

*Review Article***Migratory Sheep Husbandry in Himalayan State of Himachal Pradesh, India:  
Status and Headway Options for Improvement and Sustainability****Varun Sankhyan\* and Y. P. Thakur**Department of Animal Genetics and Breeding, COVAS, CSKHPKV, Palampur-176062,  
Himachal Pradesh, INDIA**\*Corresponding author:** [sankhyan@gmail.com](mailto:sankhyan@gmail.com)

<b>Rec. Date:</b>	Apr 05, 2019 04:56
<b>Accept Date:</b>	Jun 25, 2019 16:06
<b>DOI</b>	<a href="https://doi.org/10.5455/ijlr.20190405045621">10.5455/ijlr.20190405045621</a>

**Abstract**

Sheep husbandry is an integral component of hill farming system. Gaddi and Rampur-Bushair are two indigenous sheep breeds of the state. Average decline in sheep population over last 15 years is 1.67%/year. Wool production has also shown declining trend over the years in line with the national average; however, during 2016-17 positive growth (4.75%) has also been demonstrated. Wool procurement is mostly through middleman while wool federation accounts for only 7.32% of procurement. Primary focus of improvement programme is crossbreeding leading to disregard of selective breeding. Therefore, the breeding programmes need refinement/reorientation by introduction of new sheep breed in the region as well as selective breeding among the native sheep. Strengthening of institutional support during migration, development of remunerative and organized wool procurement mechanism and developing effective extension messages to address issues of disease and sub-optimal management under migratory systems are suggested to ensure sustainability of sheep farming in the region.

**Key words:** Improvement Strategies, Migratory System, Sheep Husbandry, Sustainability**How to cite:** Sankhyan, V., & Thakur, Y. (2019). Migratory Sheep Husbandry in Himalayan state of Himachal Pradesh, India: Status and Headway Options for Improvement and Sustainability. International Journal of Livestock Research, 9(8), 71-77. doi: 10.5455/ijlr.20190405045621**Introduction**

Sheep with its multi-faceted utility for wool, meat, milk, skins and manure, form an important component of rural economy particularly in the arid, semi-arid and mountainous areas of the country. It provides a dependable source of income to the shepherds through sale of wool and animals. They play an important role in the livelihood of a large percentage of small and marginal farmers and landless labourers engaged in sheep rearing especially in rural areas (Ramesh *et al.*, 2012; Meena *et al.*, 2017). Indian subcontinent is a rich source of diverse ovine germplasm, and only very few countries have such a large number of breeds with wide genetic diversity. In India sheep make a valuable contribution to the livelihood of the

economically weaker sections of the society since it requires low input and provides alternate means of income (Arora *et al.*, 2016). The population of sheep in India is 65 million, and there is a change of population of (-) 9.07% in sheep in the period from 2007 to 2012 livestock census. Sheep husbandry is an integral component of hill farming system of Himachal Pradesh. Gaddi and Rampur-Bushair are the two indigenous sheep breeds of the state well adapted to the prevalent migratory production system. But due to large-scale crossbreeding practiced since 1960s sizeable population (0.31 million, 38.3% of total sheep population of state) now belongs to crossbred type (19<sup>th</sup> Livestock Census, 2012). The present review article focuses on present status of sheep farming and headway options for improvement in western Himalayan state of Himachal Pradesh. Primary data for this study was generated by questionnaire-based survey methods, whereas secondary data collected from various government records/annual report and publications.

### Attributes of Prevalent Sheep Farming System in State

Migratory pastoralist is very common in Himalayas and numbers of nomadic communities' practice this (Misri, 1998). Migratory system is much relevant as >90% of state sheep and around 70% goat population is reared under this system. Many tribal communities are involved in migratory sheep husbandry. The most prominent are "Gaddi" the distinct tribe of nomadic pastoralist of Himachal Pradesh, Himalayan state of India wearing a characteristic and striking costume is involved in migratory goat and sheep husbandry. Gaddis follow alpwirtschaft type of strategy, associated with movement of people and animal in vertical space, communal control of pastures, combined with individual control of plots/haying fields and social institution that schedule the complex movement in space and time (Bhasin, 2013). Emergence of migration of these tribes as a notable feature has strong anthropological, sociopolitical and economic underpinnings (Suresh *et al.*, 2011). Apart from Gaddi sheep, Rampur-Bushair is another important sheep genetic resource reared by hill farming community. Although this is also reared predominantly under migratory production system but rearing of sedentary flocks (30-40 animals) with day grazing are also in practice.

### Population Dynamics

Sheep population vis a vis other livestock is depicted in Table 1. As per 19<sup>th</sup> livestock census total sheep population is 0.81 million out of which nearly 0.31 million (38%) are crossbreds. Although over the last few census (Table 1) livestock in total as well as sheep and goat recorded decline in population over the years but reduction in sheep is more marked than goat and other livestock. Contrary to sheep over the last 15 years goat population has even shown positive growth for 2003-2007, and also the contribution of goat to total livestock population remains more or less same for the past four livestock census, while sheep has shown a clear-cut decreasing trend.

**Table 1:** Livestock population of studied area over period of 15 years in Himachal Pradesh

	16 <sup>th</sup> census (1997)	17 <sup>th</sup> census (2003)	18 <sup>th</sup> census (2007)	19 <sup>th</sup> census (2012)	Annual change/ year (1997-2012) %
<b>Goat (millions)</b>	1.17	1.13(-3.42)	1.24(+9.73)	1.12(-9.67)	-0.30%
<b>Sheep (millions)</b>	1.08	0.93(-13.88)	0.90(-3.23)	0.81(-10.00)	-1.67%
<b>Total Livestock (TL) (millions)</b>	5.22	5.21(-3.83)	5.05(-3.07)	4.85(-3.96)	-0.47%
<b>Goat (%) of TL</b>	22.41	21.68 (-3.25)	23.96(+10.5)	23.09(-3.63)	0.20%
<b>Sheep (%) of TL</b>	20.68	17.85- (16.58)	17.82(-0.02)	16.70(-6.28)	-1.28%
<b>Sheep and Goat (%) of TL</b>	43.1	39.54(-8.26)	42.38(+7.18)	39.79(-6.11)	-0.51%

TL: Total Livestock, Figure in parenthesis indicate percent change in particular category over the previous census

### Composition of Migratory Small Ruminant Flocks

The secondary data collected from various government records and publication revealed that migratory herds are classified under 3 categories. Small flocks consist of 100-200 animals, medium flocks consist of 200-350 animals while the large flocks consist of >350 animals. The primary data generated through in person surveys of farmers under AICRP on goat improvement in various routes revealed that majority of the farmers now belongs to medium flock size (50%), followed by small flocks (40.2%) while very few were with larger size flock (9.8%). Overall proportion of sheep, goat and other animals (ponies, dog etc.) was found to be 57.44%, 41.92% and 0.76 % respectively.

The majority of flocks now have goats and sheep in almost equal proportion but two to three decades earlier sheep used to be in majority. Exclusive goat flocks are also now owned by some farmers, which earlier was not the practice. This can be explained from the fact that earlier the wool industry in the state was growing at rapid pace but in the last 10 -15 years it has shown negative growth and farmers do not get the attractive price for wool. On the other hand, over the years the demand of chevon has increased compared to mutton due to consumer preference of goat meat. In spite of the reduction in the percent population of sheep in migratory flocks it still occupies substantial proportion, albeit lower as compared to a decade earlier. In an earlier study in one of the migratory routes studied in present study Singh *et al.* (2006) reported that in Kangra district sheep and goat constitute about 67.9% and 33.1% of flock respectively, while the survey under AICRP on goat improvement revealed sheep and goat contribution to flock size about 57.4% and 41.9% respectively.

### Wool Production

Wool production has demonstrated clear cut declining trend with a sharp fall (15%) during 2015-16 in line with the national average, however during 2016-17 positive growth (4.75%) has also been demonstrated. Contribution to national production remains static with state production contributing nearly 3.5% of national production. The wool production is ranked 6<sup>th</sup> on All India basis after Rajasthan, J & K, Karnataka,

Telangana and Gujarat. The percent sheep population of Himachal Pradesh compared to total sheep production of country is 1.24% (19<sup>th</sup> Livestock Census, 2012).

**Table 2:** Wool production status in HP over last five year (BAHS, 2017)

Year	Wool Production (000Kg) in HP	Growth Rate (%)	Contribution to National Production (%)
2012-13	1649.33	--	3.58
2013-14	1654.99	-0.34	3.45
2014-15	1663.07	0.48	3.45
2015-16	1408.87	-15.28	3.23
2016-17	1475	4.75	3.39

### Wool Procurement and Marketing in State

For procurement of sheep wool directly from the sheep rearers, HP Cooperative Wool Procurement and Marketing Federation Limited was established. The wool procured over last five year is presented in Table 3.

**Table 3:** Wool procurement by HP WoolFed during last five years

Year	Wool Procured in (000Kg) in HP	Wool Production (000Kg) in HP	Percentage of Wool Procured
2012-13	61.93	1649.33	3.76%
2013-14	56.89	1654.99	3.44%
2014-15	41.91	1663.07	2.52%
2015-16	90.81	1408.87	6.45%
2016-17	108.06	1475	7.32%

Procurement over the years is increasing but still only 7.32% is procured through Wool Federation. Few other cooperatives are also procuring the wool but majority of the wool produced is still sold through middlemen. Lack of procurement chain and facilities and non-remunerative prices by Wool Federation are few reasons for low procurement by Wool Federation. The wool price/kilogram during 2013 for winter, summer and autumn clips were Rupees 28.05, 38.50 and 60.50 respectively while same during 2018 were 31.20, 38.50 and 65.00 respectively. Thus, wool prices increased marginally over period of five years. In contrast the shearing charges per sheep of HP WoolFed had increased substantially from rupees 9.20 to 13 in the corresponding period (2013-18). As far as the wool procurement through unorganized sector is concerned it is subjected to wide variability in pricing owing to factors such as personal relations, flock size, number of adjoining flocks' distance from nearby market, positions of flock, environmental conditions. Few flock owners do sometimes get remunerative prices from unorganized market but overall the pricing of wool is undervalued.

## Sheep and Wool Development Programmes of State of Himachal Pradesh

Sheep rearing is one of the main occupations of the people in Himachal Pradesh. Rampur-Bushair and Gaddi breeds of Himachal Pradesh are famous for well-known indigenous breeds. 37% of agricultural families rear sheep. The local sheep is crossed with good quality rams of Rambouillet, Russian Merino so that the quality as well as quantity of wool produced can be increased. Wool Federation procures sheep wool from farmers on minimum support price fixed by Government from time to time. Number of improved rams distributed during 2014-15, 2015-16 and 2016-17 by State Animal Husbandry Department were 406, 333 and 338 respectively (Annual Report 2018, DAH). Demand of farmers for improved rams is increasing over the years. Crossbreeding programme has increased wool production from 1343.60 to 1650 tones during 2010-2014. The decline in wool production afterwards to 1475 tons is attributed to decline in population rather than productivity/animal (Annual Report, DAH, 2018).

## Interventions in Migratory Production System

Compared to intensive and semi-intensive production system migratory production system result in low productivity/animal. The main reasons for low productivity in these systems are poor exploitation of genetic potential of indigenous animals, disease outbreaks, lamb mortality, low adoption of available technology, inadequate resource of feed and fodder, exploitation by middle man and lack of availability of financial support from different agencies (Kochewad *et al.*, 2017; Sunkara *et al.*, 2017). Therefore, strategies must be planned to address these issues to increase productivity under migratory production system. Studies of cost benefit analysis under migratory system in Himalayan regions estimates overall net return per animal to the tune of rupees 1000 (Malik *et al.*, 2018). However, net returns are subjected to wide variation due to environmental factors, pasture conditions, mortality pattern, marketing, pricing, population growth and occasionally return get considerably lower particularly in small sized flocks. Amongst different factors, size of operational holding is the most important factor determining net economic return (Suresh *et al.*, 2008). Thus, in order to improve the productivity under migratory production system apart from technological interventions like providing improved rams other associated factors like better management and utilization of input resources and better marketing needs strengthening. In study of migratory Gaddi goats under similar management system Sankhyan *et al.* (2016) reported that over period of 4 year there was significant improvement in body weight, reproductive parameters and pre-weaning mortality by applying simple management interventions such as strategic management (routine health care, mineral supplementation) and breeding inputs. Such simple management strategy could also be applied in sheep flocks in systematic and organized manner and thus have great potential in improving migratory sheep husbandry.

### Shortfalls in Current Improvement Strategies

Primary focus of improvement programme is crossbreeding leading to disregard of selective breeding. Both Gaddi and Rampur-Bushair sheep had connotation with tribal/hill community but no conservation strategies had been formulated till date. Lack of systematic and organized institutional support to farmer during migrations is another area of concern. There is paucity of Non-Government Organizations directing their efforts for socio-economic development of migratory famers/community of state as its primary or secondary objective.

### Future Breeding Policy

Although crossbreeding has resulted in improved performance however the programme need revision/evaluation since few drawbacks had also appeared over the time. These include adaptability concerns in migratory farming system, deterioration of wool during migration in bushes and reproductive/disease problem. Moreover, the major objective of increasing the wool production/animal, however is achieved to some extent by increased productivity/animal but at the same time decrease in remunerative prices of wool offsets these advantages partially. Therefore, the breeding programmes needs refinement/reorientation by introduction of new sheep breed in the region as well as selective breeding among the native sheep (Gaddi and Rampur-bushair). The breeding programmes need reorientation keeping in view the following broad points:

- a) Overemphasis on crossbreeding with exotic fine wool sheep (Merino, Rambouillet) for increasing yield/quality needs to be moderated due to low economic returns from wool.
- b) Introduction of new dual type / mutton sheep breeds (Corriedale, Polworth) to increase mutton production.
- c) Conservation and improvement of native sheep (Gaddi and Rampur-bushair) breeds.
- d) Organize better marketing network for wool / mutton sheep.

### Conclusion

The migratory system is the cornerstone of sheep farming in the region and it is practiced from long time and will remain as an integral part of the agro-economy of hill farming system. In spite of various constraints, the migratory system is still sustainable owing to the fact that it is a very low input system which effectively counterbalances its constraints and makes it a profitable venture. Moreover, the tagging of migratory system with tribal population and their cultural heritage will ensure its propagation as long as the entity of tribe is maintained. However, improvement programme needs reorientation and for sustainability of sheep farming following recommendation are suggested-

- a) Reorganization of breeding programme by reducing over-emphasis on crossbreeding and rigorous monitoring of undergoing crossbreeding strategies and ram distribution.
- b) Undertaking selective breeding programme in few identified pockets/regions and establishment of conservation units and nucleus flocks of elite Gaddi and Rampur-Bushair sheep.

- c) Strengthening of institutional support, wool collection and marketing strategies. Shifting towards twice a year shearing schedule is recommended for increase staple length/quality.
- d) There is need to develop suitable package of practices addressing the important issues like disease. Effective extension message addressing suboptimal management must be incorporated in strategies for improvement for migratory sheep farming.

### Acknowledgement

Authors acknowledge the financial support received from Indian Council of Agricultural Research and institution level support from Veterinary Officers of State Animal Husbandry Department. Authors are also grateful for flock owners for their cooperation during surveys.

### References

1. Annual Report. 2018. Department of Animal Husbandry. Government of Himachal Pradesh-Shimla. <http://hpagrisnet.gov.in/hpagris/AnimalHusbandry>.
2. Arora R, Kulkarni VS, Jain A and Yadav DK. 2016. Yalaga sheep - A microsatellite based genetic profile. *Indian Journal of Animal Sciences* 86: 1155–1158.
3. BAHHS. 2017. Basic Animal Husbandry & Fisheries Statistics. Government of India, Ministry of Agriculture & Farmers welfare, Department of animal husbandry, Dairying & Fisheries Krishi Bhawan, New Delhi <http://www.dahd.nic>.
4. Bhasin V. 2013. Pastoralist of Himalayas. *Journal of Biodiversity*. 4 (2): 83–113.
5. Kochewad SA, Meena LR, Kumar S, Kumar V and Meena LK. 2017. Sheep Rearing Systems and their Productive Performances –A Review. *Trends in Biosciences*. 10(9): 1716-1719.
6. Malik MH, Kumar S, Rouf A, Shah OS and Jan MH. 2018. Cost-Benefit analysis of small ruminant farming in Kashmir Valley. *Journal of Pharmacognosy and Photochemistry*. 7(2): 2682-2685.
7. Meena L, Kochewad S and Kumar D. 2018. Improved technologies for sustaining productivity and profitability of sheep in India- A Review. *International Journal of Livestock Research*, 8(2), 43-55. <http://dx.doi.org/10.5455/ijlr.20170518125116>.
8. Misri B. 1998. Migratory system of goat and sheep-rearing in Himachal Pradesh, India. [www.fao.org/ag/agp/agpc/doc/puplicat/tapafan3/32.doc](http://www.fao.org/ag/agp/agpc/doc/puplicat/tapafan3/32.doc).
9. 19<sup>th</sup> Livestock Census. 2012. All India Report Ministry of Agriculture Department of Animal Husbandry, Dairying and Fisheries Krishi Bhawan, New Delhi.
10. Ramesh D, Meena HR and Meena KL. 2012. Analysis of Small ruminant market system in different agro-climatic zones of Southern India. *Veterinary World*. 5:288-29.
11. Sankhyan, V., Dogra PK and Thakur YP. 2016. Attributes of migratory goat and sheep farming and impact of some improved management strategies en-route migration in adopted flocks of Western – Himalayan region of India. *Indian Journal of Animal Sciences*. 86 (9): 1079-1084.
12. Singh, D. R., Sushila, K. and Sivaramane, N. 2006. Migratory sheep and goat production system: The mainstay of tribal hill economy in Himachal Pradesh. *Agricultural Economics Research Review* 19: 387–98.
13. Sunkara V, Pothboyina G, Punnavajjala J and Prasad R. 2017. Nellore Sheep: Local Practices for Conservation of Germplasm - A Survey in Kadapa District of Andhra Pradesh. *International Journal of Livestock Research*, 7(8), 254-258. <http://dx.doi.org/10.5455/ijlr.20170613044547>.
14. Suresh, A., Gupta, D. C. and Mann, J. S. 2008. Returns and Economic Efficiency of Sheep Farming in Semi-arid Regions: A Study in Rajasthan. *Agricultural Economics Research Review*. 21: 227-234.
15. Suresh, A., Gupta, D. C. and Mann, J. S. 2011. Trends, determinants and constraints of temporary sheep migration in Rajasthan-An economic analysis. *Agricultural Economics Research Review*. 24: 255–65.