



## Adoption of Improved Sheep Husbandry Practices among the Raika Pastoralists of Marwar Region of Rajasthan

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Paper Received on May 19, 2021, Accepted on August 21, 2021 and Published Online on October 01, 2021

### ABSTRACT

*Raika is the most important pastoralist of India which is inhabiting in Rajasthan and highest livestock herder in the India. They used to migrate up to nine month a year and covered almost 1200 km journey. They usually adopted traditionally practices for rearing of their animal keeping this in mind the present study was conducted in Marwar region of Rajasthan to assess the adoption of improved sheep husbandry practices among Raika pastoralists. A total 120 respondents were subjected to structured interview schedule. The study revealed that regarding improved sheep husbandry practices was concerned half of the respondents (50.49%) possessed low level of adoption followed by medium (27.61%) and high (21.90%). Duration of migration, mass media exposure and expenditure on livestock had shown significant correlation at  $p < 0.01$  and at  $p < 0.05$ . All-inclusive extension approach needs to be taken up considering all the factors which can boost the adoption level of improved practices and respondents are required to be exposed to as many as cosmopolite sources of information as possible, to make them aware of improved sheep husbandry practices.*

**Key words :** Sheep; Adoption; Raika pastoralist; Rajasthan.

**A**nimal husbandry makes a great contribution in rural economy of developing country like India. The role of livestock in Indian economy is increasing year by year as the contribution of livestock in agriculture was 16 per cent (Meena and Singh, 2013) in 1970-71, but now its contribution in GDP has reached to 25.6 per cent. This trend will keep on increasing due to increasing population, urbanization, low land availability etc. Due to poor rain-fed area, the dependency of livestock became an utmost importance in semi-arid region like Rajasthan. Rajasthan had 56.8 million livestock population which comprises of 13.9 million cattle, 13.7 million buffalo, 7.9 million sheep and 20.84 million goats.

Rajasthan is topmost in sheep population (2019 livestock census). The data reveals the importance of sheep as the major sources of livelihood for Raika pastoralists. Raikas are the nomadic livestock inhabiting in of Marwar region of Rajasthan. Raika do not have much land to grow fodder crops so that they perform pastoral migration to other places to get fodder for their animals and most of them are used their traditional knowledge to treatment of their animal (Meena et al., 2020<sup>1</sup>). In others parts of India like Himachal Pradesh sheperds are having only migration option to fulfil their animal requirements (Sankhyan and Thakur, 2019). In aspect of their great contribution to economy of Rajasthan

farmers, sheep and goat population is still decreasing as per new census. The adoption of improved practices can help to increase income of pastoralists. Keeping the above points in view, the present study was conducted regarding the adoption of improved practices among *Raika* pastoralists in Marwar region of Rajasthan.

**METHODOLOGY**

The study was conducted in *Raika* pastoralists due to their highest population around seven lakhs in Rajasthan. (Meena et al., 2020<sup>1</sup>). The study was conducted from the Month of October 2018 to January 2019. Rajasthan state is divided into nine regions out of which Marwar region was selected due to highest population of *Raika* in Marwar region. Pali and Jodhpur district were selected from Marwar region. One tehsil tehsilswere selected from each districts. From each tehsil, three villages were selected randomly and 20 respondents from each village were selected as respondent and for interviews. Person who have at least one type of animals among sheep, goat and camel had knowledge of migration for at least ten year with their animals were chosen. So a total of 120 respondents were selected. Among it, and 105 respondents was rearing sheep out of 120 respondents.

In the present study, adoption was operationalized as the actual use of improved livestock rearing practices by the *Raika* dairy farming practices by the respondent. (Meena and Singh, 2013) enlisted improved sheep farming practices for arid zone of Rajasthan and these lists of improved practices were considered to understand adoption of the improved sheep husbandry practices among the *Raika* pastoral community. There were total 15 improved sheep husbandry practices were considered and presented to the sampled *Raika* pastoralists in a structured interview schedule with a three point continuum i.e. adoption continued, adopted but discontinued and never adopted with a score of 2,1 and 0.

All the improved livestock rearing practices was scored on a three-point continuum viz. ‘Adopted and continued’, ‘Adopted but discontinued’ and ‘Not Adopted’ with a score of 2, 1 and 0, respectively. Adoption index of each individual respondent was quantified by the following formula (Maiti et al., 2014<sup>1</sup>):

$$Adoption\ Index = \frac{Obtained\ Score}{Max.\ Obtainable\ Score} \times 100$$

Finally, all the respondents were categorized into

three level of adoption i.e. low, medium and high based on the Cumulative Square Root Frequency Method. (Maitiet al., 2014<sup>2</sup>).

To trace out the determinants of differential level of adoption of improved livestock rearing practices among the *Raika* pastoralists, the ordinal logit model was used as the outcome variable, the level of adoption, was categorised on an ordinal scale and ordered as: lower level of adoption; medium level of adoption and higher level of adoption.

Ordinal logit was used to assess the determinants of differential level of adoption of improved sheep husbandry practices among the *Raika* pastoralists in Marwar region of Rajasthan. In this analysis, the first category i.e. lower level of adoption was considered as the reference level. Statistical software SAS 9.2 has been used to calculate logit coefficients

The reduced form of ordinal logit model (Greene, 1993) is as given below:

$$Y^* = \beta'Z + \varepsilon$$

Where

y\* is the given level of adoption,

Z is the set of explanatory variables,

â is the vector of coefficient to be determined and

â is a random error with zero mean and unit variance.

Y\* is unobserved; Where:

$$Y=1, \text{ if } y^* \leq \mu_2$$

$$Y= 2, \text{ if } \mu_2 < y^* \leq \mu_3$$

$$Y= 3, \text{ if } \mu_3 < y^*$$

The  $\mu$ - values ( $\mu_2, \mu_3$ ), referred to as cut-off points, are unknown parameters to be estimated along with  $\hat{\alpha}$ . A positive coefficient indicates an increased chance that a respondent with higher score on the independent variable was observed in a higher level of adoption. A negative coefficient indicates the chances that a respondent with higher score on the independent variables was observed in a lower level of adoption. The explanatory variables were used in the empirical model on the basis of theoretical logic are chosen.

**RESULTS AND DISCUSSION**

*Adoption of improved sheep husbandry practices :* Results presented in Table 1 clearly represent the adoption of each 15 improved sheep husbandry practicesby the *Raika pastoral* community. The same

**Table 1. Distribution of respondents according to the adoption of improved sheep husbandry practices (N=105)**

Improved sheep husbandry practices	Adoption continued	Adopted but discontinued	Never adopted	Index score	Rank
Selection and purchase of quality sheep breed	2 (1.90)	4 (39.04)	62 (59.04)	0.21	V
Provision of shelter for sheep	10 (9.52)	10 (9.52)	85 (80.95)	0.14	VI
Upgrading	3 (2.85)	19 (18.09)	83 (79.04)	0.12	VIII
Colostrum feeding	105 (100)	0 (0.00)	0 (0.00)	1.00	I
Ligation and disinfection of navel	104 (99.04)	0 (0.00)	1 (0.95)	0.99	II
Practices of weaning	0 (0.00)	0 (0.00)	105 (0.00)	0.00	XI
Period of grazing	105 (100)	0 (0.00)	0 (0.00)	1.00	I
Feeding of crushed prosodies pods and tamarind seeds	9 (8.57)	0 (0.00)	96 (91.42)	0.09	IX
Feeding of tree leaves in summer	28 (26.66)	0 (0.00)	77 (73.33)	0.27	IV
Deworming	105 (100)	0 (0.00)	0 (0.00)	1.00	I
Ecto-parasiticide control	104 (99.04)	0 (0.00)	1 (0.95)	0.99	II
Castration of male sheep	13 (12.38)	67 (63.80)	25 (23.80)	0.44	III
Vaccination of sheep	105 (100)	0 (0.00)	0 (0.00)	1.00	I
Isolation of sick animal	6 (5.71)	0 (0.00)	99 (94.28)	0.06	X
Marketing of sheep calf at 3.5 years of age	4 (3.80)	20 (19.04)	81 (77.14)	0.13	VII

(Values in parenthesis indicates percentage)

table shows that all the *Raika* pastoralists continued adoption practices like colostrum's feeding, deworming, vaccination, ligation & disinfection of navel cord, grazing and control of ecto-parasites. But, majority of the practices (9 out of 15) were never adopted by the majority of the respondents. *Rao (2008)* reported that in chittor district of Andhra Pradesh very low-level adoption of weaning practices in sheep. *Meena (2020<sup>2</sup>)* revealed that 95.96 per cent of *Raikas* did not isolate their sick animal due to unavailability of place and migration pattern it was also found the discontinuance behaviour among the *Raika* pastoral community towards adoption of castration, selection & purchase of quality sheep and sheep upgradation. They perceived that non-availability of quality of sheep breed in the migratory route is the major cause of discontinuance behaviour towards these improved practices.

To understand the best adopted practices and relative position of each improved sheep husbandry practice, index score of each improved practice was calculated and presented in Table 1. Index scores were ranged between 0 and 1. Higher the index score represents higher level of adoption and vice-versa. It was found from the Table 1 that four practices viz. colostrum's feeding, deworming, grazing and vaccination had perfect index score of 1.00 which clearly indicated that all these practices were adopted and continued by

the respondents. Similarly, weaning practices had the index score of zero which indicated that none of the respondents adopted this practice. *Raikas* clarified that during migration keeping of sheep kids away from their mother was not at all possible. Therefore, they did not adopt this practice. Nine practices, out of 15, were having index score less than the half mark i.e. 0.50 which represented the lower level of adoption of these practices. But study related to sheep farming another area showed that respondents have well aware about knowledge and management practices due to good extension services are provided in that area (*Abbas and Akbay, 2017*).

**Table 2. Distribution of respondents based on the differential level of adoption of improved sheep husbandry practices (N=105)**

Category	No.	%	
Low	12 – 14.04	53	50.49
Medium	14.05-16.5	29	27.61
High	16.6-23	23	21.90

To understand the overall adoption of 15 improved sheep husbandry practices, all the respondents were categorised into three categories viz. low, medium and high based on cumulative square root frequency method. Result presented in Table 2 clearly shows that majority of the sampled *Raika* pastoral community (50.49%) were in lower level of adopter categories followed by

**Table 3. Estimated ORDINAL LOGIT Coefficients of factors determining level of adoption of improve sheep husbandry practices among the Raika pastoralists (N=105)**

Explanatory Variables (Xi)	Estimated Coefficient	SE	P > $\chi^2$	Odd Ratio		
				95 % Confidence Limit Point Estimate	Lower Limit	Upper Limit
Age	-0.357	0.248	0.149	0.699	0.430	1.137
Family size	0.139	0.247	0.573	1.149	0.708	1.866
Family education status	-0.088	0.282	0.759	0.917	0.527	1.595
Social participation	-0.122	0.287	0.669	0.884	0.504	1.551
Community cohesiveness	0.277	0.239	0.247	1.319	0.826	2.106
Distance of migration	0.529	0.449	0.239	1.697	0.703	4.096
Duration of migration	-1.360**	0.489	0.005	0.256	0.098	0.669
Extension contact	0.488	0.269	0.070	1.629	0.961	2.761
Farmer to farmer extension	-0.392	0.263	0.137	0.676	0.403	1.133
Mass media exposure	-1.194**	0.333	0.003	0.303	0.158	0.582
Livestock holding	0.293	0.338	0.386	1.340	0.692	2.596
Income from livestock	-0.069	0.316	0.828	0.933	0.503	1.734
Expenditure on livestock	-1.783*	0.883	0.043	0.168	0.030	0.950
Loglikelihood	61.276					

Dependent Variable: Y (Y= Level of Adoption; Ordered variable: 1= Lower level, 2 = Medium level, 3 = Higher level of adoption)

\*Indicates significant at 5% level of significance, in a two-tail test;

\*\*Indicates significant at 1% level of significance, in a two-tail test

27.61 per cent and 21.90 per cent were in medium and higher level of adopter categories. (Rajanna et al.2013) also reported in Telangana among sheep keepers there were lower level adoption of improved sheep husbandry practices.

*Determinants of differential level of adoption of improved sheep husbandry practices in Marwar region of Rajasthan* : The results of the Ordinal Logit model given in Table 3 indicate that different socio-economic factor was affecting adoption of improved sheep husbandry practices. These factors include age, family size, family education status, social participation, community cohesiveness, distance migration, duration migration, extension contact, farmer to farmer contact, mass media exposure, livestock holding, income from livestock and expenditure on livestock. The estimated coefficients of the ordinal logit model provide only the direction of the effect of the independent variables on the dependent variables; they do not represent actual magnitude of change or probabilities. Thus, the calculated odds ratio from the ordinal logit, which measure the expected change in probability of a particular choice being made with respect to a unit

change in an independent variable, are reported and discussed. Table 3 revealed that both the independent variables i.e. duration of migration, mass media exposure at  $p < 0.01$  and expenditure on livestock at  $p < 0.05$  contributed towards lower level of adoption of improved sheep husbandry practices. Similar result has been revealed among the dairy farmers that Education, Family size, dairy experience, organization participation, land holding, annual income significant towards adoption of improved dairy practices (Yadav and Naagar, 2021)

### CONCLUSION

Sheep husbandry was a livelihood source for Raika pastoralists. They are unaware about modern improved practices of animal husbandry due their migratory life. More than nine months in a year they used to migrate in another place. In case of improved sheep husbandry practices half of the respondents (50.49%) possessed low level of adoption. Duration of migration, mass media exposure were significantly correlated at  $p < 0.01$  and expenditure on livestock at  $p < 0.05$  with lower level of adoption. It may be recommended that Raika must get aware about improved husbandry practices for their

animals and should indulge in various training on scientific lines in small ruminant's husbandry. Further government and private sector should intervene and

propagate various modern practices for small ruminants among pastoralists through camps, mobile vet clinics, extension activities.

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