

The
POETRY
of Ladakh



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POETIC ARRANGEMENT OF WINDOWs

cover page & Photo Credits:

Piyush Shah

Location:

Typical House in Leh



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To,
ASEEM FOUNDATION,
who taught us a real meaning of
'VASUDHAIVA KUTUMBKAM'

The Poetry of Ladakh

With guidance of
ASEEM FOUNDATION &
BRICK GROUP OF INSTITUTES





The PANGONG
Photo Credits:
Aishwarya Bombale
Location:
Pangong

Preface

This book presents the enchanting and enticing region of Ladakh otherwise known as the “Land of high passes” in a novel way. This work has been done under the research grant given by Satish Misal’s educational foundation.

It studies its architectural fabric with a back drop of climate, its people, physiography, customs and conducts. This book focuses on the sustainable lifestyle pursued by the locals of Ladakh. It takes into consideration their relationship with its natural surroundings. The critical dimension of the interplay between man and nature has been emphasised. The book does not go into the details of sustainability of structures or community.

Tourism as an influential factor has been taken into consideration with its positives and negatives. The effect of tourism on social, cultural and economical factors have been noted.

The intent of the book is to sensitise people about the natural implications of a region. Importance of responding correctly to the nature around and adaptation of surrounding has been highlighted.

Acknowledgement

Foremost, we would like to express our sincere gratitude to Satish Misal educational foundation for successful publishing of this book. Also special thanks to Ms. Pooja Misal for creating such golden opportunity for this study and research and Dr.Poorva Keskar for being our constant support and inspiration.

We wish to express our profound gratitude to Aseem Foundation for the approach of studying the region and its self sustainability. Also special acknowledgment to Tashi Motup and Tsewang Spalbar, their families and other people of Ladakh for the immense encouragement and co-operation.

We would also like to acknowledge our faculty and non teaching staff for constant guidance and support. Also to our group of friends for their energy and enthusiasm with us. And finally utmost gratitude to our inspiring parents for encouraging us constantly. This study and research would not have been possible without all of them.

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LADAKH : A VIBRANT DESERT

INTRODUCTION TO LADAKH REGION

LEH PALACE
Sketch Credits:
Reva Doshi
Location:
Leh

Introduction

The legacy of Ladakh dates back to hundreds of years. It was an important stopover on trade routes along the Indus valley between Tibet and Kashmir and also between India and China. The main goods carried were salt, grain, pashm or wool, charas, indigo, silk yarn and Banaras brocade.

Twelve centuries after the Buddha attained 'nirvana' the Tibetan king Songtsen Gampo who ruled from 618 to 649 A.D., married Wen Chen from the court of China's Tang dynasty and Bhrikuti Devi, a Nepalese princess. Under their influence, Buddhism slowly developed in the central Himalayan and trans-Himalayan regions of Tibet, Spiti and Ladakh till it became the predominant faith.

The severe climate and rough terrain make Ladakh a difficult place for settlement. But for centuries people have learned to adapt to their surroundings and make it a habitable place. This has only been possible due to their sensitive approach to the surroundings. It was only after the 20th century that roads were built in Ladakh due to technological advancements and foreign materials were found in Ladakh.

Since Ladakh opened its doors to the world in 1974 it left people with an awe. Its picturesque landscape, clear blue skies, snow-clad peaks and expansive lakes is what attracts people here. But what makes this so-called desert a vibrant place is its people and their culture.

The utmost ingredient that provides the inhabitants of Ladakh with comfort are their homes. The skill of construction of houses has been of the most importance. Construction of houses was a community affair rather than an individual's work.





MIRROR OF WATER
Photo Credits:
Aishwarya Bombale
Location:
Pangong Lake

Climate

Ladakh is a cold desert with long, cold winters from November to early March, the minimum temperatures are well below freezing point for most of the winter. It gets occasional snowfall during winter. Average annual rainfall is only 102 mm. Thus, the climate becomes a deciding factor for most of the activities happening around in Ladakh. The rest of the month in the year have warmer temperature.

The cold and arid region of Ladakh has high variability in soil characteristics. Soils of the region are quite distinct from those of other zones due to differences in climate, topography, vegetation and rocks. Most of the soils of Ladakh region are coarse textured. The sand content ranging from 51 to 97 percent and clay content from 1.2 to 14.8 percent

Ladakh comes under alpine and high alpine zones and is dominated by annual and perennial herbs, followed by stunted shrubs and bushes. The vegetative growth starts at the commencement of summer when the melting snow provides abundant moisture. The flora is in full bloom in the month of August but starts disappearing by the end of September.

Animals found in Ladakh are well adapted to the climate with a thick coat of fur. Some of them are snow leopard, wild yak, marmot, brown bear, lynx, red fox, Himalayan musk deer, Himalayan thar, Tibetan wild ass, etc.

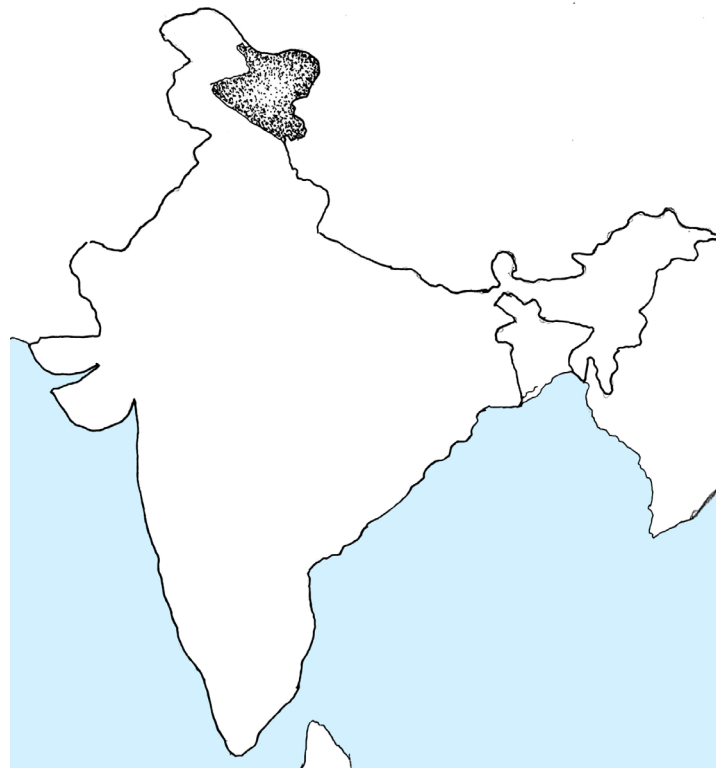
Many species of finches, robins, redstarts, hoopoe, Eurasian magpie, raven and red billed chough are commoners here. Resident water-birds include ruddy shelduck, the bar-headed goose, brown headed gulls are found at Indus basin and some lakes around. The bearded vulture and the golden eagle are common raptors here. Marshes of Ladakh is a good breeding grounds for many migratory birds.

Ladakh: Positioning & Physiography

The Ladakh region of Jammu and Kashmir, India is a cold and arid zone situated at an altitude of 3,500 m.

Mountains dominate the landscape around Ladakh. Ladakh is the largest province within the north Indian state of Jammu and Kashmir, covering approximately 60,000 square miles (100,000 sq. Km). It is surrounded and bisected by some of the highest mountain ranges in the world.

Running in a generally northwest to southeast direction through Ladakh, the great Himalayan range separates the valley of Kashmir from Ladakh. Further east, and running in the same direction, the Zaskar mountains enclose the Zaskar river valley. Still further east is the Ladakh range, forming the Indus river valley, while to the northeast the Karakorum mountains form the eastern boundary of Nubra valley. The height of these ranges prevents rain clouds from crossing into Ladakh and as a result, Ladakh receives only about 5 cm of rain per year.



*Note:-
MAP OF INDIA AND
LADAKH REGION NOT
TO SCALE*



A PORTRAIT OF LEH

CULTURE AND SOCIETY

BUDDHA
Sketch Credits:
Reva Doshi

People & Place

The present-day Ladakhis are a mixed race of pre-Tibetan and Tibetan people who migrated to this land. Today many people from mainland India, as well as from other neighbouring regions, have moved to Leh especially for work during the summers.

Concerning religion, there are a number of faiths present in Leh today. Buddhism used to be the predominant faith during the period of the kingdom, but nowadays the population is almost equally made up of Buddhist and Muslims. A small number of Christians are present since the 19th century. Recently Hindus and Sikhs moved to Leh from mainland India, mainly to work during the summer period, or those who have been assigned by the armies. The majority of Buddhist population is in the Leh district, while Kargil is mostly Muslim. Today Hindi, Urdu and English are taught in schools, allowing a new series of cultural influences to be accessed by the Ladakhis. Many villages are crowned with a gompa or monastery, generally on a hill, which may be anything from an imposing complex of temples, prayer halls and monks' dwellings, to a tiny hermitage housing and home to a solitary lama.

Having a large number of Muslim populations, mosques are prevalent in Leh. Jama- masjid mosque located in the heart of Leh has a historical background to it. It was built in 1666-67 a.d. As a result of an agreement between Aurangzeb, the Mughal emperor and the then ruler of Ladakh, deldan Namgyal. The version of Jama masjid mosque that one sees now has been rebuilt in recent times.

The influence of local architecture in terms of wood work is evident in mosques all over Leh.





*PORTRAIT OF
CULTURAL BEAUTY
Photo Credits:
Aishwarya Bombale
Location:
Leh*

Ladakhi Way of life

The lifestyle of people living in Leh is unique in its own way pertaining to its climate, topography and religion. Any community living in extreme conditions needs cooperation due to limitations imposed by nature. Co- living becomes the basis of all their activities. People in Ladakh live in families with their children and parents. Almost every family has a farmland where vegetables and fruits are grown, some people also grow cereals on their lands. Most of the food cultivated, is stored for the consumption of the family and excess food is sold in the market.

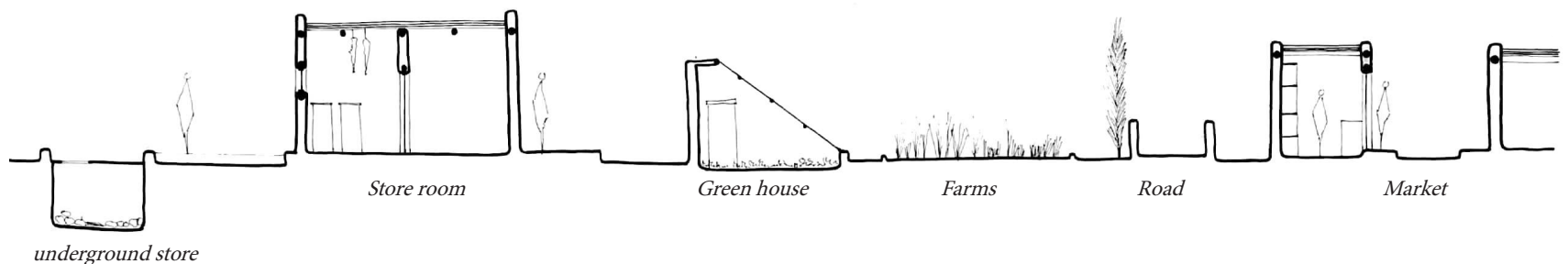
Government jobs have increased in Leh due to government interventions. Citizens living in Leh take up part-time or fulltime jobs. People working in part-time jobs tend to take care of their farms in summers.

Summer months become very important. The food and fuel required to survive the winter months is cultivated only in summer. Fuel required is the wood obtained by the trees that locally grow in Leh.

Winter months become very crucial. Most of their time is spent indoors due to harsh and cold winters. People leave their houses only for basic needs. The water streams which provide water for drinking and irrigation are frozen in winter due to sub-zero temperatures. Water is obtained from the frozen streams by breaking the top layer of ice and cold-water underneath is collected. This water is boiled and further used for their daily needs. Vegetables and fruits are stored in underground pits all over winters to keep them warm. These vegetables and fruits are then boiled and used for preparing meals.

People of Leh have a very unique way of disposing of their human waste. The waste is collected in dry toilets and is left to decompose over a year. The decomposed waste is used as manure in fields.

Even though Leh experiences harsh winters for six months, it does not dampen their spirit for celebrations. Leh celebrates all its festivals and functions in the same enthusiasm in summers as well as winters.



Food

Ladakhi food is rich in flavour and taste. The cuisine has a major influence of Chinese and Tibetan food. Climate is a major influencer in deciding the ingredients of the food. Food is majorly prepared from locally grown cereals and vegetables.

The staple food of the people is thukpa which is a thick soup that is prepared with vegetables, wheat flour, chicken and noodles, momos and roti (baked bread).

Momos are a cherished dish. These dumplings have the outer covering of wheat flour and are stuffed with meat or vegetables and served with chili sauce. Ladakh has many bakeries that serve freshly baked bread and apricot jam.

Mutton and chicken are the commonly consumed types of meat in Ladakhi cuisine. Meat is mostly eaten in winters to keep warm.

goor goor chai

Butter chai or salted tea or locally known as goor goor chai is favourite beverage of the region. It is traditionally made from tea leaves, yak butter and salt although butter made from cow's milk is widely used given its wider availability and lower cost. This is the most extensively drunk beverage in Ladakh. Regular tea of known as sweet tea in Ladakh was once a privilege due to unavailability of sugar. These days increase in trade has made sugar available.

The tea is made by boiling the tea leaves in water for half a day, achieving a dark brown colour. It is then skimmed, and poured into a cylinder with fresh yak butter and salt which is then shaken. The result is a purplish liquid that is about the thickness of a stew or thick oil. It is then poured into clay tea-pots, or jars.

Another method is to boil water and add handfuls of the tea into the water, which is allowed to steep until it turns almost black. Salt is then added, along with a little soda if wanted. The tea is then strained through a horse-hair or reed colander into a wooden butter churn, and a large lump of butter is added. This is then churned until the tea reaches the proper consistency and transferred to copper pots.



Clothing

The clothes of the people in Leh are vibrant and colourful with beautiful embroidered details. Their clothes resemble their cheerful and friendly nature. Traditionally all the clothes were made from yak and goat skin.

Gouncha is a traditional attire for men. It is a thick, voluminous robe which is tied at the neck and waist. A piece of colourful cloth called “Skerag” is tied at the waist. This is paired with a loose pajama and long felt boots. They have a unique head gear called the “paktep”.

Women have a similar robe called a “Kuntop” and on their backs they have a colourful shawl, the “bok” - in which a baby or parcels can easily be carried. Traditionally the bok would have brightly coloured design on the outside, with yak or goatskin on the inside to keep the wearer warm. The women occasionally wear a headgear called “Perak” which is studded with precious turquoise gems. It covers the head like a cobra’s hood and tapers becoming thin down the back.

After the tourist intervention and flourishing markets in Ladakh, readymade clothes have taken place of the Gouncha and Kuntop. The traditional outfits have remained as an occasional outfit for festivals. In day to day life the younger generation is seen wearing western clothes.





Agriculture

Agriculture in Leh has survived to fulfil the basic needs of the people. Agriculture has flourished even in a single cropping season in Ladakh. Typically, every villager grows crops in their farm for their daily needs and the surplus crop is sold in the market.

Fruits such as apricots, apples, apricot, walnut, watermelons and sea buckthorn are grown and sold on in a large quantity. Dry fruits are also sold in huge quantities. DRDO is doing excellent work for the people by providing cost effective techniques farming techniques.

long and harsh winters reduce the cropping season to mere four to five months in year. Single-cropping is dominant, as double-cropping is possible only in a limited area. Agriculture production is entirely based on irrigation

The area of vegetable production constitutes 5.5 per cent of the total 10,319 hectares of agricultural land in Leh district. The widely grown vegetables were potato (75.6 per cent), peas (10.7 per cent), onion (3.4 per cent), cabbage (3.3 per cent), carrot (2.0 per cent) and cauliflower (1.8 per cent).

Barley, wheat and finger millets are staple cereals used. Rice was previously a luxury cereal in this region now it is cultivated extensively because of government subsidies and rising temperatures.

Nowadays in winters, crops are cultivated in greenhouses. Spinach, cabbage, capsicum, cauliflower, tomato, fenugreek, coriander, saplings of flowers and succulents.

Green House

Solar greenhouses play a huge role in production of green leafy vegetables during harsh climates in winters. It is now a common practice to raise vegetable nurseries in spring and grow leafy vegetables during winter months in the greenhouse. Each year the number of greenhouses being built are increasing in Leh. Over every green house built the government provides the people with a subsidy of 50,000 rupees. Modifications have been made in the green houses according to the need and space availability.

UV stabilized 120 gsm translucent polyethylene sheet is covered on top of the trench during October to May. In harsh winter, an additional polyethylene sheet is placed on top of the translucent cladding material at night to retain heat inside the trench. Stones/ sand-bags are placed on edges of the polyethylene to check blowing off the sheet by strong wind. The cladding material is partly open in May and October and fully removed during summer months (June to September) to control the excessive heat build-up inside the trench. Trench greenhouse is now widely recognized as the most economical and easy to establish passive solar greenhouse for Ladakh region.

the advantages of trench greenhouse are

- construction cost of trench greenhouse is significantly low as compared to traditional greenhouses. Construction cost can be recovered within one or two years;
- since the greenhouse is below ground level, there is almost nothing that needs to be maintained;
- since the trench greenhouse is beneath the surface, the thermal mass of the earth acts as an insulator. The temperature remains warm in winter and cool in summer;
- the trench protects the crop from strong wind. Wind in association with rain causes maximum damage at the time.

Disadvantages
1 the temperature inside the greenhouse often drops to sub-zero degree Celsius at night in December and January, which limits growing of only freeze tolerant leafy vegetables;

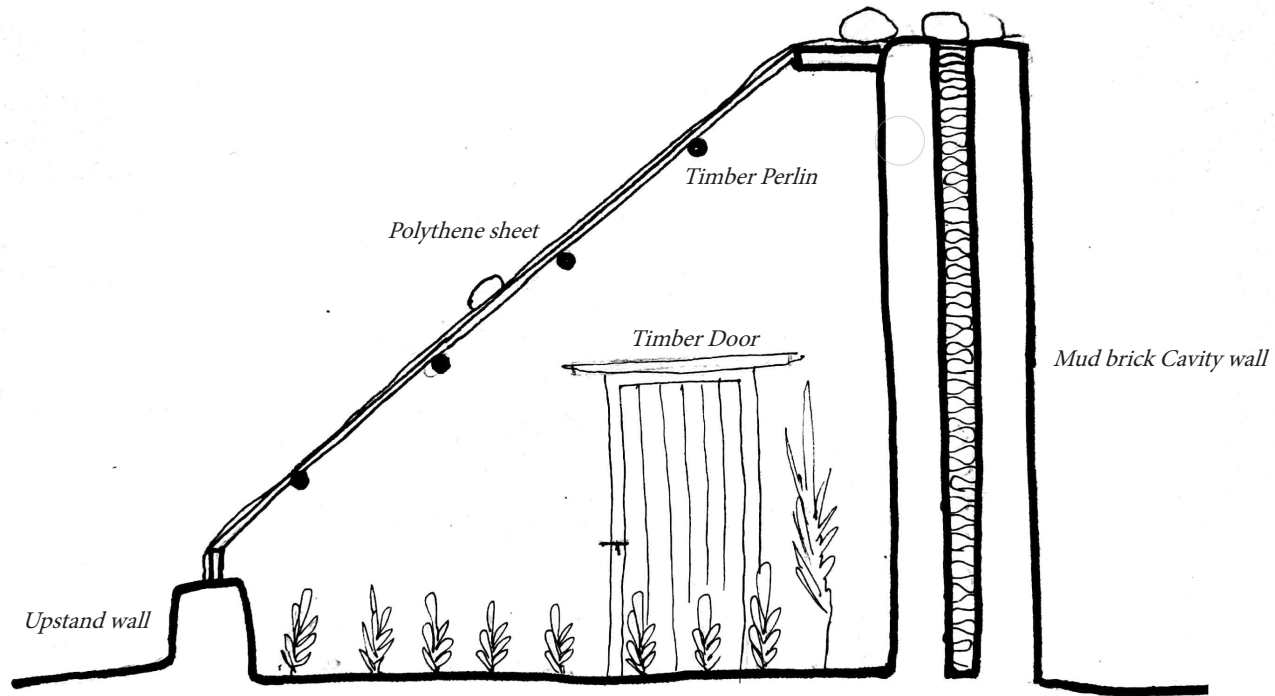
2 the cladding material needs to be removed from the greenhouse structure during summer months (June to October) due to excessive heat that builds up inside the greenhouse.

3 average service span of polyethylene sheet is 3-5 years. high wind speed, uneven surface of supporting frames, frequent removal and extreme climatic condition reduces the durability of the cladding material

Typically seen greenhouses are as follows: -

1. Ladakhi greenhouse
2. trench greenhouse

Basic components of Ladakhi greenhouse-

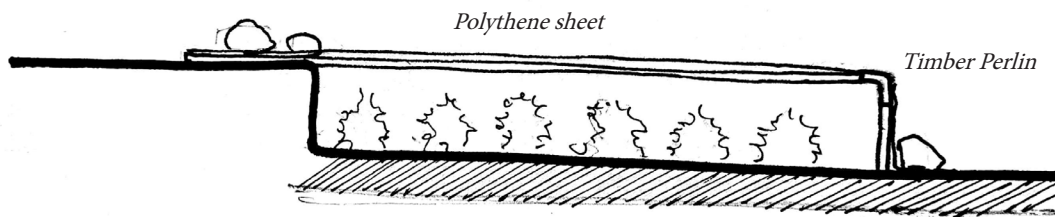
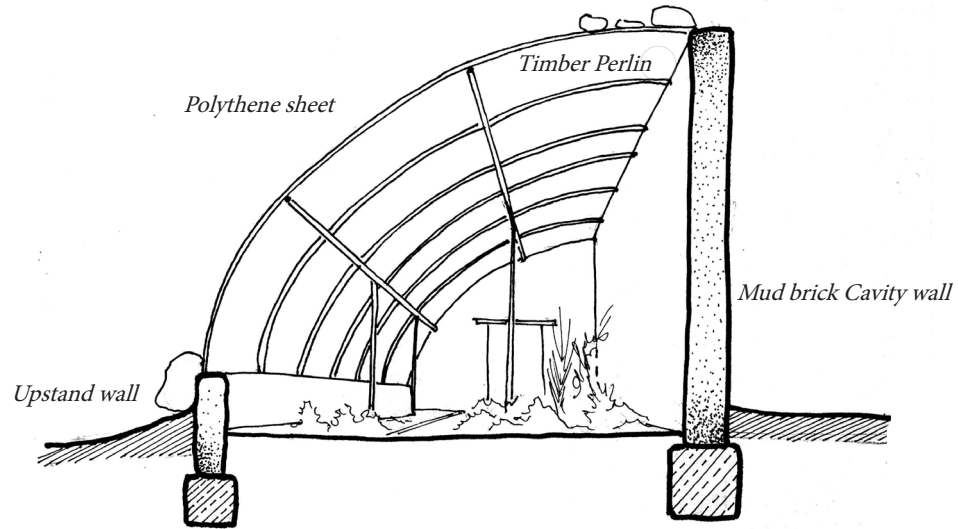


Ladakhi green house

It consists of mud walls on three sides (east, west and north) and a polythene sheet to cover on the south facing side. It is most widely used passive solar greenhouse in Leh. It is popular due to its ease of construction and higher heat retention capability at night especially during winter.

Trench greenhouse

Trench greenhouse is passive greenhouse in Ladakh region. It is an underground rectangular trench (30' x 10' x 3'; l x w x d) in north-south orientation with stone wall on four sides. Five cylindrical galvanized iron pipes (5 cm diameter, 3' long) are placed horizontally in east-west direction at 6 feet gap on top of the trench at ground level to handle the cladding material.



Nutrient Deficiency

Micronutrient deficiency is a prevailing problem in Ladakh. It includes the lack of vitamin A, B6, B12 and folic acid. Seasonal shortfall and low dietary diversity among the local populace lead to micronutrient deficiencies. This phenomenon is known as 'hidden hunger.'

Irrigation & Water Management

Crops cultivated in the Ladakh region solely depend upon irrigation. The main irrigation systems used are canals (ma-yur), tanks, etc. The melted snow water from various rivulets called 'kangs-chhu' merges to form streams that flow through the valley touching many villages where each village draws water from this stream as required.

A new system of water management has been developed in Leh; which is the construction of artificial glaciers. Construction of glaciers or also known as ice stupas is necessary for the villages near foothills of mountains. They face acute scarcity of water in spring when crops are to be planted. These stupas are built by releasing (spraying) water from beneath the ground when outside temperatures are sub-zero. As water comes in contact with the air outside, it freezes and forms ice. The water is sprayed over a tree or wire frame, thus it takes the shape of a stupa.



FLOWING STREAM

Photo Credits:

Aishwarya Bombale

Location:

Shey



WATER STREAM
Photo Credits:
Reva Doshi
Location:
Shey

Animal Husbandry

Ladakh has a rich heritage of Ladakhi yak and Bactrian camel (double humped camel). Yak provides milk, meat and fibre besides their utility as excellent pack and transport animal in snow bound, high altitude mountains. Horses/ponies and donkey are extensively used for riding as well as for transportation. They are used by people working in tourism as pack animals in trekking/hiking and also used by the paramilitary forces for transportation of supplies. The double humped camel is a major tourist attraction for camel riding in Nubra valley. Double humped camels can survive -40c to +40c and carrying a load of around 240 kg but they have reached to the stage of extinction. Animal husbandry has reduced drastically in Ladakh. Subsequently the population of yaks have also been reduced.

Markets

Leh has markets of all sizes and forms. Every village has its own market place, preferably at the entrance of the villages. Items such as fruits, cereals, vegetables are sold in a weekly market or in shops. Dry fruits, jams, pickles, meat are also sold. Clothing market has also flourished in Leh. Blankets, shawls, winter wear are in high demand. Crockeries are also a cherished item in Leh. Restaurants and café and homestays have become another type of business. Hardware shops and construction material is readily available in Leh. Leh city has two markets, one is the juna bazar and another is a tourist market place. The juna bazar is mostly visited by locals.



*TOURIST MARKET
Photo Credits:
Reva Doshi
Location:
Leh*

Tourism

Tourism in Ladakh started in 1974 when Leh-Manali highway was constructed. After which it affected Ladakh and its people in every aspect of life. Change became the need of an hour. According to records kept at tourist office, Leh considering from 2014 to 2017 annual growth in total tourist arrival increased by 30% than previous records. Around 5, 68,123 tourists visited Ladakh from 2014 to 2017. Out of which 4, 40,001 were domestic and 1, 28,122 were foreign tourists. Domestic tourist arrival grew by 43% and foreign tourist arrival grew by 28% between 2015 and 2017 as recorded on April 21, 2017. In 2017 2, 77,000 tourists visited Ladakh- a region with native population of about 2, 74,000. Increase in the number of tourists has led to commercial development of Leh. Economy took a stand and opportunities for start-ups increased. Summer became the season when most of the income is incurred. Tsering angmo, deputy director of Jammu Kashmir department of tourism had told media that every year, 25-30 guest houses are getting registered in Ladakh with the total number of hotels and guesthouses reach 826 as of November 2017. They have 13,732 beds. Besides this official number, there are several other homestays that are not registered.

Hike in the number of tourists coming to Leh has some major concerns related around it. Tourism has strained the region's already scarce natural resources. Entire Ladakh region has started to face water crisis on regular basis. Tourists coming to Leh tend to live a luxury lifestyle in multi-star hotels, which demands huge amount of water. Reduction in the amount of precipitation has added to the problem.

The waste generated by the tourist is in such high numbers that its disposal has become an added issue. Plastic waste is the major adulterating factor. This region unaware of plastic a decade back now struggles to dispose the waste.

Economic surplus which was generated due to production of excess crops, fruits and cereals used to stay within the villages, but now it is absorbed into the larger market. Villagers normally tend to give away excess produce in good will, but now they tend to sell the extras in higher prices. This can put strain on the relationship between neighbours.

Road accidents and traffic jams have increased. A serene and quiet place now has vehicles. Pollution levels have also gone up.

Even though such problems are prevailing, the people of Leh welcome tourists with the same enthusiasm each year.

THE ELEVATED ROAD

Photo Credits:

Aishwarya Bombale

Location:

Magnetic Hills



Education

Aiming at to impart education to all the school going age children of the district with teaching learning facilities, the education department has created infrastructure of schools in every corner so that no one can be left without the basic need of the era and at the behest of the Ladakh autonomous hill development council, the education has accorded the priority sector of the development. The literacy rate of the district records as 65.30% as per 2001 census.

To attract the children of under privileged and weaker sections of the society towards education free schooling facility, scholarships, free uniform, and other incentives have been provided spending a handsome amount.





*Left Page-
LEARNINGS FROM
RELIGION
Photo Credits:
Aishwarya Bombale
Location:
Leh Palace*

*JULLAY
Photo Credits:
Aishwarya Bombale
Location:
Shey*



A WHITE-WASHED CANVAS

ARCHITECTURAL FABRIC OF LEH

LIKIR MONASTERY

Sketch Credits:

Reva Doshi

Location:

Likir

Introduction

In the barren scenery of Leh trees become the only vertical elements of an agricultural village. Mountains are the backdrop of every scene where as monasteries, resting on hills crown every village. Houses are the basic unit of a village. It serves not only as a resting place for an individual family member but also as a place for community get-togethers. Leh does not have many public structure, individual houses fulfill its need. Most of the houses in Leh are whitewashed. They represent peace and goodwill, one more thing for which the people of Leh are known for. Stained glass windows and beautifully carved lintels suggest their lively spirit.

Every element of on the streets of Leh sing in harmony with each other. The colors add magic and dynamics to the streets. Prayer flags on each house show their spiritual connection. Each color on the flag responds to an element of nature. Prayer wheels and stupas are another element from the street which connects the people of Leh with god.



THIKSEY MONASTERY

Photo Credits:

Piyush Shah

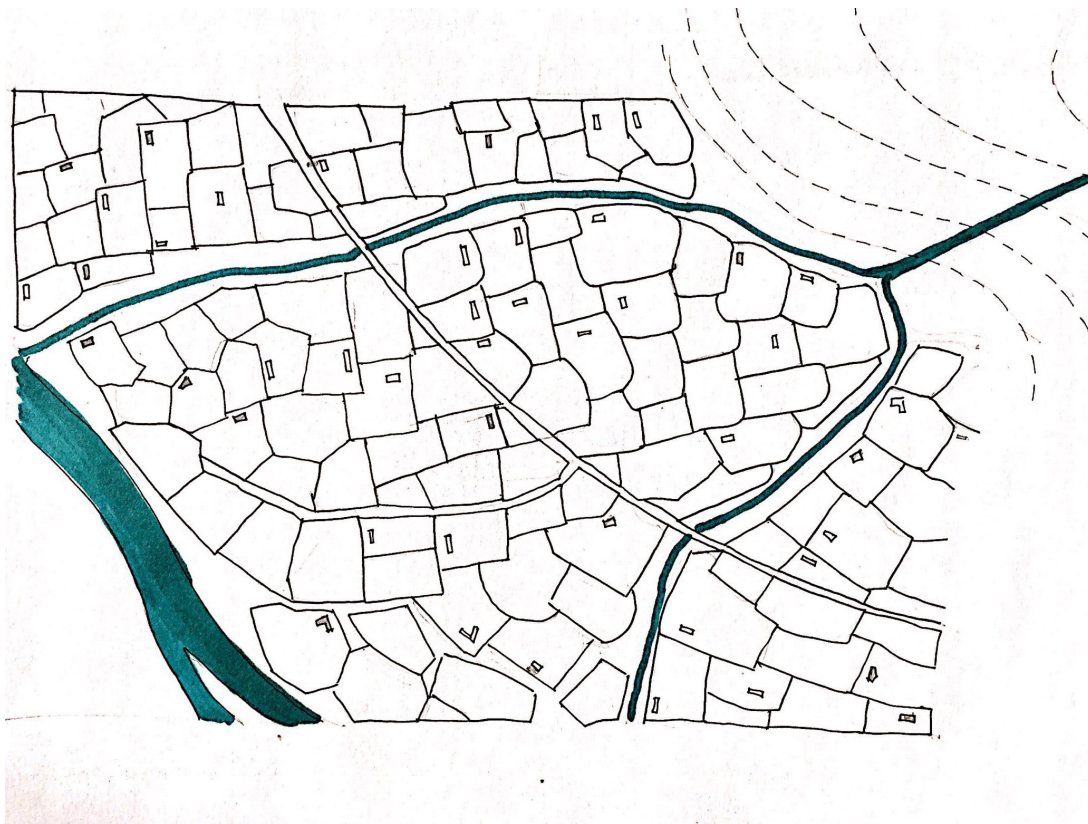
Location:

Thiksey



Placement of Villages

The position of the villages can be influenced by a number of factors. Natural elements played an important role in the past. Water, cultivable land, sun and terrain top this list. Agriculture and animal husbandry used to be their primary occupation; thus, natural factors were important for a functional cycle of agriculture. Now-a-days alongside these, accessibility, education, ease of travel and business opportunities are also given priority.



Construction Technology

As we have earlier talked about houses being the fundamental unit of a village, thus the basic understanding of the construction technology becomes necessary. Examples of earliest constructions are seen in palaces of Leh and Shey which dates back to the sixteenth century a.d. the use of construction material such as stone, wood and earth are seen in these structures. These materials have stood the test of time and are still being used in the similar fashion twenty first century. The utilization of these materials as structural and load bearing members have remained the same but the methods of ornamentation have evolved over the time

Availability of Materials

Over hundreds of years the people of Leh have become proficient in making precise use of their available natural resources to fulfill their basic needs. The basic components of their houses are earth, stone and wood. As environment offers the first in plenty most of the houses are built by earth. Stone is used to make foundations and plinths of buildings where as wood makes the support system for the roofs and lintels and bands. Wood is available in lesser abundance than stone and earth, which is why burnt bricks for which wood is used as a fuel are a rare sight in Leh. Wood becomes scarce as we go on higher altitudes. Willow and poplar are the two kinds of timber trees found in Ladakh. Timber is cultivated by each family on their lands. Willow and poplar trees are planted on the periphery of each farmland. The branches of the trees are cut in the beginning of winter, which is used as fuel for cooking and heating of house in fireplace. Transportation of stone is costly affair which is why we hardly see houses entirely made from stone.

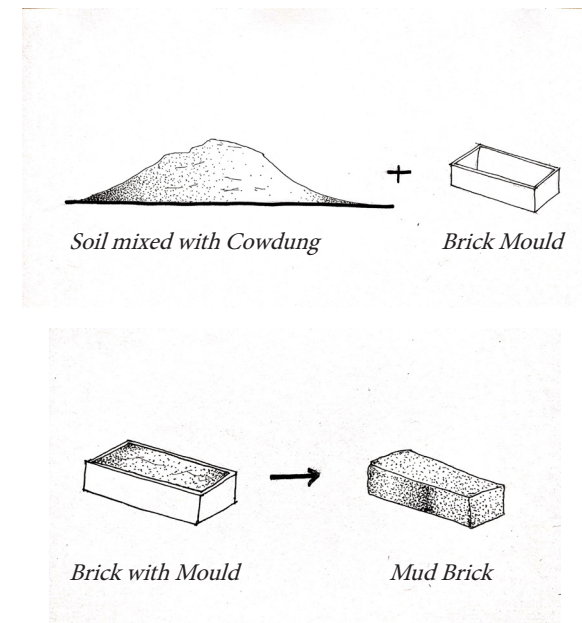
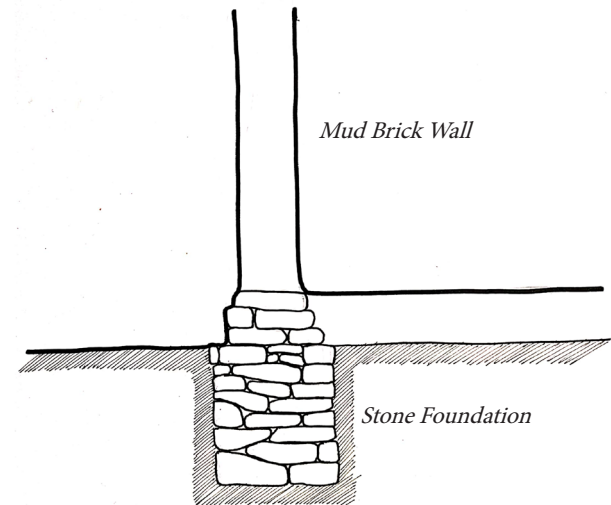
Foundation

Foundations are always constructed of stone which rise to the plinth level. Foundations can form a small plinth or could be high enough to form the entire ground floor. Buildings built on flat lands near farms have lower plinths, while structures built on sloping ground have higher plinths. In most cases stone used for foundation and plinth is undressed as some masons believe that it provides better interlocking. The width of the foundations is wider than the thickness of the wall. This provides the wall with better stability. Larger stones are used in the base of the foundation, where as we see the use of flatter and smaller stones as we go higher. It was a luxurious material in the past as the existing methods were inefficient to carry stone for longer distances.

Mud Walls

Earth is the cheapest of materials available. The only way to use it is by mixing it with water and letting it dry during the summer months. Burned bricks had never been used in Leh, as it was not possible to use ovens to fire clay in large quantities.

Earth is mixed with cow dung or straw to bind the clay together and give it tensile strength. Water is added to this mixture to get the right consistency. The mixture is then placed in metal mold which is of the size of brick. The mixture is properly compressed in the mold and the upper surface is made plain by applying small amount of water on the surface. Once the mixture has gained shape of the mold, the mold is removed and brick is left to dry. This process generally takes place on open grounds as it becomes easier for bricks to dry. These bricks are called as pagbu bricks. They are used in many places and are among the cheapest material in the market. Mud walls become the primary element which insulates the entire structure. These walls are load bearing carrying the load of the roof and its self-weight. These walls are tied together with timber lacings. Timber bands run in all directions, binding the walls together.



Mortar

Mud mortar known as kalak is used to bind stones and mud bricks and to fill up gaps. Earth is mixed with water on the building site while the house is being built and it is prepared whenever needed. An important criterion for water and earth mixture is that the ingredients should be well mixed and that the mixture texture should not be too rough to allow equal drying and added ingredients to be well distributed.

Apart from earth and water, other ingredients can be added to the mixture, such as hay and clay. Hay is added to increase the tensile strength and avoid excessive shrinkage.

Plaster

Houses build with mud bricks are finished with mud plaster known as zhala.

The plaster protects the house from harsh climates outside.

Plaster ingredients can be:

- earth;
- earth + hay; (to decrease shrinkage cracks)
- earth + animal dung. (for better insulation)

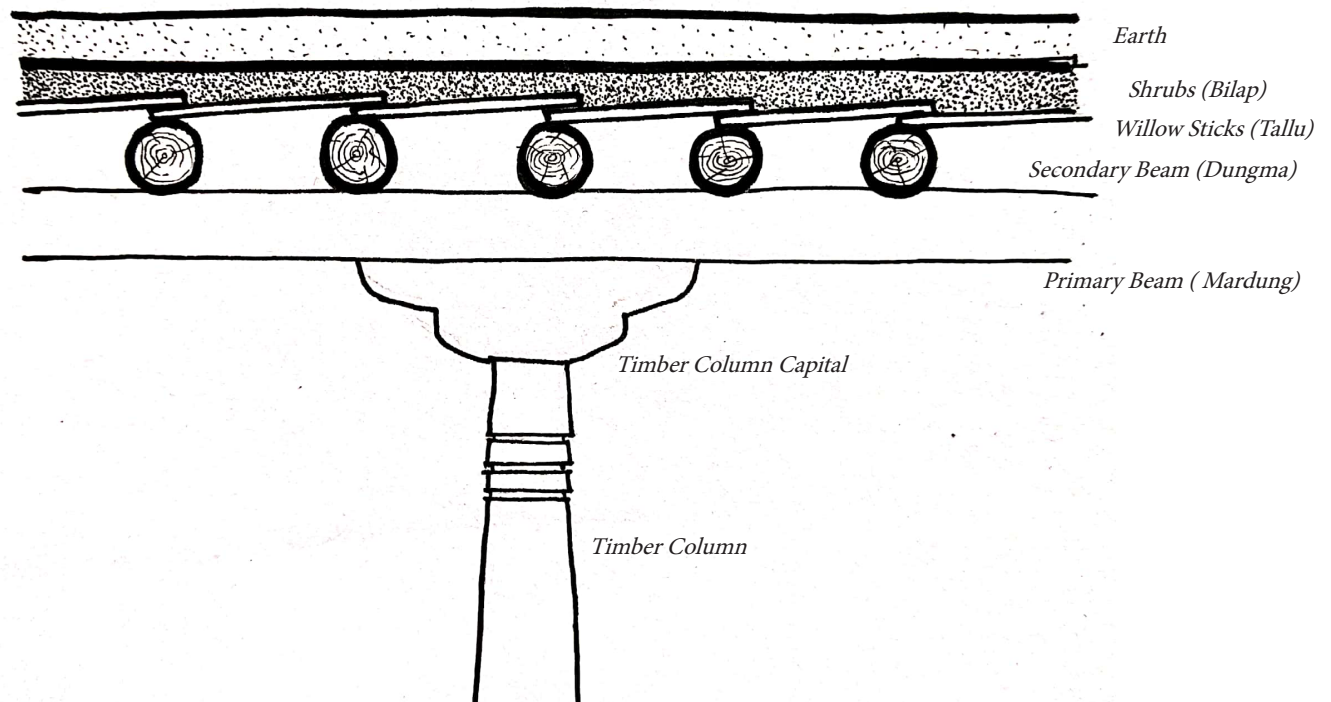
Fine clay is preferable for plastering. Markalak (clayey soil from the mountains) is added to some percent to the mud.

Roof

The roofing system majorly seen in Leh is flat roofing. The flat roof is supported by round timber beams known as mardung and dungma. These beams are made of poplar trees, which are generally grown in the backyard of the house. These beams are topped with thin sections of branches if willow trees known as tallu. A special type of grass known as bilap and layers of clay finish are used to insulate the roof. The leakage of snow is prevented with the help of these grass and clay finishes. Recently due to climatic changes which caused occasional rainfall, this roofing system became inefficient. The mud layer and grass are not a waterproofing agent. Due to these reasons people have stated to modify their roof sections. Placing polythene sheets in between grass and clay layer helps to keep water out. Some people have adapted to application of cement layer on roof top. This roof does not function as expected, as the concrete roof develops cracks due to severe expansion and contraction thus leading to leakage problems.

An interesting thing to notice is that even though Leh being a stopover in trade routes, pitched roof or vaulted roof were never used. These types of roofing system were not implemented due to lack of knowledge but due to the inefficiency of these roofing systems in Leh. Vaulted or pitched roofs would be difficult to insulate from snow and mud would be difficult to place on such roofs.

Moreover, such roof would increase the height of the room and thus increase the volume of the space. Heating the room with such high volume would be difficult. All the air heated with the help to the fire place would move to the upper part of the room and heating would become difficult in winters.

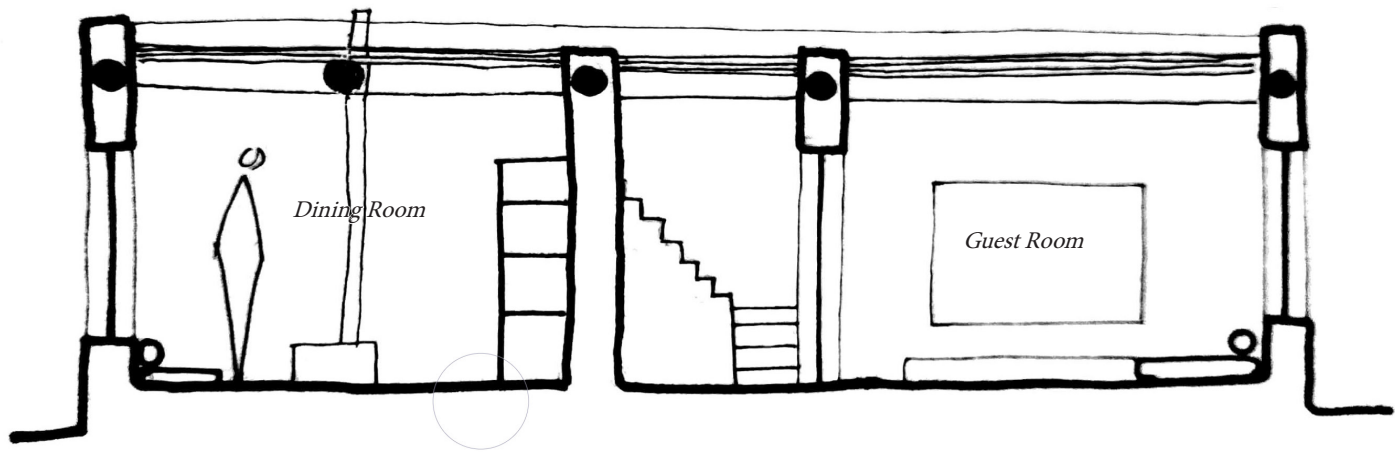


Residential Structures

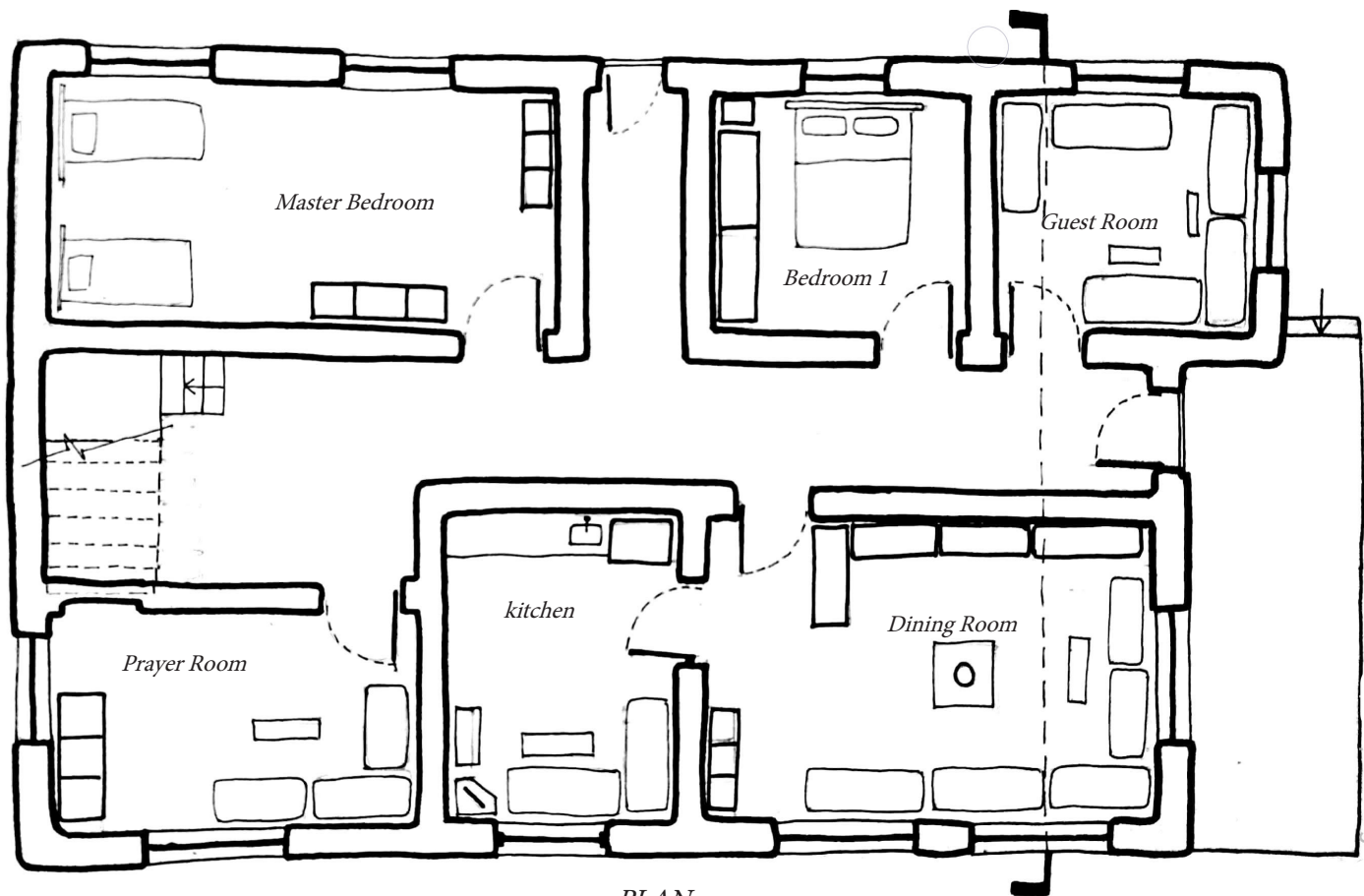
Houses in Leh are an integral unit in the life of the people. They form a cosmos of its own. The house turns the exterior harsh climates into livable spaces. It provides them with warm and comfortable spaces. They become the center of all activities. Community gathering during functions like weddings, child birth, birthdays, etc. take place here. Other factors like farming, irrigation, storing of food, sun direction also become important. Owing to all these needs a typical house in Leh is planned.

Typically seen houses have a simple ground floor structure or two storey structure. Houses in villages have farmlands in their surroundings. Narrow pathways and mud roads lead to the entrance of the house. Most of houses have their entrance facing to the east. Houses have higher plinths to prevent snow and snow water from entering rooms and passages.

Each house has a spine of central passage which branches out in different rooms. Dining room, kitchen, guest room, bedrooms, worship place are the commonly seen spaces in the house. Toilets are sometimes a different block or are built in the same structure. The sequence in which these rooms are arranged is very critical. Guest rooms are placed on the exterior side. Whereas dining rooms and bedrooms are placed on the interiors. Kitchen is the most private space of the house which has access only from the dining room. Dining room and guest rooms are highly ornamented with furniture and stained-glass windows. Most of the gatherings and get-togethers happen in the dining room. Bedrooms are only used during the night.



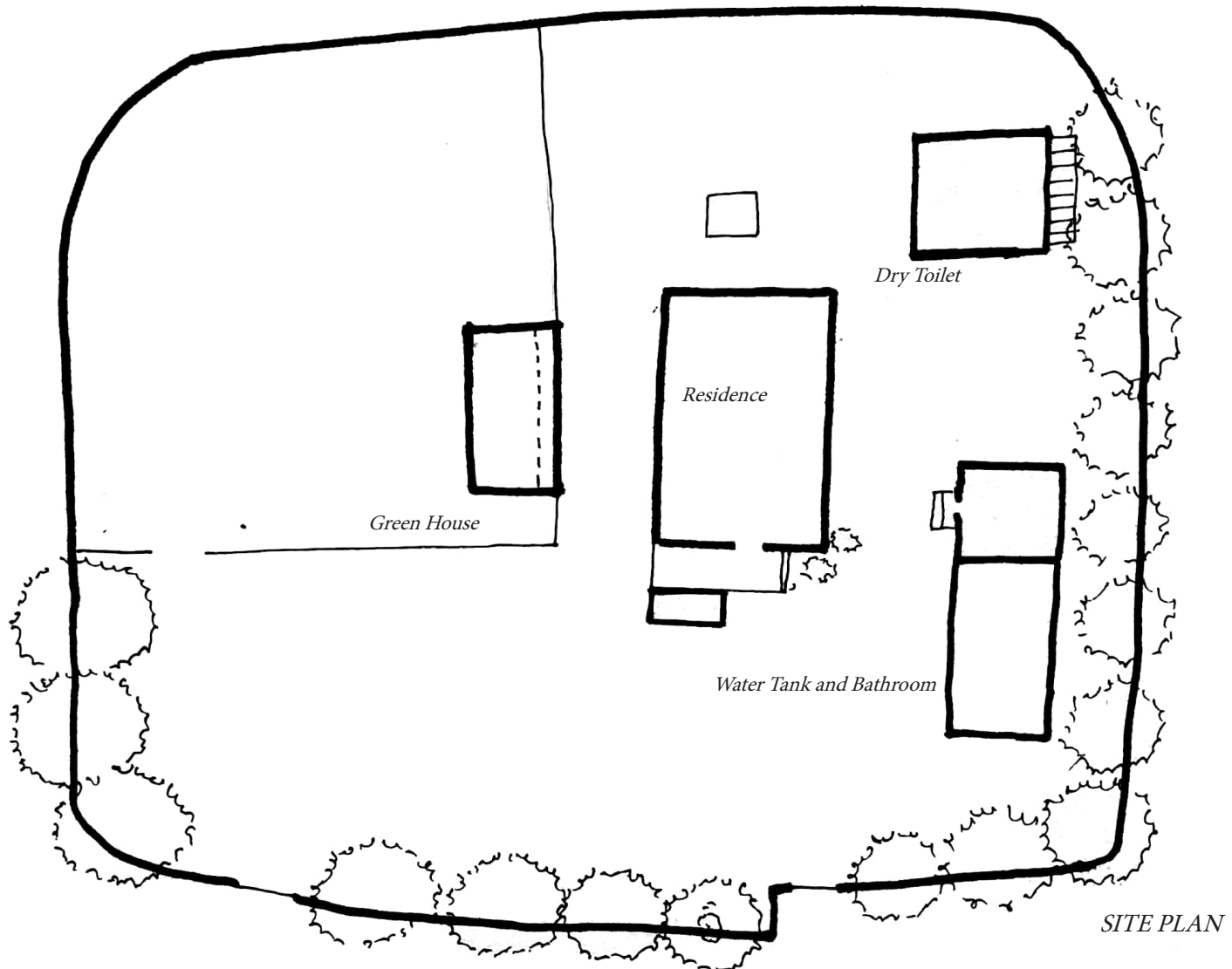
SECTION



PLAN



FRONT ELEVATION



Elements of House

Entrance and Gardens

The entrance of most of the houses in villages of Leh face upon farmland and garden. These gardens or farmlands change color through the year. In summers it is filled with fresh green and bright yellow which come in contrast with pale mountains. In autumn it changes its color to orange while starting to lose leaves. The rest of the winters the trees remain barren.



HOUSE
Sketch Credits:
Reva Doshi
Location:
Shey

Stables

In agrarian society animals become a priceless commodity. They provide dairy, wool, meat and also dung which is used as fuel. Every family owns cattle which are kept in stables during winters. Harsh winters compel the owners to build stables. Their walls are built with stone and mud which have wooden roofing. The openings of these structures are relatively very small to trap heat inside.



*STORAGE AND
COWSHED
Photo Credits:
Aishwarya Bombale
Location:
Shey*

Kitchen & Dining Room

In a Ladakhi house where people need to spend most of their time indoors in winters, kitchen and dining become highly occupied spaces. Most of the festivals and functions or family get-togethers during winters are celebrated here. A traditional fire place (bukhari) located near the seatings keep the space warm. The dining room holds the most decorative wooden cupboards which showcases utensils made of copper or steel.



DINING
Sketch Credits:
Reva Doshi
Location:
Shey

Sun Room or Glass Room

This is a special room with stained glass windows on most of the sides. On sunny days radiation in Leh is strong, even in winters. Direct sunlight is used to keep families warm. Rooftop sun rooms used to be built for families to enjoy the sunlight through the year. Now-a-days an improvised version of this room is seen. Houses have a room similar to sun room in one corner of the house. It is a luxurious room in the house which may serve the purpose of receiving guests. It is usually oriented according to the direction of sun. The beautifully carved window lintels and wooden windows enhance the façade of the house. The having a glass room or sun room becomes a mark of the family status.

Prayer Room

A typical Ladakhi house has a private space for performing their religious rituals. Any family who can afford to build a prayer room, has one on the most uppermost part, towards the highest and purest form. It is generally built in north or west orientation. Because of its religious importance it could be the most decorated room of the house. The prayer room is used by the family every day to give offerings. Pure water in seven cups is kept on a wooden platform in each morning as an offering. The cups are emptied on each evening. Oil lamps are lit every day in morning and evening. These lamps are placed in glass boxes with a chimney. This ensures that oil lamps do not ruin the interior of the room. The prayer room can also have wall paintings and several painted texts hanging from walls. The room has enough space for a monk and the family members to perform rituals on religious occasions. The size of room could be an indicator of the wealth of the family.



PRAYER ROOM
Photo Credits:
Aishwarya Bombale
Location:
Nimoo

Storage Room

In winters when the supply of resources become scares, the house becomes a depository. Fuel, food and fodder are stored in these rooms. There are different kinds of store rooms for each of the above-mentioned things.

Food such as leafy vegetables, potatoes, meat, etc. Is stored in underground rooms which are dug at the end of summers. These rooms are either located in the basement of the house or are located in the backyard. These underground pits are at least a meter deep to keep the food insulated in winters.

An interior room is generally used to store grounded cereals, mainly barley. This room is called bankhang. This room has several silos which store the grounded cereals. Not every house has this room. In some households these silos are buried in ground to keep them insulated.

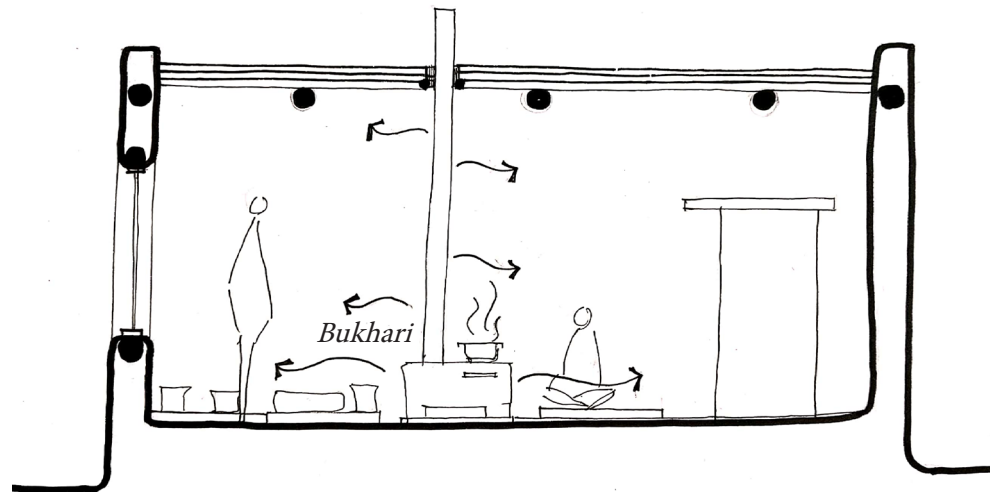
Fuel such as cow dung and wood are stored on upper floors, away from the ground to keep them warm with the help of sun.

Bukhari

A bhukhari is traditional fireplace in Ladakh which servers' dual purpose in winter i.e. To heat up space and to cook food. .[1] bukhari consist of a wide cylindrical fire-chamber at the base in which wood, charcoal , cow dung or other fuel are burned and a narrow , long cylinder on the top that helps in heating the room and acts as a chimney. Bukhari is mostly used in winter months.



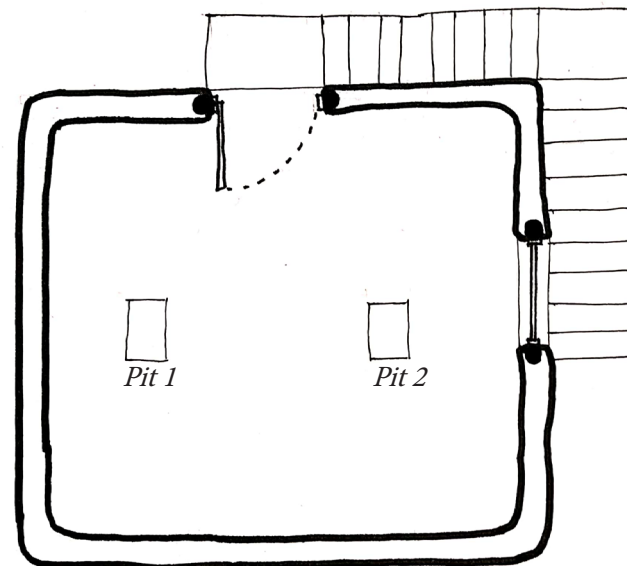
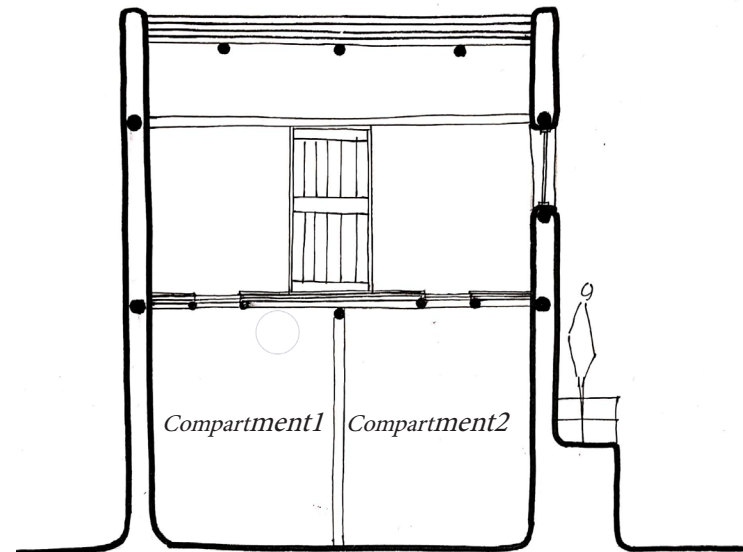
BUKHARI
Photo Credits:
Piyush Shah
Location:
Shey



Dry Toilet

Each house in Ladakh has a separate block of self-composting toilet which is a g+1 structure. This double storied structure has a collection chamber on the ground floor and a room on the upper floor which has a hole on the floor slab. After each use a mixture of cow dung, soil and earth and ash from the kitchen stove is shoveled upon the waste. This addition of mixture accelerates the production of fertilizers while eliminating foul smells.

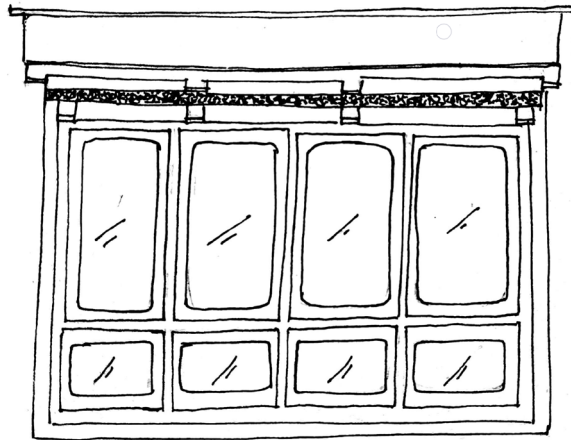
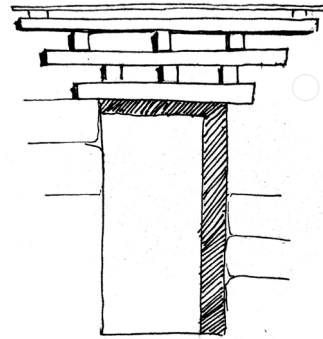
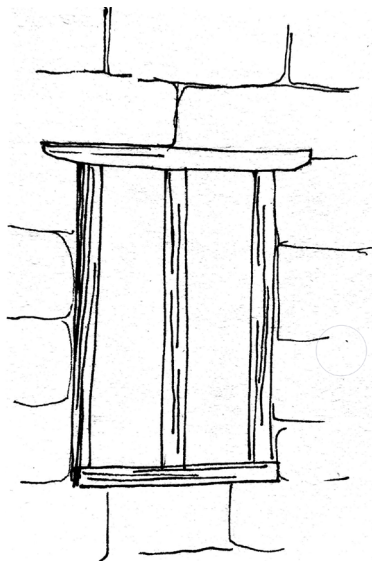
Once a year the contents of the collection chamber are emptied and used on fields as fertilizers. These dry toilets are especially useful in winter months when temperatures drop to minus 30 degrees Celsius, and water freezes. Since ages the people of Ladakh have been using dry compost toilet. The main reason behind it is that the availability of water is less compared to other parts of India



PLAN

Windows

The highly carved wooden window lintels and doors are seen in today's Ladakhi house. They have evolved from a very primitive form of windows. The main aim of such lintels were to transfer the load of the masonry above safely to the wall on the side of the openings. In earlier days glass was not available and thus we see smaller openings on wall. Only balconies projecting out had larger openings. These days stained glass windows add magic to the highly carved windows.



Religious Structures

Gompa

Gompas are Buddhist temples, located in Tibet, India, Nepal, and Bhutan. Their design and interior details vary from region to region; however, all follow a general layout of a central prayer hall containing a buddha statue, benches for the monks or nuns to engage in prayer or meditation and attached living accommodation. The gompa may also be accompanied by many numbers of stupas. Although gompas in ancient Ladakh were probably built as pure wooden structures, none at all remain and the gompas nowadays are basically mixed structure of outer walls of stone or sundried pagbu bricks and inner wooden construction. Windows and door frames of temples are more intricately carved than that of houses.

there are more than 100 gompas or monasteries in Ladakh. These gompas are religious residences of Buddhist monks who stay here and adhere to the Buddhist way of life, meditate and pray. The largest monastery in Ladakh is the hemis gompa that is located at a distance of 45 kilometers from Leh, the capital of Ladakh. The Namgyal tsemo gompa, which was built in the year 1430, houses a three-storied statue of lord buddha. The Sankar gompa is also an important monastery. The Likir monastery was built in the 11th century. Another old monastery is the cave gompa located at shergole.

Thiksey monastery

Located about 17 kms south of Leh. It serves as the largest monastery in central Ladakh. The Tibetan Buddhist monastery is known for its architecture and its location. It has a 12 storey structure coupled with 10 temples, an assembly hall and a nunnery. A big statue of maitreya or future buddha that is 40 feet in height also lies in the monastery. Devoted to goddess Tara, the Tara temple is another attraction for visitors. It took four years to craft the big statue. Carved by the local artists under the master nawang tsering, it is adorned with clay, copper and gold paint.

The monastery also serves as a residential place for around 120 monks. Buildings of the structure are also made in hierarchal order. The monastery is known as 'mini potala' of India as it appears like potala place in Lhasa. Besides visiting the monastery, travelers can also spot here some precious stupas, thangkas, statues, swords and wall paintings.





THIKSEY MONASTERY

Photo Credits:

Aishwarya Bombale

Location:

Thiksey

Stupa

A stupa is a sacred commemorative monument which holds the relics associated with Buddha and other saintly people. The hemispherical form of stupa appears to be derived from pre-Buddhist burial mounds. As most characteristically seen at Shanti Stupa, Leh, the monument consists of a circular base supporting a massive solid dome from which projects an umbrella-like structure.

The Dalai Lama inaugurated the Shanti Stupa in the year 1995. Shanti Stupa is situated at a height of 4267 meters overlooking the Leh city situated 5 km away from it. It is built as a two-level structure reached by flight of 500 steps. At the first level there is a Dharmakaya (as in white strip of Indian national flag) with two deer on each side, features a central image of Lord Buddha in golden color sitting on a platform turning the Dharmakaya wheel. At the second level, there are many small images depicting the birth of Buddha, defeating of devils, meditation and death of Buddha, all embossed in vibrant colors.



DRAMATIC BURIAL

Photo Credits:

Aishwarya Bombale

Location:

Leh

Prayer Wheel

A prayer wheel is a sacred wheel commonly known as mani in Ladakh. The prayer wheel represents the dharma cycle preached by buddha. It has the same meritious effects as reciting mantras. Commonly, the mantra om mani padme hum is written on the outside of the wheel. Other mantras can be written as well. It is basically a cylindrical wheel made of metal and wood which rotates on a spindle. Prayer wheels are located along road sides.

Most commonly seen are the one with a single cylindrical wheel. It stands on a plinth and has a flat roof supported by four columns to shelter it from snow.

Another type which is commonly seen near monasteries and palaces, is a long series of small cylindrical prayer wheels places on a meter-high upstand wall.



PRAYER WHEEL
Photo Credits:
Aishwarya Bombale
Location:
Thiksey



THE LAST STANZA

CONCLUSION

DRAMATIC BURIAL
Sketch Credits:
Reva doshi
Location:
Leh

Interplay of Man and Nature

The people of Leh have truly perceived the meaning of respect and gratitude. It not only means towards each individual but also towards nature and surroundings. They have developed their culture and architecture keeping in mind the limitations imposed upon them by the climate. Highly sensitive approach towards anything and everything around them has rendered them the ability to settle there.

The three basic needs of any man i.e. Food, clothing and shelter were bestowed upon them by the nature, in return the people replenish their surroundings. Minimal processing is done on the materials borrowed from the nature. This approach makes it possible to return the materials back to the nature.

Lack of any alternate source to obtain food, clothing and shelter compelled the populace of Leh to stick to their natural resources and take care of them. Give and take between the nature and man has continued for centuries together.

The colourful flag that everyone sees in Ladakh is the reason for their self-sustainable lifestyle. THEY PRAY AND RESPECT EVERY ELEMENT IN THE NATURE.

1. Blue : Sky
2. White : Snow
3. Red : Fire
4. Green : Trees
5. Yellow : Soil
6. Black Hair : Animals

Sky & Snow

This is the first element in the flag which is given the utmost importance. As this region is devoid of rain, snow becomes the only source of water for the populace of Ladakh.

Streams and rivulets are formed due to molten snow which flow down the slopes and meet the rivers. Villages and farms are thus located near these rivulets and stream which provide for drinking water and irrigation.

Each family draws adequate water from the main rivulets and releases the excess water.

In winters when snow starts taking over, agricultural activities stop, but water is still needed for drinking and daily activities. This water is obtained by breaking the upper surface of ice and collecting the cold-water underneath.



Fire

Fire is the magical element which keeps people warm in the cold winters. Fire needs fuel to burn which is provided by wood, dried animal waste, waste paper, dried grass, etc. Anything and everything which can be burned is used as fuel.

As we saw earlier the fire is burnt in a traditional fireplace called bukhari. In winters the bukhari also serves as stove for cooking food. This adjustment saves a lot of fuel which would otherwise be required for cooking food and heating the space separately.

The height of the rooms are lower than standard houses which makes it easy to trap heat.

(refer Bukhari in Elements of house)

Trees & Soil

The elements of trees and soil go hand in hand. These elements are important in providing the local populace with food and shelter. They are seen taking utmost care in utilization of these materials.

Branches of willow trees are used in construction of roof. They are also used as fuel in bukhari. The need of wood as fuel is very high during winters, but one would not see a single tree completely cut down. Each year during autumn when leaves start to fall only a few branches of trees are cut and the rest of the tree regrows. This highly sensitive approach is admirable.

Soil is used for cultivation of crops in summers. Whereas in winters the farms are not cultivated due to freezing temperatures. But even then, the farms are not kept unattended. When winter starts the fields are sprinkled with water. This water turns into ice as temperatures drop. This activity prevents the fertile top layer of soil from erosion due to strong winds.

In winters when access to the outside world reduces, availability of food becomes nil in the market. Thus, vegetables and fruits need to be stored within the houses during winter months. The food produced during summer months is stored in metre deep underground pits, where earth provides insulation.

The nutrients taken by the plants from the soil, are replenished into the soil by the converting the human waste into manure. This process is done with the help of dry toilets



Animals (Yak)

Clothing which is another basic necessity of man was provided by yak's skin. Most of the clothes, shoes, tents, blankets, etc. were made of yak's skin. This animal was also used for travelling and carrying goods.

These animals were taken care of by their owners. Their owners made enclosed sheds of mud bricks or stones for them to rest safely in winters.

Issues

Tourism

After tourism was introduced in Ladakh, all these structural systems of the society were disturbed. Introduction of business opportunities led to the economic growth of Leh, but their already existing system which were quality based got disturbed.

It is undeniable that tourism has brought increased revenue and employment but it has also strained the region's already scarce natural resources.

Tsering Angmo, deputy director of Jammu-Kashmir department of tourism had told media that every year, 25-30 guest houses are getting registered in Ladakh with the total number of hotels and guesthouses reach 826 as of November 2017. They have 13,732 beds. Besides this official number, there are several other homestays that are not registered.

Ladakh lately has started facing water crisis on regular basis. Amount of precipitation has decreased. The tourist numbers have increased to a large extent and thus the need of water. Tourist tend to live a luxury lifestyle in Leh thus the water requirements in such hotels is large. This adds to the existing water crisis.

According to research done by DOWN TO EARTH organization

In 2017 2, 77,000 tourists visited Ladakh- a region with native population of about 2, 74,000.

Thus Ladakhis would need double the amount of water which is used each year

Average annual precipitation (2011)

a) Snow fall in mm- 150mm

b) Rain fall in mm-102mm

c) Temperature ranges from 28 degree Celsius to 33 degree Celsius

d) Rain fall in 2016 – 20.9mm (one of the lowest rainfall)

Ladakh is suffering from probably its worst water crisis.

The exponential rise in tourist foot fall allied with 21% decrease in glacial area

According to study by Ladakh ecological development group (LEDEG) an environmental NGO based in Karzoo, Leh - An average Ladakhi uses 21 liters of water per day during summer & 10-12 liters during winter, while tourist needs as much as 75 liters

According to survey, there are total number of 826 hotels and guest houses, they have 13732 beds. So if we consider double occupancy for each bed, calculation suggests that on a given day assuming all the registered accommodations and have full occupancy, Ladakh would need 20, 59,800 liters of water.

Every tourist tends to buy packed mineral water which leads to increase in number of plastic bottles. A region unaware of plastic a decade back, now generates 30,000 plastic water bottles. Garbage, notably plastic waste, continues to adulterate Leh and is being dumped at

Within Leh the only handful of Ladakhis who own large hotels benefit disproportionately. Much of the money spent in Leh goes to tour operators and merchants who come to Ladakh just for the tourist season. The problem goes beyond an uneven distribution of the benefits. The relations between mutual neighbors are broken down by the extension of the business. A town known for peaceful community living where one could trust each other completely has started to lose its character.

Similarly, villagers have begun selling traditional building materials in Leh. Where once economic surplus stayed within the villages, it is now absorbed into the larger market. Villagers normally tend to give away excess produce in good will, but now tend to sell the extras in higher prices in tourist market

The increase in tourism has increased the number of vehicles. This has increased the number of Road accidents and traffic jams. A serene and quiet place now FACES PROBLEM OF TRAFFIC JAMS. Pollution levels have also gone up.

These are some serious concerns we must cater to. We along with the government can save this from ruining the region.



RETURN TO THE PRIOR

PROPOSED SOLUTIONS

SERIES OF WHEELS

Sketch Credits:

Reva doshi

Location:

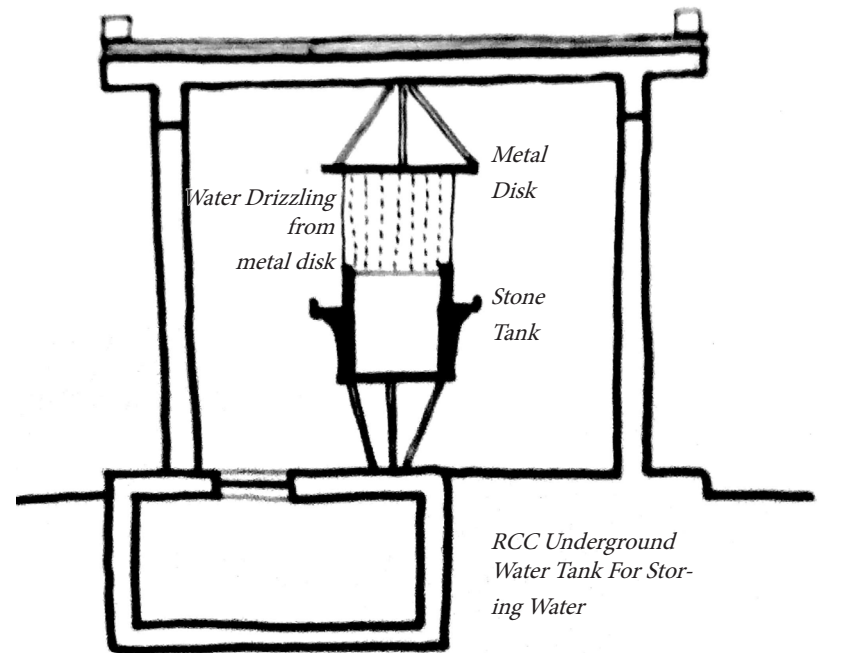
Leh

Proposed Solutions

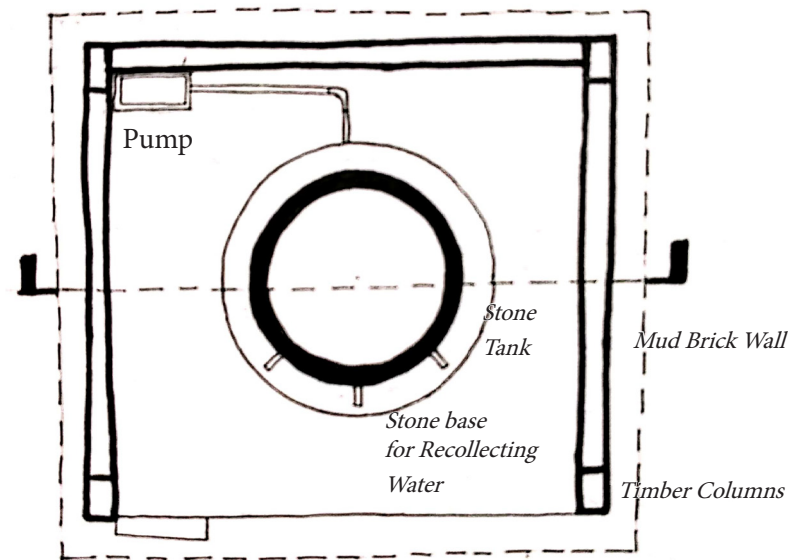
We learnt in the last chapter that; tourism is doing no good to the region. Infact it is ruining the entire cycle of sustainability. Waste was never dumped in landfills or dumpyards. Everything went back to the earth. This region was once unknown to the material of plastic, now faces severe issues of disposing the waste. A tourist should also learn from the highly sensitive approach of the locals. This simple inter-

Drinking Water Fountain

It would be very beneficial if we would be able to curb the generation of plastic right at the beginning. Water becomes the basic necessity of tourists. A trustworthy source of water comes from mineral water bottles. This generates heaps of waste. An alternate, readily available and trustworthy source of water is needed in Leh. The functioning of these water fountains is very simple, tourists carry their own water bottles around and whenever they feel the need to refill their bottles, these water fountains are readily available on every tourist center and along the main roads after specific intervals.



Section

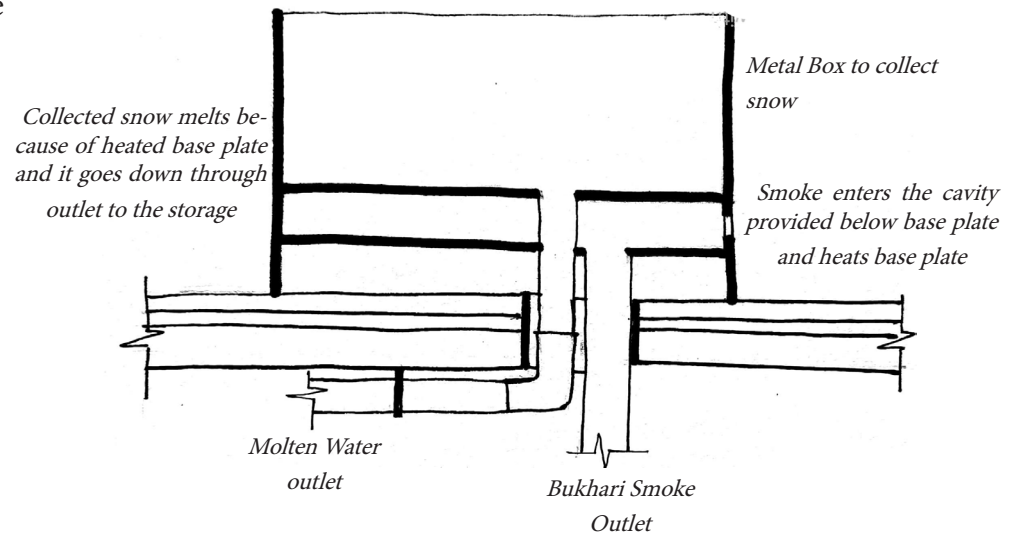
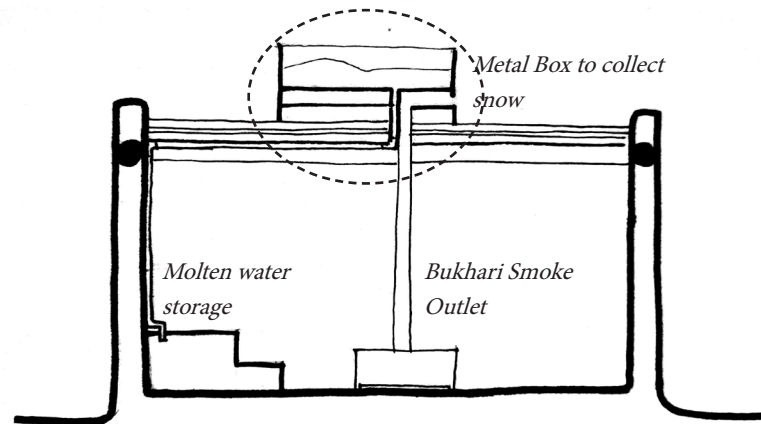


Plan

Snow Harvesting

In winters, when water freezes the local people obtain water for their daily activities from frozen water streams. For doing so they have to break the top layer of ice of the streams and fill their buckets with water. Earlier, people used to obtain water from handpumps even during winters but nowadays ground water level has reduced and thus water penetrated in the ground during summers is not available in winters. This has caused a serious issue. As we, earlier saw increased tourism is adding to this water crisis.

We have seen flat roofing system in Leh. Thus, the snow collected on the roofs is thrown down manually in winters in the interval of Every few days. This snow could be utilized to obtain drinking water in the houses. The heat from the bukhari that is thrown out by the means of chimney, could be used for melting the snow collected on the roof. A metal box could be provided on the roof, which collects the snow, and is in contact with the heat given out by bukhari. Thus, whenever bukhari is turned on, the metal box on the roof would receive heat and the snow would start melting. The molten snow could have an inlet inside the house.





BRO AT YOUR SERVICE. PRIDE OF THE NATION. HOPE YOU ENJOYED THE POST



SANGAM
Photo Credits:
Aishwarya Bombale
Location:
Nimoo

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