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Feeding Practices of Livestock at Jamalpur Sadar Upazila in Jamalpur District of Bangladesh

Mahzabin Farzana[1], Shanaz Alam Sunny[1], Md. Mosharaf Hossain[2] and Mofassara Akter[1*]

[1]Department of Animal Nutrition, Genetics and Breeding, Sher-e-Bangla Agricultural University, Sher-e-Bangla Nagar, Dhaka, Bangladesh; [2]Department of Anatomy, Histology and Physiology, Sher-e-Bangla Agricultural University, Sher-e-Bangla Nagar, Dhaka, Bangladesh

***Corresponding author:** Mofassara Akter; E-mail: makter.angb@sau.edu.bd

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ABSTRACT

This study assessed livestock feeding practices, feed resource utilization, and rice straw feeding methods in Jamalpur Sadar Upazila, Bangladesh. A field survey was conducted among 20 small, medium, and large farms using a structured questionnaire. Information on livestock population, feeding systems, milk yield, and animal health was collected through interviews and on-farm observations, and data were analyzed using Microsoft Excel. The livestock composition consisted of 56% cattle, 29% dairy cows, and 14% small ruminants, with crossbred cattle accounting for 64% of the total herd due to their higher milk-producing potential. The average daily milk yield was 6.0 L for crossbred cows and 1.5 L for indigenous cows, contributing to a total daily production of 553 L across the surveyed farms. Commercial feeding systems were practiced by 40% of large farms, whereas small and medium farms predominantly relied on traditional or mixed feeding systems (15% and 45%, respectively). Rice straw was used as a major roughage source in all farms; 80% used unprocessed straw and 20% used processed forms. Additionally, 45% of farmers practiced grazing, while 55% provided cut-and-carry grass. Unconventional feed resources such as vegetable waste, rice gruel, and fruit peels were also used. The findings indicate that most farmers in Jamalpur Sadar Upazila possess limited knowledge of scientific feeding practices, resulting in predominantly traditional systems that do not meet optimal nutritional requirements. Strengthening farmer training, promoting balanced ration formulation, and encouraging improved straw processing technologies are essential to enhance livestock nutrition and productivity in the region.

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Introduction

Bangladesh is predominantly an agricultural country where the livestock sector plays a vital role in accelerating economic growth. The recent structural change in the economic development which has been transforming from low income to middle-income country might have consequences on the changing livestock farming practices to cope with this pace of development. Appropriate feeds and feeding systems are the major drivers for livestock development (Uddin et al. 2019). Though in Bangladesh the livestock sector is becoming improved day by day individual productivity of animals is not improving. Improper feed supply and traditional feeding system is one of the main reasons for this hindrance to productivity. Moreover, genetic potential, health condition, management system is also related to the productivity of the animal. Quddus et al. (2017) reported that the performance of the crossbred cattle was better than that of indigenous cattle in respect to milk production, profitability and input used and reception of extension services was higher for crossbred cows (67.2%) than that of indigenous (32.8%). Rashid et al. (2007) reported that the average milk production per day per cow was 5.78 liter in the study farms of Jessore. Vaccination and deworming practices are necessary to prevent disease outbreaks. Irrespective of areas regular cleaning, de-worming, vaccination was 88.52%, 67.61%, and 63.37% respectively (Amin et al., 2020). About 14% of livestock owners follow vaccination programs to keep better their animals from viral or bacterial infections (Alam et al., 2016).

Feed is any ingredient fed to an animal to sustain them which is rich in a nutrient that furnishes animal and enhancing its productivity. Feeding is the act of supplying feed ingredients. Feeding has a direct impact on the growth rate and health status of the animal. A feeding system can be defined as an organization of the allocation of feed resources to group animals for at least one production cycle (Roggero et al., 1996). Roggero et al. (1996) also reported that to analyze feeding systems require investigations in farm operations where farmers are monitored and interviewed about their practices and behavior in terms of management, feeding scheme, feed storage, and supplementation. It was reported that the cattle feeding system is mostly intensive (77%) followed by semi-extensive (23%) in the survey area (Amin et al., 2020). Besides feeding, rearing is important for animal production. Crossbreed cattle are highly susceptible to disease than indigenous and its better rearing of crossbreed cattle in semi-intensive and intensive systems. It was found that farmers have used half grazing (39.97%), full grazing (33.63%), and stall feeding (26.40%) cattle rearing systems (Amin et al., 2020).

Animals know how to auto-regulate and they stop eating once they feel satisfied. So, the supply of nutrient-rich feed is essential for both the maintenance and production of animals. Otherwise, malnutritional consequences occurred frequently. Islam et al. (2002) mentioned that this situation of undernutrition is aggravated by the unsystematic feeding practices exercised by the farmers, which depend on the seasonal availability and consistent natural hazard. During the dry season, there is a shortage of feed supply and the nutritive value of feed is low. Effective utilization of feed resources and appropriate supplementation is necessary during this scarcity period. Most rural farmers are not concerned about the nutritional way of feeding because of lacking knowledge about feeding. Hossain et al. (1999) and Rahman et al. (1998) explained that traditional knowledge on cattle feeding like chopping of straw, mixing of green grass with straw, feeding tree leaves etc. were practiced by the rural farmers.

Rice straw is the main roughage for dairy cows, which is low in nutritive value and palatability but it contributes 90% of the roughage feed to animals (Khan et al., 2009). Aquino et al. (2020) reported that the high silica and lignin contents of straw also contribute to poor nutrient (DM and protein) digestibility (<50%). So, pre-treatment of straw is necessary to enhance its contribution to improve meat and milk production. Khan et al. (2014) reported that among the five farmers of Jamalpur district no one used processed straw.

Most farmers rely on a combination of home-produced and purchased feeds. Rahman et al. (2013) found that 84% of farmers used both sources, 15% depended solely on purchased feeds, and only 1% relied entirely on their own production. Cultivation of green fodder such as Napier and German grass remains limited. Amin et al. (2020) documented fodder cultivation rates of 3.45%, 3.85%, 6.67%, 14.89%, and 39.62% in Mymensingh, Tangail, Kurigram, Sylhet, and Jessore districts, respectively. The present survey on livestock feeding practices in Jamalpur Sadar Upazilla was conducted to assess the livestock population and feed availability, identify common feeding methods and technologies used to improve feed quality, evaluate management and health conditions and understand farmers' challenges and suggest possible improvements.

Materials and methods

Study area and period

A field survey was conducted by collecting data from 20 farms including smallholder households and larger commercial farms in Jamalpur Sadar Upazila under Jamalpur district, Bangladesh (Figure 1). Data were collected over a five-month period from 15 March to 21 August 2021.

Survey design and procedure

A structured questionnaire was developed and designed to collect the primary data. The survey was conducted through direct farm visits and face-to-face interviews with farmers while maintaining appropriate health and safety precautions during the COVID-19 pandemic. Secondary data were also obtained from various journals, the Upazila Livestock Office, and the Veterinary Hospital of Jamalpur Sadar.

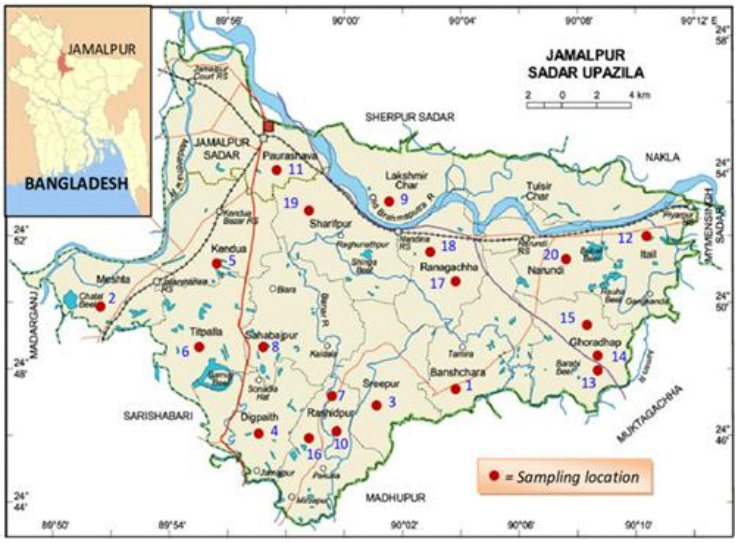

Figure 1. Map of Jamalpur Sadar Upazilla of Jamalpur District

Data collection

Information was gathered through direct observation and repeated questioning of farmers. Before each interview, the objectives of the study were clearly explained to respondents. The questionnaire included questions on farm characteristics, livestock species and breeds, milk yield, feeding practices, feed types and quantities, methods of rice straw utilization, health management, and farmers' training or knowledge on feeding.

Data analysis

All collected data were compiled and organized using Microsoft Excel 2019. Descriptive statistics such as frequency and percentage were computed to summarize the results and identify patterns in feeding systems, feed resource use, and management practices.

Results and Discussion

Livestock population, breed composition, and milk production

The survey has evolved a total of 305 livestock (cattle, goat, sheep) during the survey period where cattle were 56%, dairy cows 29%, goat/sheep 14% were shown in (Table 2). According to the Upazila Livestock Office (2020), the total livestock population in Jamalpur Sadar comprised 114,320 cattle, 55,960 goats, and 27,330 sheep (Table 1). Both indigenous and crossbred cattle were reared in the area, with 36% indigenous and 64% crossbred animals (Figure 2). The dominant crossbreeds were Australian Friesian, Sindhi, and Sahiwal crosses. This finding is comparable with Alam et al. (2016), who reported that 95% of cattle in municipal areas were crossbred, while Siddiquee et al. (2013) observed a higher proportion of indigenous breeds (58.4%) in Mymensingh.

Table 1. Livestock population at Jamalpur Sadar Upazila of Jamalpur District

Cattle	Buffalo	Goat	Sheep	Chicken	Duck	Pigeon	Quail	Pig
114320	4320	55960	27330	201600	118340	3234	1234	72

(Source: Upazila Livestock Office and Veterinary Hospital, Jamalpur Sadar, 2020)

Table 2. Average livestock population at Jamalpur Sadar Upazila of Jamalpur District

	Types of animals	Mean ± SD
	Cattle	8.6 ± 8.8
	Dairy Cow	4.4 ± 7.6
	Sheep/Goat	4.1 ± 2.2

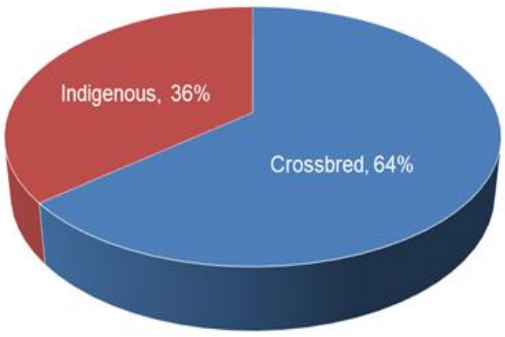

Figure 2. Cattle breeds in Jamalpur Sadar Upazila of Jamalpur District

Milk production data indicated that farmers preferred crossbred cattle due to their high yield. The total milk yield from 89 dairy cows was 553 L/day, average milk yield was 29.00 L/day, 6.00 ± 2.15 L/day for crossbred and 1.5 ± 0.37 L/day for indigenous cows (Table 3). Similar trends were reported by Hossain et al. (2005), where crossbreds produced 10.4 L/day and indigenous cows 2.4 L/day. Low productivity in local cattle is largely attributed to poor genetics and feeding management (Rahman et al., 1998).

Table 3. Milk production of dairy cows at Jamalpur Sadar Upazila of Jamalpur District

No. of dairy cow/day	Total milk yield/day	Average milk yield/day	Milk yield of crossbreed cow/day	Milk yield of indigenous cow/day
89	553 liter	29 liter	6 ± 2.15	1.5 ± 0.37

Health status of livestock

The health survey revealed that 13.5% of cattle, 17.0% of dairy cows, and 20.0% of goats/sheep were affected by diseases such as bloat, mastitis, naval ill, pneumonia, and parasitic infections (Figure 3). These values are lower than disease prevalence rates reported by Islam et al. (2013), Subir and Islam (2011), and Rahman et al. (2011), which ranged from 20.5% to 55% in other regions. Differences may result from variations in climate, management, and veterinary support. About 40% cattle, 50% dairy cow, 22% sheep and goat were vaccinated but maximum farmer vaccinated their animal after disease occurrence. Common vaccines included FMD, anthrax, and black quarter, while anthelmintics such as *Renadex, Lt-Vet, Antiworm, Piper Vet*, and *Ivermectin* were frequently used. Siddiquee et al. (2013) reported that a large number of farmers (59.4%) are not attached to the vaccination program. Deworming status is slightly better in this area and about 75% cattle, 67% dairy cow, and 44 % goat and sheep were dewormed under deworming program.

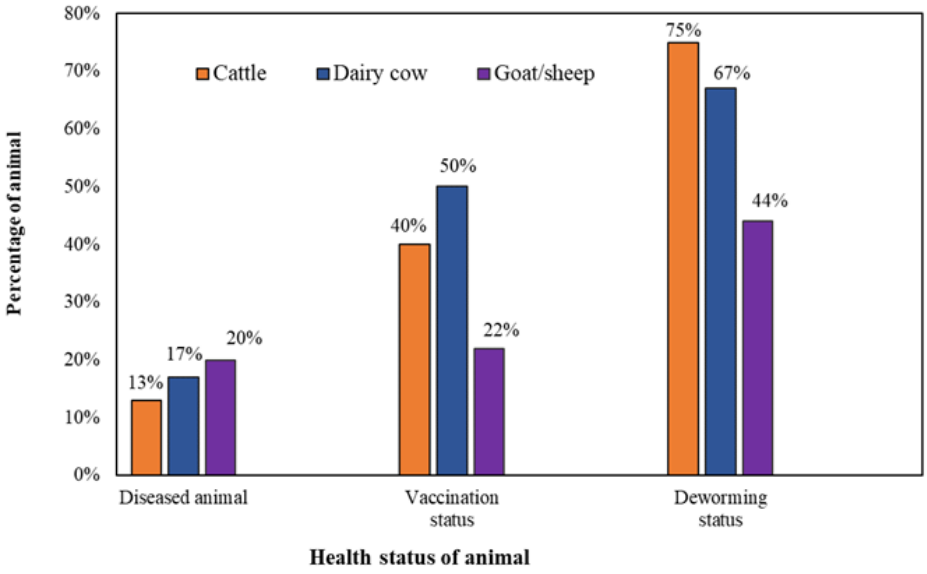

Figure 3. Health status of livestock in Jamalpur Sadar Upazila of Jamalpur District

Rearing systems of livestock

Three main rearing systems were practiced in the study area such as intensive (55%), semi-intensive (35%), and extensive (10%) (Figure 4). Intensive rearing predominated among medium and large farms, while small ruminants were mostly reared under semi-intensive systems. These results differ slightly from Rahman et al. (2013), who reported 80% semi-intensive, 17% intensive, and 3% extensive rearing in other regions. Most farmers housed animals in tin-shed or semi-pucca buildings, though many farms lacked proper sanitation and ventilation.

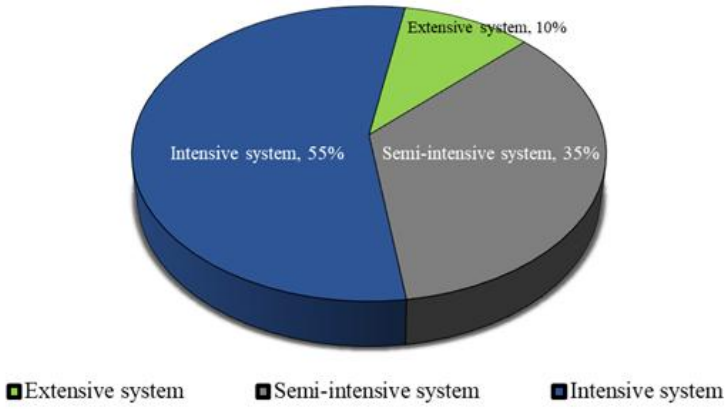

Figure 4. Rearing system of Livestock in Jamalpur Sadar Upazila of Jamalpur District

Feeding systems of livestock

Feeding systems in Jamalpur Sadar were classified as traditional (15%), commercial (40%), and mixed (45%) (Figure 5). In traditional systems, animals grazed freely on natural vegetation, whereas commercial farms practiced stall feeding with formulated diets. Similar findings were reported by Hossain et al. (2005), where 63% of farmers followed stall feeding and 37% combined stall and grazing systems. Traditional feeding relied mainly on rice straw and native grasses with minimal concentrates (Khan et al., 2009).

Available feedstuffs for livestock

The main feed resources included rice straw, rice bran, wheat bran, oil cakes, crushed maize, green grasses (Napier, German, roadside grasses), and tree leaves. Some farmers also used unconventional feeds such as fruit peels, spoiled potatoes, vegetable waste, and water hyacinth. The average amount of supplied feed was recorded (Table 4) that were rice straw 5.3 kg/day/animal, green grass 6.45 kg/day/animal, concentrates 2.12 kg/day/animal and compound feed 1.63 kg/day/animal for cattle, rice straw 4.2 kg/day/animal, green grass 10.81 kg/day/animal concentrates 2.17 kg/day/animal and compound feed 3.45 kg/day/animal for a dairy cow, rice straw 0.5 kg/day/animal, green grass *ad libitum*, concentrate 0.08 kg/day/animal and compound feed not used for goat/sheep. Rice straw is used as basal feed during a shortage of green roughage. Its digestibility ranged from 45–50% (Aquino et al., 2020). Dairy cows were supplemented with calcium and multivitamins, while other cattle received zinc and liver tonics.

Table 4. Average amount of supplied feed (Kg/day/animal) in Jamalpur Sadar Upazila of Jamalpur District

Feed items	Cattle	Dairy Cow	Sheep/Goat
Rice straw	4.45	3.50	0.50
Green grass	6.45	10.81	*Ad libitum*
Concentrates	2.12	2.17	0.08
Compound feed	1.63	3.45	-

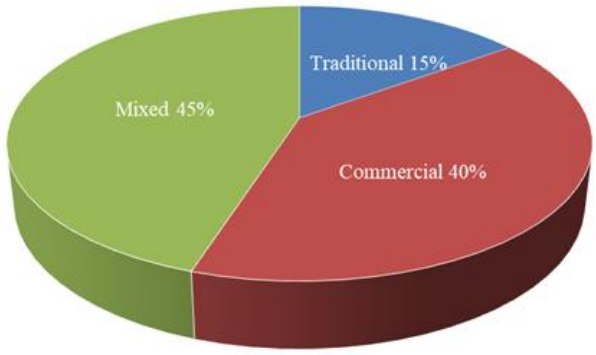

Figure 5. Feeding system practiced in Jamalpur Sadar Upazilla of Jamalpur District

Grazing practices of livestock

It was observed that among the 20 surveyed farms in Jamalpur Sadar, approximately 45% provided grazing facilities for their animals, while the remaining 55% practiced stall feeding without access to grazing (Figure 6a). Two main grazing systems were identified in the study area: full-time grazing (22%) and half-time grazing (78%), as illustrated in (Figure 6b). Green grass was supplied to the animals through two approaches. In intensive rearing systems, farmers adopted a cut-and-carry method, transporting green fodder to the animals. Conversely, in semi-intensive and extensive systems, animals were allowed to graze freely in open fields. The duration of grazing in Jamalpur Sadar ranged from a minimum of 4 hours to a maximum of 10 hours per day. Amin et al. (2020) reported similar durations (6–10 hours/day) in Rajshahi district. Cut-and-carry feeding was common in intensive farms, whereas semi-intensive farms allowed open grazing. Khan et al. (2009) reported that local cattle are typically provided with up to 1 kg of concentrate daily, usually rice polish.

Feeding methods of livestock

Most farmers (75%) offered a mixed diet of rice straw, green grass, and concentrate, while 15% used straw–grass–compound feed combinations and 10% relied on straw–concentrate diets (Figure 7). According to Khan et al. (2014) most of the farmers (48%) were using a diet of straw, green grass and concentrate, 40% of them used straw and concentrate and the rest of them (4%) used green grass and concentrate.

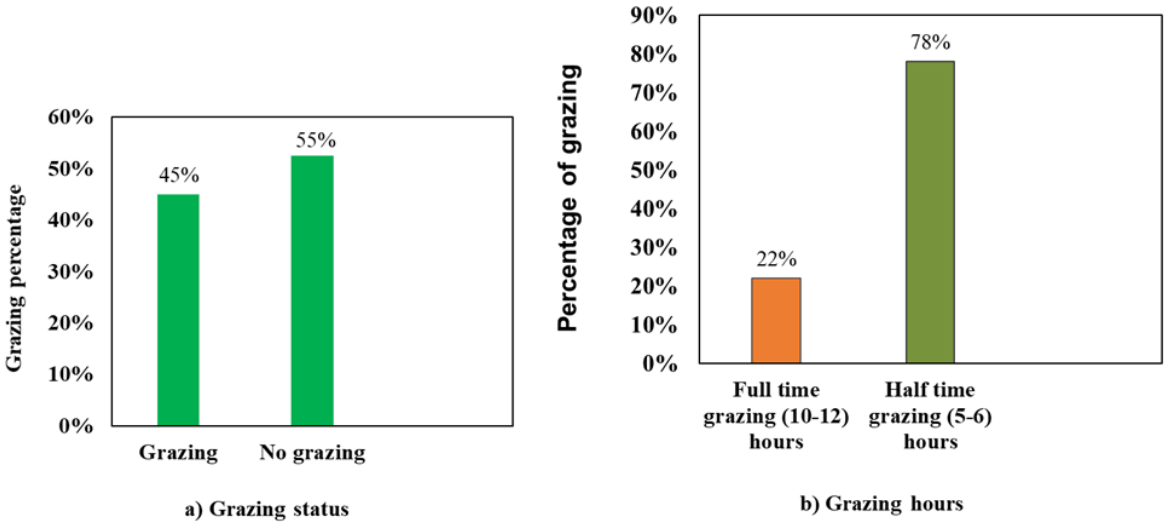

Figure 6. Grazing status of livestock in Jamalpur Sadar Upazilla of Jamalpur District

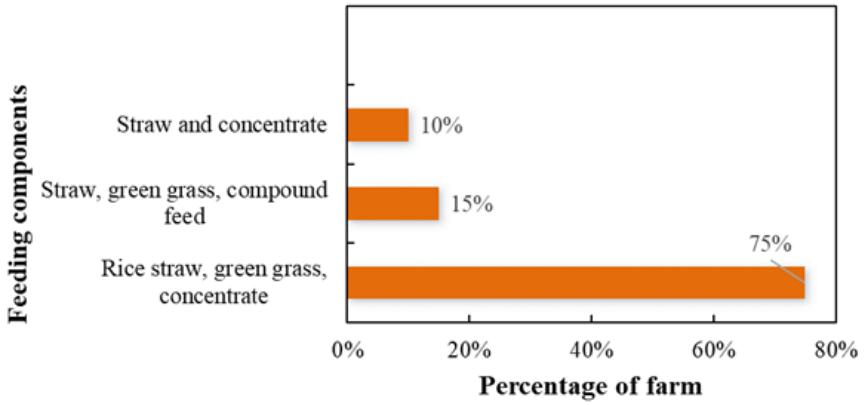

Figure 7. Feeding methods practiced in Jamalpur Sadar Upazilla of Jamalpur District

Rice straw utilization

Rice straw was fed mainly without processing (80%), and only 20% of farmers practiced simple physical treatment such as chopping or soaking (Figure 8). Untreated straw, though widely used, has low protein (3–7%) and high lignin content, limiting its digestibility (Shen et al., 1998; Mallik et al., 2015). Chemical or biological treatments could improve its feeding value (Ibrahim et al., 1983), but such practices were absent in the study area.

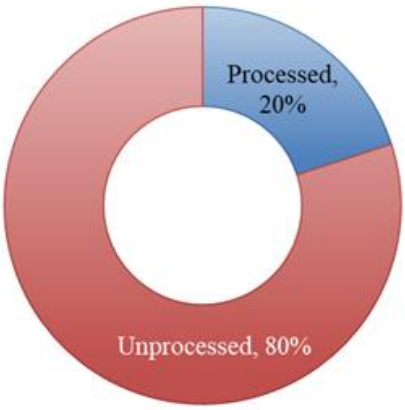

Figure 8. Rice straw feeding systems in Jamalpur Sadar Upazilla of Jamalpur District

Constraints and farmer suggestions

The major constraints identified were scarcity of quality feed and fodder, high feed cost, limited grazing land, poor veterinary services, and inadequate credit and marketing support at Jamalpur Sadar Upazila (Figure 9). These findings align with Rashid et al. (2007), who reported that 98% of farmers faced feed shortages and 86% lacked access to credit. Farmers suggested improving fodder cultivation, reducing low-yield animals, ensuring affordable veterinary care, and strengthening support from the Upazila Livestock Office.

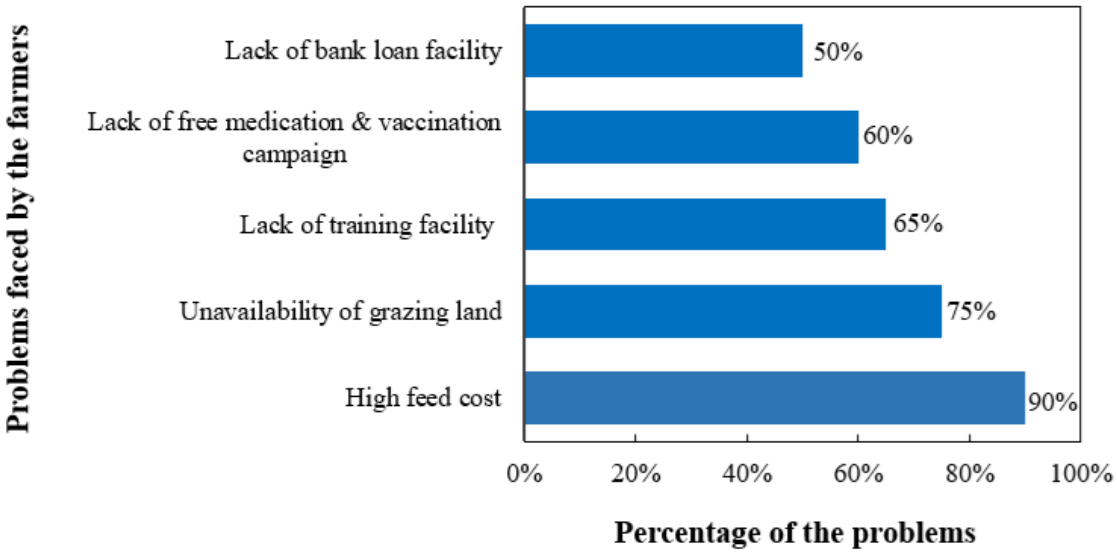

Figure 9. Problems faced by the farmers in rearing livestock in Jamalpur Sadar Upazila of Jamalpur District

Conclusions

The survey revealed that overall feeding and rearing systems were largely unscientific, with poor hygiene and inadequate disease management, and limited livestock productivity. The amount of supplied feed to the livestock was in improper ratio. In addition, processed straw was used by only few farmers. Vaccination and deworming status were not in appropriate frequency. To improve production, immediate interventions are required, including farmer training on feed formulation, feed processing, and proper livestock management. The study recommended that feeding balanced ration and processed straw to the animal can improve the production of animal. Besides awareness campaigns, workshops, and free veterinary services could enhance animal health. Government attention is also needed for suitable livestock development in Jamalpur Sadar Upazila such as providing credit/loan or another facility to the farmer that can attract more farmers.

Conflict of interest statement

The authors declare that there is no conflict of interest that could be perceived as prejudicing the impartiality of the research reported.

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