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Ladakh's Cultural and Traditional Adaptation to its High Latitude Harsh Climatic Environment and Challenges Ahead Due to it's Recent Life Style and Climatic Changes

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Ladakh region is one of the most remote and sparsely populated regions situated in the Indian State of Jammu & Kashmir, covering an area of 80,000 sq. km and ranging in elevation from 2600 m to 7670 m. it is the largest and highest located district in India. Being a cold desert, there is a saying that a person who has his head in a sun and his feet in a shade will endure both sun-stroke and frost bite at the same time, this extreme weather as well as climatic temperatures variation makes life very difficult in Ladakh. In summer the temperature is 20℃ to 27℃ whereas the in winter the temperature drops to -20℃ to -27℃ and in areas like Zanskar it drops below -40℃ . For centuries Ladakh region has enjoyed a stable economy based on self reliance mainly through its subsistence agricultural economy growing mainly barley, wheat, vegetables, and plantations and remaining from livestock within the duration of short summer season of 6 to 7 months in a year. But over the past few decades especially from 1970's when Ladakh was opened to the outside world, Ladakh's self reliance stable economy has shifted to dependence on outside forces, mainly the presence of large army and huge influx of foreign tourist, has lead to an uncontrollable money and materialistic driven economy in the present scenario. 'Change' and 'Development' are inevitable but it does not have to necessary the adaptation of western and modern culture having the notion of materialistic culture of having a job and buying what you need, leaving behind the culture of having concept of producing it yourself . The recent changes like huge influx of rural to urban migration, gradual life style changes increased tremendous pressure in local resources like water, energy and food security due to high increase in the per capita demand and consumption of these resources. On the other hand impact of climate changes like receding of glaciers, depletion of ground water resource and environment degradation due to excessive use of fossil fuels has lead to a serious threat to the existence of traditional and cultural livelihoods of the people of Ladakh.

Introduction

Ladakh was once an independent Buddhist kingdom. A breakdown in relations with Tibet in the 17th century resulted in an attempted invasion by the Fifth Dalai Lama. With the help from Kashmiris restored Ladakhi rule later on but at a price — the building of a mosque in Leh and the conversion of the Ladakhi king to Islam. Kashmir later went on to annex Ladakh, ending its independence and in the long run making it part of British India. The kingdom's former land is now divided between India, Pakistan, and the Aksai Chin district of the People's Republic of China. The present Ladakh is the largest district of state Jammu & Kashmir in India, covering more than half the area of the state. Nevertheless, Ladakh is also one of the least populated districts in India. It is renowned for its remote mountain beauty and Tibetan Buddhist culture; it is sometimes called "Little Tibet". Ladakh comprises of two districts, namely Leh and Kargil. Of the two districts Leh is by far the larger one in terms of area, although there is not much difference in the population figures of the two districts. Leh has six blocks comprising of 112 revenue villages and its population as per the 2001 census was 117,637. The density of population is 8 people per square kilometer. It is one of the most remote and sparsely populated regions in India. The name 'Ladakh' has been derived fro a local word 'Ladags' meaning a land of high passes.

Geography and Natural conditions

The region of Ladakh is located on the high Tibetan plateau between India and the Himalayan Mountains to the south, China and the Karakoram Mountains to the north, and Indian Kashmir to the west. It is a high altitude cold desert in the rain shadow region of the Himalayas, with glacial-fed rivers, no soils and a low diversity of xerophytes plants and has wide range of endangered animals' species (snow leopards, blue sheep, marmots, coyotes, wolves, lynx, musk deer, and wild double -hump camels). Temperatures can be as low as minus -40℃ to -30℃. Ladakh consists of a number of distinct areas including the fairly populous main Indus valley, the more remote Zanskar (in the south) and Nubra valleys (to the north) over Khardung La in the Ladakh mountain range, the highest motorable pass in the world at 5602 m or 18,380 ft), the almost deserted Aksai Chin (under Chinese rule) and the predominantly Shiite Muslim Kargil and Suru Valley areas in the west (Kargil being the second most important town in Ladakh after Leh). While the city of Leh is located at a height of 12,000 feet, Kargil city is located at around 9000 feet, both are district headquarters. Some of the regions in Ladakh like Drass experience temperatures as low as -40℃ (Drass also has the record for being the second coldest place on earth when temperatures reached -65℃). All in all the weather conditions in Ladakh can be termed as harsh at best.

Demographics

Unlike the rest of Jammu & Kashmir which is mainly Islamic, majority of Ladakhis is Tibetan Buddhist (50%), with rest consisting of Shia Muslims (45%). Local Christians and some settled Hindu and Sikh families make up one percent of the total population. Most Buddhists follow the tantric form of Buddhism known as Vajrayana Buddhism. The population following Islam predominantly adheres to the Shia form of Islam, principally among the related Balti. The people are of Tibetan descent with some Dardic (Indo-Aryan) admixture; the Balti are believed to have more Dardic ancestry than the Ladakhis. The Changpa nomads who live in the Rupshu plateau are pure Tibetans, and it was probably herders like them who first settled in Ladakh and Baltistan. Muslim Arghons, descendants of Kashmiri or Central Asian merchants and Ladakhi women mainly live in Leh. Ladakhis mostly speak a dialect of Tibetan referred to as Ladakhi, and there are some differences in language. The Balti language, which is spoken mainly in Kargil, Nubra, Central Ladakh as well as Baltistan in Pakistan-occupied Kashmir is a sister dialect of Ladakhi.

Economy

Ladakh has traditionally been an agricultural subsistence economy based on growing barley, wheat and local vegetables. The rest deficient was supplemented by rearing livestock like yaks, sheep and goats. At the lower elevation fruits are grown while the high altitude is the preserve of the nomadic herders. Surplus productions is traded for items like tea, salt and various luxury items like precious stones etc. though there is little production for exports but items like dry apricots, apricot oil and pashmina woven shawls and its by-products is widely demanded in domestic as well as in International market. The duration of the agricultural season is very short consisting of 6-7 months and the rest months are cold or either covered with snow. Inspite of this harsh climactic condition the agricultural production was generally high and enough to feed the entire population. The success of this system was mainly due to refinement of the traditional techniques to suit the local climatic conditions along with strong social structure to support the agriculture. Some of the local traditional techniques are:

- The lack of water was overcome by diverting water from streams along sophisticated irrigational channels and managed by strong community at the local village level ensuring equal water distribution.
- Supplementing the much needed manure (beside cow dung etc) through human 'nightsoil' through the practice of local composed pit toilets or 'dry toilets'.
- An extensive system of sharing the resources throughout the village, locally called '*langde*' evolved so that extensive labour activities can be

completed without extra cost of hiring men or labourers from outside

- Another system called '*rare*' means that each family has to take turns to herd all the animals in the village for a day
- Both the tradition of passing the land to eldest son and the practice of polyandrous marriages (whereby brothers share a common wife) to prevent the fragmentation of the family land and also a natural way of controlling population in the region.

These traditional practices had sustained the much required food and social security over past hundred of years in Ladakh. Since the opening of Ladakh to outside world and with the Jammu & Kashmir crisis making the Kashmir valley a no-go area for tourists, the Indian Government encouraged a shift in trekking and other tourist activities to the relatively unaffected areas of Ladakh thus making tourism a major source of income for what previously was a subsistence, agricultural economy (Apricots, apples and walnuts are cultivated in deep valleys). At an average in one tourist season approximate 30,000 to 40,000 tourists (comprising mostly foreign tourists) arrive in Ladakh every year. Presently other than tourism the pillars of Ladakh's economy are handicrafts, dry fruits and woolen products like 'Pashmina' making it second largest income source for the local people mostly for the rural regions.

Recent life style and climatic changes

Ladakh with its unique history, culture and breath taking scenic natural mountains is acting as a dynamic magnet attracting tourists from all over the world. Due to uncontrolled policy on tourism activities particularly at Leh urban areas number of problems are arising which Ladakhis had never experience before. The ever increasing tourists influx, a common phenomena of huge migration from rural to urban area (mainly young semi educated youths for employments and profits from tourism and government jobs) and ever increasing seasonal migrate laborers (mainly from Nepal, Bihar and Uttar Pradesh) has created a tremendous pressure on basic need resources like water, space and energy mainly in urban areas. The traditional water supply scenario in Leh town was totally dependent on glacier fed streams and carrying water from streams to home was a general scenario. Water usage used to increase substantially in summers, when water was abundant in the streams due to melting glaciers and used to decrease in winters, because less water was used in washing and cleaning. But now due to the growing tourism market in the town has also increased the demand of water for the luxuries like "Hot and Cold Showers" and "Flush Toilet Facility" which became prominent sign-board elements for the guest houses in the city, further added by demand of the migrated people from outside Ladakh region has lead to drastic change in the water usage pattern all over the urban areas. Now to fulfill the demand of water, local government agency like P.H.E. (Public Health Engineering) supplies the water through tankers in the city, further people and specially guest house owners are now fast adapting solutions like "Bore-wells" to harness ground water and even the agency like P.H.E. has tried to cope up with increasing water demand by digging more and more bore-wells in and around the city without carrying out any research about the ground water levels and recharge solutions. Two main sources of water supply in Ladakh the natural glaciers and snow fall are presently experiencing the worst changes mainly due to local and global warming through excessive emission of green house gases. The most visible impact of this climate change is the rapidly shrinking of natural glaciers all over Ladakh and erratic pattern of snowfall in terms of season as well as in volume. The visible consequences of these combine negative forces are acute water supply shortage in urban areas, increase in garbage and solid wastes (mainly increase in mineral water pet plastic bottles) and serious threat to health and hygienic conditions of urban dwellers.

The other important area of concern is the safety in terms of health and hygienic conditions mainly in urban areas. The changing trends are making people to go for more and more flush toilets irrespective of the growing water scarcity, without proper sewage system in place. The dark and grey waters released from the toilets and kitchens of modern Ladakhi houses and

guest houses are directly disposed into open pits therefore populating the under ground water resources. The traditional "Ladakhi" toilets are most sustainable due to less water consumption as compared to the flush toilets. A traditional Ladakhi toilet consists of a small room with a hole in the floor, built above a vertical chute, usually one floor high. A shovel of mixture of soil, and ash from the kitchen was thrown after every use instead of water which made decomposing process faster and at the end of the year turned the mass into rich odourless 'nightsoil' manure to be thrown in agricultural fields. Therefore, making proper utilization of solid waste as well as preventing pollution of underground water resources. The failure of traditional Ladakhi toilets and more popularity of 'Flush toilets' are due to many factors such as limited availability of space in Urban areas, no system of collection of waste, non- availability of soils and foil smells due to improper use of traditional toilets, these are main hindrances for preventing the urban dwellers to adapt traditional toilets. This hurdle can be overcome with introduction and awareness on improved 'urine diverting composed pit toilets' and other 'eco-friendly sanitary solutions' that fits in context with terrain like in Ladakh.

Another major problem that equally threatens the fragile environment of the cold desert of Ladakh region is disposal of solid wastes or garbages in small towns. Amidst the low production of home grown agricultural products and declining agricultural practices in both rural and urban areas, the people are now more depended on 'packaged foods' imported from outside Ladakh. Basic foods like rice, pulses and even barley, wheat and vegetables packed in plastic packages are being introduced in Ladakh in past few years. Now people are dependent on such products therefore first and foremost completely changing the food patterns of the region, secondly the solid waste or garbage problems due to improper disposal of these packages. In this process of economization, both the buyers and sellers completely ignore the solid waste management which is generated through them. This has already resulted in huge accumulation of non-biodegradable solid wastes like plastic bottles, wrappers, plastic cans without any concrete plans to dispose it ecologically therefore choking major water streams and drainage systems. The large dump landfills outside the peripheral of urban areas has become a feeding ground for local domesticated animals like local cows and donkeys, therefore indirectly threatening the dairy products of the region. Presently, the whole solid wastes and garbage disposals problems scenario has worsen to great extend particularly in Leh and Kargil towns, in addition it has now also very visible in popular and ecological fragile tourist spots like Pangyong Lake, Tsomorari Lake and also in passes like kardung-la. In local Ladakhi traditions there is no such as 'waste', people depended on local grown organic products for their daily food needs and the waste from such products were either eaten by animals or produce as manure for agricultural fields, even the human waste is made in use therefore completely closing the loop. Such traditional practices are still prevalent in many remote rural areas in Ladakh region till today.

Challenges ahead

The challenges that present Ladakh region faces now is how to cope with the present transaction from remote an isolated region to developed region without losing its rich traditional culture. By 'Culture' and 'Traditions' here I mean of traditional methods of preserving, managing and utilizing natural resources in sustainable manner. The major challenges that we face now is the scarcity of water for both domestic as well as agricultural uses. The gradual receding of glaciers, excessive use of ground water and increasing pollution of open water bodies have threaten the very existence of life especially in high altitude and fragile ecological region like Ladakh. This will not only lead to the scarcity of drinking water crisis but also lead to number of chain reactions like decrease in agricultural practices threatening the food security in near by future. The change in the pattern of local resource usage has already started to change the livelihood pattern in the region. The change has also been very visible in the lifestyle of nomadic people living the remote regions of Ladakh; due to lack of pasture development the rearing of livestock animals have decreased incredibly.

Another major challenge would be the food security in Ladakh, as Ladakh till date remains cut-off from the main land for more than five months. The erratic climatic patterns are already changing the crop patterns, low production and increasing population whihc is also becoming a concern for future food dependency, other wise, with fewer alternatives the people have to depend on air-lifted packaged foods for long isolated winters and paying high price. The increasing nucleus family system depending on modern energy hungry machines like room heating systems, diesel pumps for lifting waters and diesel generators for lighting for fulfilling the basic needs are putting tremendous pressure on per capita energy consumption in the region has imposed further danger to the fragile ecology of the region.

Conclusion

Fortunately Ladakh is also a home of abundant renewable resources mainly sun & water and also number of indigenous forward thinking voluntary and governmental organization who could lead an ecological and sustainable development in Ladakh. The promotion of 'appropriate technologies' using renewable energy like 'bio-climatic architecture' for room heating through solar energy, solar charged home lighting systems, solar power grids and micro hydro power units for providing all necessary energy requirements for basic needs as well as income generations opportunities at the local level and solar water pumps could reduce the pressure on use of fossil fuels and local bio-mass of the region. Further, the decentralization of such renewable energy services will provide employment and income generations opportunities at the local level therefore preserving and improving the local traditional practices of better natural resources management in the region. Such initiatives will avoid the pitfalls for Ladakh which so many other blindly modernized developed regions or countries have suffered.

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