsildar Kacheri
5. Kalbhairav temple
6. New shimpi ali
7. Brahin Ali comprising big scale courtyard wadas
8. Wari in town – Cultural landscape
9. Karha river side – Natural Heritage

Heritage Grade-III comprises building and precincts of importance for townscape; that evoke architectural, aesthetic, or sociological interest through not as much as in Heritage Grade-II. These contribute to determine the character of the locality and can be representative of lifestyle of a particular community or region and may also be distinguished by setting, or special character of the façade and uniformity of height, width and scale.

1. Sopandev temple
2. Godhaji jagtap samadhi
3. Baji Pasalkar samadhi
4. Pars in historic town
5. Samjai Temple in Brahmin ali
6. Gansh temple near Purandare wada

HERITATE STATISTICS		
A	Identified Heritage Structures	308 no
B	Heritage precincts	1 no
	Streetscapes	2 no
C	Traditional open spaces	9 no

Issues related to regulations for Gaothan and similar congested area as specified in DP

- Core / old town has maximum population density but is neglected mostly. Gross density in core area 684.66/Ha, Gross Density in new area is 24.71/Ha
- South portion of old town near Karha river is totally neglected in development as most of commercial area's are encroaching near main Bazar Road. But this area is

having maximum potential of being (recreational, nature heritage) River development project which includes maximum old Wada's which are 300 to 350 yrs. old. Maximum old temples which are Sangameshwar, Kalbhairav, Sopandev, Samjai, Karhabai, Ram Mandir.

- No recreational facilities other than cinema hall is present in Saswad (monumental / land marks are maximum in old core) concentrate of built heritage.
- Many Wada's are in neglected & ruin condition in old core.
- Strong migration trend could be seen in Saswad. Many families are shifting to pune or in newly developing areas. Most of the Wada's are on rent. Many of these tenants are working in pune. So Saswad is developing as suburb of pune.
- Saswad comes under Municipal council C
- Infrastructural facilities

Primary schools- 6 no, Highschools- 2 no, Higher education- 1 no
Primary health centre & dispensary & maternity home by muncipal council, One private hospital
350 retail shops, Vegetable, fish, mutton market is there.

Bye laws review

- Building coming up in Important area, fronting major roads more than 12m & in case of monumental building authority required to frame suitable rules considering architectural aesthetic points of view
- Front open spaces

a) For streets 7.5m to less than 12m width 1m set back
b) For streets 12 m & above 1.5m
c) For streets less than 7.5 m in width no set back is required unless there is 4.5m clear distance of structural projections. For less than 4.5m width set back of 2.25 m should be there from centre line of such lane. Streets less than 4.5 m which shall be treated as lanes. Despite their narrowness from part of traffic circulation system widening should be proposed & normal setback mentioned above shall be applied.
d) Balconies, cornices, Weather sheds, roof projections shall be allowed in setback will not be considered in built over area.

- Built up area in gaothan area shall not be more than 75%
- Maximum height of building shall be 2 storey. In case building with two story is to be constructed the built over area shall not be more than 60%
- No such specifications mentioned for use of specific materials for building construction in any part of the town

Issues related to Built heritage

Total 48% of houses in Historic core are in vacant and ruin condition where as 44% houses are on rent. Only 8% houses are owned by their actual owners.

- Addition of new services like electric fittings, sanitary pipes
- Addition of water tanks, toilets creating dead loads & creating structural defects in structure
- Addition of excess floors without understanding structure

- Old spaces are not in proper use
- Old Craftsmanship working in materials like stone, lime, fine brickwork, wooden carvings are not easily available
- Use of cement can not gel with lime plaster creating problems like seepage
- Sanitary services abruptly added in structure creating problems
- Old material is getting deteriorated need to have regular maintenance
- Scrap material, garbage of demolished old structure is adding mess in area

V. Brief Policies and guidelines

The main objectives of the policy are to,

- Maintain and enhance the unique heritage character of Saswad
- Preserve significant buildings and building features, and ensure new designs contribute to the Saswad heritage character
- Ensure that changes to Contributing Buildings enhance the Saswad Heritage Character
- Maintain Saswad identity
- Support pedestrian amenities by maintaining human-scaled development, connections to adjacent neighborhoods, and a welcoming, interesting sidewalk environment;
- Encourage the redevelopment and revitalization of underutilized sites to enhance Saswad heritage Character
- Involve area residents, property and business owners, and interested individuals in the process of evolution of the Saswad

Changes in legislations

- **FSI** should be restricted to 1.5 or less in old historic core
- Change in **bye laws** according to scale & proportions of existing heritage buildings should be made
- **Heritage committee** – If opinion of the Heritage Conservation Committee, such demolition / reconstruction /alteration is undesirable then it is mandatory for owner of heritage structure to stop reconstruction/ demolition. The Heritage Conservation Committee shall have the power to direct, especially in areas designated by them, that the exterior design and height of buildings should have their approval to preserve the beauty of the area.
- **Widths of buildings**
- **Road widening**
- **Pedestrianization**
- Preparation of list of heritage sites including heritage buildings, Heritage precincts and listed natural features areas. A concentration of heritage buildings, which contribute to the overall heritage character of the street. These are identified individually in the Inventory sheets
- Alteration / Modification/ Relaxation in development norms
- Road widening - Widening of the existing roads under the Master Plan of the City or Town / Zonal Development Plan or in the Layout Plan shall be carried out considering the existing heritage buildings

Maintaining character

1. Overall –Signage , street furniture, hording designs should respect ambience of old town should have similar character to avoid mess in visual sense
2. Precinct – Scale, vocabulary, architectural character of any new development should go with old character
3. Streetscape- Any new development reconstruction in selected heritage areas such as shimpi ali, brahmin ali, jagtap ali should be in scale & proportion with old character. Vocabulary of new developments should go with previous character
4. New development in heritage precincts- New reservations for school building, playgrounds, town hall, library are within heritage premise may lose essence of aesthetic value of precinct. This should have guidelines for controlling these type of reservations.
5. Main roads especially Bajarpeth road, new shimpi ali or saraf ali, ambaji Pant Purandare road are under major transformations. Initially they were having purely mixed-use character now changing to totally commercial area. This commercial area is encroaching into residential zone as well as per survey. This should be controlled with specific norms
6. Buildings that contribute to the heritage character should not be demolished.
7. The renovation of façades of Contributing Buildings should respect the original architectural style.
8. New and renovated buildings must be designed to be Sympathetic to the district heritage attributes, through massing, rhythm of solids and voids, significant design features, and high quality materials.

Conclusions

Though historic core of Saswad is full of built heritage sites its suffering through urban pressures such as population growth, modernization and so on. From the conservation point of view its very much issential to implement policies to enhance local character and use it in today's context with the understanding of new generations.

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