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Knowledge level of scientific management practices of buffalo farmers in Bharatpur district of Rajasthan

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Abstract
The present study was conducted in Bharatpur district of Rajasthan, to find out the knowledge level of buffalo owners. Data were collected from 120 buffalo owners of both selected tahsils of Bharatpur district of Rajasthan. The Finding revealed that the majority of buffalo owners belonged to middle (26-39 year) age group, illiterate, medium (7-11) family members) size of the family and small land-holding. The majority (57.50%) of respondents had not any type of social participation. Above 74 per cent of the buffalo owners were having a small size (1-3.5 Tropical Livestock Unit) of buffalo herd. Majority of respondents had a medium level of knowledge about all aspect of buffalo scientific management practices Whereas, only health care practices had high level of knowledge. Knowledge of scientific buffalo management practices was positively and significantly associated with education at 1 per cent level of significance, whereas land holding, extension contact and mass media exposure were found associated positively and significantly at 5 per cent level of significance.

Keywords: Knowledge, buffalo, Rajasthan, management, livestock

Introduction
About 20.5 million people depend upon livestock for their daily livelihood in India. Livestock contributed 16 per cent to the income of small farm households as against an average of 14 per cent for all rural households (Anonymous, 2012) [1]. According to Rajasthan state livestock policy, in Rajasthan more than 80 per cent of rural population keep livestock in their households. Among all livestock specie, buffaloes hold the greatest promise to protein rich raw milk, its production for human consumption and sustainable development in the 21 Stcentury, as these animals form an integral part of the typical farming system in India (Manohar *et al.*, 2015) [5]. India's buffalo germplasm treasures include the world-renowned breeds like Murrah, Nili Ravi, Jaffarabadi, Mehsana, Banni and Surti besides seven other recognized breeds and several distinctive population groups dotting different regions across the country in the form of a necklace of 'Black Gold'. India ranks first in the buffaloes population and milk production. The buffalo (Bubalus bubalis) population in the world is actually 194 million head, 188 million found in Asia during 2014 (Anonymous, 2017) [2]. In India, Buffalo population during 2012 was 108.7 million and during 2017 it raises to 109.85 million. About 1 per cent of increase during the inter-census period 2012-2017. In India, Rajasthan has second position in buffalo population after Utter Pradesh. Buffalo population in Rajasthan is 13.7 (in million) (Anonymous, 2012) [1]. India accounting 20 per cent of world milk production, achieving an annual output of 155.5 million tonnes during 2015-16 as compared to 165.4 million tonnes during 2016-17 recording a growth of 6.4 per cent. The analysis shows nearly 35.4 percent of the milk production is contributed by indigenous buffaloes followed by non-descript buffaloes contribute 13.8 percent in milk production. Uttar Pradesh is largest producer in milk with 17 percent of the total milk production followed by Rajasthan with 12.6 percent. The per capita availability of milk was an average of 355 gm per day in India and 785gm per day in Rajasthan, which is third in the country (Anonymous, 2017) [2]. Buffalo was used as a milch animal with added advantage as a meat animal without the religious taboos attached to its slaughter. Buffaloes meat production in India is 7.4 million tonnes, in which buffalo contributed with 19.83 per cent in the year 2016-17 (Anonymous, 2017) [2]. Various research works has been done in different countries related to scientific buffalo husbandry practices. But adoption of scientific management practices still limited due to lack of knowledge. Knowledge of scientific buffalo husbandry practices is one of the important aspects, which influence the production and productivity of the buffaloes. Socio-economic profiles of buffalo owners play an important role in the knowledge of various livestock management practices

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Thus, this study was conducted to assess the knowledge level of buffalo owners regarding scientific management practices in Bharatpur district of Rajasthan.

Materials & Methods
Present study was conducted in the Bharatpur district of Rajasthan. Weir and Bayana, two tehsils were selected purposively based on highest buffalo population among all tehsils. Four villages from each of the selected tehsil were selected randomly and a total of eight villages were selected for the study. A total of 15 buffalo owners were selected randomly from each village whose having minimum 2 buffaloes for livelihood. Thus, the total sample size was constituted of 120 buffalo owners for the study. Ex-post-facto research design was used in this study. A pre-tested structured questionnaire was used to collect relevant information. The knowledge of buffalo owners was measured by developing 'tailor-made' test that included important recommendations of veterinary and animal husbandry related to buffalo viz. feeding, breeding, milking, health care and general management practices. The knowledge score of each area viz. feeding, breeding, milking health care and general management of a respondent was added up to know the level of knowledge in a particular area so, as to prioritize the areas according to mean knowledge score obtained.

The knowledge mean score of one respondent(s) in a sub-area/area was calculated by the following formula:

$$\text{Knowledge mean score} = \frac{\text{Total obtained score}}{\text{Total obtainable score}}$$

Where: Obtained score = 1(X) + 0(Y), Maximum obtainable score = X+Y.
Where: X = Number of statements buffalo owner answered correctly, Y = Number of statements answered incorrectly, X + Y = Total number of statements for buffalo owners interviewed.

Results and Discussions
socio-economic profiles of buffalo owners
The majority (41.66%) of buffalo owners belonged to middle (26-39 year) age group. Sabapara *et al*. (2016) [7] also found that most of the dairy respondents (43.67%) belonged to middle age in Southern Gujarat. The majority (30.83%) of the respondents were found illiterate and only 0.83 per cent of the respondents were studied up to graduate level. Godara *et al*. (2018) [3] also found that most of the respondent (82%) were literate in rural areas of Western Haryana. About 51 per cent of respondents belonged to medium (7-11) family members) size of the family. The majority (40%) of respondents belonged to small land-holding followed by semi-medium (39.16%), medium (20%) and marginal (0.83%) land-holding. These findings are more or less similar to Rahim *et al*. (2018) [6] who reported that most of the respondents (53%) belonged to the small landholding class in plain land of subornachar upazila in Bangladesh. The majority (57.50%) of respondents had not any type of social participation. Above 74 per cent of the buffalo owners were having a small size (1-3.5 Tropical Livestock Unit) of buffalo herd followed by medium (22.50%) and large (3.33%) size of the buffalo herd. About 42 per cent of respondents belonged to the medium income category followed by low (35.83%) and high (22.5%) income category. All the respondents were used family members as a

source of information frequently. Television was utilized as the major source of information of the respondents frequently.

Knowledge level of buffalo owners in sub-area of buffalo management practices
Knowledge level of buffalo owners refers to the information they possess in respect of buffalo management practices. Therefore, an effort have been made to ascertain the knowledge level possessed by the buffalo owners regarding scientific buffalo management practices. Knowledge level of buffalo owners regarding different sub-areas of all buffalo management practices (feeding, breeding, milking, health care and management) is presented as follows.

Knowledge level of buffalo owners in sub-area of feeding practices:
Data presented in Table (1) showed that the knowledge regarding ingredient of balance ration and quantity of dry fodder were having knowledge mean score of 1 and ranked first in Weir tehsil followed by component of concentrate feeding with knowledge score of 0.98 and ranked second. Overall pooled data showed that ingredient of balance ration occupied 1st rank with knowledge mean score of 1, whereas component of concentrate feeding (0.99) was ranked second. Urea treatment of poor-quality roughage got least knowledge mean score of 0.17 and occupied 10th rank.

Table 1: Distribution of respondents according to their knowledge about feeding practices:

N=120

Sr. No.	Sub area of feeding practices	Weir		Bayana		Pooled	
		Mean Score	Rank	Mean Score	Rank	Mean Score	Rank
1.	Preservation methods for green fodder	0.50	VII	0.50	VI	0.50	VIII
2.	Component of concentrate feeding	0.98	II	1	I	0.99	II
3.	Ingredients of balance Ration	1	I	1	I	1	I
4.	Quantity of concentrate Feeding	0.37	VIII	0.42	VII	0.39	IX
5.	Quantity of concentrate feeding to pregnant Buffalo	0.80	IV	0.8	III	0.80	V
6.	Quantity of dry fodder	1	I	0.91	II	0.95	III
7.	Quantity of green Fodder	0.66	V	0.66	V	0.66	VII
8.	Quantity of mineral mixture/salt	0.60	VI	0.75	IV	0.67	VI
9.	Identification of feed/fodder not fit for Consumption	0.93	III	0.91	II	0.92	IV
10.	Urea treatment for poor quality roughage	0.15	IX	0.2	VIII	0.17	X

Knowledge level of buffalo owners in sub-area of breeding practices
The data presented in Table (2) indicated that the sub-areas in which the knowledge level of buffalo owners was found highest and ranked first in proper time of mating and length of gestation period with knowledge mean score of 1.00 in both Weir and Bayana tehsils. In Pooled data further showed that proper time of mating (1.00), length of gestation period (0.98), length of estrous cycle and confirmation of retention of placenta (0.94), heat sign in female buffalo (0.75), age of female at first service (0.51), breeding after calving (0.48) and age of male at first service (0.07) ranked 1st, 2nd, 3rd, 4th, 5th 6th and 7th respectively.

Table 2: Distribution of respondents according to their knowledge about breeding practices:

N=120

Sr. No.	Sub area of breeding practices	Weir		Bayana		Pooled	
		Mean Score	Rank	Mean score	Rank	Mean Score	Rank
1.	Age of male at first service	0.10	VII	0.05	VIII	0.07	VII
2.	Age of female at first service	0.53	V	0.50	VI	0.51	V
3.	Heat sign in female buffalo	0.78	IV	0.73	V	0.75	IV
4.	Proper time of mating	1	I	1	I	1	I
5.	Length of oestrous cycle	0.96	II	0.93	IV	0.94	III
6.	Length of gestation period	1	I	0.96	III	0.98	II
7.	Confirmation of Retention of placenta	0.91	III	0.98	II	0.94	III
8.	Breeding after calving	0.51	VI	0.45	VII	0.48	VI

Knowledge level of buffalo owners in sub-area of milking practices

The Data presented in table (3) showed that washing hand before milking was found highest score (1.00) and ranked first in Weir followed by stripping (0.45), wipe the udder and teat after milking (0.43), pattern of milking (0.19) and drying off pregnant animal before calving (0.06) and ranked 2nd, 3rd, 4th, and 5th. Whereas, in Bayana wash hand before milking was found highest score (1.00) and ranked first followed by wipe the udder and teat after milking (0.56), stripping (0.51), pattern of milking (0.20) and drying off pregnant animal before calving (0.13) and ranked 2nd, 3rd, 4th and 5th. Pooled data show that wash hand before milking got highest knowledge mean score (1.00) and ranked first followed by wipe the udder and teat after milking (0.49), stripping (0.48), pattern of milking (0.19) and drying off pregnant animal before calving (0.09) and ranked 2nd, 3rd, 4th and 5th respectively.

Table 3: Distribution of respondents according to their knowledge about milking practices:

N=120

Sr. No.	Sub area of milking practices	Weir		Bayana		Pooled	
		Mean Score	Rank	Mean Score	Rank	Mean Score	Rank
1.	Stripping	0.45	II	0.51	III	0.48	III
2.	Washing hand before Milking	1	I	1	I	1	I
3.	Drying off pregnant animal before calving	0.06	V	0.13	V	0.09	V
4.	Wipe the udder and teat after milking	0.43	III	0.56	II	0.49	II
5.	Pattern of milking	0.19	IV	0.20	IV	0.19	IV

Knowledge level of buffalo owners in sub-areas of health care practices

Data presented in Table (4) showed that highest knowledge level were found in most common infectious diseases of buffalo and symptoms of illness with mean score of 0.65 and ranked first in Weir. Whereas, in Bayana deworming of buffalo and symptoms of illness were got highest knowledge (0.70) and ranked first. Pooled data show that symptoms of illness were having highest knowledge mean score (0.67) with rank first followed by most common infectious disease (0.65) and deworming of buffalo (0.65) occupied second ranked. Practices followed during sickness of buffalo (0.63), harmful effects caused by internal parasites (0.62), sign of illness of animal (0.59), vaccination of buffalo (0.58), control ecto-

parasite (0.41), advantage of vaccination (0.31) and horn trimming (0.25) were ranked 3rd, 4th, 5th, 6th, 7th, 8th and 9th, respectively.

Table 4: Distribution of respondents according to their knowledge about health care practices:

N=120

Sr. No.	Sub area of health care practices	Weir		Bayana		Pooled	
		Mean score	Rank	Mean Score	Rank	Mean Score	Rank
1.	Most common infectious Diseases	0.65	I	0.65	II	0.65	II
2.	Vaccination of buffalo	0.60	III	0.56	IV	0.58	VI
3.	Advantage of vaccination	0.34	V	0.28	VI	0.31	VIII
4.	Harmful effects caused by internal parasites	0.60	III	0.65	II	0.62	IV
5.	Deworming of buffalo	0.61	II	0.70	I	0.65	II
6.	Horn trimming	0.25	VI	0.25	VII	0.25	IX
7.	Symptoms of illness	0.65	I	0.70	I	0.67	I
8.	Practices follow during sickness of buffalo	0.61	II	0.65	II	0.63	III
9.	Sign of illness of animal	0.61	II	0.57	III	0.59	V
10	Control ecto-parasite	0.36	IV	0.46	V	0.41	VII

Knowledge level of buffalo owner in different sub-area of general management practices

In Table (5) indicated that colostrum feeding was ranked first in Weir and Bayana tehsils with mean score of 0.98 & 0.96, respectively. Pooled data showed that colostrum feeding ranked first with mean score of 0.97 followed by age of calf at first deworming (0.93), frequency of manger cleaning (0.93), name of local breeds (0.92), disposal of placenta (0.82), protection of buffalo in adverse climatic condition (0.52), minimizing fodder loss (0.38), care of pregnant female (0.34) and disposal of carcass (0.23) and ranked 2nd, 3rd, 4th, 5th, 6th, 7th and 8th respectively.

Table 5: Distribution of respondents according to their knowledge about general management practices:

N=120

Sr. No.	General management	Weir		Bayana		Pooled	
		Mean score	Rank	Mean Score	Rank	Mean Score	Rank
1.	Name of local breeds	0.95	III	0.90	III	0.92	III
2.	Protection of buffalo in adverse climatic condition	0.52	V	0.53	V	0.52	V
3.	Care of pregnant Female	0.32	VII	0.36	VII	0.34	VII
4.	Colostrum feeding	0.98	I	0.96	I	0.97	I
5.	Age of calf at first deworming	0.95	III	0.91	II	0.93	II
6.	Disposal of placenta	0.85	IV	0.80	IV	0.82	IV
7.	Disposal of carcass	0.25	VIII	0.21	VIII	0.23	VIII
8.	Minimizing fodder loss	0.38	VI	0.39	VI	0.38	VI
9.	Frequency of manger cleaning	0.96	II	0.91	II	0.93	II

Over all knowledge level about different buffalo management practices

Feeding: Data presented in Table (6) revealed that majority (52.5%) of the respondents had medium level of knowledge followed by high (36.66%) and low (10.83%) level of knowledge about feeding practices of buffalo.

Breeding: Data presented in Table (6) revealed that majority (71.66%) and (75%) of respondents had medium level of knowledge in Weir and Bayana tehsils, respectively. Pooled data showed that majority (73.33%) of respondents had medium level of knowledge of breeding followed by high (16.66%) and low (10%).

Milking: Data presented in table (6) reported that majority of respondents in Weir (51.66%) and Bayana (60%) had high level of knowledge. Pooled data showed that 55.83 per cent of respondents had high level of knowledge followed by medium (29.16%) and low (15%) level of knowledge about milking practices of buffalo, respectively.

Health care: Data presented in table (6) reported that majority of respondents in Weir (50%) and in Bayana (58.33%) had medium level of knowledge. In pooled data 54.16 per cent of respondents had medium level of knowledge followed by low (24.16%) and high (21.66%) level of knowledge about health care practices in buffalo, respectively.

Management: Data presented in table (6) revealed that majority of respondents in Weir (55%) and Bayana (68.33%) had medium level of knowledge. In pooled data 61.66 per cent of respondents had medium level of knowledge followed by low (25%) and high (13.33%) level of knowledge about management practices in buffalo, respectively.

Overall: It is evident from table (6) that majority of respondents (46.66%) had medium level of knowledge about scientific buffalo management practices followed by low (32.5%) and high (20.83%) level of knowledge. These might be due to lack of training facilities about scientific buffalo management practices. Jeelani *et al.* (2015) found that majority (70.8%) of respondents were having medium knowledge level followed by 19.2 and 10 per cent of respondents were having low and high level of knowledge, respectively.

Table 6: Distribution of respondents according to their overall knowledge about different buffalo management practices:

N=120

Sr. No.	Management practices	Knowledge level	Weir	Bayana	Pooled
1.	Feeding	Low (8-10)	5(8.33)	8(13.33)	13(10.83)
		Medium (10-12)	34(56.66)	29(48.33)	63(52.5)
		High (12-14)	21(35)	23(38.33)	44(36.66)
2.	Breeding	Low (4-7)	2(3.33)	10(16.66)	12(10)
		Medium (7-10)	43(71.66)	45(75)	88(73.33)
		High (10-13)	15(25)	5(8.33)	20(16.66)
3.	Milking	Low (1-2)	9(15)	9(15)	18(15)
		Medium (2-3)	20(33.33)	15(25)	35(29.16)
		High (3-4)	31(51.66)	36(60)	67(55.83)
4.	Health care	Low (7-12)	10(16.66)	19(31.66)	29(24.16)
		Medium (12-17)	30(50)	35(58.33)	65(54.16)
		High (17-22)	20(33.33)	6(10)	26(21.66)
5.	Management	Low (6-9)	11(18.33)	19(31.66)	30(25)
		Medium (9-12)	33(55)	41(68.33)	74(61.66)
		High (12-15)	16(26.66)	0	16(13.33)
6.	Over all	Low (37-43)	13(21.66)	26(43.33)	39(32.50)
		Medium (43-49)	24(40)	32(53.33)	56(46.66)
		High (49-55)	23(38.33)	2(3.33)	25(20.83)

Relationship of socio-economic characteristics with knowledge level of respondents

Correlation coefficient (values) was calculated to ascertain the relationship between some of the selected socio-economic variables with the knowledge level of scientific buffalo management practices of the respondents. The results presented in Table (7) indicated that knowledge of scientific buffalo management practices was positively and significantly associated with education at 1 per cent level of significance, whereas land holding, extension contact and mass media exposure were found associated positively and significantly at 5 per cent level of significance. However, social participation, herd size and gross family income were associated positively and non-significant. Family size was associated with negatively and significantly. It might be due to joint family had less knowledge about scientific buffalo management whereas, age was negatively associated with knowledge. It might be due to aged person had less scientific knowledge about buffalo management.

Table 7: Correlation of knowledge level with various socio-economic aspects of the respondents

N=120

Sr. No.	Variables	R
1.	Age	-0.121
2.	Education	0.464 **
3.	Family size	-0.184*
4.	Land holding	0.205*
5.	Social participation	0.068
6.	Herd size	0.054
7.	Gross family income	0.029
8.	Extension contact	0.204*
9.	Mass media exposure	0.197*

Conclusions

It concluded from findings that majority of buffalo owners belonged from middle age group, illiterate, medium size family and small land holding also concluded that Buffalo owners had medium level of knowledge and they were following traditional way in all aspect of buffalo management system. There is need to provide training programmes and other extension services about scientific way of housing, feeding, breeding, health care and management for batter knowledge and maximum utilization of buffalo and to increase socio-economic status of buffalo owners.

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