

ADOPTION LEVEL OF BUFFALO FARMING PRACTICES IN THE ARID ZONE OF RAJASTHAN

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ABSTRACT

This study was conducted in Pali district. This district was purposively selected for the study as the first phase of the project was in operation only in this district. The sample size was limited to 200 participants and 100 non-participants considering the time and other resources available for the study. A sample of 10 participant farmers were selected by adopting simple random sampling technique from each of the selected 20 villages. Likewise, 100 non-participant farmers were selected from six villages of the non-project area having similar socio-economic status. Thus, in all 300 farmers constituted the sample of the study. It could be concluded that 47.50 and 42.50 percent of the participant farmers were in the medium and high levels of adoption of recommended practices, respectively, whereas 54.00 and 45.00 percent of the non-participant farmers in the control villages were in the medium and low levels of adoption, respectively. The extent of adoption of participant farmers was strikingly more than that of the non-participant farmers and there existed a significant difference between the two groups. In the case of the non-participant farmers, the majority of them were non-adopters of various recommended practices except in practices such as period of grazing and feeding of tree leaves in summer. The reasons given by the majority of the participant farmers for non-adoption of recommended practices were lack of

knowledge, non-availability of inputs, lack of time and lack of veterinary services.

Keywords: adoption, buffalo farming, technology, Rajasthan

INTRODUCTION

The buffalo (*Bubalus bubalis*) holds the greatest promise for food security and sustainable development in the 21st century as these animals form an integral part of the typical farming system in India. In India, the buffalo has been the backbone of the rural economy. It is the mainstay in the production of butter and ghee. Not only this, the buffalo is also considered more useful for reasons of higher fat content in milk, its ability to utilize agricultural byproducts more efficiently and requirement for fewer kilo calories to produce 1 kg milk. The buffalo has been the friend of small farmers, often their largest capital asset. It is a fit companion for Indian farmers, who grow older with their buffaloes developing a high degree of mutual understanding. As with many of the live stock species maintained by rural families, there is a socio-cultural linkage with buffaloes also. Livestock play a pivotal role in the country's rural economy. It contributed nearly 16 percent of total income from agriculture in 1970-71, which increased to over 25 percent in 2009-10. This will continue to be

so in the coming period due to various economic factors like increase in the population, urbanization and per capita income growth. The role of livestock is much pronounced in the arid zone of Rajasthan, which is prone to drought and resultant crop failure. At the time of crop failure, the livestock sector acts as a cushion which the farmers can fall upon. As per the 2007 Livestock Census, Rajasthan had 10.9 million cattle, 10.4 million buffalo, 10.0 million buffalo and 16.8 million goats. The buffalo is one of the major livestock species contributing to the livelihood security of farmers in Rajasthan. It can thrive in adverse climatic conditions using sparse vegetation. The major buffalo breeds are Murrah, Surti, Nili Ravi, Jafravadi and Mehsana. Buffaloes are mainly reared by socially and economically backward people of the society for whom they act as a store of wealth of high liquidity, a resource for meeting the household nutritional security and a source of regular income. The farmers rear buffalo mainly in an extensive management system using traditional management practices relying on common pastureland for grazing. Various improved buffalo management technologies were developed at the Central Arid Zone Research Institute, Jodhpur to cater the needs of buffalo farmers. These technologies pertained to the broad areas of breed management, nutrition, health care, reproduction and product management. Adoption of improved management practices is expected to increase the income of farmers. The performance and contribution of livestock in recent decades towards agricultural production is phenomenal. Livestock not only provide livelihood but also offer employment opportunities to the poorer and weaker sections of the society. Indian planners and policy makers realized the need to recognize and promote small scale livestock production, which is thought to act as a key component of poverty

alleviation efforts.

In order to improve the socio-economic status of these farmers by helping them cross over the poverty line, a novel project, namely the Farming System's Research for Improved Buffalo Production (FSRIBP). Central Arid Zone Research Institute, aided by FSRIBP, was conceived and launched in the arid zone of Rajasthan in the year of 2007. A systematic evaluation on scientific lines to understand the impact of the project in changing the knowledge and behavioural aspects of target farmers is essential because this would form a basis for extending this project to the other target areas. With this in mind, the present study was undertaken with the following objectives:

1. To measure the extent of adoption of recommended buffalo farming practices among participant and non-participant farmers.
2. To ascertain the reasons for non-adoption of recommended practices.

MATERIALS AND METHODS

Raipur panchayat samiti of Pali district was purposively selected for the study as the first phase of the project was in operation only in this district. The sample size was limited to 200 participants and 100 non-participants considering the time and other resources available for the study. A sample of 10 participants farmers were selected by adopting simple random sampling technique from each of the selected 20 villages. Likewise, 100 non-participants farmers were selected from two villages of non-project area having similar socio-economic status. Thus, in all 300 farmers constituted the sample of the study (Sharma, 2005).

Rogers (1983) defined adoption as the decision to make full use of an innovation as the

best course of action available. However, adoption of improved management practices for buffaloes in the field is low due to various reasons. Considering the importance of buffaloes in the livelihood of rural poor in marginalized environments such as Rajasthan, it is imperative to enhance the adoption of improved management technologies of buffalo farming. The term adoption in this study means the use of recommended practices by the respondents. In consultation with the FSRIBP and Livestock Development Project field functionaries, fifteen skill oriented technologies/practices in buffalo farming recommended through the programme were identified for study of adoption. The recommended practices were described to respondents and they were requested to indicate their extent of adoption during the previous years. The respondents who had adopted the recommended practice were given two scores and for those not adopted were given zero score. The extent of adoption of recommended practices for each respondent farmer was measured by using an adoption quotient developed by Sengupta (1967) and adopted by Swaminathan (1986). Based on the adoption quotient, the respondents were classified into three categories using mean and standard deviation.

RESULTS AND DISCUSSION

The findings on the presented and discussed in terms of extent and practice wise adoption.

Extent of adoption of recommended practices (overall adoption)

The data presented in Table 1 revealed that about 42.50 and 47.50 percent of the participants were high and medium adopters, respectively, whereas only 01.00 and 54.00 percent of the non-participants were in these categories. The remaining 10.00 percent of the project farmers and 45.00 percent of the non-project farmers were in the low level of adoption category. This indicates that the extent of adoption of practices by beneficiaries was higher in the target area than in the control area. The reason is that the project has created a considerable level of technological impact on the participant farmers due to the utilization of services such as veterinary and extension services rendered by the project officials. Besides this, increased awareness through mass media exposure and its utilization and through contact with extension agents would have certainly increased the level of adoption along with knowledge gained regarding buffalo husbandry practices. The non-availability of these services and facilities in the control area would be

Table 1. Distribution of buffalo farmers according to their level of adoption behavior.

(N = 300)

S. No.	Level of adoption	Adopters (N=200)		Non-adopters (N=100)		Total (N=300)	
		F	%	F	%	F	%
1.	Low -SD	20	10.00	45	45.00	65	21.66
2.	Medium ±SD	95	47.50	54	54.00	149	49.67
3.	High +SD	85	42.50	01	01.00	86	28.67
	Overall	200	100	100	100	120	100

F = Frequency; % = Percentage

the main reason for the considerable percentage of low adoption. The findings are in line with the findings of Mohan *et al.* (2005), Suresh *et al.* (2008) and Meena *et al.* (2007). Thus, the buffalo farmers who were selected as the beneficiaries of the project had increased their level of adoption to a moderately high level, indicating a considerable amount of technological impact on them.

Practice wise adoption of recommended practices

Fifteen practices in buffalo rearing as recommended by Farming System's Research for Improved Buffalo Production (FSRIBP) were considered for assessing the adoption by the respondent farmers. The data generated in this aspect were analyzed and are presented in Table 2. It can be seen from the table that of the 15 practices recommended by FSRIBP in buffalo rearing, the practices namely selection and purchase of quality buffalo (77.50 percent), provision of shelter for animals (56.00 percent), feeding of colostrums to new born calf (80.00 percent), period of grazing (97.05 percent), feeding of crushed prosopis pods and tamarind seeds (75.00 percent), feeding of tree leaves in summer (83.00 percent), deworming (73.00 percent), vaccination of buffalo (71.00 percent) and marketing of calf at 15 months of age (67.05 percent) were adopted by the majority of the participant farmers (Tajane *et al.*, 2005). The reason for the maximum level of adoption of these technologies/ practices might be the farmers' conviction they had gained in these areas by way of reduction in mortality and enhanced production level. The adoption level seemed to be poor in the areas of upgrading, ligation and disinfections of naval cord, practice of weaning at 2 months of age, ectoparasiticide application for eradication of ticks and lice, castration of male buffalo calves at

6 months of age and isolation of sick animals to prevent the spread of diseases.

In the case of non-participant farmers, the period of grazing and the feeding of tree leaves such as *neem* (*Azadirachta indica* A Juss.), *khejari* (*Prosopis cinerria*), *babool* (*Acacia nilotica*) and *jharberi pala* (*Ziziphus mauritiana*) spices were the practices adopted by 84.00 and 52.00 percent of farmers, while the majority of them were non-adopters of almost all the remaining practices in buffalo rearing. The reasons given were lack of knowledge and non-availability of suitable inputs. The main reason that the majority of the participant farmers were in the adopter category when compared to non-participants might be the thrust of the project officials to improve buffalo husbandry as a viable enterprise in the project area. The findings are in line with those of Kumaravel and Krishnaraj (2005) and Meena (2005).

Reasons for non-adoption of recommended practices by participants farmers

The reasons for non-adoption of various recommended practices were collected, tabulated and are presented in Table 3. From the table it can be observed that with regards to practice of selection and purchase of quality animals, the high cost of animals (67.70 percent) and the non-availability of good breeds (32.30 percent) were the reasons given by the farmers for non-adoption of the recommended practices. The farmers stated that they were unable to spend money on such quality breed of buffalo.

With respect to provision of shelter for animals, the participant farmers felt that for a few animals the overhang in the house was enough (22.70 percent) and some of them opined that construction of separate shed for providing shelter to the animals (77.30 percent) was a costly affair.

Table 2. Practice wise adoption of recommended technologies practices in buffalo.

S. No.	Technologies	Project area (N=200)				Non-project area (N=100)			
		Adopter		Non-adopter		Adopter		Non-adopter	
		No.	%	No.	%	No.	%	No.	%
1	Selection and purchase of quality buffalo breed	155	77.5	45	22.5	08	8.00	92	92.00
2	Provision of shelter for buffalo	112	56.0	88	44.0	40	40.00	60	60.00
3	Upgrading	16	08.0	184	92.0	05	5.00	95	95.00
4	Colostrums feeding	175	87.5	25	12.5	15	15.00	85	85.00
5	Ligation and disinfection of naval	72	36.0	128	64.4	00	0.00	100	100
6	Practice of weaning	13	06.5	187	93.5	00	0.00	100	100
7	Period of grazing	195	97.5	05	02.5	84	84.00	16	16.00
8	Feeding of crushed prosopis pods and tamarind seeds	150	75.0	50	25.0	14	14.00	86	86.00
9	Feeding of tree leaves in summer	166	83.0	34	17.0	52	52.00	48	48.00
10	Deworming	146	73.0	54	27.0	07	7.00	93	93.00
11	Ecto-parasiticide application	54	27.0	146	73.3	03	3.00	97	97.00
12	Castration of lamb	13	06.5	187	93.5	00	0.00	100	100
13	Vaccination of buffalo	142	71.0	58	29.0	02	2.00	98	98.00
14	Isolation of sick buffalo	20	10.0	180	90.0	00	0.00	100	100
15	Marketing of ram cat 16 months of age	135	67.5	65	32.5	33	33.00	67	67.00

N=Number of respondents, % = Percent

Table 3. Reasons for non-adoption of recommended buffalo rearing practices (Farmers).

S. No.	Recommended practices	Non adopter	Reasons for non-adoption	No. (Percent)
1	Selection and purchase of quality animals	45	a. High cost b. Non-availability of breeds	30 (66.7) 15 (33.3)
2	Provision of shelter for animals	88	a. Over hang in the house sufficient b. Shed construction is costly	20 (22.7) 68 (77.3)
3	Upgrading	184	a. Non-availability of quality calves b. lack of knowledge	18 (9.8) 166 (90.2)
4	Colostrum feeding	25	a. Colostrum feeding will induce diarrhea b. Lack of time	17 (68.0) 8 (32.0)
5	Ligation and disinfection of naval cord	128	a. Not necessary b. Lack of knowledge	111 (86.7) 17 (13.3)
6	Practice of weaning	187	a. Lack of knowledge b. lambs will feel lonely	142 (75.9) 45 (24.1)
7	Period of grazing	05	a. Lack of knowledge	7 (100.0)
8	Feeding of crushed drosopis pods and tamarind seeds	50	a. Lack of knowledge	50 (100.0)
9	Feeding of tree leaves in summer	34	a. Lack of knowledge b. Time consuming	16 (47.1) 18 (52.9)
10	Deworming	54	a. Lack of knowledge b. Inadequacy of dewormers	48 (88.9) 06 (11.1)
11	Ecto-parsiticide application	146	a. Costly method b. Lack of knowledge c. Time consuming	39 (26.7) 63 (43.2) 44 (30.2)
12	Castration of lamb	187	a. Lack of veterinary services b. Lack of knowledge	24 (12.8) 163 (87.2)
13	Vaccination of buffalo	58	a. Buffalo go down in condition b. Failure of vaccination c. Lack of knowledge	05 (08.6) 27 (46.6) 26 (44.8)
14	Isolation of sick animals	180	a. Non-availability of isolation space b. Lack of knowledge	33 (18.3) 147 (81.7)
15	Marketing of calf at 16 months of age	65	a. Lack of knowledge	65 (100.0)

With regards to upgrading, lack of knowledge about the scientific breeding practices (90.20 percent) and non-availability of quality calves (09.80 percent) were the reasons mentioned by most of the non-adopters. In the case of colostrums feeding the farmers felt that feeding of colostrums immediately after birth would induce diarrhea and cause the animal to go down in condition (68.70 percent). The one third of the non-adopters of this practice cited the non-availability of time as the reason for non-adoption as they were engaged in other activities. With regards to the practice of ligation and disinfection of naval cord, the non-adopters felt that the mother itself would lick the umbilical cord and it would heal automatically and hence there was no need to cut and ligate the cord. A few of the non-adopters said lack of knowledge was their reason for not adopting this practice.

In the case of the practice of weaning, lack of knowledge was cited by the majority of the respondent farmers. Some of the farmers also opined that weaned animals would feel lonely and isolated. As far as period of grazing is concerned very few gave lack of knowledge as the reason for non-adoption of following the recommended time of grazing. In the case of feeding of crushed prosopis pods and tamarind seed, lack of knowledge was the reason given by nearly half of the total participant farmers. With regards to the feeding of tree leaves in summer, some of the participant farmers stated they lacked knowledge in the feeding of suitable types of leaves, while the remainder felt that this practice was a time consuming affair.

In the case of deworming, lack of knowledge was given by the majority of the non-adopters (88.90 percent) while the remaining 11.10 percent of them stated that inadequacy of dewormers with the local veterinarian and link worker couples was their reason for non-adoption.

With regard to ectoparasiticide application, a large proportion (43.20 percent) of respondents cited lack of knowledge about the practice as their reason for their non-adoption. The remaining 30.20 and 26.70 percent of non-adopters felt that the recommended practice was time consuming and was a costly method, respectively.

Lack of knowledge was the reason given by the majority (87.20 percent) of non-adopters with respect to the practice of castration of male calves, followed by lack of veterinary services (12.80 percent) in their villages to perform this operation. With respect to the vaccination of buffalo 46.60 percent of non-adopters gave bitter experience of failure of vaccination leading to mortality of buffalo as their major reason, followed by lack of knowledge (44.80 percent) and the wrong notion of the condition of animals would deteriorate if vaccinated (8.60 percent). With regard to isolation of sick animals, lack of knowledge (81.70 percent) and non-availability of isolation space (18.30 percent) were the reasons cited for non-adoption. In the case of marketing of male calves at 15 months of age, the non-adopters said that lack of knowledge about organized marketing was their reason for non-adoption.

CONCLUSION

About 47.50 and 42.50 percent of the participant farmers were in the medium and high levels of adoption of recommended practices, respectively, whereas 54.00 and 45.00 percent of non-participant farmers in the control villages were in the medium and low levels of adoption, respectively. The extent of adoption of participant farmers was strikingly more than that of the non-participant farmers and there existed a

significant difference between the two groups. The recommended practices in buffalo rearing, namely selection and purchase of quality buffalo, provision of shelter for animals, feeding of colostrums for new born calf, period of grazing of buffalo, feeding of crushed prosopis pods and tamarind seeds, feeding of tree leaves in summer, deworming, vaccination and marketing of calf at 15 months of age were adopted by majority of the participant farmers. Most of the participant farmers had poor adoption in areas such as upgrading of animals, ligation and disinfection of naval cord, practice of weaning, ectoparasiticide application, castration of male calves and isolation of sick animals. In the case of non-participant farmers, the majority of them were non-adopters of various recommended practices except practices such as period of grazing and feeding of tree leaves in summer. The majority of the participant farmers said that the reason for their non-adoption of recommended practices were lack of knowledge, non-availability of inputs, lack of time and lack of veterinary services.

REFERENCES

- Kumaravel, P. and R. Krishnaraj. 2005. Adoption behaviour of livestock farmers. *Indian Journal of Extension Education*, **41**(1&2): 117-121.
- Meena, M.L. 2005. *Problems and prospects of improved buffalo production in the flood prone eastern plain zone of Rajasthan*. Ph.D. Thesis, RAU, Bikaner Campus: Jobner.
- Meena, M.L., N.K. Sharma and A. Dudi. 2007. Buffalo keepers' adoption about improved buffalo production practices. *Indian Research Journal of Extension Education*, **7**(2&3): 65-68.
- Mohan, B., R.L. Sagar, K. Singh, P. Tripathi and V.S. Vihan. 2007. Present status of goat rearing under rural condition. *Indian Research Journal of Extension Education*, **7**(1): 43-45.
- Rogers, E.M. 1983. *Diffusion of Innovations*. The Free Press, New York: 132.
- Sengupta, H. 2007. Adoption scale to measures livestock production practices in arid zone of Rajasthan (Unpublished), RAU, Bikaner, Campus: SKN, COA, Jobner.
- Sharma, N.K. 2006. Construction of adoption scale about improved buffalo production technology in Agro-climatic Zone IIIb of Rajasthan. *Rajasthan Journal of Extension Education*, **16**(2): 23-26.
- Suresh, A., D.C. Gupta and J.S. Mann. 2008. Adoption of improved management practices of buffalo in the semi arid region of Rajasthan. *Indian Journal of Extension Education*, **44**(1&2): 100-105.
- Swaminathan, M.S. 1986. Agricultural planning-improving the livestock in rural areas. *Indian Farmers Times*, **6**(11): 32.
- Tajane, S.B., P.J. Rajkamal and Veeranna. 2005. Work environment of the veterinary surgeons. *Indian Journal of Extension Education*, **41**(1&2): 99-101.