



Insights into the Buffalo Housing Practices Followed by Farmers in the Non-Tribal Area of Chittorgarh District in Rajasthan

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ABSTRACT

An effort was made to evaluate the existing housing practices followed by the farmers of Begun and Kapasan tehsils in Chittorgarh district of Rajasthan. In total, 160 respondents were randomly selected from four villages of each selected tehsil and interviewed regarding the various housing practices adopted by them. Our study revealed a largely traditional way of buffalo housing management, with scientific management adopted in certain sphere of housing like providing feed in manger, optimally ventilated housing, among others.

HIGHLIGHTS

- Different buffalo housing practices in the non-tribal belt of Udaipur district was studied.
- The housing practices are influenced by herd size, availability of construction materials, and level of awareness.

Keywords: Buffalo housing, Chittorgarh, housing practices

Livestock rearing has been an integral part of rural Indian economy since time immemorial. The importance of livestock for rural economy becomes even more significant in the times of climate change, as livestock rearing acts as insurance against hardships like crop failure, providing employment and income round the year. India is the world leader in both livestock and buffalo population with an inventory of 536.76 million and 109.85 million population (20th livestock census), respectively. Still, the full potential of our livestock is yet to be realized. The livestock production is constrained by many factors like improper management, negligible to low inputs, lack of product processing, among other things. The housing management of animals forms the very backbone of any livestock production system. However, the studies conducted in the

rural hinterland points out mostly towards a largely non-scientific approach when it comes to housing of buffaloes. This largely impacts the productivity and productive life of buffaloes.

Buffalo has significant contribution in India's milk and meat production. The tropical set up of India imposes extra heat load on this species which is naturally constrained for survival in very hot environment due to its black body, scanty hair and sweat glands. If proper provisions are not provided in terms of heat amelioration, the production and

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reproduction in buffaloes is negatively impacted. This makes optimal housing management to be even more crucial for buffaloes. All these facts make it imperative that the hitherto unassessed area of management practices followed in buffaloes in the area under study should be evaluated properly. So, with this study we tried to evaluate the various housing management practices followed by buffalo rearers in non-tribal region of Chittorgarh district of Rajasthan. The data generated with this study will help in making better policy decisions for buffalo rearing in the rural set up, as the reasons behind the adoption and non-adoption of various management strategies will be brought to fore.

MATERIALS AND METHODS

This study was undertaken to collect the information regarding breeding and milking management practices adopted by buffalo rearers in the Chittorgarh district of Rajasthan. The district comprises of 11 tehsils, out of which two tehsils *i.e.*, Begun and Kapasan were selected. Further, four villages (Thukrai, Mandawari, Shrinagar and Jainagar) from Begun, and four villages (Dhamana, Singhpur, Mungana and Pandoli station) from Kapasan tehsil were identified, and 20 respondents from each of these villages were randomly selected for this study. Thus, the entire sample consisted of 160 respondents from eight selected villages located in these two tehsils of Chittorgarh district. The data was collected through personal interview technique from every selected respondent. An interview schedule was prepared with the help of faculty of Department of Livestock Production Management, College of Veterinary and Animal Science Navania, Vallabhnagar, Udaipur, the District Animal Husbandry Department and other experts of the subject. The respondents were categorized on the basis of herd size of buffalo owned by them. The adult buffalo units were grouped as either milch, dry, pregnant buffalo or bull considered as one adult unit, while heifer and calf were considered as 0.5 and 0.25 adult unit, respectively. The respondents were then classified as small (with up to 1.5 buffalo units), Medium (from 1.6 to 4.5 buffalo units), and Large (above 4.5 buffalo units) group. Six traits *i.e.*, age, education level, herd size, land holding, family size and annual income of respondents were identified and statistically correlated with existing housing management practices by using Chi Square (χ^2) test as defined by Snedecor and Cochran (1994).

RESULTS AND DISCUSSION

Adoption of good housing practices is not only crucial to for the comfort of animals and efficient production, but also has got huge welfare implications. Optimal housing management devised according to the prevalent climatic set up helps in scientific feeding, improved care and management, proper disease control, at the same time shielding the animals from adverse climatic conditions and maintaining animals in thermo neutral zone, rendering the animals to be most productive. This study was thus aimed at evaluating the buffalo housing practices followed in the hitherto unassessed are of Chittorgarh district in Rajasthan. The rationale being, the evaluation of the gaps in knowledge of buffalo rearers regarding housing management will help in devising housing practices as per the requirement of the study area rather than following the traditional “one shoe fits all” approach. The results and discussion on different aspects of housing has been presented in subsequent sub-sections.

Type of housing

The type of housing followed by farmers for animals is dependent on a number of variables, with financial availability and awareness being the key determining factors. The data on prevalent housing practices in the study area has been presented in table 1. As evident from the table, 56.25 per cent of buffalo rearers adopted conventional housing and 43.75 per cent adopted loose housing for their animals. Further, large herd households (66.66%) mainly followed conventional housing while loose housing was preferred by small herd owners (53.34%), implying non-significant ($\chi^2 = 2.97$) association between herd size and type of housing. Out of total respondents, 61.25 per cent buffalo rearers shared their house with animals, followed by 33.12% respondents who housed their animals near their house, while 5.63% of the respondents housed their animals separately from their house. The association analysis revealed non-significant effect of herd size on the location of shed ($\chi^2 = 7.72$). Our study revealed conventional housing to be the most followed practice, closely followed by loose housing, contrary to the findings of Mathur (2001). Furthermore, the majority shared their dwelling with animals, while only a handful of respondents had animal houses separate and away from their own home. These findings are in

Table 1: Types of buffalo housing prevalent in Begu and Kapasan tehsils of Chittorgarh, Rajasthan

Sl. No.	Practices	Small Herd	Medium Herd	Large Herd	Overall	χ^2 value
1	Type of housing					
A	Conventional	21 (46.66)#	51 (57.95)	18 (66.66)	90 (56.25)	2.97
B	Loose	24 (53.34)	37 (42.05)	09 (33.34)	70 (43.75)	
2	Location of shed					
A	Inside dwelling house	33 (73.33)	48 (54.54)	17 (62.96)	98 (61.25)	7.72
B	Near dwelling house	12 (26.67)	34 (38.63)	7 (25.93)	53 (33.12)	
C	Separate from dwelling house	0 (0.00)	6 (6.83)	3 (11.11)	9 (5.63)	
3	Type of floor					
A	<i>Kutchha</i>	43 (95.55)	82 (93.18)	19 (70.37)	144 (90.00)	14.03**
B	<i>Pucca</i>	2 (4.45)	6 (6.82)	8 (29.63)	16 (10.00)	
4	Slope in floor					
A	Yes	9 (20.00)	19 (21.60)	10 (37.03)	38 (23.75)	3.20
B	No	36 (80.00)	69 (78.40)	17 (62.97)	122 (76.25)	
5	Drainage channel/pit					
A	Yes	6 (13.33)	15 (17.05)	9 (33.33)	30 (18.75)	4.80
B	No	39 (86.67)	73 (82.95)	18 (66.67)	130 (81.25)	

Figure in parenthesis indicate herd wise percentage; *significant ($p < 0.05$). ** significant ($p < 0.01$) NA (Test not applicable).

line with that of Sinha *et al.* (2009), Manohar (2012), and Godara *et al.* (2018), while Gupta *et al.* (2008) and Roy *et al.* (2007) reported quite contrary findings with a majority of respondents providing shelter away from their own dwellings. Furthermore, it was found that 90.00 per cent of buffalo rearers had *kutchha* floor and 10.00 per cent had *pucca* floor in their animal house, with a highly significant ($\chi^2 = 14.03$) association between herd size and floor type. 76.25 per cent of the respondents did not provide slope in the floor of animal houses, while only 23.75 per cent were following the practice of providing slope in the floor animal house, with large herd owners following this practice to a larger extent (37.03% of total large herd owners). Association analysis revealed a non-significant ($\chi^2 = 3.20$) relationship between herd size and providing slope in the floor of animal house. Majority of respondents (81.25 per cent) did not have drainage channel/pit in their animal houses, while only a small number of respondents (18.75 per cent) had this provision in their animal housing, with a non-significant ($\chi^2 = 4.80$) association between herd size and practice of drainage channel/pit in animal housing. Majority of respondents had *kutchha* floor in their animal houses without any slope and proper drainage channels. These findings concur with Kumar *et al.* (2006), Kishore *et al.* (2013), and Godara *et al.* (2018). However, almost all respondents had properly

ventilated animal houses, concurring with Choudhary *et al.* (2018). But vast majority did not have light provision in their animal houses, similar to the findings of Manohar (2012), and Choudhary *et al.* (2018). Proper light inside animal houses is crucial for proper monitoring of animals, and also influences productivity of animals. Provision of concrete floor with slopes, along with drainage pits are crucial to maintain a clean and hygienic animal house and to avoid the buildup and spread of pathogens and thriving of insect vectors. Our findings indicate a largely unscientific approach towards the type and location, construction and maintenance of housing.

Construction materials used

The choice of roofing material is mostly based on prevalent prices and durability, that seems to be true in our study area. Data revealed that 65.00 per cent respondents provided single sloped roof in their animal houses, while 35.00 per cent had flat roof in their animal houses (table 1). Further, 74.08 per cent of large herd owners had single slope roof shed animal houses and 40.00 per cent small herd owners had flat roof animal houses.

The data on roofing in animal house indicated that asbestos, thatch, stone slabs, and reinforced cement concrete (RCC) as roofing material was used by 52.50,

40.62, 5.00, and 1.87 per cent respondents, respectively. It was also found that, 43.18 per cent of total medium herd owners, 42.22 per cent of total small herd owners and 29.63 per cent of total large herd owners used thatch as roofing material for their animal houses. 36.88, 31.30 and 30.62 per cent of the respondents used stone in mud/cement, thatch, and bricks in lime/mud/cement as wall material, respectively. The association between herd size and wall material for animal house was found to be non-significant ($\chi^2 = 2.13$). The type of roof material and design is one of the main determinants of the microclimate inside animal house, which in turn has a say in comfort and productivity of animals. Our findings indicate that a majority of respondents provided single sloped roof and asbestos and thatch were the main roofing materials. These findings concur with Fogya (2017), while disagrees with the findings of Rathore *et al.* (2010), and Subramanyan *et al.* (2016). Regarding the choice of wall material, our study disagrees with Choudhary *et al.* (2018) and Godara *et al.* (2018) as majority respondents in our case had stone in mud/cement-based walls. The contrary findings may be attributed to cheap availability of stone materials in the surveyed area and it is also stronger compared to other construction materials.

Feeding, watering and lighting management

The choice of manger and water troughs for feeding and

providing water also determines the feed and water intake, in turn affecting the production of animals. Majority (80.63 per cent) of the respondents practiced manger feeding, while only 19.37 per cent did not have the provision of manger in their animal shed (table 3). Further, the association between herd size and practice of manger feeding in animal housing was found to be significant ($\chi^2 = 6.74^*$). However, 32.56 per cent had kutcha manger and 36.44 per cent had pucca manger for feeding, while 31.00 per cent had manger made of wood/iron. The association between herd size and type of manger in animal housing was found to be highly significant ($\chi^2 = 29.97^{**}$). Moreover, majority (65.00 per cent) of respondents had no provision of water trough inside their animal shed, while only 35.00 per cent respondents had provision of water trough in their animal shed. Our study revealed a significant level of adoption of scientific practice of manger feeding with majority of respondents having concrete mangers, agreeing with Manohar, (2012). However, majority of respondents did not have water trough in their animal houses, concurring with Patbandha *et al.* (2018).

All the respondents with different herd sizes provided optimum ventilation in their animal houses. However, only a small number of respondents (33.12 per cent) had provision of light in their animal shed while vast majority (66.87 per cent) had no light provision in their animal shed, with a significant ($\chi^2 = 5.65$) association between the

Table 2: Use of various construction materials and related buffalo housing aspects Begu and Kapasan tehsils of Chittorgarh, Rajasthan

Sl. No.	Practices	Small Herd	Medium Herd	Large Herd	Overall	χ^2 value
1	Feature of roof shed					
A	Flat	18 (40.0)	31 (35.23)	07(25.92)	56(35.00)	NA
B	Single slope	27 (60.00)	57(64.77)	20(74.08)	104(65.00)	
C	Double slope	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	
2	Roof material					
A	Thatch	19 (42.22)	38 (43.18)	8 (29.63)	65 (40.62)	NA
B	Asbestos/Tin	24 (53.33)	46 (52.27)	14 (51.85)	84 (52.50)	
C	Stone slab	2(4.45)	3(3.4)	3(11.11)	8 (5.00)	
D	RCC	0 (0.00)	1 (1.13)	2 (7.41)	3 (1.87)	
E	Any other	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	
3	Wall material					
A	Thatch	17(37.77)	26(29.55)	7(25.93)	50 (31.30)	2.13
B	Bricks in lime/mud/ cement	12(26.66)	29(32.95)	8(29.63)	49 (30.62)	
C	Stone in mud/cement	14(31.11)	33(37.50)	12(44.44)	59 (36.88)	

Figure in parenthesis indicate herd wise percentage; *significant ($p < 0.05$). ** significant ($p < 0.01$) NA (Test not applicable).

Table 3: Data related to various management aspects of buffalo housing in Begu and Kapasan tehsils of Chittorgarh, Rajasthan

Sl. No.	Practices	Small Herd	Medium Herd	Large Herd	Overall	χ^2 value
1	Manger feeding					
A	Yes	31 (68.88)	73(82.95)	25(92.60)	129 (80.63)	6.74*
B	No	14(31.12)	15(17.05)	2(7.4)	31(19.37)	
2	Type of manger					
A	<i>Kutchra</i>	9 (29.04)	31 (42.46)	2 (8.00)	42(32.54)	29.97**
B	<i>Pucca</i>	7 (22.58)	18(24.66)	22 (88.00)	47(36.44)	
C	Wooden/Iron	15 (48.38)	24 (32.88)	1 (4.00)	40(31.00)	
3	Water trough in shed					
A	Yes	14(31.11)	29(32.96)	13(48.14)	56 (35.00)	2.51
B	No	31(68.88)	59(67.05)	14(51.86)	104 (65.00)	
4	Grooming					
A	Yes	13(28.88)	31(35.22)	16(59.24)	60 (37.50)	3.23
B	No	32(71.12)	57(64.78)	17(62.96)	100 (62.50)	
5	Ventilation					
A	Low	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	NA
B	Optimum	45 (100.00)	88 (100.00)	27 (100.00)	160	
C	Excess	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	
6	Light provision in animal shed					
A	Yes	12(26.67)	27(30.69)	14(51.85)	53 (33.13)	5.65*
B	No	33(73.33)	61(69.31)	13(48.15)	107 (66.87)	
7	Wallowing facility available					
A	Yes	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	NA
B	No	45 (100.00)	88 (100.00)	27 (100.00)	160 (100.00)	

Figure in parenthesis indicate herd wise percentage; *significant ($p < 0.05$). ** significant ($p < 0.01$) NA (Test not applicable).

herd size and light provision in animal shed. Moreover, none of the respondents provided wallowing facility for their buffaloes. The practice of grooming and provision of wallowing is crucial aspect of buffalo management. Our study revealed that only a minority of respondents followed the practice of grooming their animals, contrary to the findings of Choudhary *et al.* (2018). Grooming of animal allows for maintenance of skin hygiene, proper blood circulation and early detection of any pathogenic lesion, at the same time minimizing the prevalence of ectoparasites on animal body. A vast majority (62.50 per cent) did not adopt the practice of grooming their animals, while only 37.50 per cent respondents regularly groomed their animals, with non-significant ($\chi^2 = 3.23$) association between herd size and grooming practice. The provision of wallowing is very important aspect of summer management of buffaloes. However, there were no takers for this crucial practice in the whole study area, suggesting lack of awareness. Wallowing is an important aspect of buffaloes as they are unable to dissipate body

heat during summers due to naturally constrained black body, scant sweat glands and sparse hairs. Wallowing facilitates evaporative cooling and aids in maintenance of proper body temperature.

Winter care of animals and care of pregnant animals

There was a non-significant ($\chi^2 = 0.51$) association between provision of bedding material in winter and herd size, with majority (73.75 per cent) providing bedding material in their animal shed, while 26.23 per cent respondents did not provide any sort of bedding material (table 4). About 77.78 per cent of the large herd owners adopted the practice of providing bedding material during winter, followed by 75.55 per cent of small herd owners and 71.60 per cent of medium herd owners.

Furthermore, 67.50 per cent of the total respondents provided bedding material to pregnant buffalo, while, 26.25 per cent did not provide any bedding material to

Table 4: Data related to adoption of various winter care and management of pregnant buffaloes in Begu and Kapasan tehsils of Chittorgarh, Rajasthan

Sl. No.	Practices	Small Herd	Medium Herd	Large Herd	Overall	χ^2 value
1	Grooming					
A	Yes	13(28.88)	31(35.22)	16(59.24)	60 (37.50)	3.23
B	No	32(71.12)	57(64.78)	17(62.96)	100 (62.50)	
2	Bedding material in winter					
A	Yes	34(75.55)	63(71.60)	21(77.78)	118 (73.75)	0.51
B	No	11(24.45)	25(28.40)	6(22.22)	42 (26.25)	
3	Segregate buffalo before calving					
A	Yes	25(55.55)	49(55.69)	17(62.96)	91 (56.88)	0.49
B	No	20(44.45)	39(44.31)	10(37.04)	69 (43.12)	
4	Bedding material to pregnant buffalo					
A	Yes	34(75.56)	63(71.60)	21(77.78)	118 (73.75)	0.51
B	No	11(24.44)	25(28.40)	6(22.22)	42 (26.25)	

Figure in parenthesis indicate herd wise percentage; *significant ($p < 0.05$). ** significant ($p < 0.01$) NA (Test not applicable).

their pregnant buffaloes. It was also revealed that, 77.78 per cent of the large herd owners, 75.56 per cent small herd owners and 71.60 per cent medium herd owners followed the practice of providing bedding material to their pregnant buffaloes, with a non-significant ($\chi^2 = 0.51$) association between herd size and providing bedding material to their pregnant buffaloes. About 56.87 per cent of the respondents segregated their pregnant buffaloes from the herd before calving, while, 43.12 per cent did not adopt this practice. Results indicated that, 62.96 per cent of the large herd owners were following this practice, followed by medium herd owners (55.69 per cent) and the small herd owners (55.55 per cent). The association between segregation of pregnant buffalo from the herd before calving and herd size was found to be non-significant ($\chi^2 = 0.49$). The practice of providing bedding material during winters and to pregnant buffaloes is of utmost importance for the comfort of animals. Majority of respondents provided bedding materials to their buffaloes during winter and also to their pregnant buffaloes, with wheat straw being the most common bedding material due to cheaper price and easy availability. Our findings are in line with Manohar (2012), and Choudhary *et al.* (2018). The bedding material provides thermal insulation from the cold floor during winter, at the same time capturing body warmth and keeping the animal warm and comfortable. In pregnant animals, bedding material is provided for comfort from the hard floor surfaces. Segregation of buffaloes from the herd is another important aspect of housing

management of pregnant animals, which was adopted by a majority of respondents in our study area, agreeing with the findings of Manohar (2012), and Choudhary *et al.* (2018). While Godara *et al.* (2018) reported that majority of respondents did not segregate their buffaloes from the herd before calving.

CONCLUSION

Housing management forms the most crucial aspect of a successful animal rearing enterprise that is sustainable, economic, at the same time takes care of welfare of animals. Majority of animal holding in our country is with the small or marginal farmers, who have got almost negligible inputs when it comes to animal rearing and is mostly done as a supplementary or sustenance activity. The same is evident in our study where the housing practices were more or less unscientific and based on traditional ways. This highlights the lack of awareness about the significance of housing in carrying out an economical animal rearing operation. Proper policy making in a participatory mode is therefore necessary, that devices set of animal rearing strategies customized according to the ground realities of the various belts of Chittorgarh district.

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