Farming and Landownership in Zanskar Trans Himalayan Region, Ladakh: A Case Study of Mountainous Agricultural System in Geography
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Farming and Landownership in Zanskar Trans Himalayan Region, Ladakh: A Case Study of Mountainous Agricultural System in Geography.

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Abstract

Zanskar Trans Himalayan region as being most isolate and backwardness more of the community dependent on farming based livelihood. The farming is based on the local available resources in the region and is purely self-subsistence farming. Method of agricultural system inherits from old generation to new generation. This article is based on community observations, secondary and primary study investigation. Agricultural activities in this region are limited only for five months in a year i.e May to September. The area is having mixed kind of farming. The primary products of agriculture are used for local population and livestocks need. Use of modern fertilizers and technology are limited. The prime crops are barley, wheat, pea and vegetables. Agriculture is dependent on animals and viz a viz. landholding size in the area in small and agricultural activities carried in the limited available land i.e on alluvial fans. Farming in this region is 100 percent dependent on irrigation. At village level water resources management for irrigation is done through traditional way. Organic farming is mainly carried in the region.

Keywords Agriculture, Farming, Landholding, Organic, Monasteries

11.1 Introduction

Globally agriculture provides a livelihood for more people than any other industry. Growth in agricultural production and productivity is needed to raise rural incomes, to support the increasing numbers dependent on the industry and to meet the food and raw material demand.

Technological change plays a key role in agricultural development. The invention, innovation and diffusion chain involves many links. Development of market infrastructure and institutions is essential for economic growth. Animal products cost more per unit of energy than staple crops, so consumption is low in developing countries. Rising income and populations result in rapidly

increasing demand. Market demand is concentrated in urban areas so, it leads to high transportation cost from remote areas.

A transformation of developed country agriculture occurred towards the middle of 20th century, through the widespread induction of industrial inputs of mechanical power, fertilizers and other agro-chemicals. The fertilizers replaced the need of animal manure. Change was slower in remote areas, where use of animal draught is still common since higher cost, labour saving technology is less appropriate.

The people of Zanskar practice a mixed kind of agriculture, in which livestock has a very important role in their agricultural system. The agriculture of Zanskar is not much modernized as compared to other parts of the country. The agriculture is based on self-reliance in food. The mixed farming and social setup in Zanskari traditional way of life has been effectively providing enough food, fuel and clothing for all, while using most of their natural resources in conservative manner. In a very recent time the people of Zanskar have got opportunity to select other livelihood options for their survival. Among there are service sectors, private business and tourism sector.

The dzo, yak, dzomo and horse are the domestic animals which have an important role in farming system of Zanskar. These animals are used for plough the fields, thresh the harvest, transportation, and form a source for production of wool, hair and dung etc. Besides these domestic animals people keep goat, sheep, donkey, and poultry for basic requirements.

Snow melt water is only source of irrigation in Zanskar. Farming in Zanskar is 100% irrigated. *Yura*[1] is used to irrigate the fields. Every household gets their turn to irrigate their respective fields for a fixed time once, twice in a month. This is necessitated by lack of water resources. Minimal modern inputs are used in farming practices of Zanskar region. People nowadays use tractors and threshing machines.

Study area

Nomenclature of Zanskar comes from the local word "*Zangskar*" meaning white copper. Zanskar is basically a Buddhist area with a small Muslim population. It covers area of some 7000 Km ^{2} and is situated at an elevation between 3500 and 7000 meters above the mean sea level. Its climate is very severe and it remains cut off from the rest of the world from November to June when only limited helicopter service is its only link with outside world. The region remains snow-covered during winters and movement of people comes to nearly standstill even within the region. Winter is severely cold and nearly no outdoor activity is possible for four to five months. People live in small houses build of stone, mud and wood. Human beings and domestic animals share the same cooking-cum-sleeping room on ground floor during winter months. Domestic animals are grazed on natural pastures in summers but have to be stall-fed during winters. Fig.1 shows the location map of the project area.

[1] **Is a small canal used for supply water from main river to field**

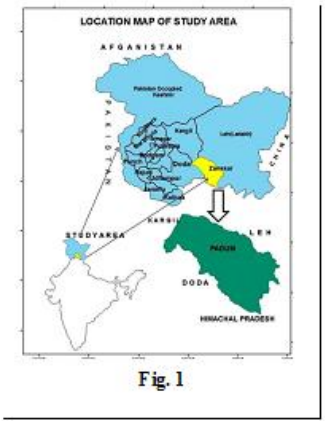

Fig. 1

The villages are mostly situated along the two main tributaries of Zanskar River. The first one, the Stot, has its source near the Pensi-La (4400m.) . The second branch is formed by two main tributaries known as *Kurgiakh-chu* with its source near the Shingo-La and *Tsarap-chu* with its source near the Baralacha-La. These two rivers unite below the village of Purneto form the Luknak River also named *Lingti* or *Tsarap*. The Luknak-Chu then flows northwestwards along a narrow and precipitous gorge towards the Padum village where it unites with Stot River to form Zanskar River.

The Great Himalayan Range is to the south west and it separate Zanskar from Kishtwar and Chamba districts. To the northeast lies Zanskar Range separating Zanskar from Leh district. Zanskar River is the only drainage outlet for whole Zanskar region. It cuts a deep and narrow gorge through the Zanskar range.

This topographical configuration makes access to Zanskar difficult from all sides. Communication with the neighbour Himalayan areas is maintained through mountain passes or along Zanskar River. The river freezes during winter months and provide a route to Leh district. This is called *Chader*route.People track on this route during winter from December to first week of February to reach Leh. The easiest approach is from Kargil through Suru Valley and Pensi La. It is along this route that only road to Zanskar was built in 1979 to connect Padum with Kargil. Remoteness of this region also explains why only a few western travelers have visited this area until recent times. Tibetologist Alexander Csoma de Körös was the first Europeans to visit Zanskar in 1823. Moreover, because of its strategic location of entire Ladakh region close to border with Pakistan and China, Zanskar was declared a restricted area and was reopened to foreigners only in 1974.

Discussion

Database and methodology

The prime objectives of present paper is focused on the study of farming system in Zanskar Trans-Himalayan region. The present paper is based on observation of primary and secondary data

sources. The primary survey has been conducted in relevant data to meet the objectives of study have been obtained from both primary and secondary sources. Information pertaining to socio-cultural constraints and agricultural attributes was not available; therefore, in order to familiarize with the area and to know about these aspects, the researcher conducted four months survey through questionnaires of 237 households in 24 revenue villages of Zanskar in 2014 and 2015.

The project is based on the analysis of various parameters of agricultural, soil, water, climatic, social, cultural, livestock and economic indicators acquired through questionnaires. This questionnaire contains eight blocks. Each block contains information on details of respondents, household information, information about agricultural land, cultivation, liabilities, agricultural assets, livestock details and questions on agricultural problems. Sample population was selected from all the villages based on the number of households in the villages. All collected information were tabulated and compiled for further analysis. Statistical techniques have been used to analyze various kinds of data. GIS software Arc 9.1 has been used to prepare various types of maps.

The discussion on the farming system of Zanskar can be structured under following headways:

1. Mixed Farming

2. Land Ownership

1 Mixed Farming

The people of Zanskar region are occupied mainly in agriculture sector. Their prime objective is to self-sustaining in food production. The agriculture is not for commercial purposes. Only very limited amount of agricultural production is used for sale in near market like Leh and Padum. The younger generation is least interested in agricultural activities because of poor economic returns in the form of money. Less per capita land holding size is also responsible for poor agricultural production in the area. Because of less land holding size heavy machines like tractor could not able to use in Zanskar.

Agricultural sector plays a very important role in Zanskar economy as it employs large share of the population and also has a large contribution to the local livelihood. In governmental projects and budgets the sector has given less priority to this sector. Because of that, the sector encounters various challenges. This study attempts to examine the agricultural production and recommendation for more agricultural output. The following main points are discussed about the agricultural and livestock productions in Zanskar.

The people of Zanskar rear various domestic animals like horse, ass, donkey, yak, dzo, dzomo, goat, sheep, pashe etc. These animals have a vital role during the process of farming. People get many food items like dairy products, meat, wool, hide, hair and dung for fuel directly from

domestic animals. The Zanskar regions remains cut off from rest of the world for more than six months.

Zanskar region has a very limited season (May to September) for farming practices. During this short season people keep domestic animals in higher reaches known as *doksa*[2]. During this time period mainly women members of a household go to *doksa* along with domestic animals. Male members exercise the farming in the village. During the *doksa* they collect butter, Cheese, hair, wool and dungs as a stock. Generally in a *doksa* one female member carry domestic animals of two to three household. One *doksa* carry 20 to 50 livestock.

In a three months they able to collect in an average around 50 to 80 Kgms of butter, 150 to 200 kgms of dry Cheese and 240 to 300 kgms of dungs for fuel. The cost of Zanskari Butter is ₹ 450/kgms, Cheese is ₹ 200/kgms and for dungs it is ₹ 50/ Kgms in local market. During this short time period they able to earn good amount of money. The Pashmina wool is very famous in Zanskar which is also a good source of income for the local people but the extraction of pashmina wool is not at large scale as in Leh district. Very limited amount of pashmina wool is produced in Zanskar. Mainly male and children are engaged in farming practices in lower valleys.

[2]Is a kind of transhumance activities performed in Zanskar.

Plate 1 shows environs of a doksa and dry cheese near Panzila in Zanskar.

Plate 2 shows ploughing and a cultivated land in Zanskar.

During this time period people grow peas, barley, wheat, vegetables and alfalfa. The farming of Zanskar region is to produce for self-subsistence. The people of Zanskar were self-dependent only on their farming before 1980s. They purchase or exchange very limited items like salt, sugar and hardware etc. After connecting area with road with district headquarters people are exposed to new opportunities and options. Government also opened ration store because of which they are able to produce some surplus production from farming. The surplus production is sold in the local market, Kargil and Leh. Farming is also important because it gives fodder like alfalfa,weeds, straw, and hay for domestic animals.

[3] **Is a unit to measure land by revenue department, which is one eighth of an acre.**

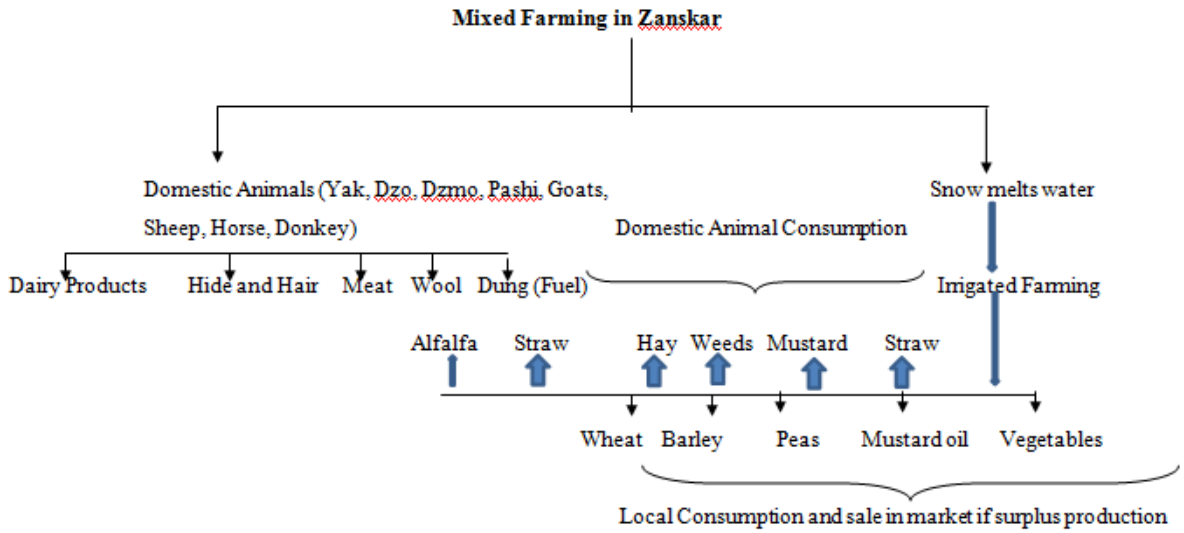

Fig. 2 Reflecting mixed farming in Zanskar.

It can be concluded from the above discussion that Zanskar region is dominated by primary economic activities that is agriculture and livestock rearing. Fig. 2 discussed the details of mixed farming system in Zanskar. The barley, wheat, peas, fodder and vegetables are the main crops in Zanskar. The growing season in Zanskar is very limited. During this time period people collect food in the form of butter, cheese, meat, agricultural products. During this short season they also collect fuel wood and cow dungs for the winter.

2 The Land Ownership

In Zanskar land records are maintained by revenue department and are known as 'Patwari'records. The title refers to the government official known as 'Patwari', whose duty is to maintain land records. The standard local unit of area used by the 'Patwari' and the farmer is the *kanal*[3]which is

one eighth of an acre. Based on the interview and observation in field land ownership in Zanskar can be divided in following way;

2.a Land owned by private

Private land in Zanskar divided among the *Khangchen* and *Khangchung*. The average land holding size is very small in Zanskar. The private land again divided into following three types;

a. *Jing*: land which is used for cultivation purposes and grow various types of crops.

b. *Oal*: land which is used for grow fodder for domestic animals e.g. Alfalfa.

c. *Tsas*: land used for the production of vegetables. Now a day farmers are aware enough to grow vegetables as cash crop, because in the local market demand for vegetables has increased due to presence of government, non-government employees and business man from outside the region.

In table 1, shows data on average land per household in Zanskar. In which it can be clearly reflected that the maximum of land is used for jing (cultivation), oal (alfalfa) followed by tsas (land for vegetables). From this table it can be clearly analyzed

Table 1 shows average land owned by per household in Zanskar

Average land per household in Zanskar (land in Kanal)						
Sr. No.	Village	Total Households	Cultivable (in Kanals)			Land
			Jing (Cultivated)	Oal (Alfalfa)	Tsas (Vegetables)	Total
1	Zangla	34	14.53	8.21	1.78	24.52
2	Hamiling	2	35	25	11	71
3	Padum	18	38.5	23.72	11	73.22
4	Salapi	11	13.8	7.3	0.9	22
5	Sani	11	12.4	4.3	0.8	17.5
6	Rantaksha	5	28.8	15.5	2	46.3
7	Ating	5	10	10.2	1.64	21.84
8	Remala	2	22.5	27.5	2.5	52.5
9	Phey	11	14.45	12	1.2	27.65
10	Tongde	10	23.3	7.7	3.5	34.5
11	Ufti/ Pibiting	24	22.66	16.02	8.76	47.44
12	Tungri Thahan	11	38.9	19.27	4.63	62.8
13	Techa Khasar	3	10.67	8.33	1.67	20.67
14	Karsha	19	20.94	16.26	3.34	40.54
15	Langmi-Reging	2	12.5	17.5	3	33
16	Abran	22	17.9	15.18	2.73	35.81
17	Akshow	8	30	17.25	2.62	49.87
18	Pipcha	5	22	15.9	2.2	40.1
19	Testa	11	14.9	12	2.47	29.37
20	Raru-Moony	7	39	25.42	16.9	81.32
21	Shunshadey	8	19.37	15.12	4.62	39.11
22	Ichar	2	75	35	12.5	122.5
23	Kargyak	3	16	10	2.33	28.33
24	Chah	3	16	7.3	2	25.3
	Total	237	569.12	371.98	106.09	1047.19

Sources: Primary Survey (2014-15))

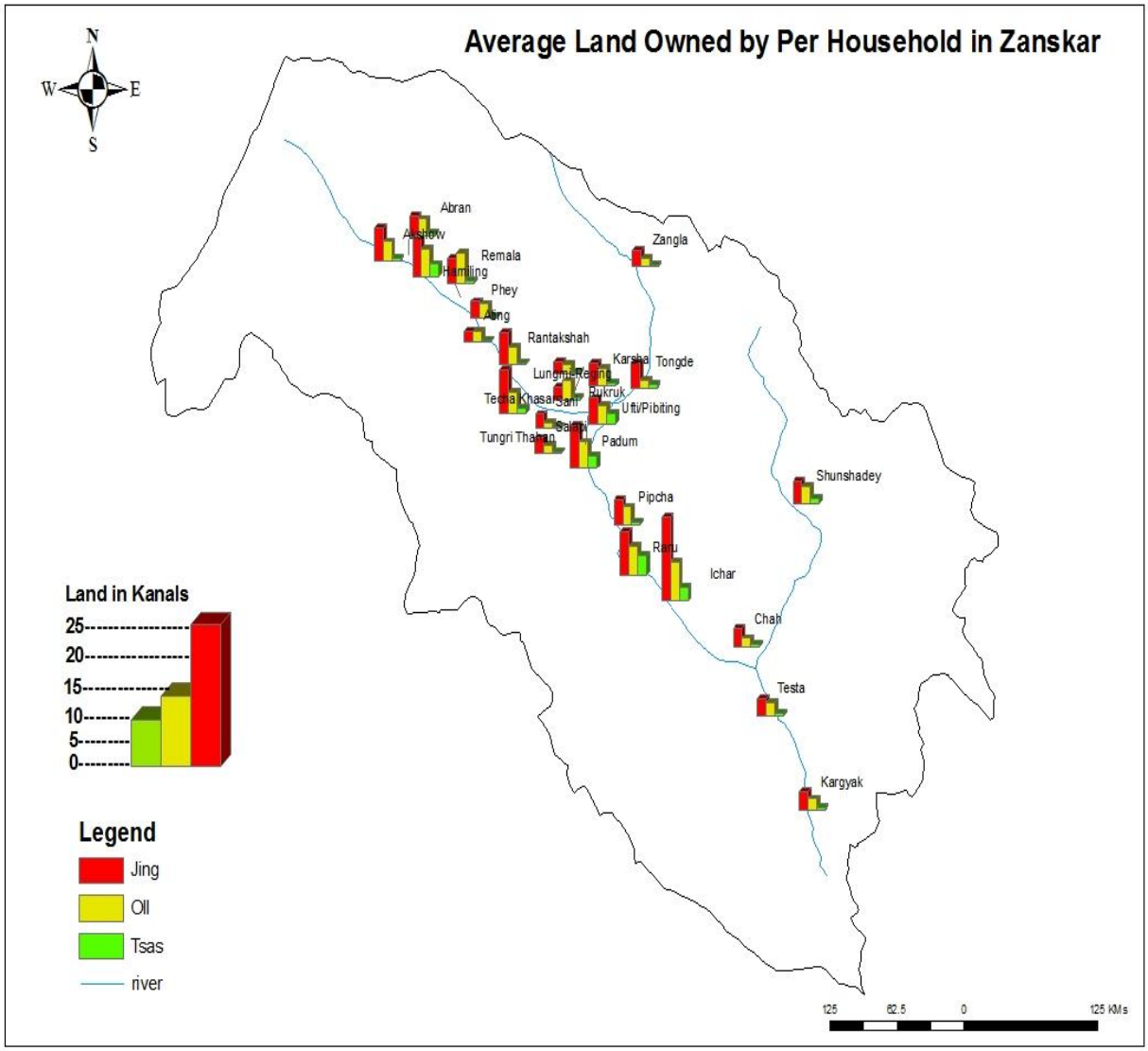

Fig. 3

that village wise per household average land holding is highest in Ichar (123 Kanal), Raru Money (81 Kanal) and at the same time Kargyak and Chah have the least per per household average land size.

In fig. 3 shows the average land by per household in Zanskar under various categories of land. In this map it is clearly visible that land holding size per household is highest in the villages of central and Stod valley as compare to Luknak valley. This is mainly because of existing of river terraces and alluvial fans in Central and Stod valley. The Luknak valley is situated in a very narrow valley. In Luknak valley Ichar and Raru have the highest per household land. In almost every village the highest graph in jing followed by oal and tsas categories of land. The villages like Raru Money (81.32 Kanal), Padum (73 Kanal) and Hamiling (71 Kanal) have maximum area and the villages are

located on river terraces as compare to other villages. This is one of the reasons. Same table also clears that the villages having less land holding sizes per household are Salapi (22 Kanal), Chah (25 Kanal), Kargyak (28 Kanal) and Testa (29 Kanal). Maximum of all these villages are situated in Luknak valley which is a gorge.

2.b Land owned by Monastery:

In Zanskar society is largely dominated by monastic culture. In which monastery play a vital role in social and cultural life. Almost every village is associated with a main monastery of near to it. So in every village there are lands which are owned by the local monastery. There are following three types of monastic land;

a. *Khral Jing*: Monastery land which leased to tenant farmer He has to give some share of agricultural output to monastery.

b. *Shas Jing*: land which allotted to a farmer for a few years in return for a proportion of the produce.

c. *Rang Bad*: land which is directly managed by monastery manager.

Table 2 shows village wise household working as tenant on monastery land. From this table it can be clearly analyzed that among 237 households only 22 (9 percent) farmers are tenant on monastery land. It also can be analyzed that maximum of farmers in villages are not working as a tenant on monastery land. Zangla is the only village where five farmers (15 percent) are tenant of monastery land.

Table 2 shows village wise household having tenant on monastery land.

Sno	**Village**	**Total households**	**Yes**	**% age**
1	Zangla	**34**	5	15
2	Hamiling	**2**	0	0
3	Padum	**18**	2	11
4	Salapi	**11**	2	18
5	Sani	**11**	0	0
6	Rantaksha	**5**	0	0
7	Ating	**5**	0	0
8	Remala	**2**	0	0
9	Phey	**11**	1	9

10	Tongde	**10**	2	20
11	ufti/ pibiting	**24**	0	0
12	Tungri Thagan	**11**	2	18
13	TechaKhasar	**3**	1	33
14	Karsha	**19**	1	5
15	Lungmi-Reging	**2**	0	0
16	Abran	**22**	2	9
17	Akshow	**8**	1	13
18	Pipcha	**5**	1	20
19	Testa	**11**	0	0
20	Raru-Moony	**7**	1	14
21	Shunshadi	**8**	1	13
22	Ichar	**2**	0	0
23	Kargyak	**3**	0	0
24	Chahh	**3**	0	0

Sources: Primary Survey 2014-15

It can be concluded that Zanskar is dominated by monastic culture. Every village has some land on the name of monastery and it is tilled by the farmers but it is under the direct control of monastery. Monastery received some portion of agricultural production in the form of returns.

2. c Community land

In Zanskar, primarily in the valley, alluvial fans and river terraces are used for cultivation purposes. The land which is barren but cannot be brought under irrigation are generally used for grazing their herds, collection of fuels and wood. This land is situated in hilly areas. This kind of land is owned by state government. Every village has its own demarcated community land.

Conclusion

It can be concluded from the above discussion that farmer of Zanskar valley practices traditional farming for centuries. It remains isolated for most of the time period. The prime source of livelihood is agriculture which is based on traditional farming. Agriculture is dependent on 100% irrigation. The main source of water is from melted glaciers and snow. The prime agricultural productions are barley, wheat, peas and limited vegetables. It can also inferred from table 1 that cultivated occupies the highest land followed by alfalfa and vegetables. The farmers of Zanskar also owned domestic animals like yak, cow, sheep, horse and donkeys for domestic use. They get milk far, meat and medium of transportation from these domestic animals. The local communities

are self-dependent as far as concern local consumption. Fig. 2 shows the details of product and byproducts of mixed farming.

The region has very limited months for agricultural activities. It begins in the month of April and completely closes at the beginning of October every yea. During this short growing season farmers involved in a mixed kind of farming. Farming system is mainly based on traditional methods. The use of modern technologies and fertilizers are limited. Landholding sizes are small because of the mountainous region. The agricultural activities carried on alluvial fans in the area. The society is dominated by monastic culture and almost every village has monastery agricultural land owned by tenants.

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