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The Existing Management Practices of Buffalo production at Selected coastal areas of Bhola in Bangladesh

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Abstract

The aim of the study was to gather information on buffalo management practices at the domestic level as well as the status of farmers and the problems they confronted with likely solutions in selected coastal areas of Bangladesh. The data was collected from a random sample consisting of one hundred twenty (120) farmers residing in two coastal upazillas (Charfesson and Monprura) of Bhola district through the questionnaire from October 2023 to June 2024. The Buffalo management was practiced by male keepers (79.17%) in the age group of 25-40 years (45.83%) who completed fundamental education (48.33%) and possessed to a small category (49.17%) whose principal profession was agriculture (47.5%). Approximately 75.83% of farmers used their capital, while 95.83% practiced buffalo rearing without training. About three-fourths (72.5%) did not aware about the house of buffalo. Among them the shelters provided basically at night (77.5%), majority of them had the tinned roof (91.67%), the muddy floor (95.83%), the inappropriate space of the floor (57.5%), and the inappropriate drainage system (60%). The maximum farmers (91.67%) practiced pasturage of their buffalo from dusk to down in public lands but did not feed any concentrates. No farmer acknowledged any feeding technology, provided mineral vitamin supplements or probiotics, and followed the feeding of balanced rations. The clean drinking water supply (4.17%) was also a deplorable practice. Natural breeding (84.17%) was higheras buffalo show heat mainly in winter. About 44.17% and 67.5% of farmers practiced vaccination and deworming, respectively. The general observations indicated that the practices of scientific management to reduce the innate capacity of the buffalo were not followed, food scarcity is the most common problem and, therefore, the management practices were not optimal and require to be modified through training, encouragement and offering extension services to improve their current socioeconomic status.

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1. Introduction

The agricultural sector is the backbone of Bangladesh, where livestock contributes a fundamental role. The Asian buffalo, essentially the *Bubalus bubalis*, plays a vital role as livestock in tropical and subtropical regions (Suhail *et al*., 2009), plays a crucial role in the rural economy by providing dairy products and protein sources (Ghaffar *et al*., 1991). Among domesticated animals, Asian buffalo potentially offers the highest output and utilization (Cockrill, 1994). The total buffalo populations in Bangladesh are 15.16 Lakh heads (DLS, 2023). Approximately 42.8% of the

nation's buffalo reside in its sugarcane regions, about 39.9% are in coastal areas, while roughly 11.8% inhabit swampy lands in this country (Faruque *et al.,* 1990). The buffalo's share of milk and meat production in Bangladesh constitutes a relatively minor fraction, at approximately 2.0% and 0.94% respectively, of the total national production (DLS, 2023). In Southeast Asia and Southern Asia, buffalo agriculture has garnered significant popularity; however, its merits are often overlooked by policymakers and researchers in Bangladesh, leading to inadequate consideration of its potential (Banerjee, 2018). Rural women of farming communities can elevate their socio-economic standing by engaging in buffalo rearing, presenting a pivotal pathway towards alleviating poverty (Kalash *et al.*, 2009; Sarkar *et al*., 2013; Amin *et al*., 2015).

Bangladesh's buffalo population exhibits high productivity, stemming from their exceptionally high production potential, enhanced capacity to effectively utilize limited resources of high-quality feed, as well as their robust resistance to endemic diseases and adaptability to prevailing climate-related challenges, particularly in coastal regions where environmental risks are most pronounced. Geographical siting, land suitability for grazing, climatic conditions, and the scarcity of job prospects in the southwestern coastal area of a particular country collectively influence the prevalence of buffalo rearing as a predominant occupation amongst its local inhabitants. Inhabitants of this geopolitical area engage in home-based buffalo husbandry while also adopting a communal approach known as the Bathan system, characterized by unfettered access to resources. Conventional buffalo husbandry practices exhibit numerous drawbacks warranting reconsideration of underlying factors contributing to suboptimal outcomes. The buffalo's inherent genetic potential is largely contingent upon the management practices employed in its breeding and upbringing. Implementation of scientific management techniques is likely to yield heightened productivity. A more comprehensive comprehension of current buffalo breeding methodologies employed in coastal areas is required to elucidate the SWOT (strengths, weaknesses, opportunities, and threats) characteristics of breeding systems and to develop targeted intervention strategies. Variations in climate, pedology, husbandry techniques, and alimentary patterns in Bangladesh significantly influence the diversity of the buffalo production system (Saadullah, 2012; Rahman *et al.,* 2018). In domestic scenarios, village-based subsistence agriculture and extensive free-range farming, commonly referred to as Bathan, facilitate the management of buffaloes in saline coastal ecosystems (Huque and Borghese, 2013). In Bangladesh, buffalo reared in low-entry production systems comprise a significantly higher proportion, estimated at 90%, whereas those raised in half-entry systems manifest a notably lower prevalence, corresponding to approximately 10% (DLS, 2023). Several reports on the state of farmers and buffalo management systems have been published (Faruque and Amin, 1995; Sarkar *et al.,* 2013; Amin *et al.,* 2015; Hasan *et al*., 2016; Uddin *et al.*, 2016) in several locations of Bangladesh. Despite the prevalence of buffalo management in coastal regions across Bangladesh, notably in Buffalo, diligent research on buffalo management practices and challenges in these areas is notably scarce. A comprehensive understanding of the prevailing buffalo management systems in domestic agriculture of the coastal regions in Bangladesh is essential to inform the development of buffalo production at the localized, domestic level. This investigation was undertaken to acquire empirically informed knowledge regarding buffalo husbandry practices currently employed by buffalo owners participating in household farming systems in coastal regions, along with the identification of existing limitations and potential solutions to facilitate buffalo development in these areas. The information obtained from this study could serve as a basis for adopting feasible and relevant scientific rearing practices for the development of buffalo in coastal areas that can help improve their level of production to promote the economic status of farmers. These findings of the conducted study provide a foundation for the implementation of

scientifically informed rearing methodologies in coastal buffalo farming, which can enhance production capacity and contribute to improved financial well-being of stakeholders.

2. Literature Review:

Buffalo farming is an important component of the agricultural system in the coastal areas of Bangladesh. These coastal regions are vulnerable to the impacts of climate change, such as cyclones, rising temperatures, sea level rise, and coastal flooding, which can pose significant challenges for buffalo husbandry (Paul & Vogl, 2010). Bangladesh is one of the most vulnerable countries to the effects of climate change, and the livestock sector, including buffalo farming, is a critical part of the country's food security (Ali *et al.,* 2020). The impacts of climate change on livestock health and the emergence of new diseases are of particular concern in this context (Ali *et al.,* 2020). Previous studies have highlighted the potential for diversification from crop to livestock production as an adaptation strategy for smallholder farmers in the face of climate change. The water buffalo, in particular, has been identified as a transformative opportunity for farmers seeking to adapt their livelihoods to the changing climate (Escarcha *et al.,* 2019).

The coastal regions of Bangladesh are home to the Sundarbans, a vast mangrove forest that serves as a natural barrier against the impacts of climate change, such as cyclones and coastal flooding. However, the proliferation of coastal aquaculture, including shrimp farming, in these areas poses its own set of challenges, further compounding the challenges faced by buffalo farmers (Paul & Vogl, 2010). The Bhola coastal area of Bangladesh presents a unique environment for livestock rearing, particularly for buffaloes, demanding specific husbandry practices tailored to the region's distinct ecological and socio-economic conditions (Sarker *et al*., 2018). The Bhola coastal area in Bangladesh is known for its diverse agricultural practices, including the rearing of buffalo livestock. Bangladesh is home to a significant population of buffaloes, which play a crucial role in the country's dairy and meat production (Rahman *et al*., 2020). Although the trend of increase in buffalo population in recent years has been relatively higher than that of cattle, the contribution of buffalo milk to national production in Bangladesh remains relatively low at only 2%, a stark contrast to the much more substantial contributions of 51.2%, 59.5%, and 66.6% in India, Pakistan, and Nepal, respectively (Rahman *et al*., 2020). This discrepancy highlights the untapped potential for buffalo husbandry in Bangladesh, particularly in the Bhola coastal area, where the climate and environmental conditions are well-suited for buffalo rearing. Buffaloes are known for their resilience to harsh climates, including the frequent floods, droughts, and high tidal waves that characterize the Bhola coastal region. They can thrive with minimal or no housing facilities, making them an attractive option for smallholder farmers in the area. Moreover, buffaloes' innate resistance to various tropical diseases further enhances their suitability for the region, as they are able to withstand the unique challenges posed by the coastal environment (Rahman *et al.,* 2020). A baseline survey conducted across different river basin areas in Bangladesh, focusing on seasonal feed availability, utilization of fodder resources, and livestock production systems, revealed that a significant proportion of households (approximately 51%) are landless (Sarker *et al.,* 2018). To better understand the existing buffalo husbandry practices in the Bhola coastal area, this study employed a comprehensive research approach.

2. Materials and Methods

2.1 Study area and farmers' selection

The study was conducted in two Upazilas of the Bhola coastal district called Charfesson and Monpura (Figure 1) of Bangladesh. The researchers contacted the government breeding and the veterinary officers of the selected upazilas to collect information about the pockets of the domestic buffalo population in the areas under their respective jurisdiction. Buffalo farmers thus identified, were also contacted to get help to locate other farmers in their locality. Having

compiled a list of buffalo farmers in each Upazila, the respondents who had at least two buffalo were selected for the study. A total of 120 farmers (5 of each union) of domestic agriculture adopting PPRS (random proportional probability sampling) of Lahiri (Snedecor and Cochrane, 1989) were selected.

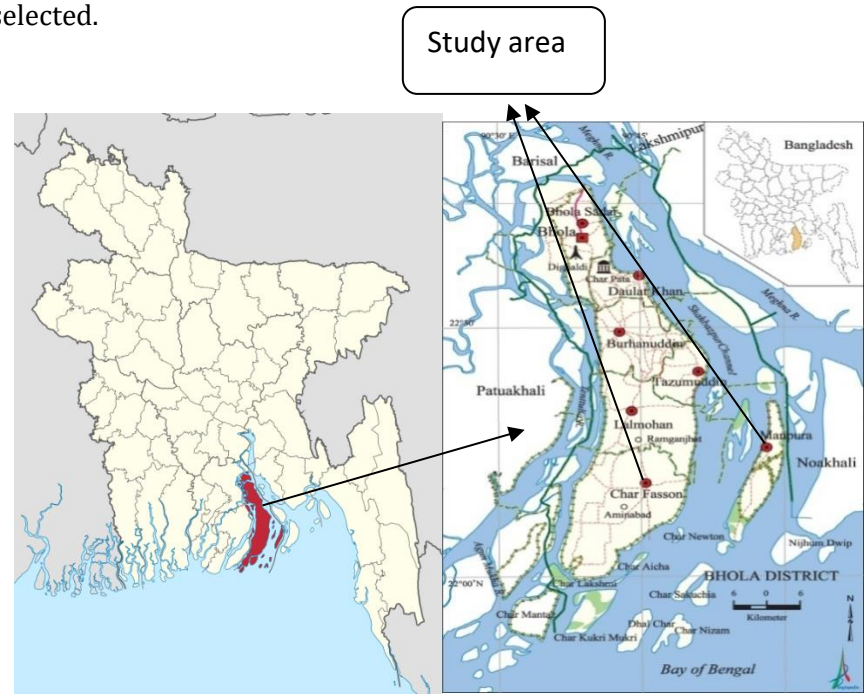

Fig 1: Location map for study area

2.2 Development of interview schedule and data collection

An interview time table was carefully prepared that provided an open and closed form of questionnaire taking into account the targets of the study. The draft of the interview time was previously examined in the field amongst a few guardians of Buffalo and was corrected accordingly before the compilation of the final report. Earlier than interviewing, the goals of the study have been certainly explained to the participants and encouraged them to offer precise data. The questions had been asked very simply with a brief were essential. The information had been collected from October 2023 to June 2024 through physically direct interviews with the guardians and the findings were additionally applied.

2.3 Statistical analysis of data

All the data collected were verified and verified crossed before transferring to the master leaves. The data were analyzed with the help of the SPSS-V-16 computer package program.

3. Results and Discussion

3.1. Socio-economic status of the farmers

Buffalo Farming was a supplementary supply of income for almost all buffalo keepers. People of all aspects of society, irrespective of religion, home size, education, profession, and economic history. Of the 120 participants, more than three-fourths (79.17%) have been men, whereas in an age variation of 26-40 years (45.83%) accompanied by 41-55 years (29.16%), up to 25 years (15.83%), and over 55 years 10.00%), respectively. Around 65.83 % of farmers' domestic size became more than five, and half of (48.33 %) of guardians had primary-stage education. Around half of the buffalo guardians (49.17%) possessed to the small category (0.25-2.5 acres) of the farmers. Most people of interviewee (47.5%) had been dedicated to agriculture, which includes the breeding of different livestock (Table 1).

Table 1. Socioeconomic status of the farmers (n=120)

Topics	Variations	Total number	Percentage
Age (Years)	Up to 25	19	15.83
	26-40	55	45.83
	41-55	35	29.16
	Above 55	12	10
Sex	Male	95	79.17
	Female	25	20.83
Hosehold size (In Number)	Not cross 5 members	41	34.17
	Above 5 members	79	65.83
Stage of education	Illiterate	40	33.33
	Primary	58	48.33
	SSC	15	12.5
	Above SSC	7	5.83
Land Possession	Landless (00-0.49 acres)	10	8.33
	Low (0.25-2.5 acres)	59	49.17
	Medium (2.51-7.5 acres)	44	36.67
	High (7.51+acres	7	5.83
Profession	Agriculture	57	47.5
	Job Holder	7	5.83
	Business	26	21.67
	Job seeker	12	10
	Others	9	7.5
Training received	Yes	5	4.17
	No	115	95.83
Source of asset/Financial aid	Own asset	91	75.83
	Loan from bank	13	10.83
	others	16	13.33

All farmers had acquired their understanding and enjoy in elevating buffalo from the predecessors in their family and/or neighboring farmers of Buffalo, and some of them (4.17%) participatedin learning buffalo control practices. The preceding surveys (Islam *et al*., 2017) had shown that the highest percentage of buffalo farmers was inside the age organization of 26 to 40, which participated in agriculture and the average size of the family was 6.17 people. Sarkar *et al*. (2013) noted that 30% of Buffalo farmers from the Bagerhat district in Bangladesh completely depended upon Buffalo breeding, but none of them got the buffalo breedingtrainingn. There, 82.5% of farmers used their asset, and the remaining managed capital by having a bank loan or NGOs and different sources to buy and/or increase buffalo.

3.2. Demographic distribution

Buffalo in the study areas were predominantly maintained by indigenous agriculturalists (95%), exhibiting distinct phenotypic variations without standardized classification. Remaining participants managed crossbred herds or combined indigenous and hybrid populations. Building upon foundational research, Hamid *et al*. (2016) identified Bangladeshi buffalo populations as primarily river-type indigenous genotypes, with limited swamp varieties observed in eastern regions. Different populations crossed with Murrah, Nili-Ravi, Surti, and Jaffrabadi are available to the Indian border of Bangladesh (Huque and Borghese, 2013).

3.3. Husbandry practices

Herd size

Most (75%) of the farms included more than 6 buffalo that reared in bathan (presented in figure 2). The small size of the flock less than 6 in home agriculture is because of the problem of the raising a huge number of buffalo in the confined area, but prefer to raise in char or bathan/open places.

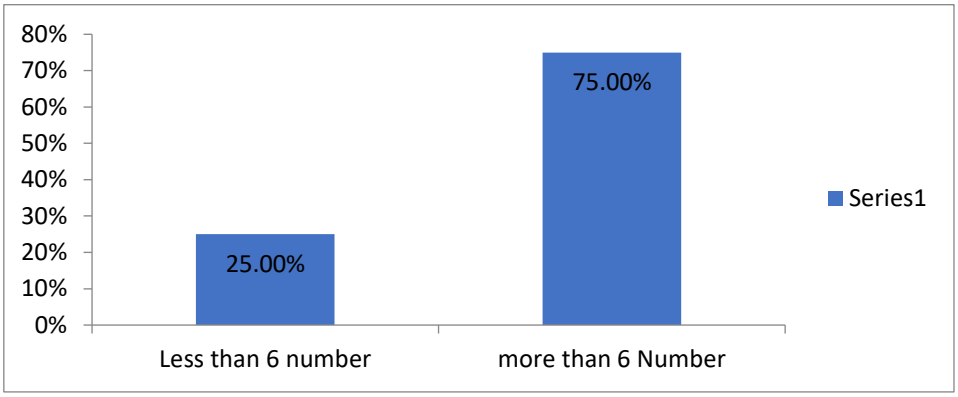

Fig 2: Herd size of Buffalo

Most agricultural operators (91.25%) maintain female buffalo herds primarily for dairy production and offspring generation, with male calves typically marketed post-weaning or during early maturation (2-2.5 years).These findings align with Rahman *et al.*(2018), whose evaluation of semi-intensive systems in Bhola district documented an average herd size of 1.80 ± 0.12. A pattern reinforced by coastal region analyses. Karim *et al.*(2013) observed flocks ranging 3-4 head in Pirojpur and Borguna territories. Notably, non-coastal domestic operations show comparable trends: Uddin *et al.*(2016) reported 82% of households managing 1-3 buffaloes, with clear gender disproportion favoring females. A strategic herd composition favoring productive assets.

Housing practices

Table 2. Existing Housing practices (n=120)

Topics	Class	Total number	Percentage
Providing shed	Shed with no fence	22	18.33
	Fenced homing system	11	9.17
	No arrangement of house	87	72.5
Sheltering period	All time	0	0
	Only during night	93	77.5
	Only in utmost weather	27	22.5
Homing systems	Inside the house	1	0.83
	Near the dwelling house	36	30.0
	different buffalo shed	83	69.17
Roof type	Made of local materials	10	8.33
	Tin shed	110	91.67
	Cemented shed	0	0
Category of flooring	Muddy	115	95.83
	cemented	5	4.17
Sufficiency of floor space	Enough	51	42.5
	Not enough	69	57.5
Drainage system of waste material	Good	48	40.0
	Not so good	72	60.0
Waste disposal	Compost fertilizer pit	91	75.83
	any place	14	11.67
	Biogas	2	1.7
	Applied to the agricultural land	13	10.83
Manager (Concrete)	concreted	74	61.67
	Not copncreted	46	38.33
Provided bedding equipment during cooler season	Yes	48	40.0
	No	72	60.0
Weltering facilities	Sufficient	118	98.33
	Insufficient	2	1.7

Most farmers (72.5%) did not exercise to provide shelter to their buffalo (Table 2). During the day/night, they placed their buffalo near the farm without any shelter or in an elevated location in an open location, which is poor housing management. Hasan *et al.* (2016) noted that 48.57% of buffalo keepers did not offer any residence for buffalo, while 31.42% of farmers had conventional buffalo shelter without enclosure and 20% of buffalo owner had a housing system surrounded in the district of Bhola. According to Siddiki (2017), 100% of Subornochar farmers, 70% of Bagha,80% of Trishal, and 45% of Lalpur sub district did not aware about the residence for buffalo under a semi -intensitive system. Among the participants who provided a shelter, which was basically at night, they interested to keep their buffalo very close to their home so that they could notice them more easily. They provided a shelter, a muddy floor but inappropriate place for their buffalo. These observations are in line with the results of Rahman *et al.* (2018) who enumerated that some farmers built the floors with brick, some sheds have roofs of tin, but many shelter did not have a boundary wall. Akbar *et al.* (2009) found that most of the lactating buffalo was not placed in large -scale corner areas, but buffalo, who were in ordinary ground, sometimes had a cover with only the roof of straw or tin without wall and floor always remain muddy. About 65% of farmers did not maintain a suitable drainage system in the shelter. About 70% of farmers provided cemented nurseries, and most farmers (90%) were closer to their homes or farms. About 35% of respondents provided straw bedding in winter. The highest percentage of farmers (97.5%) stated that they had the corresponding welding equipment. The buffalo was allowed to welder in the river, canal and a large pond.Saadullah (2012) observed that the guardians of Buffalo had their welding place, but sometimes all the flock together in the mud.

Feeds and feeding of Buffalo

A substantial majority of farmers (91.67%) practiced rotational grazing of their buffalo in public areas from dawn to dusk, supplementing their fodder with locally sourced grasses such as Dal (*Saccrolepsis indicates*), Durba (*Cynodondactylon*), Halancha (*Enhydra fluctuates*), Water Hyacinth (*Eichhorniacrassipes*), as well as crops residues and fallow land materials, primarily rice straw. Moreover, the majority (95.83%) of surveyed farmers did not engage in the cultivation of highly nutritious fodder for their buffalo, a finding corroborated by Uddin *et al.* (2016) in their examination of domestic agriculture in non-coastal regions.

Amin *et al*. (2015) revealed that the most of the participants (80%) of the Upazila subornochar of the Noakhali district primarily relied on the roadside and the unused land herbs as feed source, while the remaining farmers opted for cutting and transporting pasture leaves, water hyacinth, tree leaves, and urigash, where rice straw is the main source of power. Similarly, Sarkar*et al*. (2013) reported that the majority of farmers in the Bagerhat district of Bangladesh heavily relied on grazing for their buffalo. This scarcity of nutritional needs resulted from the domestic farmers' hesitation to transition from locally available resources to more balanced feeding practices. They can easily utilize locally grown food resource. A further analysis by Rahman *et al*. (2018) highlighted that improved feeding technologies, such as straw feed, straw blocks, or urea-straw, were met with reluctance and inadequate adoption by farmers. Instead, they concurrently practiced indigenous technical knowledge (ITK) regarding buffalo nutrition. Although a minority of farmers initiated the use of minor concentrates, no mineral supplements or vitamins, or growth promoters were employed in buffalo diets Amin *et. al* (2015). Sarkar *et al*. (2013) who reported that it was not discovered that farmers would provide concentrate to their buffalo. It was amazing that most of the participants (96.25%) largely depended upon the local river/canal followed by lake water as a source of drinking water, although the water from the tubewell is available because of the unawareness of farmers.

Table 3. Existing Feeding management (n=120)

Topics	Class	Total number	Percentage
Type of feeding method	Bring from field	7	5.83
	pasturing	110	91.67
	Stall feeding	0	0
	Tethering	3	2.5
Sources of feed	Harvesting residue	11	9.17
	Bought	6	5.00
	Collected from various lands	103	85.83
Pasture land	Farmers own land	5	4.17
	By lease	8	6.67
	Local Public land	107	89.17
Cultivation of Nutritious fodder	Yes	5	4.17
	No	115	95.83
Advanced feeding methods	UMS (Urea Molasses Straw)	0	0
	UMB (Urea Molasses Block)	0	0
	Hay	1	0.83
	No acknowledged	119	99.17
Feeding of Iodized salt	Regular basis	35	29.17
	Sporadically/haphazardly	67	55.83
	Not feeding	18	15.00
supplements of Vitamin-mineral premix	Supplied	16	13.33
	Not supplied	104	86.67
Feeding concentrate feed	Supplied	32	26.67
	Not supplied	88	73.33
Sources of concentrate feed	agricultural by-products	114	95.00
	Purchase locally	6	5.00
Hormone, probiotics, and growth promoter	Yes	0	0
	No	120	100
Feeding of balanced ration	Supplied	0	0
	Not supplied	120	100
Source of drinking water	Tube-well	5	4.17
	lake	31	25.83
	Local river	84	70.00

Breeding management

In household subsistence farming, buffaloes primarily mate naturally(84.17%) and most farmers do not keep breeding bulls (Table 4). The findings of this study coincide with the observations of Uddin *et al*. (2016) who declared that the natural breeding method was followed by the majority of household farmers (95%) in Bangladesh, although the number of reproduction bulls is very minimal. Rahim *et al*. (2018) noted that all the beneficiaries of the buffalo (100%) followed natural breeding for buffalo reproduction in the Noakhali district in Bangladesh. Hasan *et al*. (2016) revealed that only 25.71% of the guardians followed artificial insemination for better production in the district of Bhola. This variation might be due to the eagerness and consciousness of farmers and also the shortage of available artificial insemination facilities in the study areas. Most farmers reported that buffalo show heat mainly in winter and cannot detect heat properly, but no one used a teaser bull to detect heat. Because Buffalo often show "heat" (estrus) during the winter season because their reproductive cycle is influenced by environmental factors like photoperiod and temperature, with many breeds showing a seasonal breeding pattern where they are most receptive to mating in cooler months, particularly in areas with significant seasonal variation in day length and temperature; essentially, the shorter

daylight hours of winter can trigger hormonal changes that lead to increased fertility in buffalo. Besides this, using a teaser bull to detect heat need much attention to rear up and lack of awareness to understand the importance of recognizing estrus (heat) at right time, that why they were not interested to use a teaser bull. After insemination, the diagnosis of pregnancy is crucial to reduce the delivery gap for next calving of buffalo. Moreover, 22.5% of buffalo keepers determined pregnancy depending on their idea not to return estrus).

Table 4. Existing Breeding management (n=120)

Topics	Variables	Total number	Percentage
Methods of identifying heat	Behavioral	120	0
	Using dummy bull	0	0
Mating type	Artificial insemination (AI)	7	70.00
	Both natural and AI	12	10.00
	Only natural mating	101	84.17
Breeding period	Summer season	0	0
	Rainy season	22	18.33
	Winter season	98	81.67
Pregnancy diagnosis procedure	Veterinarian	2	1.67
	By quack	28	23.33
	Not followed	90	75.00
Keeping breeding bull	Yes	19	15.83
	No	101	84.17
Records of breeding	Yes	13	10.83
	No	107	89.17

Around 77.5% of interviewees had not followed the veterinary field assistant (VFA)/ AI technician or veterinary doctor for the determination of pregnancy after three months of parturition. It might be due to lack of trained personnel to determine pregnancy and the farmers are engaged into another business at the same time of buffalo rearing so they can't pay much attention to buffalo. Another possible cause is the ignorance of the value to determine pregnancy in case of profitable farming. It was observed that few farmers alert in the reproduction records; However, record maintenance was incomplete due to lack of awareness. Rahim *et al*. (2018) showed that 3% of farmers maintained their buffalo records. Due to lack of their reproduction record, the farmer doesn't get right information of their reproduction history, the total cost and benefit of rearing buffalo. They also don't understand how they add more profit by reducing the reproduction interval or getting reproduction at right time. As a result, the production is getting less day by day. Poor breeding practices in buffalo herds can significantly impact the economy of buffalo farmers by leading to reduced milk production, lower calf yields, extended calving intervals, increased culling rates, and overall decreased profitability due to a lower reproductive efficiency, ultimately causing substantial economic losses for farmers relying on buffalo dairy production (Sarwat *et. al*, 2016)

Health management

About 44.17% and 67.5% of farmers didn't follow vaccination and deworming schedule properly for their buffaloes, respectively (Table 5)**.** The previous results are similar to the observations of Rahman *et al.* (2018) who found that around 65.2% and 91.3% of the farmers in the coastal regions tried to follow the vaccination and deworming schedule of their buffalo, respectively. Hasan *et al*. (2016) revealed that 74.28% and 71.4% of the farmers of the district of Bhola followed proper vaccination and deworming, respectively. Islam *et al.* (2017) illustrated that vaccination and deworming were maintained properly by 70% and 90% of farmers, respectively in their findings of several regions of Bangladesh. The reasons for the variation of veterinary

health management practice for vaccination and deworming may be due to the changing of the different survey area and the awareness of the farmers.

Table 5. Health management (n=120)

Parameters	Categories	Frequency	Percentage
Vaccinated the animal	Not followed	67	55.83
	Followed	53	44.17
Maintained deworming	Not followed	39	32.5
	Followed	81	67.5
Buffalo treatment conducted by	Veterinary doctor	7	5.83
	Quacks/AI technician	113	94.17
Providing veterinary medical services	Satisfactory	13	10.83
	Fair	32	26.67
	Not satisfactory	75	62.5
Follow quarantine	Yes	3	2.5
	No	117	97.5
Use of Disinfection in their sheds	Yes	2	1.67
	No	118	98.33
The hygienic condition of buffalo house	Good	39	32.5
	poor	81	67.5

It is well known that seasonal variation largely affects the incidence of parasitic infestation in buffalo. Some disease like coccidiosis is more prevalent in winter or less rainy period, Cryptosporidium is higher in spring and winter, Hot environment impairs reproductive functions of buffalo (Gorsich *et al*.,2014). Due this seasonal variation of the diseases the veterinary service depends upon this variation largely. At this time the Govt. offices should increase their support towards beneficiaries. We discovered that veterinary health management in case of vaccination and deworming were higher in the Bhola district than in Patuakhali. It might be due to more awareness among the people, developed transportation and all the veterinary services are available at Patuakhali district than in Bhola, as it is a district of Riverine Island. Most (95%) of the participants treated their sick buffalo by quack followed by a veterinary doctor in favor of severe cases. In other cases, 10 percent of the farmers told good medical service of the Upazila Livestock Hospital for their diseased buffalo (Table 5). Farmers living closer to Upazila's headquarters generally receive medical services easily. As a result, proper treatment was not provided to the farmers as well as the costing of treating buffalo increases significantly those who took medical service from a Quack. Sometimes, wrong treatment leads to death their animals thus make a fear about disease and people get discourage about buffalo rearing. The survey demonstrated that buffalo guardians were not aware of the quarantine of diseased animals. It was not discovered that farmers use disinfectants in making the buffalo sheds clean. Similarly, LAL (1999) and Kishore *et al*. (2013) the probable causative factors for this phenomenon can be attributed to the inadequate awareness among farmers, exorbitant disinfectant expenses, and unwarranted charges that failed to provide farmers with immediate returns. The shed's health status, specifically, reveals a suboptimal condition in approximately 65% of cases.

3.4. Problems faced by the guardians of Buffalo and their suggestions

The main problems faced by farmers were the scarcity of good quality feed and fodder, lack of pasturage land, inappropriate veterinary medical services, insufficient quality breed, problem of artificial insemination (AI), inadequate government support, shortage of training facilities, lack of marketing channel for milk and meat, etc. (Table 6). Grazing and the land of pastures are very low, mainly during the cultivation period and the dry season in the coastal areas of Bangladesh. Government can play a pivotal role to enhance buffalo production by increasing the aid to make

more unused land of coastal area to turn into highly growing nutritious fodder like Napier, Packchong etc. that will meet the problem of good quality fodder and grazing land. The veterinary services and Artificial insemination (AI) support should make more available to the door of beneficiaries and special training on buffalo rearing should be arranged to make the beneficiaries to understand how to rear buffalo scientifically, protect their animal from environmental hazard, vaccinate to protect from disease, primary treatment before treating by a veterinary doctor and nursing the buffalo properly. Many of them suffer from asset shortage to invest money to make buffalo production profitable. So, Govt. may take a project to assist the farmer economically with minimum interest that attracts the farmers to make their farm profitable as main income source. To overcome the problems of domestic buffalo in coastal areas and lead to the more advantageous program, buffalo farmers were asked to propose their opinion. Some of their proposals are listed in Table 6. Amin *et al.* (2015), Hasan *et al.* (2016), and Islam *et al*. (2017) also reported similar types of problems and suggestion's opinion by the Guardians of Buffalo.

Table 6. Problems faced by the guardians of Buffalo and their suggestions (n=120)

Problems and suggestions	Total number	Percentage
Problems		
Food and fodder scarcity	111	92.25
Lack of pasturage facilities	56	46.67
Insufficient veterinary services	105	87.50
Calf fatality	47	39.17
Lack of good quality semen	61	50.83
Unavailability of Artificial insemination (AI)	84	72.50
Inadequate government support	44	36.67
Insufficient training facilities	71	59.17
Lower price of milk and meat	41	34.17
Natural disaster	80	66.67
Probable solution		
Require Govt. fund for Fodder cultivation	100	83.33
Proper Subsidy required for buffalo feeds	96	80.00
High quality breeding bull/semen	83	69.17
Training and encouragement required for buffalo production	77	64.17
Financial aid for the Guardians of Buffalo	69	57.5
Sufficient veterinary medical services	95	79.17
Establish appropriate supply channels for marketing buffalo milk and meat	98	81.67

4. Conclusions

The results illustrated that most farmers did not follow the modern scientific practices of food, reproduction, accommodation, and medical care instead of following the traditional laggard breeding system. The progress of buffalo breeding seems unpleasant because of defective husbandry practices and a lack of awareness about the value of management practices. As the principal business of the farmer is agriculture, they figure out buffalo rearing as a source of additional income under the domestic working framing system. However, at present a remarkable effort is taken to promote buffalo management and production strategies in coastal areas. According to the previous knowledge, it could be ended that buffalo guardians must be familiar with and inspired by hands on training in scientific breeding method. Authoritative entities must forthwith implement requisite measures to address pertinent issues as a matter of paramount urgency. Then it can become more profitable to increase its economic level.

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