



Socio-economic status and livestock scenario in Spiti valley of Western Himalayas

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Received: 31 March 2022; Accepted: 5 May 2022

Keywords: Alpine pastures, Constraints, Livestock scenario, Spiti valley, Socio-economic status

Livestock sector contributes 4.11% of national GDP and 25.6% of total agriculture GDP in India. This sector provides employment to 8.8% population of our country, majority of which are women (Anonymous 2019). Himachal Pradesh is a hilly state of India where agriculture and allied sectors provide employment to around 71% of the working population in the state. Livestock rearing plays a cogent role in the economy of Himachal Pradesh as it contributes about 28-30% of the total value of agricultural produce (Kumar *et al.* 2012). Spiti valley of Himachal Pradesh is a typical cold desert with bare mountains; which has however rich Trans-Himalayan fauna and flora. Livestock rearing is an integral component of traditional agriculture in this region as it helps to meet out nutritional demands, family income, asset savings, soil productivity and sustainable agriculture production. In Spiti valley, cattle, yak, churu, sheep and goat are primarily reared by local farmers for various purposes. The fodder resources of this region are limited and animals are stall-fed particularly in harsh winters by feeding fodder tree leaves (willow) and crop residues (Singh and Bohra 2005). Keeping in view the importance of livestock rearing in this part of the country, the current study was undertaken to study the socio-economic status, fodder resources and constraints in livestock farming as faced by livestock farmers of Spiti valley of Himachal Pradesh.

In the study, a survey was conducted on socio-economic profile, fodder resources and livestock farming constraints by using a semi-structured questionnaire from the 48 livestock farmers of 16 villages of Kaza block of Spiti valley. The sampled families were classified into three categories based on size of their land holding, i.e. marginal (<1 ha), small (1-2 ha) and semi medium (2-4 ha).

The informants were interviewed in their local dialect (Bhoti) to understand the livestock rearing activities, fodder resources, income from livestock sector, livestock treatment methods, status of ethnoveterinary practices and the constraints in livestock production in Kaza block of Spiti valley.

The socio-economic and household parameters of the livestock farmers are presented in Table 1. In the study area, the majority of livestock farmers belonged to marginal (47.91%), followed by small (31.25%) and semi medium (20.83%) class. Family structure represented the number of total individuals in household which comprised of adults, children and the respective male and female. The average size of the family was found to be maximum, i.e. 8.13 in marginal farm category. Under overall situation, family size was found to be 7.95 with 52.58% males and 47.42% females. The number of females per thousand of males was worked out to be 926.54, 861.43, and 904.39 for marginal, small, and semi medium farm categories, respectively. In the study, it was observed that most of the families were under joint family system which is a healthy sign for the society. The literacy rate was highest among semi-medium farmers (85.70%) followed by small farmers (79.33%) and lowest for marginal farmers (73.83%). It was however observed that most of the farmers (25.92%) were educated up to middle class suggesting greater scope for their motivation, towards adoption of modern technology in their existing agriculture system.

The people of Spiti rear animals, viz. local cattle, yak, churu, sheep, goat and donkey for their sustenance. Among the livestock kept by the farmers (Table 1), sheep ranked highest followed by goat, Spiti horse, cow, churu, yak and donkey. Average number of sheep and goat per household were 3.17 and 0.83, respectively, whereas cow, churu and yak were 0.56, 0.54 and 0.43 per household.

Among different farmers' classes, marginal farmers had maximum (7.46) adult cattle unit. Findings of the study are in agreement with Mohan *et al.* (2012) and Singh *et al.* (2021) who reported that the sheep and goat are primarily reared by small and marginal farmers. It is evident from the findings of the study that with increase in the farmers' land holding, the total number of livestock reared declined and they preferred to rear large ruminants and horses. Marginal farmers in the region kept more sheep and goat in comparison to large farmers as they were more dependent on pasture lands for grazing, which is in accordance with Rawat *et al.* (2015) where it has been reported that small and marginal farmers were more dependent on common property resources for grazing.

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Table 1. Socio-economic profile of the households in the Spiti valley of Himachal Pradesh

Particulars	Marginal (n=23)	Small (n=15)	Semi medium (n=10)	Overall
<i>Family size</i>				
Av. number of males	4.22 (51.91)	4.33 (53.66)	3.87(52.51)	4.18(52.58)
Av. number of females	3.91 (48.09)	3.73 (46.22)	3.5 (47.49)	3.77 (47.42)
Av. size of family	8.13 (100)	8.07 (100)	7.37 (100)	7.95 (100)
Sex ratio	926.54	861.43	904.39	901.58
<i>Livestock inventory ACU per household</i>				
Cow	0.21 (6.3)	0.53 (7.81)	0.8 (18.18)	0.56 (8.43)
Churu	0.39 (5.23)	0.6 (8.84)	0.8 (18.18)	0.54 (8.18)
Yak	0.21 (2.82)	0.4 (5.89)	1 (22.73)	0.43 (6.56)
Sheep	4.34 (58.18)	3.5 (51.55)	0 (0)	3.17 (47.99)
Goat	1.3 (17.43)	0.66 (9.72)	0 (0)	0.83 (12.54)
Horse	0.26 (3.49)	0.7 (10.31)	1.5 (34.09)	0.66 (9.92)
Donkey	0.49 (6.57)	0.4 (5.89)	0.3 (6.82)	0.42 (6.38)
Total	7.46 (100)	6.79 (100)	4.4 (100)	6.61(100)
<i>Annual income (₹) per annum</i>				
Agriculture	47800 (71.63)	116740 (84.59)	284180 (91.93)	118589.6 (85.01)
Livestock product	3520 (5.27)	4070 (2.95)	4950 (1.6)	3989.79 (2.86)
Sale of livestock	15410 (23.09)	17200 (12.46)	20000 (6.47)	16925.63 (12.13)
Total	66730 (100)	138010 (100)	309130 (100)	139505 (100)
<i>Problems in livestock production</i>				
Inadequate knowledge of improved breeds and breeding	18 (78.26)	11 (73.33)	6 (60.00)	35 (72.92)
Lack of knowledge of improved housing systems	10 (43.48)	5 (33.33)	3 (30.00)	18 (37.50)
Scarcity of feed during lean periods	12 (52.17)	7 (46.67)	4 (40.00)	23 (47.92)
Unavailability of veterinary services on time	8 (34.78)	6 (40.00)	5 (50.00)	19 (39.58)
Animal health care during migration	3 (13.04)	4 (26.67)	4 (40.00)	11 (22.92)
No vaccination of sheep and goat before migration	17 (73.91)	7 (46.67)	4 (40.00)	11 (22.92)
Problem of marketing of products (milk, meat wool)	8 (34.78)	6 (40.00)	5 (50.00)	19 (39.58)

* Figures in the parenthesis are percentage to the total; * Sex-ratio refers to the number of females per thousands of female.

Yak and Churu (interspecies cross of Yak and local cattle) are another unique animals found in the Spiti valley which have manifold benefits to the local farmers. However, the population of Yak in this region is dwindling due to improvement in road infrastructure and farmers preference to keep more productive lactating animals. The contribution of livestock sector to the farmers income was highest in case of marginal farmers who generated an income of ₹18,930 per annum which was around 28.36% of the total income generated through agriculture sector. Whereas, in case of small and semi-medium farmers, contribution of livestock sector in total income generated through agriculture sector was 15.41 and 8.07% respectively. Beigh *et al.* (2020) has also reported that income from livestock sector helps in improving family income of the households and acts as a cushion during lean period. Major constraints in livestock production observed in the study area are presented in Table 1. In the study area farmers indicated that lack of awareness on improved breeds and breeding methods, scarcity of feed during lean periods, unavailability of veterinary services on time and problem of marketing of products (milk, meat, wool) were the most significant problems in livestock rearing activities. Thakur *et al.* (2012) has also reported that the scarcity of green fodders during winters adversely

affects the small ruminant health in the Chamba region of Himachal Pradesh. Singh (2000) has also highlighted low fodder availability in lean period in the Changar area of Kangra district of Himachal Pradesh.

The results pertaining to the livestock treatment methods and the status of ethnoveterinary practices as adopted in the study area are presented in Table 2. In the study area 52.08% informants adopted modern veterinary medicines/vaccines for the treatment of their livestock, 16.68% informants used local treatments to cure their livestock, 20.83% preferred herbs to treat the disease of animals and only 10.41% believed that evil spirits can harm their livestock where they go for religious prayers for the recovery of animals from diseases. However, in certain cases when local vets were unavailable they prefer to go to local healers known as *Amchis* for the treatments of the diseased animals. Study revealed that 58.33% respondents claimed that non-availability of veterinary drugs on time was a reason of using EVP. Continuous faith on herbs (25%) and less cost of herbal medicines (16.67%) were another important reasons for adopting ethnoveterinary practices in the study area. The role of women in ethnoveterinary practices was mainly restricted to administration of medicines and collection of herbs in the region. The medicinal

Table 2. Status of ethnoveterinary practices in the Spiti valley of Himachal Pradesh

Particulars	Response from farmers (%)
<i>Livestock treatment methods</i>	
Medicine/vaccine	52.08
Herbs	20.83
Local treatment	16.68
Religious prayer	10.41
Total	100
<i>Status of ethnoveterinary practices</i>	
Extinct	56.25
Sparsely Used	29.17
Maintaining	14.58
Total	100
<i>Reasons for using ethnoveterinary practices</i>	
Non availability of veterinary drugs/ services on time	58.33
Faith in herbal drugs	25.00
Less cost	16.67
Total	100
<i>Role of women in ethnoveterinary practice</i>	
Not involved in work	50.00
Feeding medicine	33.33
Gathering herbs	10.41
Helping in making medicine	6.25
Total	100

plants used in ethnoveterinary practices in the region belonged to the family Asteraceae (5 species), Lamiaceae (3 species), Polygonaceae, Apiaceae, Ranunculaceae (2 species), Scrophulariaceae, Ephedraceae, Leguminosae, Berberidaceae, Tamaricaceae, Elaeagnaceae, Poaceae, Salicaceae, Brassicaceae, Oleaceae, Boraginaceae and Alliaceae (1 species each). Notable native species used in ethnoveterinary practice were *Aconitum violaceum*, *Aconitum heterophyllum*, *Arnebia euchroma*, *Picrorhiza kurroa*, *Saussurea bracteata*, *Podophyllum hexandrum*, *Carum carvi*, *Artemisia brevifolia*, *Bunium persicum*, *Myricaria germanica*, *Mentha longifolia*, *Lactuca macrorhiza*, *Rheum emodi*, *Hyssopus officinalis*, *Hordeum vulgare*, *Salix daphnoides*, *Thymus serpyllum*, *Cicer microphyllum*, etc. Thakur *et al.* (2016) has also reported different species of family Asteraceae (8), Lamiaceae (7), Apiaceae (4) were employed in ethnoveterinary practice in Chamba district of Himachal Pradesh, which are in conjunction with the findings of the study. During migration period, local farmers prefer to go for treatment of their livestock using herbs, since unavailability of timely veterinary services and drugs was a major limiting factor and use of local herbs is the only option available for treating their livestock. However, ethnoveterinary practices in the region are declining day by day due to easy availability of modern veterinary healthcare facilities in the region. It has also been observed that the traditional healers (*Amchis*) are unable to pass on their knowledge to next generations as young generation are more interested

in lucrative jobs instead of doing cumbersome works like identification and collection of herbs from the mountains.

In the study, it was recorded that a total of 22 fodder species were utilized by the local farmers for feeding of animals. The major species utilized in animal feeding included *Pisum sativum* residue, *Pisum arvense*, *Medicago sativa*, *Hordeum vulgare*, local grasses and leaves of tree species. Important fodder resources of the region included tree leaves viz. *Salix daphnoides* (Changma), *Hippophae rhamnoides* (Tirkuk), *Robinia pseudoacacia* (Robinia); Grasses and cultivated fodders i.e. *Stipa jacquemontii* (Semu sa), *Elymus semicostatus* (Bichi), *Bromus tectorum* (Kasambha), *Hordeum vulgare* (Ney), *Lolium perenne* (Zamak) and *Leymus secalinus* (Rumbha); Legumes (cultivated and wild) i.e. *Medicago falcata* (Buksab), *Medicago sativa* (Ladhakh buksab), *Pisum sativum* (Hara mutter), *Cicer microphyllum* (Tseri sa), *Pisum arvense* (Kala mutter) and Forbs and herbs included *Lepidium latifolium* (Chulti sa), *Lindelia longiflora* (Shorak), *Rumex nepalensis* (Shoma), *Aconogonum tortuosum* (Nyalo), *Dracocephalum heterophyllum* (Gurum dangzi), *Lactuca macrorhiza* (Bhasa), *Oxytropis microphylla* (Langdi sa) and *Carex atrofusca* (Chunya). Bharti *et al.* (2016) has reported similar results for animals fed with willow leaves, stalks of cereal crops, alfalfa and other plant residues during the winter season in the cold arid zone of India.

SUMMARY

Livestock rearing plays a cogent role in the economy of Himachal Pradesh, as it contributes about 28-30% of the total value of agricultural produce. In the study area, the majority of livestock farmers belonged to marginal category and were rearing sheep, goat, local cattle, Churu and Yak for their sustenance. The literacy rate in the area was highest in semi-medium farmers followed by small and marginal farmers. Study revealed that contribution of livestock sector to the gross farmer's income was highest in case of marginal farmers. In the study area, inadequate exposure to improved breeding practices, scarcity of green fodder and poor marketing facilities were the major constraints in livestock production. The majority of farmers in this region were adopting modern veterinary medicines/vaccines for the treatment of their livestock; however, ethnoveterinary practices are still in progress. In the light of results obtained, it can be concluded that the socio-economic status of the livestock farmers in the alpine area of Lahaul and Spiti is appreciable, though there are multiple constraints in livestock production practices which directly affect the animal health and thus the farmers livelihood.

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