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Adoption of dairy management practices among the livestock owners of Bikaner district of Rajasthan

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Abstract
Livestock has become an integral part of all interventions aimed at reducing rural poverty and enhancing food and nutrition security. The dairy livestock owners who raise cattle and buffaloes are yet ignorant with scientific management practices. If feeding, breeding, health care and other management practices fit in proper operation, it would be possible to reach the desired level of milk production. The findings of the study revealed that a total of 120 dairy livestock owners were selected in randomly selected 8 villages from Bikaner and Lunkaransar tehsils of Bikaner district of Rajasthan. The quantitative and qualitative data were collected through interview schedule, discussion, observation and available secondary sources. It was found that majority of the dairy livestock owners (59.17%) (69.16%) (75.83% and (65.00%) had medium level of adoption regarding breeding, feeding, management and health care practices, respectively. Majority of the dairy livestock owners (71.67%) had medium level of adoption regarding overall dairy management practices. The results revealed that adoption index in four major aspects viz. feeding, health care, breeding and management were found to be 36, 32.71, 31.55 & 31.25 and ranked 1st, 2nd, 3rd and 4th respectively. The overall adoption level of dairy management practices in thes study area was found to be only 31.99.

Keywords: Adoption index, adoption, dairy livestock owners, management practices, Rajasthan

1. Introduction
India is a vast country with diversified agro climatic conditions. Majority of dairy livestock owners families are engaged in agricultural operations for about 8-9 months in a year but agriculture alone is unable to provide necessary employment and income to the people. Under such conditions, dairying constitutes an important activity of the rural population, mostly a subsidiary occupation. Livestock is directly linked with very poor landless agricultural labourers as well as small and marginal farmers. Recognizing the importance of dairy husbandry, the Government of India initiated various dairy husbandry improvement projects like SLPP, TRYSEM, AICRP and TMP. The general objective of all these programmes was to improve the cattle and thereby, enhance milk production per unit through effective breeding, disease control measures, proper marketing facilities and supply of feeds and fodder seeds through rural dairy extension tranining, services and supplies. The National Commission on Agriculture also observed that next to agriculture, dairying is the most important subsidiary occupation i.e. mixed farming is best suited under Indian conditions. In India about 65 to 70 percent of the population is engaged in agriculture and rearing of livestock. Although the economic contribution of livestock seems to be quite substantial in the agricultural economy as well as in the national economy. Considering the vitality of above stated facts, the present study entitled "Adoption of dairy management practices among the livestock owners of Bikaner district of Rajasthan" was taken up with specific objective: To find out the extent of adoption of improved dairy husbandry practices by the dairy livestock owners.

2. Materials and Methods
The present study was conducted in the Bikaner district of Rajasthan**.** The district was selected purposefully due to a good number of primary milk producers and a good network of milk procurement centres. Out of eight tehsils of the district, only Bikaner and Lunkaransar were selected purposively on the basis of possessing highest livestock population. A comprehensive list of all the villages was prepared under the respective tehsil in discussion with patwaries, tehsildar, veterinary officer, Dairy Co-operative societies and other secondary sources.

Four villages from each of the selected tehsils were selected randomly and a total of eight villages were selected for the purpose of study. Out of these, fifteen dairy livestock owners were selected from each village randomly having 4 milch animals minimum. Thus, the total sample size was constituted 120 dairy livestock owners for present study. Quantitative and qualitative data were collected through informal discussions with the beneficiary dairy livestock owners and also consultation of available literature and experts of RAJUVAS Bikaner. An interview schedule was developed to measure the knowledge level of dairy livestock owners about improved dairy management practices possessed at the time of investigation as evident from his response to a set of questions. Statements were framed under four dairy practices i.e., breeding, feeding, health care and management. In this study, it refers to the degree of adoption of any items of recommended package of dairy practices by a dairy livestock owner either in past or at present. Each question had three possibilities which were Adopted, Partially Adopted and Not Adopted. The score was given in form of 2, 1 and 0 to Adopted, Partially Adopted and Not Adopted respectively. The extent of adoption was calculated on the basis of total score secured by the dairy livestock owner. Based on total scores, the dairy livestock owners were classified into three categories i.e., low, medium and high by using mean and standard deviation. The adoption index was calculated by using following formula:-

$$\text{Adoption index} = \frac{\text{Total obtained score}}{\text{Total obtainable score}} \times 100$$

The total obtained scores of the dairy livestock owners in each practice of knowledge were calculated and categorized into low, medium and high groups on the basis of mean and standard deviation. The following formula was used for calculation of standard deviation.

$$\text{S.D.} = \sqrt{\sum_{i=1}^{n} \frac{(xi - \overline{X})^2}{n-1}}$$

where, S.D. = Standard deviation.
Σ = Summation
Xi = individual score
$\overline{X}$ = mean of the score
n = total number of respondents

3. Results and Discussion

The data in Table 1 reflect that majority (59.17%) of the dairy livestock owners had medium level of adoption followed by low (23.33%) and high (17.50%) regarding breeding practices. In case of feeding practices, majority (69.16%) of the dairy livestock owners were possessed medium level of adoption followed by low (19.17%) and high (11.67%) level of adoption. With respect to management practices, 75.83% of the dairy livestock owners had medium level of adoption followed by high (13.34%) and low level of adoption (10.83%). In health care practices, majority (65.00%) of the dairy livestock owners had medium level of adoption followed by low (19.17%) and high level of adoption (15.83%). Majority of the dairy livestock owners (71.67%) had medium level adoption followed by low (15.83%) and high (12.50%) level of adoption regarding overall dairy management practices. The results revealed that adoption index in four major aspects viz. feeding, health care, breeding and management were found to be 36, 32.71, 31.55 & 31.25 and ranked 1st, 2nd, 3rd and 4th respectively. Among all four practices in the study area, higher level of adoption was observed in feeding practices. It may be due to most of dairy livestock owners had traditional knowledge of feeding practices. This traditional knowledge was passed generation to generation through oral transmission. Among all four practices in the study area, adoption level regarding management practices was found minimum. It may be due to fact that dairy livestock owners were rearing their animals in traditional way of management and minimum utilization of recent innovations and scientific technologies related to dairy management practices. The overall adoption level of dairy management practices in the study area was found to be only 31.99. It indicated that they have moderate adoption about dairy management practices.

Table 1: Distribution of the dairy livestock owners according to their level of adoption in different dairy management practices: (n=120)

Practices	Adoption categories	Frequency	Adoption index	Rank order
Breeding	Low(<2.04)	28(23.33)	31.55	III
	Medium(2.04-6.80)	71 (59.17)		
	High(>6.80)	21(17.50)		
Feeding	Low(<4.12)	23(19.17)	36.00	I
	Medium(04.12-10.28)	83(69.16)		
	High(>10.28)	14(11.67)		
Management	Low(<4.65)	13(10.83)	31.25	IV
	Medium(4.65-11.61)	91(75.83)		
	High(>11.61)	16(13.34)		
Health care	Low(<3.01)	23(19.17)	32.71	II
	Medium(3.01-7.45)	78(65.00)		
	High(>7.45)	19(15.83		
Overall	Low(<19.83)	19(15.83)	31.99	-
	Medium(19.83-30.09)	86(71.67)		
	High(>30.09)	15(12.50)		

Figures in parentheses indicate percentages.

According to Mande and Thombre (2009) [7] feeding practices for cow possessed more adoption index (57.36) followed by feeding practices for newly born calf (54.83), breeding practices (52.83) and health care practices (40.20). The overall adoption index was 52.17 in Latur district. In Ada'a district of Oromia state Ethiopia, Fita and Trivedi (2012) [5] reported that extent of adoption of the recommended practices in six major aspects of dairy husbandry viz., selection and

breeding, housing, feeding and watering, animal health and disease control, care and management and value addition were found to be 67.85, 66.33, 39.51, 60.70, 47.99 and 14.25 percent, respectively. The overall adoption of improved dairy husbandry practices in the study area was found to be only 50.44. The findings are almost similar [3]. They revealed that the maximum percent of adoption (64.00%) was recorded for improved feeding, whereas minimum percent of adoption (52.11%) was observed for improved management in vicinity of Raipur.

3.1 Adoption level of different breeding practices

A perusal of data presented in Table 2 show that highest adoption was found for detection of heat in animals with adoption index of 38.33 and ranked first. This may be due to the fact that most of the dairy livestock owners had long experience of cattle rearing and they closely observed the heat symptoms of cattle. However, appropriate time for mating, pregnancy diagnosis by experts and appropriate sire for breeding had adoption index of 37.50, 36.67 & 33.33 and ranked second, third and fourth, respectively. They knew the economic importance of appropriate time of mating and to avoid wastage of time they took the services of veterinary experts for pregnancy diagnosis. Low level of adoption related to breeding practices were observed in case of the A.I. technique for conceive animal, castration of the animals and practice of keeping breeding records with adoption index of 31.25, 22.92 & 20.83 and ranked 5th, 6th and 7th respectively. This may be due to the fact that most of the dairy livestock owners utilized breeding bull for mating their cow, which was available at village, so they did not feel any necessity for adopting A.I. technique and practice of keeping breeding records. They did not know the advantage of A.I. because of low education level and lack of awareness. Low adoption level about castration of animals was due to hesitation and their emotional thinking about this practice as well as with the fact that most of the dairy livestock owners in the study area were rearing local cattle and due to lack of awareness, they did not feel benefits of calf castration. These findings were in contrary with the findings [4] who reported that natural breeding method was preferred by 83.90 percent farmers and 100.00 percent buffalo owners adopted natural breeding. Devi G. (2013) reported that 45.00 percent of farmers did not adopt A.I. followed by 27.92 percent, 22.73 percent and 4.55 percent farmers who were found falling in partly, fully and to some extent category of artificial insemination adoption, respectively.

Table 2: Distribution of dairy livestock owners according to adoption Index of different breeding practices (n=120)

S. No.	Adoption of different breeding practices	Adoption index	Rank order
1.	A.I. technique for conceive animal	31.25	V
2.	Pregnancy diagnosis by experts	36.67	III
3.	Practice of keeping breeding records	20.83	VII
4.	Castration of the animals	22.92	VI
5.	Appropriate sire for breeding	33.33	IV
6.	Appropriate time for mating	37.50	II
7.	Detection of heat in animals	38.33	I

3.2 Adoption level of different feeding practices

A perusal of data presented in Table 3 reveal that highest adoption was found regarding provide concentrate mixture on the basis of milk production with adoption index of 45.83 and ranked first. This may be due to the fact that milk production is mainly depends upon feeding of concentrate mixture, so inadequate and improper feeding of imbalance concentrate mixture may hinders the milk production and economic status of the dairy livestock owners. However, regarding provide extra concentrate ration to pregnant animals, feeding green fodder to animals and feeding of colostrum to calf were scoring adoption index of 43.33, 37.92 & 36.67 and ranked second, third and fourth, respectively. Low level of adoption related to feeding practices were observed in case of feeding of mineral mixture and prepare hay for use in scarcity period with adoption index of 31.67 and similarly ranked 7th followed by prepare silage for use in scarcity period, feeding of concentrates to animals with adoption index of 31.25 & 30.00 and ranked 8th and 9th respectively. Low level of adoption related to feeding of mineral mixture was due to high price of mineral mixture in the market. They did not feel necessity to prepare hay for use in scarcity period, to prepare silage for use in scarcity period and feeding of concentrates to animals due to lack of knowledge about them and low education status. Meena *et al.* (2012) [6] reported that adoption level of tribal farmers regarding feeding of dry fodder (100%), feeding of colostrum to newly born calves (86.25%) was quite high and green fodder (50.00%) in Udaipur district in Rajasthan.

Table 3: Distribution of dairy livestock owners according to adoption index of different feeding practices: (n=120)

S. No.	Adoption of different feeding practices	Adoption index	Rank order
1.	Balanced ration feeding	36.25	V
2.	Feeding of mineral mixture	31.67	VII
3.	Feeding green fodder to animals	37.92	III
4.	Feeding of concentrates to animals	30.00	IX
5.	Provide extra concentrate ration to pregnant animals	43.33	II
6.	Provide special ration after parturition	36.67	VI
7.	Provide concentrate mixture on the basis of milk production	45.83	I
8.	Feeding of colostrum to calf	35.42	IV
9.	Prepare hay for use in scarcity period	31.67	VII
10.	Prepare silage for use in scarcity period	31.25	VIII

3.3 Adoption level of different management practices

Table 4 indicates that highest adoption was found regarding providing clean drinking water to animals among different management practices with adoption index of 40.83 and ranked first. This may be due to their old traditional system to provide clean drinking water to animals. However, regular cleaning of animal shed, adoption of weaning practice and adoption of principle of clean milk production had adoption index of 38.33, 35.00 & 33.75 and ranked second, third and fourth, respectively. Low level of adoption related to management practices observed in case of adoption of culling of unproductive animal, adoption of burial /incineration method of carcass disposal, adoption of maintaining of different records with adoption index of 28.33, 25.00 & 18.33 and ranked 9th, 10th and 11th, respectively. This may be due to lack of awareness and low education status, so majority of dairy livestock owners did not adopted culling of unproductive animal, adoption of burial /incineration method

of carcass disposal, adoption of maintaining of different record of production at the farm. Akhter *et al.* (2013) [1] reported that non-adoption of the animal husbandry practices were observed in health & hygiene (56.30%) followed by the housing management (31.70%), feeding of dairy animals (26.6%), breeding of dairy animals (17.20%) and clean milk production (6.70%). Dubey *et al.* (2013) [4] reported that highest adoption gap (47.89%) was found in the use of improved management practices.

Table 4: Distribution of dairy livestock owners according to adoption index of different management practices (n=120)

S. No.	Adoption of different management practices	Adoption index	Rank order
1.	Construction of floor in shed	29.17	VIII
2.	Regular cleaning of animal shed	38.33	II
3.	Weaning practice	35.00	III
4.	Providing clean drinking water to animals	40.83	I
5.	Feeding green/dry fodders after chaffing	29.17	VIII
6.	Stall feeding	31.25	VII
7.	Calf dehorning	31.67	VI
8.	Whitening animal drinking water tank regularly	32.92	V
9.	Culling of unproductive animal	28.33	IX
10.	Principle of clean milk production	33.75	IV
11.	Adoption of full hand method of milking	31.67	VI
12.	Maintaining of different records	18.33	XI
13.	Burial /incineration method of carcass disposal	25.00	X

3.4 Adoption level of different health care practices

A perusal of data in Table 5 show that highest adoption was found in vaccination of the animals among different health care practices with adoption index of 37.50 and ranked first. This might be due to the fact that government has running door to door vaccination programme for cattle and buffaloes. Thus, most of the dairy livestock owner's animal has got vaccinated. Whereas, regarding "isolation of sick animals" and "isolation of the advance pregnant animals" obtained adoption index of 36.25 and similarly ranked second. This may be due to the fact that most of the dairy livestock owners had long experience of cattle rearing and they closely observed the benefits of such practices. Tick control and disinfection of the naval cord had adoption index of 33.33 & 30.83 and ranked third and fourth, respectively. Low level of adoption were found in utilization of veterinary services regularly and quarantine practice with adoption index of 30.00 & 27.08 and ranked 6th and 7th, respectively. This may be due to lack of awareness and low education status, thus majority of dairy livestock owners did not adopt utilization of veterinary services regularly and quarantine practice. Dairy livestock owners were found to be skilled in treating their animals through indigenous practices and most of them preferred to consult village traditional healers and quacks over the veterinary doctors. These findings were in substantial support [8] who conducted a study and reported that majority of livestock farmers followed the practices of isolating sick animal from the rest of herd and had knowledge of importance of protecting their animals from ectoparasites in *Tarai* area of Uttarakhand. Sharma (2011) [8] reported that 59.00 percent livestock owner adopted deworming practices for prevention and control of parasitic infestation.

Table 5: Distribution of dairy livestock owners according to adoption index of different health care practices: (n=120)

S. No.	Adoption of different health-care practices	Adoption index	Rank order
1.	Tick control	33..33	III
2.	Utilization of veterinary services regularly	30.00	VI
3.	Deworming of the animals	30.41	V
4.	Isolation of sick animals	36.25	II
5.	Disinfection of the naval cord	30.83	IV
6.	Isolation of advance pregnant animals	36.25	II
7.	Quarantine practice	27.08	VII
8.	Vaccination of the animals	37.50	I

4. Conclusion

The study concluded that medium level of adoption was found in terms of feeding, breeding, and management and health care practices. Most of the dairy livestock owners adopted traditional system of management and have lack of awareness about different scientific practices related to dairy sector. As training found to influence the level of adoption of dairy management practices and in a positive way. KVK, animal husbandary department, cooperative dairies and state universities must periodically conduct training and awareness programmes with respect animal health care and management aspect to boost up level of adoption of dairy management practices. That would be provided sustainable security for livelihood of dairy livestock owners and their livestock.

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