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Socioeconomic profile of sheep Rearers of Zanskar: High altitude cold arid region of district Kargil

¹Manish Meshram, ²HM Khan, ³M Abdullah, ⁴AH Akand, ⁵IU Sheikh, ⁶Fozia Shah and ⁷A Shah

¹Ph.D. Scholar, Division of Livestock Production Management, Sher-e-Kashmir University of Agricultural Sciences and Technology, Kashmir, Shuhama, Alusteng, Srinagar, Jammu and Kashmir, India

²Professor, Division of Livestock Production Management, Sher-e-Kashmir University of Agricultural Sciences and Technology, Kashmir, Shuhama, Alusteng, Srinagar, Jammu and Kashmir, India

³Assistant Professor, Mountain Research Centre of Sheep and Goat, Sher-e-Kashmir University of Agricultural Sciences and Technology, Kashmir, Shuhama, Alusteng, Srinagar, Jammu and Kashmir, India

⁴Associate Professor, Division of VAHE Veterinary Animal Husbandry Extensions, Sher-e-Kashmir University of Agricultural Sciences and Technology, Kashmir, Shuhama, Alusteng, Srinagar, Jammu and Kashmir, India

⁵Professor & Head Division of Livestock Production Management, Sher-e-Kashmir University of Agricultural Sciences and Technology, Kashmir, Shuhama, Alusteng, Srinagar, Jammu and Kashmir, India

⁶Assistant Professor Division of Physiology, Sher-e-Kashmir University of Agricultural Sciences and Technology, Kashmir, Shuhama, Alusteng, Srinagar, Jammu and Kashmir, India

⁷Assistant Professor, Mountain Livestock Research Institute, Sher-e-Kashmir University of Agricultural Sciences and Technology, Kashmir, Shuhama, Alusteng, Srinagar, Jammu and Kashmir, India

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Corresponding Author: Manish Meshram

Abstract

The survey was conducted to study the socio-economic profile of sheep rearers in 5 villages (Khashar, Pibiting, Razing, Tasha and Ufti) of Zanskar in Kargil district. This region is having cold arid high altitude climate. A total of 100 respondents were face to face interviewed through a pre-structured questionnaire. Results revealed that majority of respondents had (89%) joint type families. About (60%) families are medium sized (6-9 members). About (28%) respondents were having agriculture + livestock as primary occupation. whereas (26%) respondents were having agriculture + Sheep rearing as secondary occupation. The land holdings of respondents were marginal type (7.05±0.42 kanals/0.89 acre). Monthly income of 71% of respondents was in the range of Rs.11000-20000 with average of Rs.17451±1400.11). About 44% of sheep rearers were having age above 60 years with illiteracy rate of 21%. About (27%) of respondents had more than 20 years of sheep rearing experience. A very good numbers (91%) of women were involved for different sheep rearing activities. The respondents had average flock strength of sheep (12.47±0.11). Other animals reared by respondents along with sheep per household; goats (5.29±0.20 numbers) with a range of 1-5 goats in (78%) cases. Number of cattle per household were (2.51±0.05) with 0-2 cattle in (98%) cases. About 30 and 41 households were rearing yak and its hybrids (Zho, Zomo, Gurmo, Thalgo), respectively. Thus it can be concluded that government policies need to be reoriented with focus on commercial livestock farming for employment, nutritional and livelihood security of the residents of the Zanskar.

Keywords: Socio-economic, agriculture, sheep, sheep rearers, Zanskar

Introduction

Zanskar is the biggest subdivision in district Kargil. The area being part of Ladkha it is frequently referred to as the land filled with mountains. This area consists of extremely challenging weather conditions with an average altitude of 6000 meters above mean sea level, so it is one of the highest inhabited and harshest location in the country. The temperatures in the winter can dip below -30. The area is located between 76° 52' 39' E and 33° 28' 8' N with area of 70002 km². River Zanskar flows through the region. The population of Zanskar is 13797 and a literacy rate of 59.53%

(Census, 2011) ^[3] with 93.81% of the population following Buddhism. Since it is a unique agro climatic place in India it has been bestowed by nature with a rich natural animal depth and having distinctive characteristics that enable them to cope with severe environmental conditions that are found in this cold, dry, high altitude and barren area. Native livestock breeds have been multifaceted, retaining distinguished genetic characteristics which set these individuals apart from other breeds in India. These characteristics involve a resistance to tropical diseases, the capacity for adaptation to harsh or extremely frigid, dry and

covered and dry environments, ranging and the capacity to thrive on subpar the feed. People in these areas mostly rely on animal resources because the region is a frigid desert with vast, uncultivated areas where cultivation of crops is very difficult and limited. Livestock plays important role in generating income and alleviating poverty of the residents of these areas. The economic resources include mainly agricultural sector, ecosystems, and the tourism industry. Besides cattle sales, meat and milk, employment, transportation, and traditional knowledge also add to their livelihood. Due to very harsh climate, high altitude with less oxygen availability besides remoteness these areas have not been studied properly. In this research the socio-economic profile of sheep rearers of this area has been studied for the first time which shall serve as a guide for policy planners for its future development.

Materials and Methods

To study the socio-economic status of sheep rearers of Zanskar in Kargil district, a field survey was undertaken from June 2022 to November 2022 in five villages, viz. Khashar, Pibiting, Razing, Tasha and Ufti, of Zanskar Sub-division in district Kargil of Ladakh. Proportionate random sampling was followed wherein 20% of the villages of the region were selected and from each village 20 respondents were considered for the survey. A total of 5 villages with 100 respondents were interviewed by contact method on key indicators of socio-economic profile of sheep farmers (Family size, Family type, occupation, Household income, land holding, literacy etc.).

Statistical analysis: The data collected during the period of study was coded, compiled systematically, tabulated and subjected to statistical analysis (average, percentage) using Statistical Package for Social Sciences (SPSS 2020) computer programme.

Results and Discussion

Family Size

The results indicated that majority (60%) of sheep rearers in Zanskar were having medium size families (6-9 members). About 29% of families were large size families (>9 members) and small size families (<5 members) were only 11%. The results further indicated that medium (6-9) families members family size varied between villages with higher in Ufti village (75%) followed by Razing (65%), Khashar (65%), Pibiting (50%) and 45% Tasha village, respectively (Table 1 family size). The present study is in close agreement with surveys conducted in different parts of India (Manzoor *et al.* 2022; Nijanand *et al.*, 2021 and Reddy *et al.* 2020) ^[8, 10, 12] where they have reported that majority of sheep rearers had medium family's size families in South Kashmir of Jammu and Kashmir, Narayanapet district of Telangana state and Andhra Pradesh, respectively. Contrary to these findings large family size have been reported to be predominant family size among sheep rearers in different parts of the country (Kanakaraja *et al.* 2022 and Shashidhara *et al.* 2022) ^[6, 13] in which they have reported that majority of sheep rearers had large family sizes in Yadgir district of Karnataka and north eastern dry zone of Karnataka, respectively. Large size families suit the agrarian societies with large land holding so as to prevent division of land and

have a large work force in hand for agricultural operations. However, in this study much of the study area was hilly in nature making it unsuitable for agricultural operations and hence land holding/household was quite low. Smaller land holding as revealed in the present study could thus possibly be the reason behind predominantly large sized families among sheep rearers in the Zanskar region.

Family type

The results of the survey indicated majority of the families were joint type (89%) in Zanskar, followed by nuclear (11%). Joint family type varied between villages with higher in Ufti village (100%) followed by Razing (90%), Tasha (90%) Pibiting (90%) and (75%) Khashar village, respectively (Table 1 family type). The present study is in close agreement with surveys conducted in different parts of India (Mahe *et al.* 2023; Manzoor *et al.* 2022 and Kanakaraja *et al.* 2022) ^[7, 8, 6] in which they have reported that majority of sheep rearers had joint families, in Cauvery delta zone of Tamil Nadu, south Kashmir of Jammu and Kashmir and Yadgir district of Karnataka, respectively. Contrary to these findings nuclear family type has been reported to be predominant family type among sheep rearers in different parts of the country (Ajmeera 2022 and Sundaramoorthy *et al.* 2021) ^[1, 17] in which they have reported that majority of sheep rearers had nuclear families in Kothagudem and Khammam district of Telangana state and Ramanathapuram Virudhunagar district of Tamil Nadu, respectively. Joint type families suit the agrarian societies with large land holding so as to prevent division of land and have a large work force in hand for agricultural operations. However, in the present case much of the study area was hilly in nature making it unsuitable for agricultural operations and hence land holding/household was quite low. Smaller land holding as revealed in the present study could thus possibly be the reason behind predominantly joint type families among sheep rearers in the sub-division.

Primary occupation

Majority (28%) of the respondents in the villages were having Agriculture + livestock farming followed by family business/daily labour agriculture (19%), and agriculture (14%), government services (14%) as their main occupations. Livestock oriented occupations i.e., followed by Agriculture + sheep farming (9%) sheep farming (8%), livestock farming (8%) and were prevalent among considerably lesser proportion of sheep rearers as their primary occupation. Village-wise comparison revealed that Ufti had highest proportion of sheep rearers having family business/ daily labour (55%) as their primary occupation in comparison to other sub-divisions (Table 1 primary occupation). The present study is in close agreement with surveys conducted in different parts of India (Nishanth *et al.* 2023; Ajmeera 2022 and Manzoor *et al.* 2022) ^[11, 1, 8] wherein they reported that majority of sheep rearers had primary occupation agriculture and livestock combined in Cauvery delta zone of Tamil Nadu, Kothagudem and Khammam district of Telangana state and south Kashmir of Jammu and Kashmir, respectively. Contrary to these findings primary occupation has been reported to be predominant. Sheep farming among sheep rearers in different parts of the country (Siripurapu 2023; Kanakaraja

et al. 2022 and Vasanthi *et al.* 2022)^[16, 6, 18] wherein they reported majority of sheep rearers had sheep farming as primary occupation in Telangana, Yadgir district of Karnataka and Telangana, respectively.

Sub occupation

Majority (26%) of the respondents in the villages were having agriculture as sub occupation, with proportion of such respondents being higher in Ufti village (50%) followed by Tasha (45%) Razing (25%), Pibiting (10%) and (0%) Khashar village. Sheep farming represented the second most prevalent (22%) sub occupation among sheep rearers in the sub division with proportion of such sheep rearers being higher in Khashar (35%) followed by Tasha (25%), Razing (20%), Pibiting (15%) and (15%) Ufti village. Among other livestock - oriented occupations, sheep farming in combination with agriculture was the most prevalent (19%) sub occupation followed by agriculture and livestock combined (16%) and livestock (11%) (Table 1 sub occupation). The present study is in close agreement with surveys conducted in different parts of India (Kanakaraja *et al.* 2022; Vasanthi *et al.* 2022 and Manzoor, *et al.* 2020)^[6, 18, 9] wherein they reported majority of sheep rearers had sub-occupation agriculture in Yadgir district of Karnataka, Telangana and Anantnag district of Jammu and Kashmir, respectively. Contrary to these findings sub -occupation has been reported to be predominant Sheep farming among sheep rearers in different parts of the country (Nishanth *et al.* 2023; Manzoor *et al.* 2022 and Giriraj *et al.* 2022)^[11, 8, 5] wherein they reported majority of sheep rearers had sub-occupation agriculture in Cauvery delta zone of Tamil Nadu, South Kashmir of Jammu and Kashmir and Karnataka state, respectively. Zanskar is land locked area and the habitants occupy different terrains in different geographical locations wherein land is not suitable for agricultural operations at most of the places. However, sheep enterprise has not taken the pace keeping in view better avenues for sheep husbandry in terms of grazing facilities, demand and supply gap and source of employment generation. Sheep rearing just substantiates income of the respondents.

Household income of respondents

The details of household income of sheep rearers have been presented in table 2. The results indicated that majority (75%) of sheep rearers in the district were in the income group of Rs 21,000-30,000/month with proportion of such respondents being highest in followed by Pibiting (90%) Tasha (90%), Ufti (90%), Razing (85%) and (20%) Khashar village. Similar findings were reported earlier in Cauvery delta zone of Tamil Nadu (Nishanth *et al.* 2023)^[11] in Narayanapet District of Telangana state (Nijanand *et al.* 2021)^[10] in Anantnag district of Jammu and Kashmir (Manzoor, *et al.* 2020)^[9]. Although the higher income group (Rs. 11000-20000/month) represented the second major income group of sheep rearing community in the sub division, the proportion of such sheep rearers was very less (10%). Within the higher income group, Razing village was having a slightly higher proportion of sheep rearers (15%) in comparison to all other village while as the Khashar was having lowest proportion of such sheep rearers (5%). Similar findings were reported earlier in Andhra Pradesh

(Reddy *et al.* 2020)^[12]. The results further indicated that a very small proportion of sheep rearers (10%) in the district were falling in the lower income group (>Rs 30000/month). However, village wise comparisons indicated that Razing village had a higher proportion of such sheep rearers (15%) in comparison to other village. Comparison of monthly income across different village in the study area further revealed that the mean sum of squares for monthly income of sheep rearers in Khashar village (18105.21±2203.61) was higher than in Razing (16900.83±2061.76), Pibiting (15299.58±1796.89), Tasha (14988.33±1788.82) and (14786.25±1805.85) Ufti village). Similar findings were reported earlier in south Kashmir of Jammu and Kashmir (Manzoor *et al.* 2022)^[8], in Telangana (Vasanthi *et al.* 2022)^[18] in Ramanathapuram Virudhunagar district of Tamil Nadu (Sundaramoorthy *et al.* 2021)^[17].

Land holding (Kanals/household) of respondents

The results indicated that average land holding per household of sheep rearers was 7.05±0.41 kanals in the Sub division. The average land holding/household (non-irrigated) was higher in Khashar village (10.40±1.63 kanals) followed by Pibiting (7.25±0.41kanals) Ufti (6.00±0.53 kanals), Razing (5.95±0.47kanals) and lowest in (5.80±0.66kanals) Tasha village. The present study is in close agreement with surveys conducted in different parts of India (Shashidhara *et al.* 2022; Manzoor *et al.* 2022 and Reddy *et al.* 2020)^[13, 8, 12] wherein they reported majority of sheep rearers had marginal farmers in north eastern dry zone of Karnataka, south Kashmir of Jammu and Kashmir, and Andhra Pradesh, respectively. Contrary to these findings large land holding has been reported to be predominant among sheep rearers in different parts of the country (Siripurapu 2023; Giriraj *et al.* 2022 and Nijanand *et al.* 2021)^[16, 5, 10] in Telangana, Karnataka state and Narayanapet district of Telangana State, respectively. Land holding size in the present study clears about marginality and marginal farmers who mostly depend upon common property resources (CPR) like community pastures, vegetation around the banks of water bodies, barren and uncultivable lands besides alpine pastures in highland areas for meeting the requirements of their livestock. These CPRs provide inputs for livestock production and subsistence for the poor. Marginal land holding of sheep rearers in the area could possibly be attributed to hilly terrains, barren lands, and cold arid conditions making it unsuitable for agriculture.

Age of respondents

The overall district figures indicated that majority (43%) of the family heads were in the age group of more than 60 years followed by 21-40 (32%) and 41-60 years (25%). The proportion of sheep rearers falling in the age group of years was higher in Ufti village (60%) followed by Khashar (55%), Pibiting (55%), Razing (35%) lowest in (10%) Tasha village. The present study is in close agreement with surveys conducted in different parts of India (Mahe *et al.* 2023 and Kanakaraja *et al.* 2022)^[7, 6] wherein they reported majority of sheep rearers had old age group in Bidar district of Karnataka and Yadgir district of Karnataka, respectively. Contrary to these findings large land holding has been reported to middle age group Sheep farming among sheep rearers in different parts of the country (Siripurapu 2023;

Nishanth *et al.* 2023; Giriraj *et al.* 2022 and Manzoor *et al.* 2022) [16, 11, 5, 8] in Telangana, the Cauvery delta zone of Tamil Nadu, Karnataka state and south Kashmir of Jammu and Kashmir, respectively. Involvement of old age group in Zanskar sub-division may probably be because of illiteracy, less employment and less lucrative opportunities. Further, it seemed age was not a factor in deciding the types of work in Kargil district wherein main aim was to earn livelihood and nutritional security for their families.

Education of respondents

It is evident that majority of the sheep rearers (28%) were having education up to middle standard with proportion of such respondents being higher in Ufti (40%) followed by Khashar (30%), Pibiting (25%), Razing (25%) and lowest in Tasha village (20%). The results also indicated that there was a slightly lesser percentage (22%) of sheep rearers in the Sub-division who were up to high school proportion of such respondents being higher in Tasha (30%) followed by Ufti (25%), Pibiting (20%), Razing (20%) and lowest in Khashar village (20%). The results also indicated that there was lower percentage (21%) of sheep rearers in the Sub-division who were illiterate with no formal education with proportion of such respondents being higher in Khashar, Pibiting and Tasha (25%) followed by Razing and Ufti (15%) and those with education up to high school (15%) and graduation level (14%) and above was more or less similar. Contrary to these findings among sheep rearers in different parts of the country (Siripurapu 2023; Nishanth *et al.* 2023 and Mahe *et al.* 2023) [16, 11, 7] in Telangana, Cauvery delta zone of Tamil Nadu and Bidar district of Karnataka, respectively. The low level of literacy among sheep rearers could possibly be due to the fact that people with better education shift to services sector and other lucrative professions leaving sheep farming in the hands of the less educated people. This could further be potentiated by lesser avenues for education in certain areas of the sub-division which remain inaccessible for a considerable part of the year owing to hilly nature and harsh winters therein.

Sheep rearing experience of respondents

The results indicated that majority (26%) of sheep rearing family heads in the sub-division had a sheep farming experience of above 20 years followed by those with an experience of 6-10 years (24%). The proportion of sheep rearers with an experience of less than 5 years was higher in Tasha (45%) than elsewhere in the sub-division. Similarly, the proportion of sheep rearers with an experience of above 16-20 years was higher in Khashar (25%) than elsewhere in the sub-division. The proportion of sheep rearers with an experience of above 11-15 years was higher in Pibiting (25%) village. Similarly, the proportion of sheep rearers with an experience of above 20 years was highest in Pibiting (50%) followed by Khashar and Razing (35%) and whereas in Ufti no one had more than 20 years of sheep rearing experience. The present study is in close agreement with surveys conducted in different parts of India (Shashidhara *et al.* 2022; Channappa *et al.* 2021 and Sundaramoorthy *et al.* 2021) [13, 4, 17] wherein they reported majority of sheep rearers had more than higher Sheep rearing experience in North Eastern dry zone of Karnataka, Raichur district of Kalyana Karnataka and Ramanathapuram Virudhunagar

district of Tamil Nadu, respectively. Contrary to these findings large land holding has been reported to medium sheep farming experience respondents among sheep rearers in different parts of the country (Nijanand *et al.* 2021 and Manzoor, *et al.* 2020) [10, 9] in Narayanpet district of Telangana state and Anantnag district of Jammu and Kashmir, respectively. Traditionally livestock is being kept in Zanskar for domestic use and to substantiate the income as there used to be less income generating sources/avenues. Apart from having other lucrative employment generating sources livestock provides for nutritional and livelihood security in most parts of this region because of their marginality and inaccessibility due to high mountains. As such varied experiences are observed from region to region. Further, some government initiatives were started some years back which might be the reason for less experience of some of the sheep rearers.

Livestock inventory

The details of the livestock inventory maintained by sheep rearers by sheep rearers in the district have been presented in table 3. The results indicated that the average sheep flock size in the sub-division was 12.47 ± 0.11 heads of sheep comprising of 9.86 ± 0.10 ewes, 1.00 ± 0.00 rams, and 1.61 ± 0.10 female lambs, respectively. Village level comparison revealed that the average flock size was significantly ($p < 0.05$) higher in Ufti (13.30 ± 0.19) than Tasha (12.50 ± 0.28), Razing (12.50 ± 0.37), Pibiting (12.25 ± 0.09) and Khashar (11.80 ± 0.17) village of the sub-divisions. The present study is in close agreement with surveys conducted in different parts of India and abroad (Ale *et al.* 2023) [2] in Oromia regional state and western Ethiopia wherein they reported that sheep rearers had similar sheep numbers. Contrary to these results there has been reported to large livestock sizes among sheep rearers in different parts of the country (Manzoor, *et al.* 2020 and Shivakumara *et al.* 2020) [9, 15] in Anantnag district of Jammu and Kashmir, Tumakuru, Chitradurga, Belagavi and Kalaburagi districts of Karnataka, respectively.

Other livestock maintained by respondents

Sheep rearers in the sub-division were rearing goats, cattle and equines in addition to sheep. All the sheep rearers were rearing cows with majority of them (98%) rearing 1-2 cows in the sub-division. The proportion of such sheep rearers were higher in Khashar Razing and Tasha (100%) than Pibiting and Ufti (95%). Sheep rearers of this sub-division were rearing yak (30 households) and its hybrids (Zho, Zomo, Gurmo, Thalfo) (41 households). Sheep rearers (99%) in the sub-division were also rearing goats. However, the proportion of such sheep rearers were significantly higher in Pibiting, Razing, Ufti and Tasha (100%) followed by Khashar (95%). Equines were also kept by sheep rearers (68%) in the sub-division, the proportion of such sheep rearers were higher in Pibiting (80%) than Razing (75%) Tasha (70%) and Ufti (65%), Khashar (50%). The present study is in close agreement with surveys conducted in different parts of India and abroad (Siripurapu 2023; Ale *et al.* 2023 and Manzoor, *et al.* 2020) [16, 2, 9] in Telangana, in Oromia regional state, Western Ethiopia and Anantnag district of Jammu and Kashmir, respectively. Most of the cows reared by sheep rearers in the district are meant for

household milk consumption and the males are used for agricultural operations. Similarly, Yak and its hybrids are used for milk production, pack animals and for agricultural operations. Besides the people of this region have started using these yaks for eco-tourism at higher altitudes.

Extent of women participation in sheep farming activities

The results indicate that majority (67%) of the sheep rearing households involved participation of at least two women in various sheep farming activities. Only 24% of sheep rearing households involved participation of one women/household in sheep rearing activities. The results also indicated that 91% of the sheep rearing households involved participation of women (either one or two/household) in sheep rearing

activities whereas only in 9% of the sheep rearing households of this region women participation in sheep farming and related activities was negligible. The present study is in close agreement with surveys conducted in different parts of India (Manzoor *et al.* 2022 and Shirsat *et al.* 2019) [8, 14] in south Kashmir of Jammu and Kashmir and Pune and Sangli district of western Maharashtra, respectively. Due to diverse nature of mountains both male and female are involved in different activities for meeting the requirements of their household. Mostly all intensive activities (watering, feeding, milking etc. within the shed) and harvesting of grasses is undertaken by the women folk in the region. During harsh winters as the livestock is kept inside most of the work is undertaken by them.

Table 1: Socio-economic profile of sheep rearers of Zanskar (Family size, Family type, and occupation)

Family size		Family type		Occupation	As Primary occupation	As Sub occupation
Variant	Number (%)	Variant	Number (%)	Variant	Number (%)	Number (%)
Small (<6)	11 (11)	Nuclear	11 (11)	Agriculture	14 (14)	26 (26)
Medium (6-9)	60 (60)	Joint	89 (89)	Sheep Farming	8 (8)	22 (22)
Large (>9)	29 (29)			Agriculture + Sheep	9 (9)	19 (19)
				Govt. Service	14 (14)	0 (0)
				Livestock	8 (8)	11 (11)
				Agriculture +livestock	28 (28)	16 (16)
				Family business, daily labour	19 (19)	7 (7)
Total respondents				100		

Figures in parenthesis indicate percentage within a Column with respect to each parameter

Table 2: Household income (Mean ± SE) of respondents (Rs/month)

Income group (Rs/month)	Khashar (20)	Pibiting (20)	Razing (20)	Tasha (20)	Ufti (20)
10000-20000	12802.50±476.84 (75)	0.00±0.00 (0.00)	0.00±0.00 (0.00)	0.00±0.00 (0.00)	0.00±0.00 (0.00)
21000-30000	25958.33±0.00 (20)	12760.65±465.79 (90)	14559.26±1433.02 (85)	12547.69±460.24 (90)	12547.69±460.24 (90)
>30000 Rs	36027.08±1561.83 (5)	38150.00±350.00 (10)	37975.00±0.00 (15)	37054.17±5920.83 (10)	37054.17±5920.83 (10)
Average	18105.21 ^a ±2203.61	15299.58 ^a ±1796.89	16900.83 ^a ±2061.76	14988.33 ^a ±1788.82	14786.25 ^a ±1805.85

Figures in parenthesis indicate percentage within a Column with respect to each parameter

Figures with different superscripts within a row differ at *p*<.05

Table 3: Details of sheep flock composition (Mean ± SE)

Category	Khashar (20)	Pibiting (20)	Razing (20)	Tasha (20)	Ufti (20)	Total (100)
Ewe	9.70±0.18	9.25±0.09	10.20±0.29	9.80±0.24	10.35±0.19	9.86±0.10
Ram	1.00±0.00	1.00±0.00	1.00±0.00	1.00±0.00	1.00±0.00	1.00±0.00
Female lambs	1.10±0.07	2.00±0.00	1.30±0.11	1.70±0.11	1.95±0.05	1.61±0.10
Average flock size	11.80 ^a ±0.17	12.25 ^a ±0.09	12.50 ^{ab} ±0.37	12.50 ^{ab} ±0.28	13.30 ^b ±0.19	12.47±0.11

Conclusion

Majority of respondents in Zanaskar sub division were old, mainly illiterate living in joint type and medium sized families having agriculture and livestock as primary occupation but agriculture and sheep rearing as subsidiary

occupation. Sheep rearing activities along with other livestock remains the mainstay under mountain specific cold arid conditions which caters to the requirements of masses under this fragile ecosystem. As such for the development of the region government policies need to be reoriented with

focus on commercial livestock farming for employment, nutritional and livelihood security.

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