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ADOPTION LEVEL OF SHEEP FARMERS ABOUT IMPROVED SHEEP MANAGEMENT PRACTICES

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ABSTRACT

The research investigation was carried out in hyper arid partially irrigated western plain zone (Ic) of Rajasthan. Selected zone covered viz. Jaisalmer, Bikaner and some parts of Churu districts. On the basis of highest sheep population Jaisalmer sand Bikaner district were selected for this research study. Three tehsils were chosen for the research study on the basis of the highest population of sheep in three tehsils from each district. Consequently, a total of six tehsils were chosen from the two districts. Each tehsil's five villages were chosen based on which village had the highest number of sheep. For the objective the research, thirty villages were therefore deliberately chosen from six tehsils in the Jaisalmer and Bikaner districts. 150 sheep farmers were chosen from each district and 10 sheep farmers from each village were included in the proportional random sample used to choose the respondents. With the use of a structured questionnaire, 300 sheep, a mix of small, medium, and large sheep farmers were questioned. Under the objective 'Knowledge level of sheep farmers about improved sheep management practices' the findings showed that 63.67 per cent of sheep farmers had a medium level of knowledge. They had higher knowledge about improved sheep management practices by feeding and breeding practices. There also existed a significant difference regards to knowledge level of small, medium and large sheep farmers. To enhance sheep production in the Rajasthan, for effective utilization of training programmes and animal fair must be conducted at village level and free of cost and information about Government programmes related to sheep development should be provided through veterinary institutions, extension agencies and mass media.

Keywords*: sheep farmers, adoption, breeding, feeding, health & hygiene and housing practices*

INTRODUCTION

Sheep are important to rural Indian households' socio-economic and cultural livelihoods since they are small ruminants (Mahammad et al., 2022). Sheep farming has been done since ancient times and is seen as a promising commercial potential. Because of its small size, easy handling, high production rate, early sexual maturity, cheap input needs, inexpensive initial investment, and relatively simple marketing, this profession is widely practiced globally. For rural populations, raising sheep has greater benefits than raising cattle or buffaloes because of these features.

In India, sheep rearing is an essential component of the mixed integrated farming system, combining crop and livestock farming, and uses the products of one business as inputs for another. The total world livestock population in 2014 was 3.6 billion, including 1.494 billion cattle, 0.2 billion buffalo, 1.173 billion sheep, and 1.006 billion goats (Zoupanidou, E. 2019). The global sheep population increased by 6.22 percent from 1961 to 2000 and by 10.7 percent from 2000 to 2013. India holds the second-largest sheep population in the world, contributing 4.03 percent to the global sheep population (Anonymous, 2020).

Sheep farming has a long history in Rajasthan, India's largest state, which is predominantly arid or semi-arid, including a portion of the Thar Desert. In Rajasthan, more than 80 per cent of rural households raise animals. The state has a significant animal wealth of 56.8 million, comprising 11.27 per cent of India's total animal population (535.78 million), ranking second in the country. The livestock sector contributes 10.21 per cent to the state's G.D.P. In Rajasthan, the number of sheep increased by 14.13 per cent from the 2012 livestock census., accounting for almost 13.8 per cent of all livestock (Anonymous, 2021). Rajasthan is the most populous state in terms of camels and goats, second in terms of buffalo and other animals, third in terms of horses, and fourth in terms of sheep. According to the results of the 20th livestock census, there were 74.26 million sheep in India as of 2019, with Rajasthan having 7.9 million of them, the most after Telangana, Andhra Pradesh, and Karnataka.

OBJECTIVE

To know the adoption level of sheep farmers about improved sheep management practices

METHODOLOGY

Out of ten Rajasthan agro climatic zones, Hyper Arid Partial Irrigated Western Plain Zone (Ic) was chosen for the research study on the basis of having highest sheep population. The selected zone Ic covers three districts viz. Bikaner, Jaisalmer and some parts of Churu. Out of these, Bikaner and Jaisalmer districts were selected purposely for the research study because of highest sheep population among agro climatic zones.

Bikaner district has 9 tehsils, they are Kolayat, Nokha, Bikaner, Bajju, Sridungargarh, Chhatargarh, Poogal, Lunkaransar and Khajuwala. Jaisalmer district has 4 tehsils, viz. Jaisalmer, Pokaran, Bhaniyana and Fatehgarh. Out of these, three tehsils from each district were purposely selected for the research study based on the highest sheep population. Thus, six tehsils from the two districts were selected. On the basis of highest sheep population, 5 villages from each selected tehsil were selected. Hence, 30 villages were purposely selected from six selected tehsils of Jaisalmer and Bikaner district.

All the sheep respondents from selected villages were pooled separately district wise. On the basis of the number of sheep having by the farmers were categorized into three groups namely, small, medium and large sheep farmers having the flock size of 1-50, 50 -100 and more than 100, respectively. From these identified categories, 150 sheep farmers were selected through proportionately random sampling from each district. Total of 300 sheep farmers have been chosen.

For this research study, With the use of an interview schedule, the investigator used a personal interviewing strategy to gather data and information. Following data tabulation, many statistical measures were employed to draw certain conclusions, including frequency, percent, mean, mean percent scores, rank, standard deviation, ranking correlation, null hypothesis, alternate hypothesis and "z" test.

RESULTS AND DISCUSSION

Extent the adoption level of sheep farmers about improved sheep management practices

For getting an overview about adoption of improved sheep management practices by the sheep farmers, the sheep farmers were split into three categories *viz.,* low adoption level, medium adoption level and high adoption level based on the mean (161.80) and standard deviation (8.77) of the total obtained adoption score by the sheep farmers.

The sheep rearing respondents were classified into three groups as presented below:

i. The sheep farmers who obtained a score below 153.03 were categorised as having low extent of adoption

ii. The sheep farmers who obtained a score from 153.03 to 170.57 were categorised as having medium extent of adoption

iii. The sheep farmers who obtained a score more than 170.57 were categorised as having high extent of adoption

Statistical data regarding the extent of adoption of improved sheep management practices has shown in Table 1. Analysis of data illustrated in Table 1 reveals that out of 300 respondents, more than half of sheep farmers (60.33 per cent) belong to the medium level of adoption categories followed by 20.00 per cent of sheep farmers fell in low level of adoption categories. Remaining 19.67 per cent of sheep farmers had high level of adoption regarding improved sheep management practices.

A close observation of Table 1 indicated that majority (67.33 per cent) of sheep farmers in Jaisalmer district and majority (53.33 per cent) in Bikaner district belonged to medium level of adoption categories. 19.34 per cent and 13.33 per cent belonged to the low and high level of adoption in jaisalmer district, respectively. In Bikaner district 26.00 per cent belonged to high level of adoption and remaining 20.67 per cent belonged to the low level of adoption.

It may be observed that the majority of sheep farmers were medium adopters of improved sheep management practices. Only a small percentage of sheep farmers could be categories as low and high adopters of improved sheep management practices. It might be due to the reason that sheep farmers had financial limitation and inadequate access to advanced technologies, comprehensive training and practices. High level of adoption requires significant investment in improved breeds, awareness, regular trainings and advanced healthcare practices, which may be beyond the financial reach of many farmers. Additionally, rural infrastructure and limited access to up-to-date information and continuous training further hinder their ability to fully embrace and implement high-tech agricultural practices. These constraints collectively prevent sheep farmers from achieving the high adoption level, keeping them reliant on more conventional methods.

Table 1: Classification of respondents on the basis of their adoption level of sheep farmers about improved sheep management practices

Sr. No.	Adoption Categories	Jaisalmer District (n=150)								Bikaner District (n=150)								Overall (n=300)	
		Small Framers (n=24)		Medium Framers (n=61)		Large Framers (n=65)		Total (n=150)		Small Framers (n=49)		Medium Farmers (n=65)		Large Farmers (n=36)		Total (n=150)			
		F	%	F	%	F	%	F	%	F	%	F	%	F	%	F	%	F	%
1	**Low level** (Less than 153.03 score)	09	37.50	08	13.11	12	18.46	29	19.34	19	38.78	07	10.77	05	13.89	31	20.67	60	20.00
2	**Medium level** (From 153.03 to 170.57 score)	11	45.83	44	72.13	46	70.77	101	67.33	23	46.94	32	49.23	25	69.44	80	53.33	181	60.33
3	**High level** (More than 170.57 score)	04	16.67	09	14.75	07	10.77	20	13.33	07	14.29	26	40.00	06	16.67	39	26.00	59	19.67
	Total	**24**	**100**	**61**	**100**	**65**	**100**	**150**	**100**	**49**	**100**	**65**	**100**	**36**	**100**	**150**	**100**	**300**	**100**

Mean= 161.80, S.D.= 8.77, F = Frequency, % = Per cent

The findings are supported by the research study of Jiterwal (2003), Meena *et al.* (2011), Sudhakarrao (2012), Meena and Singh (2012), Koli and Koli (2016), Pandey *et al.* (2017), Godara *et al.* (2018), Shirsat *et al.* (2019), Goswami and Biswas (2021), Kapadiya, *et al*. (2022) and Pandey, *et al.* (2024), who also explored that majority of the respondents had medium level of adoption.

Aspect-wise extent the adoption level of sheep farmers about improved sheep management practices

Further, the extent of adoption of different aspects of improved sheep management practices was explored separately. The extent of adoption of all six aspects about improved sheep management practices and their relative information in sheep farmers were highlighted by ranking them in descending order on the basis of their MPS (Mean Per cent Score) of adoption and data have been shown in Table 2.

The adoption level of sheep farmers in all (six) aspects of improved sheep management practices was measured with the help of an adoption quotient. It was illumined from Table 2 that in the case of total 300 respondents, adoption quotient of aspect "Feeding" was 82.87 MPS (Mean Per cent Score) and assigned rank first. The second rank was accorded to "heath & hygiene" as it was adopted to the extent of 82.68 MPS, followed by "Shearing" (82.40 MPS), "Housing" (80.20 MPS), "Breeding" (52.72 MPS) and "Marketing Practice" (43.27 MPS) were assigned ranks 3rd, 4th, 5th and 6th, respectively.

Result regarding Jaisalmer district sheep farmers, it was depicted that adoption quotient of "Feeding" was 83.79 MPS and assigned first rank. The second rank was accorded to "Shearing" (83.43 MPS) followed by "Health & Hygiene" (81.65 MPS), "Housing" (79.93 MPS), "Breeding" (49.33 MPS) and "Marketing Practice" (43.45 MPS) were assigned ranks 3rd, 4th, 5th and 6th, respectively.

The analysis of result presented in the Table 2 exhibits the extent of adoption in Bikaner district sheep farmer, adoption quotient of aspect "Health & Hygiene" was 83.72 MPS (Mean Per cent Score) and assigned rank first. The second rank was accorded to "Feeding" as it was adopted to the extent of 81.96 MPS, followed by "Shearing" (81.38 MPS), "Housing" (80.48 MPS), "Breeding" (56.11 MPS) and "Marketing Practice" (43.09 MPS) were assigned ranks 3rd, 4th, 5th and 6th, respectively.

Table 2: Aspect-wise extent the adoption level of sheep farmers about improved sheep management practices

Sr. No.	Aspects	Jaisalmer District								Bikaner District								Overall (n=300)	
		Small Framers (n=24)		Medium Farmers (n=61)		Large Farmers (n=65)		Total (n=150)		Small Framers (n=24)		Medium Farmers (n=61)		Large Farmers (n=65)		Total (n=150)			
		MPS	Rank	MPS	Rank	MPS	Rank	MPS	Rank	MPS	Rank	MPS	Rank	MPS	Rank	MPS	Rank	MPS	Rank
1	Breeding	48.91	5	49.73	5	48.34	5	49.33	5	54.00	5	59.85	5	54.48	5	56.11	5	52.72	5
2	Feeding	81.98	2	85.44	1	83.95	1	83.79	1	78.33	3	84.26	1	83.29	2	81.96	2	82.87	1
3	Management a. Housing	77.29	3	84.67	2	77.84	4	79.93	4	78.36	2	81.69	4	81.38	4	80.48	4	80.20	4
4	b. Shearing	82.55	1	83.91	4	83.84	2	83.43	2	77.42	4	83.55	3	83.16	3	81.38	3	82.40	3
5	c. Health & Hygiene	76.86	4	84.37	3	83.73	3	81.65	3	83.37	1	84.19	2	83.62	1	83.74	1	82.68	2
6	d. Marketing Practices	43.18	6	43.81	6	43.49	6	43.49	6	40.81	6	45.03	6	43.43	6	43.09	6	43.27	6
	Overall	68.46		71.99		70.37		70.27		68.71		73.09		71.57		71.13		70.69	

rs= Rank Correlation
MPS= Mean Percent Score
**= significant at 0.01 level of probability
*= significant at 0.05 level of probability

rs= 0.65 t= 2.24* rs= 0.77 t= 3.22** rs= 0.88 t= 5.23**

rs= 0.71 t= 2.67** rs= 0.94 t= 7.88** rs= 0.82 t= 4.00** rs= 0.82 t= 3.86**

Table 3: Aspect wise comparison of adoption level of medium and small sheep farmers about improved sheep management practices

Sr. No.	Improved sheep management practices	Jaisalmer District					Bikaner District				
		Medium sheep farmers (n=61)		Small sheep farmers (n=24)		Z' Value	Medium sheep farmers (n=65)		Small sheep farmers (n=49)		Z' Value
		Mean±	S.D.	Mean±	S.D.		Mean±	S.D.	Mean±	S.D.	
1	Breeding	32.32	4.40	31.79	4.95	0.46^{NS}	38.90	3.92	35.10	3.81	5.18^{**}
2	Feeding	55.54	2.57	53.29	2.54	3.53^{**}	54.76	3.07	51.12	3.23	6.26^{**}
3	Management Housing	16.93	1.68	15.45	2.04	3.14^{**}	16.33	1.63	15.67	1.69	2.08^{*}
4	Shearing	13.42	1.51	13.20	1.50	0.7^{NS}	13.36	1.53	12.38	1.32	3.63^{**}
5	Health & Hygiene	39.65	3.19	36.12	3.48	4.3^{**}	39.56	2.88	39.18	3.39	0.63^{NS}
6	Marketing Practices	4.819	1.24	04.75	1.64	0.18^{NS}	04.95	1.04	04.48	1.40	2.14^{*}
	Overall	27.11	2.43	25.77	2.69	2.05^{*}	27.98	2.35	26.29	2.49	3.22**

NS= non-significant, **= Significant at 0.01 level of probability, *= Significant at 0.05 level of probability

Hence, it is apparent that Jaisalmer district sheep farmers had less level of adoption about these aspects regarding improved sheep management practice. The overall extent of adoption of sheep farmers in Bikaner district (71.12 MPS) was slightly higher than the Jaisalmer district sheep farmers (70.26 MPS). Sheep farmers of Jaisalmer district had low adoption of improved sheep management practices as compared to Bikaner district sheep farmers due to several key factors. Firstly, Jaisalmer is characterized by more remote and arid conditions, leading to greater challenges in accessing infrastructure, markets and extension services leading to problems in technology adoption. Secondly, the economic conditions in Jaisalmer tend to be more constrained, with farmers having lower income levels and fewer financial resources to invest in new technologies. Thirdly, educational and training opportunities related to modern sheep farming techniques are less prevalent in Jaisalmer, limiting farmers' awareness and knowledge of innovative practices. These combined factors result in a slower rate of technology adoption among sheep farmers in Jaisalmer compared to their counterparts in Bikaner.

An effort was made to determine the relationship between the ranks assigned by small, medium and large sheep farmers in the Jaisalmer and Bikaner districts by applying a rank correlation test. The rank correlation coefficient (rs) between the adoption levels of small and medium sheep farmers was 0.65 in Jaisalmer and 0.71 in Bikaner, indicating a positive correlation. The significance of rs was verified using the 't' test, showing that the calculated 't' values (2.24 in Jaisalmer and 2.67 in Bikaner) were higher than the tabulated 't' values. This suggests a similarity in the ranking patterns of adoption among small and medium sheep farmers.

The rank correlation coefficient (rs) between medium and large sheep farmers was 0.77 in Jaisalmer and 0.94 in Bikaner. The significance of this correlation was tested by the 't' test, with calculated 't' values of 3.22 in Jaisalmer and 7.88 in Bikaner, indicating significant similarity in the ranking of various aspects of adoption of improved sheep management practices. This means that both medium and large farmers exhibited similar adoption patterns regarding improved sheep management practices.

The rank correlation coefficient (rs) between large and small sheep farmers was 0.88 in Jaisalmer and 0.82 in Bikaner. The significance of this correlation was also tested by the 't' test, with calculated 't' values of 5.23 in Jaisalmer and 4.00 in Bikaner. This leads to the conclusion that there was a similarity in the ranking patterns of adoption among large and small sheep farmers in both districts regarding improved sheep management practices.

An effort was also made to determine the overall relationship between the rankings assigned by sheep farmers in Jaisalmer and Bikaner using the rank correlation test. The rank correlation coefficient (rs) was found to be 0.82, indicating a positive and significant relationship at one percent level of significance. The significance of rs was verified by using the 't' test, revealing that the calculated 't' value (3.86) exceeded the tabulated 't' value. This indicates a significant similarity in the ranking patterns of adoption possessed by the sheep farmers regarding improved sheep management practices.

1. Aspect wise comparison of adoption level of medium and small sheep farmers about improved sheep management practices

Table 3 elicited that among the six important aspects of improved sheep management practices, in Jaisalmer district "Breeding", "Shearing" and "Marketing Practices" and in Bikaner district only "Health & Hygiene" showed a non-significant difference in adoption level of the sheep farmers. There was a highly significant difference fount in the extent of adoption of the sheep farmers in Jaisalmer district in three aspects *i.e.,* "Feeding", "Housing" and "Health & Hygiene" and in Bikaner district three aspects *i.e.,* "Breeding", "Feeding" and "Shearing" as their calculated 'Z' value was higher than tabulated value at 0.01 level of significance leading to the conclusion that there was a significant difference found in the extent of adoption of improved sheep management practices between medium and small sheep farmers. In Bikaner district two aspect *viz.,* "Housing" and "Marketing Practices" found significant at 0.05 level of significance. In the overall comparison of medium and small sheep farmers in Jaisalmer district the value of 'Z' test was found to be significant at 5 per cent level, which means there is a significant difference in the adoption level of sheep farmers in both the categories about improving sheep management practices. In Bikaner district the value of 'Z' test was found to be significant at 1 per cent level, which means there is a wide difference in the adoption level of sheep farmers in both the categories about improving sheep management practices.

2. Aspect wise comparison of adoption level of medium and large sheep farmers about improved sheep management practices

Table 4: Aspect wise comparison of adoption level of medium and large sheep farmers about improved sheep management practices

Sr. No.	Improved sheep management practices	Jaisalmer District					Bikaner District				
		Medium sheep farmers (n=61)		Large sheep farmers (n=65)		Z' Value	Medium sheep farmers (n=65)		Large sheep farmers (n=36)		Z' Value
		Mean±	S.D.	Mean±	S.D.		Mean±	S.D.	Mean±	S.D.	
1	**Breeding**	32.32	4.40	32.07	3.89	0.33^{NS}	38.90	3.92	35.41	3.60	4.55**
2	**Feeding**	55.54	2.57	54.56	2.52	2.66**	54.76	3.07	54.13	2.42	1.12^{NS}
3	**Management Housing**	16.93	1.68	15.56	1.81	4.39**	16.33	1.63	16.27	2.08	0.14^{NS}
4	**Shearing**	13.42	1.51	13.41	1.39	0.77^{NS}	13.36	1.53	13.30	1.68	0.18^{NS}
5	**Health & Hygiene**	39.65	3.19	39.35	3.49	0.5^{NS}	39.56	2.88	39.33	3.41	0.8^{NS}
6	**Marketing Practices**	4.81	1.24	4.78	1.20	0.3^{NS}	04.95	1.04	4.77	1.08	0.91^{NS}
	Overall	27.11	2.43	26.62	2.38	1.49^{NS}	27.98	2.35	27.20	2.38	1.28^{NS}

NS= non-significant, **= Significant at 0.01 level of probability, *= Significant at 0.05 level of probability

Table 5 : Aspect wise comparison of adoption level of large and small sheep farmers about improved sheep management practices

Sr. No.	Improved sheep management practices	Jaisalmer District					Bikaner District				
		Large sheep farmers (n=61)		Small sheep farmers (n=24)		Z' Value	Large sheep farmers (n=65)		Small sheep farmers (n=49)		Z' Value
		Mean±	S.D.	Mean±	S.D.		Mean±	S.D.	Mean±	S.D.	
1	**Breeding**	32.07	3.89	31.79	4.95	0.25^{NS}	35.41	3.60	35.10	3.81	1.04^{NS}
2	**Feeding**	54.56	2.52	53.29	2.54	1.30^{NS}	54.13	2.42	51.12	3.23	0.39^{NS}
3	**Management Housing**	15.56	1.81	15.45	2.04	0.23^{NS}	16.27	2.08	15.67	1.69	3.87**
4	**Shearing**	13.41	1.39	13.20	1.50	0.69^{NS}	13.30	1.68	12.38	1.32	2.30*
5	**Health & Hygiene**	39.35	3.49	36.12	3.48	1.86^{NS}	39.30	3.37	39.18	3.39	2.57**
6	**Marketing Practices**	4.78	1.20	04.75	1.64	0.69^{NS}	4.77	1.08	04.48	1.40	0.96^{NS}
	Overall	26.62	2.38	25.77	2.69	0.83^{NS}	27.98	2.35	26.29	2.37	1.28^{NS}

NS= non-significant, **= Significant at 0.01 level of probability, *= Significant at 0.05 level of probability

Table 4 shows that among the six important aspects of improved sheep management practices, in Jaisalmer district "Breeding", "Health & Hygiene" "Shearing" and "Marketing Practices" and in Bikaner district "Feeding" "Housing" "Shearing" "Health & Hygiene" and "Marketing Practices" showed a non-significant difference in adoption level of the sheep farmers. It showed no significant difference between the medium and large sheep farmers. There was a highly significant difference found in the extent of adoption of the sheep farmers in Jaisalmer district only two aspects *i.e.,* "Feeding" and, "Housing", whereas, Bikaner district only one aspect *i.e.,* "Breeding" as their calculated 'Z' value was higher than tabulated value at 0.01 level of significance leading to the conclusion that there was a noteworthy difference found in the extent of adoption of improved sheep management practices between medium and large sheep farmers. In the overall comparison of medium and large sheep farmers in both the districts the value of 'Z' test was found to be non-significant, which means there is no significant difference in the adoption level of sheep farmers about improved sheep management practices.

3. Aspect wise comparison of adoption level of large and small sheep farmers about improved sheep management practices

Table 5 illumined that among the six important aspects of improved sheep management practices, in Jaisalmer district all six aspects "Breeding", "Feeding", "Housing", "Shearing", "Health & Hygiene" and "Marketing Practices" showed a non-significant difference in adoption level of the sheep farmers. It means there was no Significant difference found in the extent of adoption of improved sheep management practices between large and small sheep farmers. In Bikaner district two aspects *viz.,* "Housing" and "Health & Hygiene" showed significant difference at 0.01 level of significance and "Shearing" showed significant difference at 0.05 level of significance. In the overall comparison of large and small sheep farmers in both the districts the value of 'Z' test was found to be non-significant, which means there is no significant difference in the adoption level of sheep farmers about improved sheep management practices.

4. Overall comparison of Jaisalmer and Bikaner districts sheep farmers according to adoption level about improved sheep management practices

Table 6 shows that the calculated 'Z' value was found to be greater than the tabulated value which is highly statistically significant at 1 per cent level of significance. Therefore, the null hypothesis *i.e.* 'There is no significant difference regarding improved sheep management practices between the respondents of Jaisalmer and Bikaner districts was rejected and the alternative hypothesis was accepted. This means that there was a wide variation in the level of adoption of improved sheep management practices among sheep farmers of both the districts in the research study. The wide difference in the level of adoption of improved sheep management practices between Jaisalmer and Bikaner districts can be attributed to several factors. Firstly, agro-climatic conditions vary considerably, Jaisalmer is dry and has harsh conditions, which may limit the feasibility and benefits of some improved sheep management practices. Secondly, socio-economic factors plays an important role; Farmers in Bikaner may have better access to financial resources, education and extension services, leading to higher adoption rates. Additionally, cultural attitudes and traditional practices may influence willingness to adopt new practices, with Bikaner possibly having a more progressive attitude towards agricultural innovations than Jaisalmer.

Table 6: Overall comparison of Jaisalmer and Bikaner districts sheep farmers according to adoption level about improved sheep management practices (n=300)

Sr. No.	Districts	Sample size	Mean ±	S.D.	'Z' Value
1	**Bikaner**	150	163.47	8.99	3.40**
2	**Jaisalmer**	150	160.14	8.24	

It may be observed that the majority of sheep farmers were medium adopters of improved sheep management practices. Only a small percentage of sheep farmers could be categories as low and high adopters of improved sheep management practices. It might be due to the reason that sheep farmers had financial limitation and inadequate access to advanced technologies, comprehensive training and practices. High level of adoption requires significant investment in improved breeds, awareness, regular trainings and advanced healthcare practices, which may be beyond the financial reach of many farmers. Additionally, rural infrastructure and limited access to up-to-date information and continuous training further hinder their ability to fully embrace and implement high-tech agricultural practices. These constraints collectively prevent sheep farmers from achieving the high adoption level, keeping them reliant on more conventional methods.

The findings are supported by the research study of Jiterwal (2003), John (2021), Meena *et al*. (2011), Sudhakarrao (2012), Meena and Singh (2012), Koli and Koli (2016), Pandey *et al.* (2017), Godara *et al*. (2018), Shirsat *et al*. (2019) and Goswami and Biswas (2021), Butani et al. (2024), Butani et al. (2023) who also explored that majority of the respondents had medium level of adoption.

CONCLUSION

It may be observed that the majority of sheep farmers were medium adopters of improved sheep management practices. Only a small percentage of sheep farmers could be categories as low and high adopters of improved sheep management practices. It might be due to the reason that sheep farmers had financial limitation and inadequate access to advanced technologies, comprehensive training and practices. High level of adoption requires significant investment in improved breeds, awareness, regular trainings and advanced healthcare practices, which may be beyond the financial reach of many farmers. Additionally, rural infrastructure and limited access to up-to-date information and continuous training further hinder their ability to fully embrace and implement high-tech agricultural practices. These constraints collectively prevent sheep farmers from achieving the high adoption level, keeping them reliant on more conventional methods.

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AUTHOR CONTRIBUTION

In this research paper, all authors have made significant contributions to the research study. [First Author's Divya Choudhary] was responsible for conceptualizing the research, conducting experiments and drafting the manuscript. [Second Author's Dr. R.K. Verma] contributed to data collection, analysis and interpretation of results. [Third & Fourth Author's Kamlesh Choudhary and Reshma Yadav] provided critical revisions, methodological guidance and assisted in refining the final manuscript. All authors reviewed and approved the final version of the paper and agreed to be accountable for all aspects of the work.

CONFLICT OF INTEREST

We, the authors, declare that there are no conflicts of interest related to this research paper. We have no financial, professional, or personal relationships that could have inappropriately influenced the findings, interpretations or conclusions presented in this study. All contributions to the research, including conceptualization, methodology, analysis and writing, were conducted transparently and collaboratively. Any potential competing interests have been disclosed and we affirm that this work was carried out with integrity and adherence to ethical research standards.

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