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An insight into the nomadic life of pastoralists for their sustainability in high altitude Changthang plains of Ladakh region; a case study

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ABSTRACT

The Changthang plain in Ladakh has a rocky mountainous topography with sparse vegetation and shallow soil. Practising agriculture under such terrain and cold arid climate, has very limited proposition. However, the Changpas, the native people, have been able to manage the meagre grasslands and the livestock resources of best breeds of sheep and goat populations for a sustainable living. The article is an outcome of surveys carried out in this region and highlights various aspects of nomadic life of native people, their ways of management of livestock and pastoralism on the limited rangelands. It was found that customary nomadic life of Changpas is closely related to strong cultural ethos, groups and the historical account of trade and commerce. However, this rangeland-livestock relationship is gradually weakening due to changing lifestyle and alternate economic activities.

1. Introduction

Changthang is a popular high-altitude tourist place in Leh-Ladakh region, situated on a mountainous terrain at altitudes varying from 3500 m to 6000 m above mean sea level, thus considered to be one of the world's most remote locations (Dame et al, 2019). Inetymological terms, the word '*Chang*' means north and '*Thang'*, means plains. These areas are known for some of the best breeds of sheep and goat population who are reared by a distinct grazing community of the region called Changpas. Grazing of livestock is a regular activity, despite the fact that forage support is limited in all forms of rangelands; mountainous slopes, valleys and plains (Sanjay Kumar et al 2005). Nyoma, Durbuk, Rong Chugut (Headquarters at Chumathang) and Rupsho (Headquarters at Puga) are the four administrative towns define the region. Population is sparse and as per 2011 census, these four blocks collectively hold a total population of 13346 (Census of India 2011).

Study area

Changthang is located about 150 km northeast of Leh town. This place can be approached from Leh by traversing through two distinct terrains; along a route on the Indus flood plain from Leh-Shey to Kharu for a distance of 56 km and from Kharu to Changthang up-hill in zigzag mountainous roads for a distance of 90 km. Starting from Kharu, ascending the rocky uplands, there will be some important villages or small towns at Sakti, Zingral, Tsoltak, Durbuk, Tang tse and Changla before reaching Changthang. Chang la, the world's second highest pass is the gateway to Changthang plain (https://en.wikipedia.org/wiki/Chang_La). On arrival, one would view the crystal-clear water flowing down from the nearby glacier and the unending plains which stretch as far as one's sight can go. As per physiographical divisions, this vast highland plain consists of a number of wetlands, streams and numerous majestic lakes. The Tso Kar, the Tso Morriri, the Khyagar Tso and the Pangong Tso (within India) are some of the spectacular water bodies. In fact, Rupshou (comparatively, a wider valley) which constitutes a part of Changthang region continues beyond Tso Kar until Tso Moriri (Fig. 1). These plains stretch for about 20000 sq. km area of the cold desert (Bhatnagar et al 2006) and is characterised by a harsh weather, with temperatures dropping down to sub-zero degrees even in late summers. Though this landscape is a very difficult environment for normal life, thousands of people still live here mostly leading a nomadic life. In this article, authors have attempted to describe some important facts of this nomadic life with

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respect to their general living, occupation and coping mechanisms to sustain in this very harsh cold climatic region.

2. Materials and Methods

The assessment is an outcome of random survey carried out in the region during 2017-2019 between August to November months. The survey was conducted in two phases; one through traverses made in the upland-Changthang area and another with visiting the villages and discussion with migrants in the Leh valley. Data were collected through discussion with nomads/ local people, who stay in temporary houses in the field. Information was collected from migrants who come down to Leh town during severe winters (Fig.3). For interpretation of climatic conditions of Changthang region, daily data of maximum and minimum air temperatures for 35 year (1979-2013) for grid point "latitude 33.8768, longitude 78.125 and elevation 5528 meters" was utilized. The daily data was acquired from the National centres for Environmental Prediction's climate forecast Reanalysis (NCEP's CFSR) (Saha et al., 2010). Analysis showed that the daily maximum air temperature variation in the region was observed as lowest (-27.4°C) and highest (19.1°C), while daily minimum air temperature variation as lowest (-45.6 °C) and highest (8.1°C) during 1979-2013. In case of monthly mean of daily maximum temperature was -12.1 to 10.8°C and minimum air temperature was -30.3 to 0.8 °C (Fig.2).

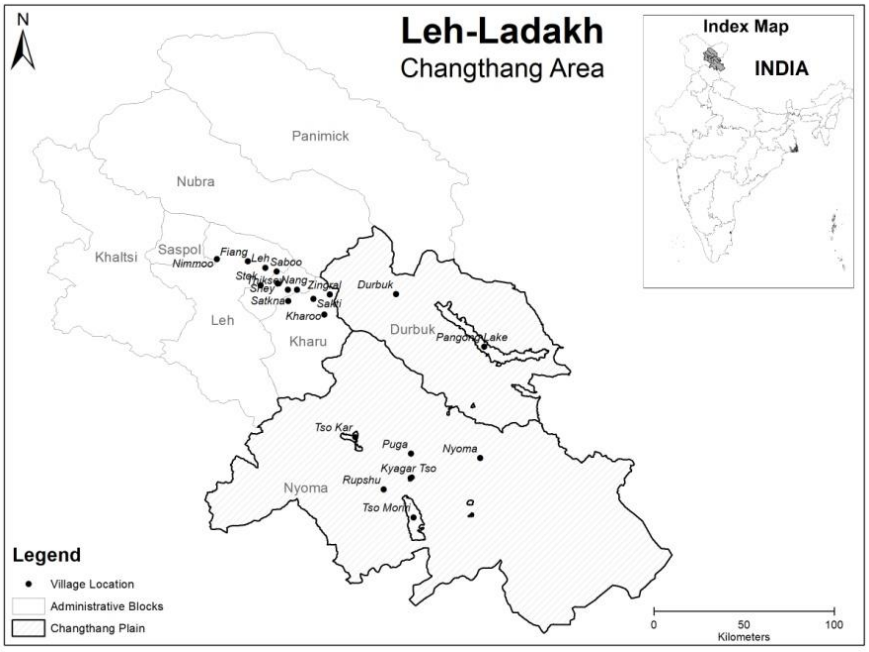

Figure 1. Location of Changthang plain

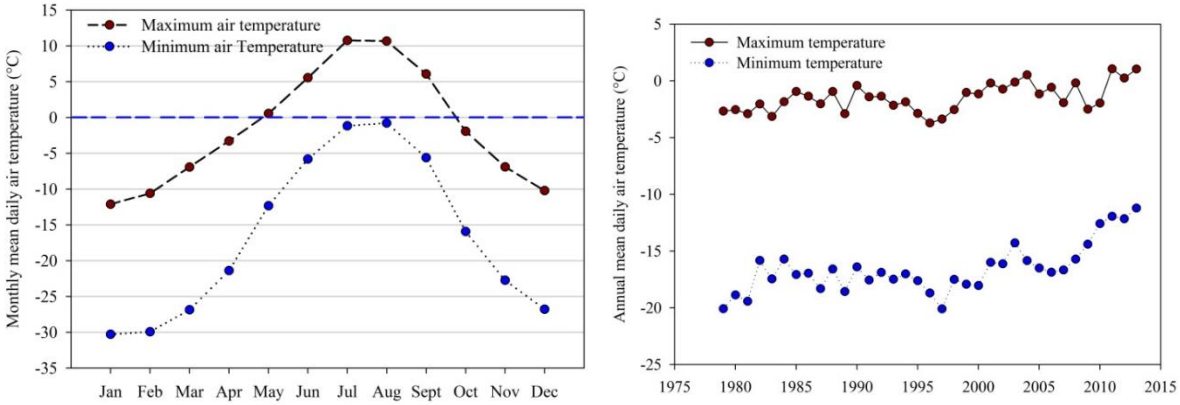

Figure 2. Variation of monthly mean of daily air temperature in Changthang region.

Results

People, their nomadic and pastoral activities (historical accounts and the present): The indigenous people inhabiting this region are known as the Changpas. They are generic nomads or transhumance practitioners. As per dictionary meaning, nomads represent a community without fixed habitation which regularly moves to and from the same areas while in transhumance, the grazers move the livestock from one grazing ground to another in a seasonal cycle, typically to lower plains during winter and highlands in summer. In this region, the transhumance of Changpas is based on a flock of sheep, yak and the very famous Pashmina goat known for their '*pashm'* or the undercoat of the goat hair. This goat hair is known by several names such as Cashmere, Pashmina, or *Layna* in Ladakhi (Renzo Garrone, 2015).Interestingly, reason for increase in livestock population in Changthang area is linked with the arrival of the TRs (Tibetan Refugees) with their livestock in the early 1960s, as well as the loss of access to most of their pastures across the Tibetan border (Bhatnagar et al., 2006b).Changpas has a diverse pattern of settlements with pockets of villages consisting of low density of human population. Thus, this low productive area causes a stiff competition between the nomads and wildlife for forage. August Hermann Francke writes referring to one of the oldest accounts of Ladakh, "A History of Western Tibet (Ladakh)," that numerous Mongoloid populations, believed to be from Tibet were already herding livestock in this region before the Dards and the Mons reached Ladakh.The Mons is a community of musicians and flute players of Ladakh. They speak Ladakhi which is of Tibeto-Burman origin. The Dards/Brogpa traces their ancestry from Aryans. Brogpa is composed of two terms Brog (Hill) and Pa (People) hence, the hill dwellers. They identify themselves as shin (Peasants) from Kargil and Suru valleys. They use the Blati script for writing. The community is stratified into different groups in order of hierarchy such as Sheikh (Priestly class), Raj Rom (Ruling Class), Shin (Peasantry & Artisan class). The Brogpas has a rich oral traditional of folk songs in the past depicting their migration from Chillas and Gilgit to their present habitat. Francke further notes that these people lived in tents made of yak hair and reared yaks where their coarse belly hair 'tsidpa' is spun and woven into tent material. They use their soft wool 'Khulu' for making ropes and blankets. The goats and sheep hair is cut only after they attain their full length. These people are believed to have moved into present-day Changthang region from a region known as Zhang-Zhung, which lies on the western edge of the Tibetan plateau. The rearing of livestock is a very critical and core activity in the economy profile of the region. Although it is adopted as a subsidiary occupation by a majority of the rural population yet it constitutes a vital activity for economy welfare of the farmers.

Distribution and characteristics of Livestock population:

The nomadic population of Changthang depends exclusively on sheep and goat rearing for its livelihood. Pashmina goats accounts for the maximum population (2.02 lakh or 62.3% of total livestock) followed by that of sheep (1.03 lakh or 31.8%). Data (Table 1) indicates a scenario of increasing sheep population only after 2013-14 (by ~4%) but after that it has remained almost constant (-0.1 % during 2016-17). Population of *Pashmina* goats showed a major increase after 2011-12 (+~14%) but in subsequent years, the population is showing decreasing trend and as on 2016-17, their population is -7.4 % (Table 1). The reasons are known from available information like it is said that during the year 2010, lots of *Pashmina* goats died due to impact of heavy snowfall. Pastures were covered with thick snow for a long period of time causing starvation, as the Changpas are not accustomed to storing fodder for the goats. As per Mr Stanzin Dorjey Gya, an internationally renowned film maker who produced films like "The Shepherdess of the Glaciers" shared that with the rise in the income generated from the *pashmina* goat, the people were rearing more and more of the goats whereas the sheep population was decreasing steadily. The animals during the late winter, from March to early May remain very weak due to the scarcity in fodder during the long winters. Goats are not able to retain much heat by themselves and are dependent on the sheep for heat with the severe temperature. Due to lack of adequate sheep population, some 20000 goats perished due to the cold in Kharnak and Rupsho area that prompted the shepherds to take a decision to keep a ratio of 75:25 between the goat and sheep (In conversation with ~~Dr.Namgial,~~ District Sheep Husbandry Officer, Leh).

Importance of Pashmina goat:

The most important animal reared by the Changpas is the *Pashmina* goat whose scientific name is *Capra Hircus Laniger*, and in Ladakhi language, this goat is known as Changra which is called as parent goat for *pashmina*. The word '*Pashmina*' stands for Persian "*pashmineh*' meaning simply 'wool' referring both to raw material and to a textile fabric.The *Pashmina* is a small goat of long-haired species. A detail account on the origin, production and processing of *pashmina* can be read from a publication of Renzo Garrone (2015). The famous pashmina shawls are made from Lena wool. The word 'Lena' is used for *Pashmina* wool locally by Ladakhis. Traditionally, the Changpas raise herds of large size. It has remained a traditional strategy to raise large herds to sustain breeding herd with a sufficient number of females in milk at any time of the year. However, in recent time there is a decrease in the total of sheep and goat population and also in the *Pashmina* goat population (Table 2)

Table 1. Data on livestock population in Ladakh region from 2010-11 to 2016-17

Category of Animals	Year wise Number of Heads/ birds						
	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
Sheep	99599 (27.8%)	101213 (28%)	105241 (29.4%)	103477 (31.9%)	108937 (31.4%)	112185 (32.8%)	103375 (31.8%)
Non-Pashmina Goat	52999 (14.8%)	53021 (15.2%)	3340 (0.9%)	3162 (1%)	2685 (0.8%)	3126 (0.9%)	19099 (5.9%)
Pashmina Goat	206014 (57.4%)	195715 (55.9%)	249206 (69.7%)	217771 (67.1%)	235687 (67.9%)	226951 (66.3%)	202561 (62.3%)
Total	358612	349949	357787	324410	347309	342262	325035

Source. Village Amenity Directory, 2014-15, 2015-16, 2016-17 and 2017-18. District Statistics and Evaluation Office, Leh. Directorate of Economics & Statistics, J&K Planning Development & Monitoring Department.

Table 2. Population of *Pashmina* Goat in different blocks of Leh District.

	2014-15		2015-16		2016-17		2017-18	
Block	Number	%	Number	%	Number	%	Number	%
Leh	188	0.08	239	0.11	957	0.47	1035	0.47
Nimoo	1745	0.74	1598	0.72	56	0.03	101	0.05
Saspol	212	0.09	228	0.10	0	0.00	0	0.00
Khaltsi	2613	1.11	3776	1.70	1064	0.53	145	0.07
Skurbuchan	3573	1.52	3381	1.52	138	0.07	142	0.06
Lingshed/Singelalok HQ at Wanla	3226	1.37	2155	0.97	906	0.45	1753	0.80
Deskit	18414	7.81	13698	6.15	4561	2.25	4561	2.08
Turtuk	2692	1.14	2603	1.17	1513	0.75	1513	0.69
Panamic	14480	6.14	11012	4.95	2487	1.23	2487	1.13
Nyoma	66382	28.17	66876	30.05	66876	33.02	70776	32.29
Rupshow HQ at Puga	66356	28.15	66542	29.90	66542	32.85	80648	36.79
RongChugut HQ at Chumathang	5672	2.41	1120	0.50	4666	2.30	4584	2.09
Durbuk	38222	16.22	38565	17.33	42793	21.13	42009	19.16
Kharu	7336	3.11	6901	3.10	6088	3.01	6406	2.92
Chuchot	1023	0.43	903	0.41	1166	0.58	726	0.33
Thiksay	3553	1.51	2978	1.34	2748	1.36	2312	1.05
Total	235687	100.0	222575	100.0	202561	100.0	219198	100.0

Source. Village Amenity Directory, 2014-15, 2015-16, 2016-17 and 2017-18. District Statistics and Evaluation Office, Leh. Directorate of Economics & Statistics, J&K Planning Development & Monitoring Department.

The population of *Pashmina* goats showed a decreasing trend (2.35 lakhs to 2.19 lakhs) between 2014-15 and 2017-18. However, in Nyoma, Durbuk, RongChugut, and Rupshou in Leh where nearly 82 % of livestock are *Pashmina* goats, their number has increased from 1.76 lakh during 2014-15 to 1.98 lakh in 2017-18 indicating a rise by 16% (Table 2). The next higher population of *Pashmina* goats are found in Diskit and Panamic blocks which are part of Nubra valley and are located far north of Changthang region. In both of these blocks, their population has decreased drastically by 13853 and 11993 numbers respectively. Such a significant reduction may surprise but this has happened as shepherds are not only selling their flocks but also their occupational pattern has changed with more preference towards profitable activities like blooming tourism industry (as per conversation with Dr.Namgial). Namgial et al (2007) in their study in Hanley valley found that present scenario of livestock population is in flux due to both socio-economic and changing pattern of lifestyle. The study also found typical changes in herd dynamics between sheep and goat and yak/horses and apprehended that any change in this relationship, may affect the rangeland resources of Changthang ecosystem.

Trade / other economic activity:

The Changpas are economically dependent on other regions like Leh, Sham and Zangskar in exchange for a vast majority of essential resources. Therefore, trade is important to their livelihood. In earlier times, they would barter salt (collected from the salt lakes), wool and *pashmina* for grains, fruits, tea, and other necessities. The annexation of Tibet into China, and the Sino-Indian war of 1962 are thought to have influenced major changes in the region.The annexation resulted in a loss of pasture land called 'Skangjung', which was the winter pastureland of the Rupsho community. This forced a change in their migratory pattern. It also caused an influx of nomadic groups from Tibet into Ladakh. It is said that increase in livestock population in Changthang began with the arrival of the Tibetian Refugees (TRs) with their livestock in the early 1960s (Bhatnagar et al., 2006b). These nomadic groups were settled into three transhumant communities, thus putting pressure on the declining pasture lands. After the Sino-Indian war, the trade route between India and Tibet was disrupted of which the salt trade was of immense importance to the Kharnak community. Furthermore, the salt trade was dependent on the salt collected from the lakes which came under bordering nation, causing competition among the different communities and thus leading to conflicts. Apart from the salt trade, Pashmina was an important trade commodity along with wool. The *Pashmina* from the Kharnak village is considered amongst the finest (Ahmed, 2004).

Religion and other Cultural ethos:

The people of the region follow the Drokpa sect (red hat) of Buddhism. This plays an important role in their culture as well as social life. Changpas are divided into two major subgroups based on their lifestyle; the Fangpa (Sedentary) and the Phalpa (Nomads). The Fangpa people practise agriculture and rearing of livestock, whereas the Phalpa of the region are pastoral nomads, i.e. people for whom the primary source of income derives from rearing livestock on natural forage rather than the cultivation of fodder (Rachel Nilza, 2008). These nomads practice seasonal migration year after year, living in permanent structures constructed in the lowlands during the winter while living in yak hair tents set up in pastures at higher altitudes during the summer (Fig.3 a to d).

(a)Summer tent house of Changpas

(b) Typical household utensils

© Women engaged in carpet making in Changthang area during summer.

(d)Women nomads from Kharnak village of Changthang preparing carpets in Leh town during winter

Figure 3. (a to d). Housing and activities performed by nomadic shephards.

Like Changpas, another group of people called Rong-pas is partly sedentary and live as a settled population. They are commonly found in Kuyul, Damchok, Chumathang, Nyoma, Ney, Kesar and Liktse villages within high altitude mountain valleys and along the Indus River. Agriculture is one of the major ways of their living. Lun-pas are the residents of Kerey and Chumoor villages in the northern region of Great Himalayan range and are semi-transhumant. They practice limited agriculture where they cultivate barley in summer even under adverse climatic conditions along with peas and turnips. Besides agricultural work, many families are engaged in pastoral and trading activities. As they have a large number of sheep and goats, in summers they migrate to higher mountain valleys or pastures zone with their flocks. They rear sheep for wool and Changra goats for 'Pashm'. Trading activities are carried on with these commodities or raw materials for the lucrative wool as well Pashmina industries in the Leh town and beyond.

Housing pattern: It was found that these local people adhere to two different kinds of housing pattern for summer and winter dwelling. During summers, they dwell in tents while practicing migration and in winters they dwell in houses made of stones which protect them from the severe temperatures (Fig.4. a to f). The dwelling units for livestock (sheep and goat)are prepared scientifically. For example, stone structures were raised considering threats of wild animals and climatic vulnerability for new born, fully grown and bigger sheep and goat. The stonewalled partitions not only help insulating the body of animals but also protect them from the attacks by wild animals. In general, life is difficult for both humans and livestock in Changthang area, but native people practise a disciplined sustainable life following various ITKs based wisdoms and also adhering to coping mechanisms.

Food and water: In most of the villages, springs are the source of water, while during the summers when the nomads move with the flock they depend on glacial water. The eating habits of the people are very indigenous to the region, where meat is consumed at a large scale. Meat, generally that of yak is kept dried to use as per requirement. Other than this, meals made from the different flours are being used. In earlier days, such goods were exchanged via barter system but now days the goods are purchased. In earlier times a dish called *Thut* was made using *Churpey*, butter and gur/sugar. This was a highly nutritious food used by the people during travelling and while herding the flock.

3. Discussion

Ladakh is best described as a rocky mountainous region with very limited arable land for agriculture and grazing purpose. Climatic conditions are harsh with months from November to March remains snow covered. Practising agriculture under such conditions has a limited proposition. The Changthang region in Ladkh has similar limitation in natural resources and good soils. However, river-borne and precipitation sediments provide a thin soil cover which is ideal for sustaining nomadic lifestyle on the available grasslands. Even the pockets of sandy plains and low sand dunes (as in north of Sakti village) are the sites for luxuriant grasslands in this region. The waterbodies supporting the vast plains are usually small glaciers, springs or lakes. Puga (south-east of Tso-Kar lake), as per Geological Survey of India (GSI) 1975 survey, is one of the top three hot springs. Chumathang is another such hot spring in Upsi-Mahey Bridge area. The lakes; Tso Moriri and Pangong Tso (Fig.1) contain brackish water while Tso-Kar contains highly concentrated salt water. Other small glaciers provide fresh water for the population and livestock. Apart from this, there are numerous hot springs in Durbuk, Puga and Demchok which are believed to carry medicinal properties and every year, thousands of people suffering from orthopaedic ailments visit the place as medical tourists.

From the survey it was noticed how harsh climatic conditions have helped the Changpas to develop trust on the concept of decentralized work forces like weaving, feeding the animals, daily grazing, protection of herds from wild animals, food preparation and safety of residence that are carried out by each member of the family. It was found that weaving of *pashmina* wools is still the most viable economic activity, which is mostly undertaken by women. The overall living pattern is also linked to type of occupational structures. While a group called Rong-pas adhere to sedentary system and live as a settled population, the Phalpa community practice migratory life. Migration is a part of these shepherds since livestock population play an integral part of their life. From the housing patterns like tents and permanent huts, it was evident how these groups have developed coping mechanisms to do away with climatic extremes. Grazing is carried out throughout the day on the riverside, hill slopes and limited plains. *Pashmina* goats are more preferred because of economic supports availed from these animals. However, keeping the sheep and goat population together is based on a scientific understanding to do away with climatic severity. Safety of livestock is another regular issue which local people have managed by building different type of dwelling units for different age groups. With a strong religious ethos and life style, these people either practise agriculture or nomadic pastoralism. At present, with better communication and technological inputs, the youths of the region are in the process of diversifying the economic activities with innovative form of agriculture (organic agriculture), adventure tourism. Irrespective of such changes in attitude for better living, under the perpetual climatic and terrain limitations, the local people still believe in the traditional ways of sustaining in this difficult condition.

(a)Limited grasslands supporting region's livestock

(b)A herd of Pashmina goats

©Grazing lands over frost heaves: source of green fodder

(d)Housing structures (kacha, pucca and improved tourists huts) at Changthang.

(e)Temporary net houses for temporary resting of livestock in a part of grazing lands

(f)Dwelling units for livestock based on their age-group to cope with severe cold and protection against wild animals

Figure 4. a to f. Coping management skills in the form of housing, grazing resources and severe cold

4. Conclusion

The life and agriculture in the remote Changthang plains is very difficult. This field based survey and assessment revealed some interesting facts about the principles of living in this high altitude cold terrain. The coping mechanisms were evident from the assessment of the daily life of Changpas, their housing pattern, food habits, trade & commercial activities and migratory/sedentary life.

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