



Existing Dairy Management Practices Followed by Cattle and Buffalo Owners of Northern Bihar

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ABSTRACT

To comprehend the current dairy management practices followed by dairy farmers, a field study was carried out in the Northern region of Bihar. The study was conducted in three districts of Northern Bihar, namely Madhepura, Supaul, and Darbhanga. Two blocks from each district were randomly selected, and from each block, two villages were randomly selected, making a total of twelve villages. A total of 180 dairy farmers were randomly selected from twelve villages that provided the data. According to the study, the majority of respondents (68.33%) used artificial insemination for breeding, and most of the respondents (40%) sought the help of a local veterinary service provider to inseminate their animals. The major reproductive issue was repeat breeding. The majority (56.11%) of the respondents got their animals vaccinated for FMD, 54.44 per cent for HS and BQ, and 7.22 per cent for Brucellosis. A majority (79.65%) of respondents got their animals vaccinated from the para-vets, whereas 20.35 per cent respondents got their animals vaccinated through an NGO. Around 66.11 percent of respondents said that “Mastitis” had affected their animals, and the majority of respondents (51.66%) sought the help of para-vets for the treatment of sick animals. The average quantity of feed and fodder provided to animals was lower as compared to scientific feeding practices. Farmers must be made aware of better animal management practices in general and better animal breeding, feeding, and health management practices in particular, and the extension infrastructure in the study region needs to be developed.

HIGHLIGHTS

- We studied Breeding and health management practices of cattle and buffaloes followed in North Bihar.
- Maximum respondents adopted Artificial Insemination as a method of breeding.
- Maximum respondents faced the incidence of Mastitis disease in animals.

Keywords: Artificial Insemination, Feed and Fodder, Health Management, Northern Bihar, Repeat Breeding

Livestock is the rural community’s lifeline. It serves as a reservoir for capital insurance against crop failure and a coping mechanism against shocks to the means of subsistence. As a result, it is regarded as a “moving bank” for farmers’ revenue (Channappa *et al.*, 2023). With the largest animal population, India continues to be the world’s top producer of milk. In contrast to agriculture, livestock farming has lower capital requirements and lower management and production costs. India’s socio-

economic development depends significantly on the animal husbandry industry. The livestock industry in India accounts for a sizeable portion of the global livestock resource. It not only aids in meeting people’s nutritional needs, but it

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also provides rural households with a significant source of income (Singodia *et al.*, 2019). In the rural economy, dairy development plays a significant role in boosting the income of rural households, particularly those of landless, marginal, and small farmers (Meena *et al.*, 2009). The value of the livestock sub-sector may be evaluated by how much it contributes to the national economy (Meena and Meena, 2005). Livestock's contribution to the cash income of small and marginal farmers and landless workers aids in achieving rural development's equitable goal (Yadav *et al.*, 2014). For reducing rural poverty and raising the rural population above the dire poverty line, livestock farming, especially dairy advancement, has enormous potential and possibilities. The expansion of the dairy industry can help the less fortunate members of society find work, and milk consumption will enhance people's nutritional state (Singh, 2018). The cost of management in the dairy industry accounts for between 75 and 80 percent of the overall cost of milk production (Verma and Sastry, 1994). To determine the advantages and disadvantages of the rearing method, it is essential to comprehend the livestock management techniques used by farmers. The conditions of dairy cows are improved by health management, which reduces the burden of illness and ensures optimal health. Animals' production is increased by maintaining their health through preventive measures like vaccination and deworming. The effectiveness of heat being identified, quick insemination, and detection of pregnancy affect the overall profit of the dairy business (Prajapati *et al.*, 2015). Harnessing the anticipated output potential of dairy animals depends in large part on animal health. An unhealthy animal is unable to perform at the required level. Therefore, early management is essential for minimizing economic losses brought on by diseases (Bihar Dairy, 2021). To maintain animal health, lower calf mortality, and increase dairy cow production, a variety of management techniques are necessary (Patel and Sabapara, 2020). Good-quality animal feed and fodder, as well as effective health management and breeding techniques, are necessary for dairy farming to be profitable. Information gathering is essential to determine the extent of scientific behaviours used by farmers (Singh, 2018). Bihar is a state with a thriving agricultural sector and favourable environmental factors for milch animal development. One of India's top states for milk production, Bihar accounts for 8.9 per cent of the country's total milk output (Bihar Dairy, 2021). Modern milk distribution systems in the

state, particularly those engaging in milk cooperatives, have grown significantly. Traditional marketing, however, still has a significant impact on the state's milk supply chain. The previous few decades have seen a dramatic transformation in the nation's dairy production. While the number of indigenous cows has been decreasing and being replaced by hybrid cows, the number of buffalo has been continuously rising. The vast majority of dairy producers in the state of Bihar are small landowners with a couple of local breed dairy animals that are reared with help from their families on agricultural waste and unimproved grazing pastures. The only cattle that may be given cereals, oil cakes, and lush, nourishing grass is crossbred animals. Deficits in feed and fodder are key obstacles to increasing animal output. The primary ingredients in livestock feed are crop byproducts and residues. About 89 per cent of the feed requirements are met by dry fodder, which provides the greatest amount of fodder. In Bihar, paddy and wheat straws together make up roughly 95 per cent of the dry feed used for animals (Bihar Dairy, 2021). Even though milk yield has increased significantly over the past few decades, the state's per capita milk availability is still low, and problems with illnesses, reproduction, and animal husbandry are expected to have a significant negative impact on the state's total milk production value (Singh, 2013; Singh *et al.*, 2010). Poor farmers should expect financial gains from enhancements in animal wellness and management, alongside enhancements to milk production and animal care. In order to determine the causes of low milk productivity and subpar performance of dairy animals in Bihar, the current study was created to gather data concerning the current dairy management practices, including breeding management, health management, and feed and fodder management practices, followed by dairy farmers in northern Bihar.

MATERIALS AND METHODS

This research was carried out in Bihar's northern region. Three districts in Northern Bihar namely Madhepura, Supaul, and Darbhanga were chosen using stratified random selection. From each district, two blocks were chosen randomly, in which one block was closest to the district headquarters and the other block was farthest from it making a total of six blocks. From each block, two villages were randomly selected making a total of twelve villages. Fifteen respondents were randomly selected

from each village making the total sample size of 180 respondents. Dairy farmers with at least five years of experience and at least one milk-producing animal were selected for the study. Data was collected using a well-organised, pre-tested, and standardized interview schedule made with the intended application in mind. Open-ended questions regarding health and breeding management were also included in the developed interview schedule. This study employed an ex-post facto research design. The data analysis process involved the use of appropriate statistical techniques like mean, frequency, and percentage. The information addressed the existing methods used by dairy farmers in Northern Bihar to manage feed and fodder, take care of their animals, and control animal breeding.

RESULTS AND DISCUSSION

In the study area, i.e., Northern Bihar, farmers had possession of both cows and buffaloes. Most of the farmers had local, non-descript cow breeds. Crossbred cows were also present. Dairy farming in the region was mainly subsistence in nature, which means most of the farmers utilized milk for household consumption. Although a few farmers also sold milk to local consumers. Crop farming in the region was of both types, i.e., subsistence and commercial. Marginal and small farmers used the crop produce for household consumption, and medium and large farmers sold their produce also. For both buffalo and cows, the average herd size in the area was two (including both indigenous and crossbred cows). Among the three districts under study, farmers in the Darbhanga district had relatively higher milk production, and there was more availability of crossbred cows. In comparison to the other two districts, Supaul had the highest percentage of indigenous, non-descript breeds of cows and the lowest milk yield. The herd size was more or less similar in all three districts.

Breeding management practices

Breeding management is a crucial animal husbandry practice in order to harness the full efficiency of dairy animals. Table 1 depicts that the majority of respondents (68.33%) used artificial insemination for breeding, followed by both techniques i.e. natural and AI (based on availability), which accounted for 22.22 percent, and finally, the natural method, which was used by 15 per

cent of respondents. The reason is the easy availability of artificial insemination in villages and less availability of mating bulls. These findings were in concordance with those of Dhaliwal and Dhillon (2017), Mohan *et al.* (2018) and Yadav *et al.* (2021) as they also reported majority of dairy farmers using Artificial Insemination as the method of breeding.

Table 1: Breeding management practices followed by cattle and buffalo owners of Northern Bihar

Existing Practices	No. of respondents	Percentage
Method of Breeding*		
Natural	27	15.00
Artificial Insemination	123	68.33
Both (As per availability)	40	22.22
In case of Natural breeding, bull used (n=27)		
Owned bull	0	0.00
Hired bull	19	70.37
Village bull	8	29.63
Pedigree bull	0	0.00
In case of AI, insemination done by		
Para-vets (Livestock Assistant)	69	38.33
Local veterinary service provider	72	40.00
NGO	22	12.22
Pregnancy diagnosis done by*		
Veterinary Doctor	34	18.88
Local veterinary service provider	98	54.44
Para-vets	72	40.00
Reproductive problems faced*		
Repeat breeding	127	70.55
Infertility	17	09.44
Delayed onset of oestrous cycle after calving	62	34.44
How breeding problems were solved*		
Consult veterinarian	36	20.00
Consult Para-vets	92	51.11
Consult local veterinary service provider	107	59.44

*Multiple responses.

Further, among the respondents who used natural method of breeding, majority of them (70.37%) used hired bull for mating and only a small percentage (29.63%) used village



bull for mating. The reason can be the easier accessibility of hired bull in the village. It was also discovered that 38.33 percent of respondents consulted para-vets, and 40 per cent of respondents consulted the local veterinary service provider in the village for getting their animals inseminated. The situation may be because of the easy availability of local veterinary service providers in the village. The majority of respondents (54.44%) had their animals' pregnancies diagnosed by a local veterinarian service provider, it was followed by para-vets (40.00%) and veterinary doctors (18.48%). Similar findings were reported by Sabapara (2016). Further, a majority (70.55%) of the respondents faced "Repeat breeding" as the most important reproductive problem, followed by "delayed onset of oestrous cycle after calving", accounting for 34.44 per cent, and lastly, "infertility" accounting for 9.44 per cent respondents. These results are corroborated by those of Patel and Ponnusamy (2019), who also noted that anestrus and repeat breeding were the main reproductive issues in dairy cows. From further investigation, it was also found that the majority of respondents (59.44%) sought local veterinary assistance to address breeding issues with their animals, while 51.11 percent turned to para-vets for the same. It could have been because there weren't many veterinarians in the area who were conveniently accessible. These results are consistent with those of Kumar *et al.* (2019), who also found that approximately the same proportion of respondents (20.50%) chose the natural method of breeding.

Health management practices

Health management practices are crucial for dairy animals because they directly impact the overall health and productivity of the animals and, consequently, the profitability of dairy farming operations. Proper health management practices ensure the well-being of dairy animals, which is essential for consistent milk production and the production of high-quality dairy products. According to Table 2, it was found that the majority (70.55%) of dairy farmers got their animals dewormed and only 29.45 per cent of respondents did not deworm their animals. Furthermore, it was also found that, a vast majority of respondents (93.70%) had their animals dewormed on a six-monthly basis, whereas only 6.30 per cent had their animals dewormed on an annual basis. The probable reason for this may be the limited awareness of

dairy farmers regarding the importance of deworming schedule of animals. Further, the majority (79.65%) of respondents got their animals vaccinated from the para-vets, whereas 20.35 per cent respondents got their animals vaccinated through an NGO. The same conclusions were reached by Kumar *et al.* (2020). In a similar vein, it was observed that the majority of respondents (62.77%) got their animals vaccinated whereas only 29.45 per cent of them did not get their animals vaccinated.

Table 2: Health management practices followed by cattle and buffalo owners of Northern Bihar

Management Practices	No. of respondents	Percentage
Deworming of animals done		
Yes	127	70.55
No	53	29.45
Deworming interval of animal (n=127)		
6 Monthly	119	93.70
Yearly	8	06.30
Vaccination of animals done		
Yes	113	62.77
No	67	37.23
Vaccination of animals done by (n=113)		
NGO	23	20.35
Para-vets	90	79.65
Local veterinary service provider	0	0.00
Vaccination for animal disease *		
FMD	101	56.11
HS + BQ	98	54.44
Brucellosis	13	07.22
Rabies	0	0.00
Lumpy skin disease	0	0.00
Person consulted for the treatment of their sick animals*		
Veterinarian	23	12.78
Para-vets	93	51.66
Local veterinary service provider	74	41.11
Isolated sick animals or not		
Isolated	98	54.44
Not Isolated	82	45.56
Isolated sick animals for (n=98)		
15 days	26	26.54
1 month	0	0.00
7 days	72	73.46

Mastitis incidence in animals		
Mastitis	119	66.11
Not Faced	61	33.89
Carcass disposal of dead animals		
Burned	0	0.00
Thrown nearby	7	03.89
Buried	173	96.11

*Multiple responses.

The study also revealed that 56.11 per cent of respondents had their animals vaccinated against Foot and Mouth Disease (FMD), 54.4 per cent had their animal vaccinated against Haemorrhagic septicaemia (HS) and Black Quarter (BQ), and 7.22 percent had their animal vaccinated against Brucellosis. It may be because of the reason that these were the only vaccines made available to the farmers by veterinary doctors free of cost. Similar results were obtained by Singh (2018). For the care of their sick animals, the majority of respondents (51.66%) turned to para-vets, while 41.11 percent consulted local veterinarian service providers. These findings could be due to the easier availability of para-vets in the village. These results concurred with those from Eqbal *et al.* (2013), Letha *et al.* (2013), and Tiwari *et al.* (2009). Additionally, it was discovered that while 45.56 percent of respondents did not isolate their sick animals from other animals, 54.44 percent of the overall respondents did. Among the respondents who isolated their sick animals, the majority (73.46%) of them isolated the animals for 7 days and only 26.15 per cent of them isolated for 15 days. These findings are contrary to those of Singh (2018). In addition, the table also showed that 33.89 per cent of respondents did not have the occurrence of “Mastitis” disease in their animals, whereas 66.11 per cent of respondents had it in their animals. The farmers’ unsanitary methods of milking may be to blame, which is the most likely explanation. Referring to the carcass disposal of the dead animals, a majority (96.11%) of the total respondents buried the carcass of the dead animals, whereas only 3.89 per cent of respondents threw the carcass away, and none of the respondents burned the carcass of dead animals. This is because farmers believed burying deceased animals was the most practical and cost-effective solution.

Information pertaining to animal health and diseases was additionally gathered from the research area through the

use of open-ended questions. From the study, it was found that the most common animal diseases prevailing in the research area were foot and mouth disease (FMD), *Surra*, diarrhoea, Mastitis, *Jarkhor*, *Chamki* fever, bloating, and lumpy skin disease. Moreover, dairy animals were also affected by the ecto-parasites. These diseases affected the general well-being and productivity of the animals. For the treatment of animals suffering from prevalent diseases such as FMD, Mastitis, diarrhoea and other diseases, dairy farmers utilised ethno veterinary medication during initial stages and also consulted veterinary professionals of the region. In the study area, calves often suffered from diarrhoea which was the leading cause of their mortality. It could be due to different management and environmental factors such as improper feeding and unhygienic housing conditions.

Feed and Fodder Management of dairy animals

In animal husbandry, feeding is one of the most crucial procedures. In general, it is acknowledged that when fed at low levels, all animals do not demonstrate their full genetic potential for increased production. When young stock is not given enough food, it grows slowly, takes longer to reach maturity, and produces less after reaching breedable age than the ideal. Owners of dairy animals need to be fully aware of the fact that adopting better feeding procedures for animals can boost milk production (Kumar *et al.*, 2019). A scientific feeding schedule that provides a higher level of nutrition guarantees better growth and the beginning of puberty, which accelerates economic returns (Kumawat and Verma, 2016).

Feed and fodder provided to different animals (per animal/day) in Madhepura district

Analyzing the information displayed in Table 3, it can be inferred that in Madhepura district, on average, 19.18 Kg of green fodder, 6.08 Kg of dry fodder, and 1.10 Kg of concentrate mixture were fed to adult indigenous cows. Similarly, 7.54 Kg of green fodder, 3.21 Kg of dry fodder, and 0.52 Kg of concentrate mixture were fed to indigenous calves. Furthermore, for crossbred adult cows, on average, 21.70 Kg of green fodder, 6.18 Kg of dry fodder, and 1.85 Kg of concentrate mixture were fed, and 7.90 Kg of green fodder, 3.81 Kg of dry fodder, and 0.62 Kg of concentrate mixture were fed to crossbred calves. For adult buffalo,

20.36 Kg of green fodder, 6.29 Kg of dry fodder, and 1.40 Kg of concentrate mixture were fed on average, and 8.29 Kg of green fodder, 3.60 Kg of dry fodder, and 0.56 Kg of concentrate mixture were fed to buffalo calves. This feeding practice was not on par with the scientific feeding of cows and buffaloes.

Table 3: Average Feed and fodder provided to different animals (per animal/day) in Madhepura district

Type of animals	Green fodder (Kg/ animal)	Dry fodder (Kg/animal)	Concentrate mixture (Kg/ animal)
Indigenous Adult Cow	19.18	6.08	1.10
Indigenous Calf	7.54	3.21	0.52
Crossbred Adult Cow	21.70	6.18	1.85
Crossbred Calf	7.90	3.81	0.62
Adult Buffalo	20.36	6.29	1.40
Buffalo Calf	8.29	3.60	0.56

Feed and fodder provided to different animals (per animal/day) in Supaul district

Based on the data in Table 4, it was ascertained that in Supaul district, on average, 18.16 Kg of green fodder, 6.02 Kg of dry fodder, and 1.44 Kg of concentrate mixture were fed to adult indigenous cows. Similarly, 6.81 Kg of green fodder, 3.18 Kg of dry fodder, and 0.61 Kg of concentrate mixture were fed to indigenous calves.

Table 4: Average Feed and fodder provided to different animals (per animal/day) in Supaul district

Type of animals	Green fodder (Kg/ animal)	Dry fodder (Kg/ animal)	Concentrate mixture (Kg/ animal)
Indigenous Adult Cow	18.16	6.02	1.44
Indigenous Calf	6.81	3.18	0.61
Crossbred Adult Cow	22.6	6.52	1.83
Crossbred Calf	6.69	3.47	0.68
Adult Buffalo	21.4	6.14	1.64
Buffalo Calf	5.38	3.17	0.52

Furthermore, for crossbred adult cows, on average, 22.6 Kg of green fodder, 6.52 Kg of dry fodder, and 1.83 Kg of concentrate mixture were fed, and 6.69 Kg of green fodder, 3.47 Kg of dry fodder, and 0.68 Kg of concentrate

mixture were fed to crossbred calves. For adult buffalo, 21.40 Kg of green fodder, 6.14 Kg of dry fodder, and 1.64 Kg of concentrate mixture were fed on average, and 5.38 Kg of green fodder, 3.17 Kg of dry fodder, and 0.52 Kg of concentrate mixture were fed to buffalo calves.

Feed and fodder provided to different animals (per animal/day) in Darbhanga district

The information provided in Table 5 elucidates that in Darbhanga district, on average, 19.81 Kg of green fodder, 6.31 Kg of dry fodder, and 1.12 Kg of concentrate mixture were fed to adult indigenous cows. Similarly, 6.29 Kg of green fodder, 3.29 Kg of dry fodder, and 0.56 Kg of concentrate mixture were fed to indigenous calves. Similarly, for crossbred adult cows, on average, 17.79 Kg of green fodder, 6.29 Kg of dry fodder, and 1.77 Kg of concentrate mixture were fed, and 6.88 Kg green of fodder, 3.33 Kg of dry fodder, and 0.71 Kg of concentrate mixture were fed to crossbred calves. For adult buffalo, 20.23 Kg of green fodder, 6.44 Kg of dry fodder, and 1.42 Kg of concentrate mixture were fed on average, and 5.89 Kg of green fodder, 3.12 Kg of dry fodder, and 0.57 Kg of concentrate mixture were fed to buffalo calves.

Table 5: Average Feed and fodder provided to different animals (per animal/day) in Darbhanga district

Type of animals	Green fodder (Kg/ animal)	Dry fodder (Kg/animal)	Concentrate mixture (Kg/ animal)
Indigenous Adult Cow	19.81	6.31	1.12
Indigenous Calf	6.29	3.29	0.56
Crossbred Adult Cow	17.79	6.29	1.77
Crossbred Calf	6.88	3.33	0.71
Adult Buffalo	20.23	6.44	1.42
Buffalo Calf	5.89	3.12	0.57

CONCLUSION

The study concluded that the majority of respondents used artificial insemination (AI) and got their animals inseminated by a local veterinary service provider. Repeat breeding was the major reproductive problem, and most respondents had their animals dewormed every six months. Most of the respondents immunized their animals for FMD, HS and BQ. The problem of

Mastitis incidence in dairy animals was common. The average feed and fodder provided to animals were less as compared to scientific feeding practices. Extension efforts in the study region must be strengthened to raise awareness of farmers regarding better health, breeding and feed and fodder management practices. Government organizations must set up animal health clinics, and KVK can arrange training in dairy farming for capacity building of farmers. Government and policy-makers should focus on strengthening the veterinary healthcare infrastructure by opening more veterinary clinics and hospitals in rural areas. Facilities for regular health check-ups and vaccination schedules for dairy animals should also be set up in study area.

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