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Original Research

Adoption of Improved Small Ruminant Practices by the Pastoralists of Jammu Kashmir and Ladakh

S. A. Khandi[1]*, Bharat Bhushan[2], R. A. Bafanda[1] and R. A. Rafiquee[3]

[1]Division of Veterinary & A. H. Extension Education, F.V.Sc & A.H., R. S. Pura, Jammu, INDIA
[2]Joint Registrar (Acad.), SKUAST-Jammu, INDIA
[3]Sheep Husbandry Department, Jammu & Kashmir, INDIA

*Corresponding Author: shafkatext@gmail.com

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Abstract

Pastoralists mainly depend on three resources livestock, pasture and water and for this purpose they migrate and this is the only way for they can survive and sustain the ecological balance of nature. The pastoralists in Jammu and Kashmir still follow their traditional occupation of rearing animals and their condition has still remained unchanged. A study was conducted to find the adoption of improved small ruminant practices by the pastoralists of Jammu and Kashmir The data was collected from 400 pastoralists belonging to Kathua, Jammu, Anantnag and Leh district of Jammu and Kashmir and Ladakh with the help of structured interview schedule containing selected dependent and independent variables, through personal interview technique. Majority of the pastoralists were middle aged, having poor education, engaged in caste occupation and were having marginal landholding and possessed medium herd size of 58 small animals. Further, most of the respondents had medium family size, with average of 6 family members. The social participation and mass media exposure of majority of the respondents were medium. They had poor extension contact. The income of the majority of respondents from livestock rearing was Rs.59290 per year and were having 31 years of average experience in livestock rearing. Pastoralists fared well in terms of economic motivation. However, majority had semi-nomadic pastoral system. The marketing system was rather limited. Nearly fifty percent of respondents (47.75%) were having medium adoption (46.60%) followed by low adoption (39.01%) of improved small ruminant practices by 32.25 percent of respondents. The respondents of the high adoption level (55.30%) constituted 20 percent of the total. Positive significant association between adoption and education, occupation, land holding, social participation, extension contact, mass media exposure, income from livestock rearing, and economic motivation was observed, while, negative significant association of adoption with pastoral and marketing system was observed.

Keywords: Adoption, Improved Small Ruminant Rearing, Pastoralist, Practices

Introduction

Pastoralists are the people who live mostly in dry and remote areas. Their livelihood depends on their intimate knowledge of the surrounding ecosystem and on the wellbeing of their livestock. Pastoralism takes many forms and are well adjusted to particular natural, political and economic environments. Livestock rearing is the sole source of livelihood for at least 20 million pastoral families and an important, often the main source of income for at least 200 million small holder farmer families in Asia, Africa and Latin America (Haan *et al*., 1997). Animals kept by pastoralists vary according to climate, environment, water and other natural resources and geographical area. Mobility is a key feature qualifying pastoralism. They inhabit zones where the potential for crop cultivation is limited due to low and highly variable rainfall conditions, steep terrain or extreme temperatures. Due to this unpredictable, susceptible and dynamic environment, they have developed thriving mechanisms of adjustment to maintain an ecological balance between themselves and the natural environment. Pastoralism is characterized by a complex set of practices and knowledge that has permitted the maintenance of a sustainable equilibrium among pastures, livestock and people. A clear understanding of the socio-economics of pastoralism is needed if the application of recent technological advances in rangeland monitoring is to yield maximum potential benefits. To understand and consider viable support environment, several distinct features need to be understood, which require going beyond the more traditional control of livestock numbers in terms of a hypothetical concept of rangeland carrying capacity. While the mechanics of data gathering and enhancing mobility have changed with time, the essential strategies for livestock management and production have remained an equivalent. In recent years, however, variety of complex concerns have emerged that render effective livestock production harder and burdensome for the pastoral nomads. These concerns include a rapid increase in human population in pastoral communities, a more sedentary way of life, an increasing need for technology to deal with pressing problems of management and rapidly changing political, economic and social conditions.

In Jammu and Kashmir, the main pastoral communities, which are involved in small ruminant rearing, are Bakerwal, Chopan, Gaddi, Changpa etc. They are distributed throughout the state. Bakerwals are found in both the Jammu and Kashmir provinces, Chopan in almost every district of the Kashmir province, Gaddis in the Kathua district and Changpas in the Leh district of the state. They are involved in pastoralism. These pastoral communities have seriously been marginalised due to their ignorance, migratory lifestyle, small population, cultural stereotyping and irrational government policies. They have traditionally been ill treated as less civilized, less productive and more degrading than a settled life style (Dabral and Malik, 2004). In this context the present study was planned to assess the adoption of pastoralists regarding improved small ruminant practices.

Materials and Methods

The study was conducted in Jammu & Kashmir and Ladakh. Ex-post facto and exploratory research design was followed in the present investigation. A multistage random sampling technique was used for the selection of pastoralists.

Locale of the Study

The present study was conducted in of Jammu & Kashmir and Ladakh. It is a hilly region with total area of 2,22,236 sq. km that sprawls over the western Himalaya and Korakoram mountains between 32.17^0 N and 36.58^0 North latitude and 73.26^0 E and 83.30^0 East longitude. It is surrounded by three countries i.e., Pakistan in the West, Afghanistan in the Northwest and China in the Northeast.

Selection of the Districts

The population of pastoralists is more or less concentrated in all the districts of Jammu and Kashmir and Ladakh. Four districts namely Kathua, Jammu, Anantnag, and Leh were selected through purposive sampling technique due to predominant pastoralist population in these districts. Four pastoral communities, Gaddi from Kathua, Bakerwal form Jammu, Chopan from Anantnag and Changpa from Leh, were selected from these districts of Jammu and Kashmir and Ladakh.

Selection of Villages

A comprehensive list of villages from the selected districts was prepared. Five villages from each district were selected through systematic random sampling technique because systematic sample is spread more evenly over the entire population and is quick, easier and convenient in large populations. Thus, a total of 20 villages were selected from four districts.

Selection of Respondents

A list of pastoralists engaged in small ruminant rearing in each village was prepared and respondents were then selected following random sampling method. Twenty respondents from each village were selected, constituting a total sample size of 400 respondents.

Adoption of Improved Small Ruminant Practices by the Pastoralists

For the present study the adoption was defined as the continued use of recommended improved small ruminant practices by the individual respondents. This was operationalised on a three-point continuum of always, sometimes and never, with 2, 1 and 0 score respectively for each of the recommended practice. The scores of individual items were added to arrive at the total score of an individual respondent. This was divided by the maximum possible score to arrive at the final adoption score, and the same was done for each of the component of the improved small ruminant practices. The schedule was developed on the basis of recommendations by different divisions of the Faculty of Veterinary Sciences and Animal Husbandry, Sher-e- Kashmir University of Agricultural Sciences and Technology of Jammu. The final schedule consisted of four components; management, feeding, breeding and healthcare. The final adoption schedule along with number of items and maximum possible score were as follows.

Adoption area	No. of items	Maximum possible score
Management practices	13	26
Feeding practices	14	28
Breeding practices	12	24
Healthcare practices	16	32
Total	**55**	**110**

Collection of Data

The data was collected from the study area with the help of pretested interview schedule by using the personal interview technique in their local language. The responses obtained were recorded and only one respondent was interviewed at a time, so that others were not influenced by the reply of that particular respondent.

Analysis of the Data

The collected data were tabulated and analysed using the software; Statistical Package for the Social Science (SPSS, 16.0). The presentation of data was done to give pertinent, valid and reliable answer to the specific objective. Inferences were drawn in the light of available knowledge and literature. Frequencies, percentage, arithmetic mean, mean percent score, standard deviation were worked out for meaningful interpretation.

Results and Discussion

The adoption of improved small ruminant practices by pastoralists was studied under four components i.e. management, feeding, breeding and healthcare. The scores obtained in the study are presented in the table 1. The mean adoption score was 50.48±0.34, which means that 45.89 percent of improved small ruminant practices were adopted by the pastoralists (Table 1). Thus, it might be concluded that nearly half of the improved small ruminant practices were adopted by the pastoralists. The variation observed in the adoption was fairly large with a standard deviation of 6.98 as can be seen from the histogram for adoption score of respondents (Fig. 1).

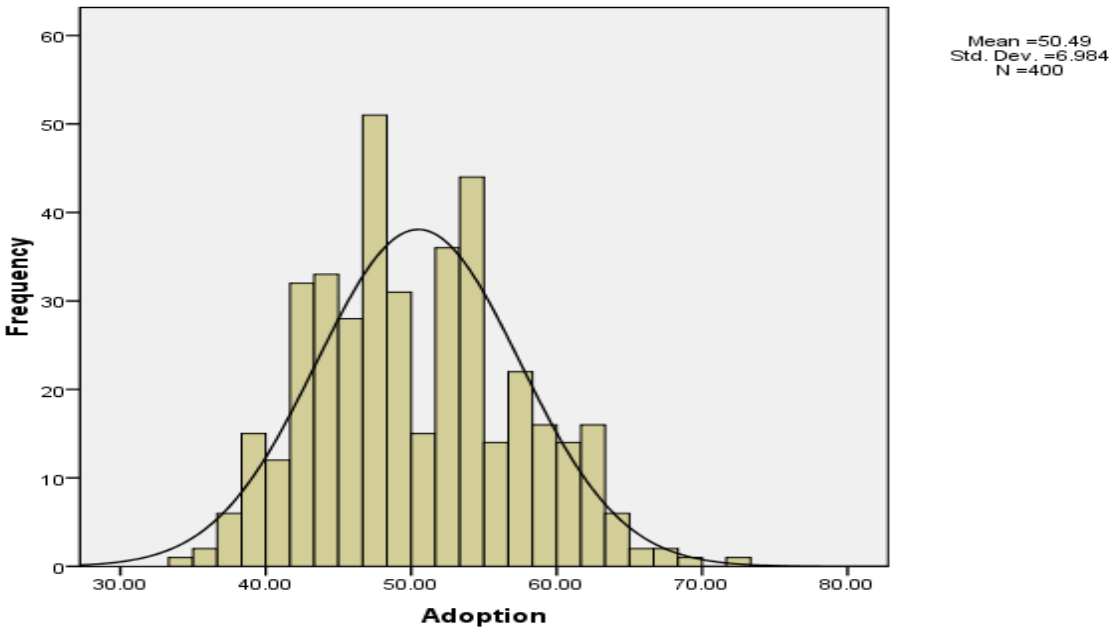

Figure 1: Histogram depicting adoption scores of respondents

Table 1: Adoption of improved small ruminant practices by the pastoralists

Area of improved small ruminant practices	Possible range	Observed range	Mean ± Standard error	Standard deviation	Percentage
Management practices	0-26	8-19	12.62±0.10	2.07	48.53
Feeding practices	0-28	6-17	10.74±0.10	2.04	38.35
Breeding practices	0-24	6-17	10.07±0.08	1.68	41.95
Healthcare practices	0-32	8-24	17.05±0.14	2.92	53.28
Total of all small ruminant practices	0-110	34-72	50.48±0.34	6.98	45.89

A closer look at the results (Table 1) revealed that improved healthcare practices were having high adoption with average score of 17.05±0.14, which meant that 53.28 percent of healthcare practices were adopted by the respondents while improved feeding practices were least adopted by the respondents with average score of 10.74 ± 0.10, which meant that 38.35 percent of feeding practices were adopted by the pastoralists. Further, 41.95 percent and 48.53 percent of improved breeding and management practices were adopted by the respondents. It can be concluded that the adoption was highest for healthcare practices and lowest for feeding practices. However, the differences observed in adoption of small ruminant practices, in general did not vary significantly. The results were corroborated by the findings of Singh *et al*. (2006), who reported that the adoption of improved feeding practices among migratory tribal people rearing sheep and goat in Himachal Pradesh was poor. Meena *et al*. (2011) observed that more than half of the respondents possessed medium level of adoption. They observed higher adoption in clean milk production followed by management, feeding, breeds and breeding practices. But there was significant difference in adoption levels between different categories of respondents with regard to breeds and breeding, feeding and management practices of goat production technology. Majority of the respondent goat keepers had medium level of adoption on selected goat farming practices (Koli and Koli, 2016).

The classification of the pastoralists on the basis of their total adoption scores (Table 2), revealed that nearly fifty percent (47.75%) were having medium adoption (46.60%) followed by low adoption (39.01%) of small ruminant practices by 32.25% of respondents. The respondents of the high adoption level (55.30%) constituted 20% of the total. The three categories of respondents with different scores of adoptions of small ruminant practices were having different knowledge levels. Highest knowledge scores were obtained by the respondents having high adoption. The mean scores obtained by respondents of low, medium and high categories were 42.91 ± 0.23, 51.26±0.21 and 59.08 ± 0.48 respectively. The classification was done using the Singh's cube root method.

Table 2: Classification of the pastoralists based on adoption scores

Category	Low (34-46)	Medium (47-56)	High (57-72)
(Mean Score ± SE)			
Management practices	10.71±0.09	12.68±0.09	15.55±0.13
Feeding practices	9.17±0.15	10.97±0.10	12.68±0.19
Breeding practices	8.79±0.08	10.07±0.09	12.12±0.16
Healthcare practices	14.22±0.20	17.52±0.11	20.47±0.18
Total score of all practices	42.91±0.23	51.26±0.21	60.83±0.35
Percentage	**39.01**	**46.6**	**55.3**

Similarly, Jeelani *et al.* (2015) conducted a study on adoption of improved animal husbandry practices by Gujjars of Jammu and Kashmir. It was revealed that respondents had medium level of adoption of improved animal husbandry practices (33.27%). Majority of respondents (70%) were having medium adoption, whereas, 18.30 percent had low and 11.70 percent had high adoption. Pastoralists had higher adoption rate in improved breeding practices (58.45%), followed by improved feeding practices (32.85%). They had lower adoption in improved management practices (24.52%), followed by improved healthcare practices (26%). It can be suggested that the future extension efforts should focus on low adoption category pastoralists so that they also get benefits of improved small ruminant practices. It can further be advocated here that the cause and effect of differential adoption of three categories should be systemically investigated for better understanding the reasons of adoption or non-adoption of improved small ruminant practices, which will definitely add to the efficiency of upcoming developmental efforts.

Relationship of Adoption with the Socio-Economic Status of Pastoralists

Age

In the president study it was found that nearly fifty percent (46.25%) were middle aged (Table 3), followed by young (28.50%) and old age group (25.25%). The variation in the adoption scores of different categories of respondents was insignificant but comparatively middle age group obtained higher scores in adoption of improved small ruminant practices. However, negative insignificant association between age and adoption was observed. Therefore, with increase in the age of the respondents, there was decline in the adoption of small ruminant practices. Similar findings have earlier been reported by Choudhary *et al.* (2018). This could probably be attributed to that fact that old aged pastoralists were involved in the livestock rearing from the very beginning and they remained stick to their traditional practices and did not adopt the newer things so easily. Therefore, it is suggested that emphasis should be given to young and middle age group, in order to increase adoption of improved small ruminant practices by various extension efforts.

Education

Education plays an important role in all round development of an individual. As is evident from the results (Table 3) majority of respondents (69.00%) were illiterate, whereas, 19 percent of the respondents had education upto primary level and 12 percent respondents had education above primary level. The possible reasons might be attributed to the fact that pastoralists mainly remain engaged in nomadic livestock rearing which affects their formal educational prospectus. Right from the childhood, they were taught to drive the flock in the pastures for grazing. Other reasons for poor education might be cultural stereotyping, poverty and ignorance. Data revealed that with the increase in formal education of the pastoralists, there was increase in the adoption of improved small ruminant practices (r= 0.464). Education found to have a positive and significant influence on the adoption of small ruminant practices (Koli and Koli, 2016; Nipane *et al.*, 2016; Jeelani *et al.*, 2014). Anyhow, it is suggested that the extension programmes for pastoralists should lay emphasis on demonstration in view of the low level of literacy prevalent among pastoralists.

Significant differences in the adoption of small ruminant practices were observed from the respondents having acquired education above primary level. The probable reason might be the complexity of information and technologies. It was very likely that the respondents having received higher education were better at deciphering the animal husbandry related information available from different sources. Other reasons like different source of

information, higher mobility, use of social media etc could have added to the variation observed. Further, pastoralists with higher education had higher scores in extension contact, mass media exposure and social participation etc. and could have played a role.

Occupation

In the present study it was found that majority of respondents (80.50%) were engaged in caste occupation (small ruminant rearing) and only 19.50 percent were involved in diversified occupational activities (Table 3). It was also noted that the pastoralists engaged in diversified occupational activities had significantly higher adoption scores towards improved small ruminant practices. The respondents involved in diversified activities being educated and having better extension contacts, mass media exposure and social participation, might be having a considerable bearing on adoption level. Previous studies quoted animal husbandry especially goat farming on nomadic pastoralism as the main occupation of the pastoralist communities (Mohammed, 2004; Susatkar *et al.,* 2011; Bhat, 2018). Further, positive significant association of occupation with adoption scores was observed. Nipane *et al.* (2016) observed that occupation was positively and significantly associated with goat farming.

Land Holding

Majority of the pastoralists (62.75%) had marginal land holding, whereas, 16.50 percent pastoralists had small and medium landholding and remaining 20.75% were landless. (Table 3). However, respondents having land, had significantly higher adoption scores (r= 0.098). But there was insignificant difference in the adoption between landless and marginal landholding categories. It may be hypothesized that landholding respondents seek diverse information from various sources which might have the bearing on the adoption of improved small ruminant practices. Similar findings have earlier been reported by Thilakar and Krishnaraj (2010), Patil *et al.* (2012), Kotach (2013), Jayashree *et al.* (2014) and Islam *et al.* (2018). Similarly, Roy and Tiwari (2017) observed that landholding was significantly and positively associated with adoption index of the goat owners in healthcare management practices.

Flock Size

In the present study (Table 3) it was found that majority of respondents (70.25%) were having small herd size (< 61 animals), whereas, 23.25% respondents possessed medium herd size (61-155 animals) and 4.50 percent respondents had large herd size (> 155 animals). Further, the respondents having large herd size had significantly lower adoption scores regarding improved small ruminant practices. Medium herd size category had insignificantly higher adoption than the small herd size category. The results were corroborated by the findings of Mastanbi *et al.* (2017), Pote *et al.* (2017) and Shiva *et al.* (2017). Positive insignificant association between herd size and adoption score was observed. Similarly, Koli and Koli (2016) and Anaglo *et al.* (2017) found non-significant association of herd size with adoption level. Further, the respondents having large herd size had significantly lower adoption score regarding improved small ruminant practices. It may be that improved small ruminant practices did not fit into their existing system of rearing and thus, they did not perceive the improved practices as beneficial. However, this needs to be substantiated by the empirical studies.

Family Size

It was found in the study that majority of respondents (56.00%) were having medium family size followed by large family size (24.50%), whereas, 19.50 percent respondents had small family size (Table 3). Similar results were earlier reported by Sabapara (2016), Pote *et al.* (2017) and Singh *et al.* (2018). They reported in their studies that majority of respondents were from medium family size category. There was inconsequential difference in the adoption scores of respondents between the three categories of family size. It could be hypothesized that with the increase in the family size, the pastoralists might be involved in some other activities that was why family size had no bearing on the adoption of small ruminant practices. Further, positive insignificant association of family size with adoption was observed.

Social Participation

In the present study it was found that majority of respondents (51.75%) were having high social participation scores

whereas, 33.25 percent were having medium social participation scores. Only 15 percent of respondents scored low on social participation (Table 3). It was further revealed that respondents having high social participation had significantly higher adoption regarding improved small ruminant practices (r= 0.240). In other words, it can be hypothesized that social participation had influence on the improved small ruminant practices. Therefore, extension efforts should focus on opinion leaders and progressive pastoralists. It can be used as a tool to enhance the adoption of improved small ruminant practices. The contention got support from the observations of Jeelani *et al.* (2014) and Koli and Koli (2016) who also observed positive and significant relationship of social participation, with adoption level. Pastoralists with higher social participation were ingenious, better cosmopolites, had higher mobility and were prone to change. This might had influenced the adoption of pastoralists with higher social participation.

Extension Contact

In the present study most of the pastoralists had medium (44.25%) to high (43.00%) extension contact whereas, 12.75 percent respondents had low extension contact (Table 3). Study findings further revealed that the respondents having high extension contact had significantly higher adoption. It meant that frequency of extension contact had pronounced effect on the adoption of improved small ruminant practices. The results were in consonance with the findings of Thilakar and Krishnaraj (2010) and Mastanbi *et al.* (2017). Anaglo *et al.* (2017) reported that extension agents had significant effects on adoption. Similarly, Jeelani *et al.* (2014) observed that extension contact was positively associated with adoption. It was concluded that there was a need to enhance the extension contact with pastoralists because of their migratory life style in order to increase the adoption of improved small ruminant practices.

Mass Media Exposure

In the present study around forty five percent (45.25%) were having medium mass media exposure, whereas, 36 percent and 18.75 percent respondents had low and high mass media exposure respectively (Table 3). The probable reason might be low formal education, conservative nature and migratory life style of the pastoralists. Findings further revealed that respondents with high mass media exposure had significantly higher adoption level as compared to the respondents having medium mass media exposure (r= 0.700). Similarly, respondents having medium mass media exposure had significantly higher adoption as compared to respondents having low mass media exposure. The results were in accordance with the findings of Thilakar and Krishnaraj (2010) and Koli and Koli (2016). Jeelani *et al.* (2014) and Roy and Tiwari (2017) reported positive and significant relationship of mass media exposure with the adoption of respondents. Similar results were also observed by Choudhary *et al.* (2018). It can be hypothesized that mass media exposure can be used as a tool for the promotion of improved small ruminant practices, which had pronounced effect on knowledge and adoption of pastoralists.

Income from Small Ruminant Rearing

In the present study, it was found that majority of the respondents (54.25%) were having medium income (Rs. 26,000 – Rs. 1,00,000/Year) from livestock rearing, whereas, 32.75 percent respondents had low (< Rs. 26,000/Year) and 13 percent respondents had high income (> Rs. 1,00,000/Year) from livestock rearing (Table 3). It may be hypothesized that due to the lack of proper marketing channels, pastoralists are not getting the remunerative price due to the involvement of middlemen. Second reason might be the low productivity of small ruminants due to widespread inbreeding. Third migratory life style of pastoralists cannot be ruled out. Results further revealed that respondents with high income from livestock rearing had significantly higher adoption scores as compared to the respondents having medium income (r= 0.255). Similar results were earlier reported by Nipane *et al.* (2016), Mastanbi *et al.* (2017), Pote *et al.* (2017) and Singh *et al.* (2018). Boz (2015) and Koli and Koli (2016) found that adoption level was influenced by income.

Experience in Small Ruminant Rearing

It was found that most of the respondents (45.50%) were having medium experience (24-40 years) in small ruminant rearing, whereas, 32.25 percent respondents had low (< 24 years) and 22.25 percent respondents had high experience (>40 years) in small ruminant (Table 3). This was because they had livestock rearing as their caste occupation and right from the childhood their life revolves around the livestock. Surprisingly, those respondents with high experience in livestock rearing had low adoption scores as compared to the respondents having medium experience.

The probable reason might be that the respondents with high experience were illiterate, conservative traditional leaders who remained stick to their traditional knowledge and practices and did not imbibe the change so easily. Here it can be suggested that the extension efforts should focus on these traditional leaders to bring desirable change in their behavior by increasing the knowledge level and adoption of improved small ruminant practices for their better livelihood. However, respondents having medium experience in livestock rearing had significantly higher adoption as compared to respondents having low experience in livestock rearing. The results were corroborated by the findings of Mastanbi *et al.* (2017). Negative though insignificant association between experience in small ruminant rearing was observed with adoption scores.

Economic Motivation

It referred to the small ruminant occupation of pastoralists in terms of profit maximization and the relative value placed by a pastoralist on economic ends. Respondents were classified on the basis of Singh's cube root method into three categories *viz.* low, medium and high economic motivation. In the present study it was found that 35.75 percent of the pastoralists were having low level of economic motivation, whereas, high and medium category constituted 33.50 percent and 30.75 percent of respondents respectively (Table 3). Positive significant association of economic motivation with adoption scores was observed. Findings of the study further revealed that respondents with high economic motivation had significantly higher adoption scores, as compared to the respondents of medium category. Similarly, respondents having medium economic motivation had significantly higher adoption as compared to the respondents of low economic motivation category. The results were in accordance with the findings of Koli and Koli (2016) and Gunaseelan *et al.* (2018) and observed the positive and significant association between economic motivation and adoption level. It can be hypothesized that the pastoralists were economically motivated and wanted better returns from the livestock rearing. Thus, there was a need to motivate the pastoralists to take up the small ruminant production on scientific lines by method as well as result demonstrations.

Pastoral System

In the present study it was found that majority of the respondents (60.75%) had semi-nomadic pastoral system whereas, 26.25 percent and 13 percent respondents had settled and nomadic pastoral system respectively (Table 3). It can be hypothesized that the pastoralists moved in a cyclic manner throughout the year in search of green grasses for their livestock. They moved in summer months to the highland pastures and had both summer and winter dwellings. It was further revealed that the respondents with nomadic pastoral system had significantly low adoption scores as compared to the respondents of semi-nomadic pastoral system. However, respondents having semi-nomadic pastoral system had significantly low adoption scores as compared to respondents having settled pastoral system. Negative significant association of pastoral system with adoption scores was observed. The most probable reason might be the migratory lifestyle, conservative nature, low education, social participation, extension contact and mass media exposure, which had reflected the change in the adoption of small ruminant practices. The results were corroborated by the findings of Sankhyan *et al.* (2016), Bhat (2018) and Choudhary *et al.* (2018).

Marketing System

It was found that majority of the respondents (54.25%) had poor marketing system, whereas, 17.25 percent and 28.50 percent respondents had fair and good marketing system respectively (Table 3). It might be due to the lack of fair markets that resulted the involvement of the middleman, who generally underpriced them. Migratory life style also added to the poor marketing of these pastoralists. Results further revealed that respondents of fair marketing system category had significantly higher adoption scores than the good marketing system category. Surprisingly, negative significant association was observed with the adoption. The probable reason might be that the pastoralists remained stick to their traditional practice and resist any change in their production system. Thus, it can be hypothesized that their peers/opinion leaders may be involved to bring the desirable change in their livestock rearing system. Further, empirical studies are advocated to find the difference in the adoption of small ruminant practices. However, Girei and Ayoola (2017) found that accessibility to market had positive impact on small ruminant production. Ramesh *et al.* (2012) observed that majority of the respondents (85%) sold their animals when they needed cash for home consumption, followed by payment of loans (28.30%).

Table 3: Relationship of adoption with socio-economic status of pastoralists

Variables	Category	Frequency (% of respondents)	Mean adoption score± SE	% of adoption	' r' value
Age	Young (<40 Years)	114 (28.50%)	50.53±0.71	45.94	-0.036
	Middle (40-57 Years)	185 (46.25%)	50.96±0.52	46.33	
	Old (>57 Years)	101 (25.25%)	19.56±0.61	45.05	
Education	Low (0)	276 (69.00%)	48.92±0.35	44.47	0.464**
	Medium (1-3)	76 (19.00%)	51.16±0.86	46.51	
	High (4-6)	48(12.00%)	58.44±0.92	53.13	
Occupation	Caste occupation (1)	322 (80.50%)	49.76±0.38	45.24	0.247**
	Diversified occupation (2-4)	78 (19.50%)	53.47±0.81	48.61	
Land holding	Landless (0)	83 (20.75%)	50.12±0.67	45.56	0.098*
	Marginal Land holding (< 2.5 acres)	251 (62.75%)	50.14±0.44	45.58	
	Small & Medium Land holding (≥2.5)	66 (16.50%)	52.26±0.93	47.51	
Flock Size	Small (<61 animals)	281(70.25%)	50.27±0.39	45.7	0.035
	Medium (61-155 animals)	93 (23.25%)	51.33±0.78	46.66	
	Large (>155 animals)	18 (4.50%)	49.85±1.80	44.98	
Family Size	Small (<5 Members)	78 (19.50%)	50.02±0.73	45.47	0.038
	Medium (5-7 Members)	224 (56.00%)	50.47±0.49	45.88	
	Large (>7 Members)	98 (24.50%)	50.90±0.65	46.27	
Social Participation	Low(0)	60 (15.00%)	48.38±0.91	43.98	0.240**
	Medium(1)	133 (33.25%)	48.75±0.62	44.31	
	High(> 1)	207(51.75%)	52.21±0.44	47.46	
Extension contact	Low (<7)	51 (12.75%)	43.27±0.74	39.34	0.633**
	Medium (7-8)	177 (44.25%)	47.70±0.35	43.36	
	High (>8)	172 (43.0%)	55.49±0.45	50.44	
Mass media exposure	Low (<6)	144 (36.00%)	45.97±0.47	41.79	0.700**
	Medium (6-7)	181 (45.25 %)	50.49±0.37	45.9	
	High (>7)	75 (18.75%)	59.15±0.58	53.77	
Income from small ruminant rearing	Low (Rs.<26000/Year)	131 (32.75%)	48.40±0.59	44	0.255**
	Medium (Rs. 26000-100000/Year)	217 (54.25%)	51.14±0.46	46.49	
	High (Rs. >100000/Year)	52 (13.0%)	53.02±0.94	48.2	
Experience in small ruminant rearing	Low (< 24 years)	129 (32.25%)	50.31±0.67	45.74	-0.048
	Medium (24-40 years)	182 (45.50%)	51.47±0.52	46.79	
	High (> 40 years)	89 (22.25%)	48.73±0.59	44.3	
Economic motivation	Low (<10)	143 (35.75%)	45.88±0.47	41.71	0.577**
	Medium (10)	123 (30.75%)	51.02±0.48	46.38	
	High (>10)	134 (33.50%)	54.92±0.57	49.93	
Pastoral system	Settled (1)	105 (26.25%)	52.77±0.44	47.97	-0.258**
	Semi-nomadic (2)	243 (60.75%)	50.33±0.50	45.75	
	Nomadic (3)	52 (13.0%)	46.61±0.75	42.37	
Marketing system	Poor (<15)	217 (54.25%)	52.03±0.43	47.3	-0.362**
	Fair (15-17)	69 (17.25%)	52.67±0.80	47.88	
	Good (>17)	114 (28.50%)	46.24±0.62	42.34	

** P < 0.05% level of significance; ** P < 0.01% level of significance*

Conclusion

The mean adoption score was 50.48 ± 0.34, which meant that 45.89 percent of improved small ruminant practices were adopted by pastoralists. Nearly fifty percent of respondents (47.75%) were having medium adoption (46.60%) followed by low adoption (39.01%) of small ruminant practices by 32.25 percent of respondents. The respondents of the high adoption level (55.30%) constituted 20 percent of the total. Improved health care practices were having high adoption, with an average score of 17.05 ± 0.14, which meant that 53.28 percent of healthcare practices were adopted by the respondents, while improved feeding practices were least adopted by the respondents, with an average score of 10.74 ± 0.10, meaning that 38.35 percent of feeding practices were adopted by the pastoralists. Further, 41.95 percent and 48.53 percent of improved breeding and management practices were adopted by the respondents respectively. Positive significant association between adoption and education, occupation, land holding, social participation, extension contact, mass media exposure, income from livestock rearing, and economic motivation was observed, while, negative significant association of adoption with pastoral and marketing system was observed.

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Conflict of Interests

There is no conflict of interest.

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