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RESEARCH ARTICLE

Distinct management practices associated with intensive buffalo *Tabelas* of Rajasthan

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Abstract: This study was an effort to document the distinct housing and feeding practices being followed by buffalo *tabelas* of Nagaur, the centrally located district of the desert state of Rajasthan. A cross-sectional survey was carried out on large buffalo farms (having >100 buffaloes), locally known as *tabela.* Using a pretested questionnaire and by making direct observations, data on housing, hygiene and feeding practices was collected. The results on housing management revealed a uniform adoption of conventional, well-ventilated cemented housing with open paddocks and cemented mangers and troughs. Tin and a combination of tin-plus-sandstone were the predominant roofing materials in the study area. Half-height walls with good ventilation were highly prevalent in the surveyed area. Hygiene measures were regularly practiced with routine cleaning and weekly disinfection, adequate drainage, and systematic dung disposal. Feeding was entirely stall-based and animals were group-fed. Green and dry fodders were provided to productive animals, with lucerne–crowfoot–sorghum mixes (43.3%) offered as primary green fodder and wheat–groundnut–sorghum straw mixes (45%) were the most common dry fodder. Green fodder was typically offered at 16-20 kg/animal and concentrates at 11-14 kg/animal. Mineral mixtures were supplied daily (100-120 g) and water was largely available *ad libitum*. Feed quality checks were universal and most feed was procured locally. The study highlights consistent, intensive management practices across *tabelas* in a water-scarce desert environment. This study provides practical baseline data to inform targeted interventions for nutrition, housing design and welfare improvements in large-scale intensive buffalo operations.

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Introduction

The story of India's milk production, evolving from a net milk deficit nation to global leader has been phenomenal. The country transformed itself from a significant milk deficit and import dependent unit during 1950s and 1960s to a highly surplus, milk exporting nation in a few decades. Over the span of three decades, from the 1980s through the 2000s, India's per capita daily milk consumption surged from just 107 grams in 1970 to 427 grams by 2020-21, significantly surpassing the global average of 322 grams recorded in 2021 (Press Information Bureau, Government of India 2022). India's milk production consistently rose through the years as the country charted its way to become the top milk producing nation in the world. With 239.29 million tonnes of milk production during 2024, the country produces 25 percent of global milk (Basic animal husbandry statistics 2024). This was made possible through policy interventions that maximized the utilization of diverse genetic pool present in the country. This is highlighted in the fact that the country has one of the largest livestock population in the world with vast breed and species diversity. India harbours 56% of the global buffalo population which adds to 66.3% of the world's buffalo milk and a quarter of world's buffalo meat production (FAOSTAT 2024). Buffalo contributed to 31.49% of the country's milk production during 2023-24, making it a significant stakeholder in India's milk production (Basic animal husbandry statistics 2024). Buffalo farming is a linchpin of rural economy, underpinning not just milk production but also meat and draught services (Mukesh et al. 2020). Its multifaceted value makes it a crucial component of India's food and livelihood security at the same time strengthening community resilience. With an exceptionally diverse buffalo gene pool, encompassing almost every recognized high-yielding breed, the country's buffalo wealth has a lot of untapped potential. The country boasts of 17 nationally registered breeds that have distinct genetic and phenotypic traits, a lot of non-descript breeds are also present which requires further attention.

Livestock farming has a key stake in the food and livelihood security of large populations in Indian states like Rajasthan, where

agriculture is constrained by a lot of challenges. The sector sustains livelihood and economy, providing round the year income even when other agricultural activities like crop production fails due to adverse climate. Despite numerous constraints, the state contributes to 14.51% (34.7 million tonnes) of India's milk production. Buffalo farming is a key stakeholder in the state's milk production, producing around 48.33% (16.8 million tonnes) of state's total milk output (Basic animal husbandry statistics 2024). There is a lot of potential for further increasing the milk production from buffaloes in the state owing to vast population. However, buffalo farming in Rajasthan faces several challenges like harsh climatic conditions, availability of feed and fodder, scarcity of water, to name a few. To address these challenges and improve productivity, the knowledge about existing managemental practices is the prerequisite.

The buffalo production systems are rapidly transforming in India but newer production systems in the state of Rajasthan is particularly noteworthy. Many studies have been published about extensive and semi-intensive systems of animal production as such systems have been associated with almost every livestock species since a long time. Highly intensive production systems are fairly new interventions in the state due to transformational changes in the animal production systems that is resulting from policy interventions, easy credit access, increasing per capita income as well as growing markets. Consequently, this study was designed to document the various prevailing buffalo production management practices in Nagaur district of Rajasthan. The area was purposively selected as region has certain unique attributes when it comes to buffalo rearing. Large buffalo farms in the area popularly known as *tabela* manages hundreds of buffaloes at a time. Several studies have been carried out on small sized buffalo farms across the country and globally, covering management practices in terms of nutrition, housing, healthcare, and breeding. There is lack of sufficient information on structure of *tabelas*, management practices of large sized buffalo farms, marketing pattern and their constraints. The results of the study will help in understanding the different management practices followed by farmers rearing hundreds of buffaloes. This will aid in devising strategies that could further improve production from buffalo.

Materials and Methods

The present study was conducted in Nagaur (27.2°N 63.73°E), the fifth largest district of Rajasthan state (figure 1). The study area is a part of the Great Indian Thar Desert. The area was selected purposively for conducting the study because of significant buffalo population (3.98% of state's total buffalo) as well as unique managemental practices associated with the buffalo rearers. A cross sectional study was conducted on 30 large buffalo herds (*tabelas*) having a minimum of 100 animals. The study area lies in Internal drainage dry zone of Rajasthan, characterized by

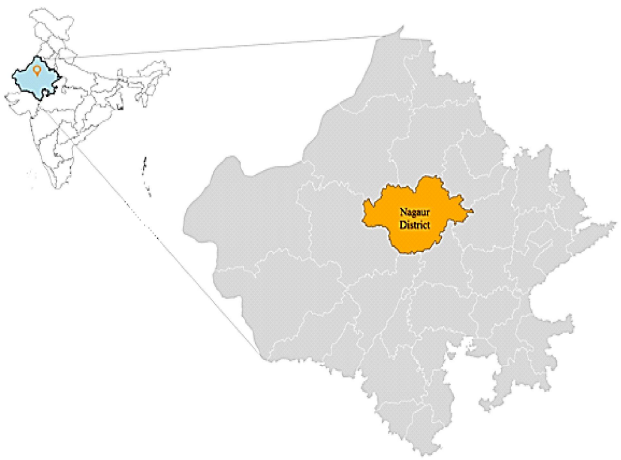

Fig. 1. Details of the survey area

sandy to sandy loam soils, high temperatures, severe drought periods, and water scarcity.

Detailed questionnaire was prepared on targeted parameters including housing, hygiene management and feeding breeding practices. This was prepared in line with the process laid out in the breed descriptors of FAO (1986) as adopted by National Bureau of Animal Genetic Resources (NBAGR, Karnal) with minor customizations. The questionnaire was pretested in field conditions and improved to remove any biasness. Data was collected on the targeted parameters by planned visit to buffalo farms. Prior to the interview, consent was taken from the buffalo owners. The data was collated based on face to face interview with the buffalo owners as well as by personal observations. The questions from the schedule were presented to farmers in their own dialect, ensuring that they had perceived the questions correctly to avoid any interpretational variation of the questions put before the respondents. The answers obtained were recorded and only one respondent was interviewed at a time. The collected data were tabulated and analyzed statistically to calculate Percentage and frequency. All statistical methods were carried out using the methods of Snedecor and Cochran (1989) in IBM SPSS software version 26.

Results and Discussion

Housing

The data on different housing aspects prevalent in the study area are presented in table 1. Based on observations, it was noticed that the buffalo keeping in the surveyed area is unique in its approach and set up. Most of the buffalo farms in the area maintain exceptionally large buffalo herds (figure 2) with few hundred animals to even 1000-2000 animals. This production system is locally known as "*tabela*". The present study revealed

that all *tabela* owners in Nagaur district housed their buffaloes under a conventional housing system, with most shelters oriented in an east-west (57.8%) direction. The Shelter height was found to be sufficient across all *tabela*, and every shelter included an open paddock designed as per scientific standards. Tin was the most commonly used roofing material (46.7%), followed closely by a combination of tin shed and sandstone (40%). Floors were uniformly constructed with cemented tiles, and all shelters had

Table 1: Prevalent Buffalo housing practices in the study area

Particulars	Frequency (n)	Percent (%)
Type of House		
Conventional	30	100
Loose	00	00
Orientation of House		
East-West	18	60
North-South	12	40
Height of Shelter		
Sufficient	30	100
Insufficient	00	00
Open Paddock (Based on Scientific Standard)		
Yes	30	100
No	00	00
Roof Material		
Tin shed	14	46.7
Sandstone Slab	04	13.3
Tin shed and Sandstone Slab (Combination)	12	40
Floor		
Cemented Tiles	30	100
Kutcha	00	00
Walls		
Cemented	30	100
Feeding Manger		
Cemented	30	100
Kutcha	00	00
Watering Trough		
Cemented	30	100
Height of Wall		
Half	25	83.34
Full	05	16.66
Height of Ventilation Window		
4 Feet	01	3.3
5 Feet	20	66.7
6 Feet	09	30
Ventilation		
Good	30	100
Fair	00	00
Poor	00	00
Lighting in Shed		
Good	27	90
Fair	03	10
Poor	00	00

cemented walls. Observations on feeding infrastructure revealed cemented mangers, and water troughs available in all *tabela* (figure 2). Majority of buffalo rearers constructed sheds with half-height

Table 2: Prevalent hygiene management practices in the study area

Particulars	Frequency (n)	Percent (%)
Odour Management		
Good (Absence of adverse odour/stink)	27	90
Fair (Some bad odour present)	03	10
Poor	00	00
Drainage System		
Good	28	93.34
Fair	02	6.66
Poor	00	00
Animal access to Manger		
Sufficient	30	100
Insufficient	00	00
Frequency of Cleaning the Shed		
Once a Day	00	00
Twice a Day	30	100
Application of Disinfectant		
Daily	00	00
Weekly	30	100
Only Monthly	00	00
Name of Disinfectant		
Phenyl	16	54.5
Kohrsolin (microbicide disinfectant)	14	45.5
Dung Deposition		
Near the Animal House	30	100
Away from the Animal House	00	00
Time When Animal Kept in Shed during Summer		
Day	30	100
Night	00	00
Water Supply by Tanker		
Sufficient	30	100
Insufficient	00	00
Provision of Wallowing		
Yes	00	00
No	30	100
Water Bath Source		
Tap Water	27	90
Fogger Sprinkler System	03	10
Animals Kept Under Tree Sheds		
Yes	00	00
No	30	100
Smoke as Insect Repellents		
Yes	13	43.3
No	17	56.7

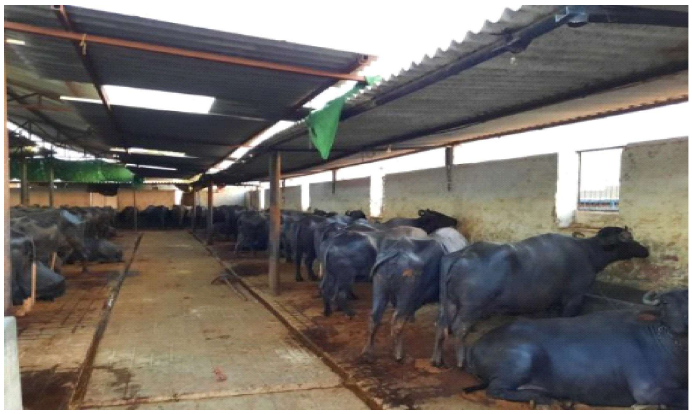

Fig. 2. A typical buffalo *Tabela* with conventional housing system

walls with open upper sections to facilitate ventilation (85%). All buffalo sheds (100%) had effective ventilation systems. While, 90% of the sheds had adequate lighting, ensuring a well-illuminated environment for the animals. These findings align with the reports of Malik et al. (2005) who reported a prevalence of Puccca house among buffalo rearers of Uttar Pradesh. Similarly, Gurjar et al. (2021) also reported a prevalence of conventional housing in Chittorgarh of Rajasthan. However, varied housing systems have been reported for buffalo across countries, with semi-intensive to extensive systems reported from regions of Bangladesh (Uddin et al. 2016; Rahman et al. 2019), both pucca and kachcha houses popular among buffalo rearers of Gangetic Plains of Bihar, India (Chandran et al. 2019). The findings on shed orientation concurs with the reports of Sabapara et al. (2015) from the tribal area of south Gujarat where majority of respondents have the animal houses oriented in east-west direction. While the observations of current study regarding height of Shelter, availability of open paddock, height of wall are similar to the reports of Sinha et al. (2009), Malik et al. (2005) and Ahirwar et al. (2009). The choice of construction material for animal shed is determined by the local availability and climatic conditions, as well as the financial status of animal keepers (Gurjar et al. 2021). This results in choice of different roofing materials and shed construction materials across varied geography and management (Rahman et al. 2019; Sabapara et al. 2015).

The data on various aspects of hygiene management at the *tabelas* is presented in table 2. The observations on hygiene management and animal comfort revealed that ventilation was universally good with no adverse odour present in most *tabela*. Proper drainage systems were maintained by the vast majority (90%) of *tabela* owners. Animals had sufficient access to mangers (90%), underlining comfortable housing. These findings on ventilation align with the reports of Vranda et al. (2017) from Karnataka and Gurjar et al. (2021) from Rajasthan. However, reports from buffalo farms of Bidar (Vranda et al. 2017) and Chittorgarh (Gurjar et al. 2021) revealed a significant lack of

Fig. 3. Different aspects of housing in *tabela* a) open paddock b) Paddock with centrally located water trough c) Water troughs in buffalo shed d) Drinking water being sourced through tankers

drainage pits, which is indicative of the unscientific management prevalent in smallholder farms with earthen floors. The sheds were cleaned twice daily by all respondents with disinfectants applied on a weekly basis by all owners. The majority (54.5%) disinfected the sheds with phenyl, followed by Kohrsolin (45.5%). All *tabela* owners deposited dung near the animal house (figure 4). During summer, animals were kept indoors during the day in all surveyed *tabela*. The water supply to farms was done by tanker in a sufficient amount for most *tabela*. However, there was no provision for wallowing in any *tabela* under survey. Gurjar et al. (2021) also reported lack of any wallowing facility in the buffalo farms of Chittorgarh district of Rajasthan. Tap water was the primary water source used for bathing buffaloes in 90% of cases. Similar observations were made by Rahman *et al*. (2019) who reported practice of bathing buffaloes in the farms itself in intensive production systems of Bangladesh with no wallowing being done. While wallowing is a common practice in semi-intensive systems where buffaloes are allowed to wallow in community farm ponds in rural areas (Chandran et al. 2019). No animals were housed under tree sheds (all kept in conventional housing). The use of smoke as an insect repellent was not practiced by the majority (56.7%).

Table 3 and 4 presents the key findings on various feeding practices followed by buffalo keepers of Nagaur district of Rajasthan. The data on feeding management revealed that the buffaloes reared in *tabelas* of Nagaur district are predominantly (100%) fed in groups with no isolated feeding practiced in the study area. Grazing was not practiced, and buffaloes are totally stall fed. This type of feeding management has also been reported in studies documenting buffalo production from urban and peri-urban areas like Jaipur (Tanwar et al. 2012). However, buffalo feeding systems vary starkly across geographies and production systems. For instance, Rahman et al. (2019) reported a total stall-based feeding in completely intensive systems while in the household yard intensive system, some grazing was allowed, in

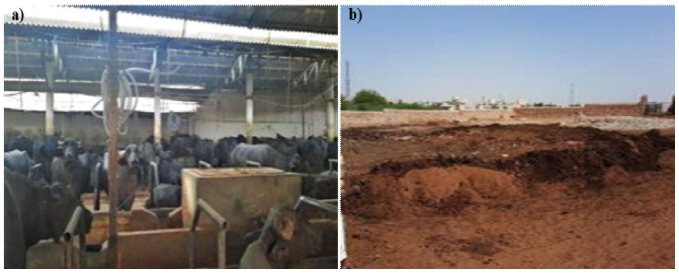

Fig. 4. Illustration of a) Shed with foggers b) Dung deposition in *tabela* as heap

line with this study. While, buffaloes reared in Central Gujarat were allowed to graze and a semi-stall feeding is widely prevalent (Khadda et al. 2017). Both green and dry fodders are fed to buffaloes, along with concentrate feeding, however, the quantity and offer is based on physiological status of the buffaloes. Similar findings have been reported from buffalo farming in Middle

Table 3: Feeding practices followed by *Tabela* owners of Nagaur

Particulars	Frequency	Percent (%)
Method of Feeding		
Group	30	100
Isolated	00	00
Provide Grazing		
Yes	00	00
No	30	100
Provide Green Fodder To		
Milch	30	100
Dry	03	10
Pregnant	30	100
Drought (affected animals)	00	0
Quantity of Green Fodder		
10 kg to 15 kg	14	46.66
16 kg to 20 kg	16	53.34
Silage or Hay Feeding		
Yes	00	00
No	30	100
Provide Concentrate To		
Milch	30	100
Pregnant	27	90
Dry	00	00
Amount of Concentrate		
9 to 10 kg per day	09	30
11 to 14 kg per day	21	70
Frequency of Concentrate		
Twice a day	30	100
Mineral Mixture to Animals		
Milch	30	100
Pregnant	12	40
Dry		0

Table 3 Concluded

Frequency of Mineral Mixture		
Once a day	30	100
Amount of Mineral Mixture		
80 to 90 g	04	13.34
100 to 120 g	26	86.66
Frequency of Water Provided Per Day		
Twice a day	24	80
All time available	06	20
Chaffing of Fodder		
Only Dry Fodder	12	40
Only Green Fodder	00	0
Both Dry and Green Fodder	18	60
Feed Quality Checking		
If Check Feed Quality-Yes	30	100
If Check Feed Quality-No	00	0
Source of Feed		
Both Own Farm and Purchase	03	10
Only Purchase	27	90

Gangetic Plains of Bihar (Chandran et al. 2019) and Semi-Arid Area of Bangladesh (Rahman et al. 2019). The vast majority (43.3%) feed a mix of lucerne, crowfoot grass and sorghum stalks as green fodder, followed by a combination of Lucerne and Crowfoot grass in 25% farms. All the farms fed green fodder to milch and pregnant animals, while only a limited farm (10%) offered green fodder to dry animals. Green fodder is given in quantities of 16-20 kg for most animals (54%). Similar findings have been reported by Dodiya et al. (2022) from Junagadh region of Gujarat , Malik et al. (2005) from Uttar Pradesh and Manohar (2014) in Jaipur district of Rajasthan. Data on the choice of dry fodder revealed combination of wheat straw with groundnut and sorghum straw as the most common (45%) offering. While chaffing was performed for both dry and green fodder by most owners (60%). However, no farm practiced the feeding of preserved fodders (silage or hay) in the study area. These results are in consonance reports of Rathore and Kachwaha (2009) from Jhunjhunu district of Rajasthan. This indicates that preservation of green fodders is not a common practice in the state of Rajasthan. Concentrate feeding is common, with 11-14 kg concentrate per animal per day given by most owners (70%). The main concentrate mixes include cottonseed cake with mung churi (30%), and concentrates are provided mainly to milch (100%) and pregnant animals (90%). Mineral mixture is routinely given once daily to milch animals (100%) and to some pregnant animals (40%), with AgriminFort being the most used brand (30%) and the majority supplying 100-120 g per animal (85%). Most farms provided water for the animals round the clock with *ad libitum* offering (85%). The observations on concentrate feeding, amount and time of concentrate aligns with the reports of Khadda et al. (2017) and Rahman et al. (2019). All the respondents were conscious about the quality of feed offered to buffaloes and routinely carried out feed quality checking. Data on the source

Table 4: Various feed offered to buffaloes

Particulars	Frequency	Percent (%)
Type of Green Fodder		
Lucerne	03	10
Lucerne and Crowfoot grass	08	26.66
Crowfoot grass and Sorghum Straw	06	20
Lucerne, Crowfoot grass and Sorghum Straw	13	43.34
Type of Concentrate		
Cotton seed caket and Mung Churi	09	30
Cotton seed cake, and Soybean Bran	06	20
Wheat Bran, Cotton seed cake	08	26.66
Cottonseed cake and Gram Churi	07	23.34
Brand of Mineral Mixture Used		
Intas	04	13
Maximilk	05	15
Ruminfort	06	20
AgriminFort	09	30
Vetcare	06	20
Types of Dry Fodder		
Bajra Straw, Sorghum Straw and Rice Straw	06	20
Sorghum Straw, Groundnut Straw, Rice Straw and Bajra Straw	11	36.66
Wheat Straw, Groundnut Straw and Sorghum Straw	13	43.34

of feed reflects that the majority (90%) owners sourced the buffalo feed from local purchase, while a small proportion also produced some feed in their own farmland.

Conclusions

The findings of this study on key aspects of housing and feeding underscores a largely scientific production adopted by the *tabela* owners of the study area. This highlights a structural shift in how buffalo keeping is transforming from simple grazing based and semi-intensive systems towards highly intensive systems. Although certain management practices like preservation of fodder could be adopted in the area to ensure supply of quality nutritive fodder round the year, especially in rainfed areas like Nagaur.

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Conflict of interest: The author(s) have no financial or ethical competing interests to declare.

References

Ahirwar RR, Nanavati S, Nayak NK (2009) Studies on housing management of buffaloes under rural and urban areas of Indore district of MP. Indian J Vet Sci Biotechnol 5(2): 41–43

Basic Animal Husbandry Statistics (2024) Department of Animal Husbandry and Dairying, Government of India. Available at: https://dahd.gov.in (Accessed: 18 September 2025)

Chandran PC, Pandian SJ, Kamal R, Dey A (2019) Socio-economic status and system of farming practices with Diara buffaloes in the middle Gangetic plains of Bihar, India. Buffalo Bull 38(3): 469–483

Dodiya VA, Sabapara GP, Kasondra SM, Garg DD, Odedra MD and Ahlawat AR (2022) Housing management practices followed by Jaffarabadi buffalo owners in rural areas of Junagadh district of Gujarat India. Indian J Vet Sci Biotechnol 19(1)

Food and Agriculture Organization of the United Nations (2024) FAOSTAT — Buffaloes: Population and milk production (dataset). Retrieved 10 September 2025, from https://www.fao.org/faostat/en/#data/

FAO (1986) Animal Genetic Resources Data Banks. 2. Descriptor list for cattle, buffalo, pigs, sheep and goats. FAO Anim Prod Health Pap 59: 34–55

Gurjar D, Gujar G, Singh R, Gurjar ML, Sharma MC, Meel P (2021) Insights into the buffalo housing practices followed by farmers in the non-tribal area of Chittorgarh district in Rajasthan. J Anim Res 11(3): 505–511

Khadda BS, Lata K, Singh B, Kumar R (2017) Study of buffalo husbandry practices in rural area of central Gujarat in India. Buffalo Bull 36(1): 75–88

Malik BS, Meena BS, Rao SVN (2005) Study of existing dairy farming practices in Uttar Pradesh. Asian J Dairy Food Res 24(2): 91–95

Manohar DS, Goswami SC, Bais B (2014) Study on feeding management practices of buffaloes in relationship with selected traits of respondents in Jaipur district of Rajasthan, India. Indian J Anim Res 48(2): 150–154

Mukesh M, Gujar G, Sodhi M (2022) Livestock sector: an integral component for country's food and social security. In: Advances in Animal Experimentation and Modeling, Academic Press, pp. 341–351

Press Information Bureau, Government of India (2022) Milk production in India: The journey of India's dairy sector — India: From a milk-deficit nation to a milk-products exporter. Press Inf Bur, 7 Sept. 2022. Available at: https://www.pib.gov.in/FeaturesDeatils.aspx?NoteId=151137 (Accessed: 18 September 2025)

Rahman SR, Islam MN, Harun-ur-Rashid MD, Siddiki MSR, Islam MA (2019) Dairy buffalo production under intensive system in semi-arid area of Bangladesh. Buffalo Bull 38(1): 83–98

Rathore RS, Singh R, Kachwaha RN, Kumar R (2010) Existing management practices followed by the cattle keepers in Churu district of Rajasthan. Indian J Anim Sci 80(8): 798–805

Sabapara GP, Desai PM, Ranjeet Singh R, Kharadi VB (2010) Breeding and health care management status of dairy animals in the tribal area of south Gujarat. Indian J Anim Sci 80(11): 1148

Sinha RRK, Dutt T, Singh RR, Bhushan B, Singh M, Kumar S (2009) Feeding and housing management practices of dairy animals in Uttar Pradesh. Indian J Anim Sci 79(8): 829

Snedecor GW, Cochran WG (1989) Statistical Methods. 8th ed. Iowa State Univ. Press, Ames, Iowa, USA

Tanwar PS, Kumar Y, Sankhala G (2012) Study on breeding and feeding management practices followed by members and non-members of dairy cooperatives in Jaipur district of Rajasthan. Indian J Dairy Sci 65(6)

Uddin MK, Mintoo AA, Awal TM, Kondo M, Kabir AKMA (2016) Characterization of buffalo milk production system in Bangladesh. Bangladesh J Anim Sci 45(1): 69–77

Vranda R, Satyanarayan K, Jagadeeswary V, Veeranna KC, Rajeshwari YB, Sudha G, Shree JS (2017) A study on different housing practices of buffaloes in Bidar district of Karnataka. Int J Sci Environ Technol 6: 295–302