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Biosecurity and Health Management Practices in Duck Farming in Coastal and Haor Regions of Bangladesh

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ABSTRACT

Duck farming has become a profitable venture in Bangladesh due to its economic potential and adaptability. This study aimed to assess the current state of native duck health, disease prevalence, and biosecurity management in selected regions of Bangladesh. Data were collected from 180 duck-rearing farmers from six upazilas of the Coastal and Haor regions using a standard questionnaire. The study investigated vaccination practices, disease prevalence, biosecurity management, and available treatment facilities. Approximately 60% of farmers in the Haor regions and 40 % in the Coastal regions reported vaccinating their ducks, while 56.67% in Haor and 34.44% in Coastal regions practiced deworming. Duck plague was the most prevalent disease in duck farms, with 83.33% and 90.00% prevalence rates in the Haor and Coastal areas, respectively. In the Haor region, 81.11% of farms reported disease incidence among growing ducks. Disease outbreaks (Duck plague and Cholera) were highest during the monsoon season at 77.78% of farms in Haor areas. In the Coastal region, 63.33% of farmers reported a higher duckling mortality rate. The frequent contact between ducks and wild birds was more common in Haor areas, as indicated by 32.22% of farmers. Disease outbreaks were identified as the major constraint to duck farming, and affordable feed price was the most pressing concern in both study areas. Despite these challenges, improvements in disease management, vaccination coverage, and biosecurity measures, alongside efforts to reduce feed costs, could significantly enhance the sector's growth. It can be concluded that duck farming holds considerable potential and promising opportunities in the Haor and Coastal regions of Bangladesh.

Keywords: Biosecurity practice, Constraint, Deworming, Disease management, Vaccination

INTRODUCTION

Bangladesh is often described as a waterlogged country due to its geography. One-third of the country is covered with wetlands. The southern boundary of Bangladesh borders the Bay of Bengal and is connected with numerous rivers, canals, haors, and beels (lake like wetlands with stagnant water). The Haor Basin is an internationally important wetland ecosystem. Bangladesh is a riverine country where 16,488 km² of haors, canals, ponds, and low-lying water reservoirs can be efficiently utilized for duck production (Parvez et al., 2020). Duck farming is particularly profitable in the southern Coastal belt and Haor-based ecosystems (Pervin et al., 2013; Parvez et al., 2020). In these areas, many farmers are engaged in family and commercial duck rearing. Duck production plays a vital role in supporting rural farmers by providing employment and income sources for Asian communities (Adzitey and Adzitey, 2011). It is considered an important avenue for the marginalized and rural communities in the Haor areas of Bangladesh (Khan et al., 2018).

Although duck farming is a lucrative business, it faces several obstacles, most notably the frequent outbreaks of infectious diseases (Khan et al., 2018). Duck plague is a major infectious disease that can affect all ages and is associated with high morbidity and mortality rates ranging from 5% to 100% (Chakraborty et al., 2024). According to Islam et al. (2016), 52% of duck farms in Mymensingh were infected with duck cholera. Duck plague and duck cholera are more prevalent in areas with poor biosecurity practices, particularly in the Coastal regions (Rahman et al., 2009). These diseases result in high mortality, reduced growth rates, and decreased egg production in flocks, which negatively impact the economic livelihood of

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farmers, particularly that of small-scale farmers in rural areas. Biosecurity involves a set of preventive measures to control the outbreak and spread of infectious diseases and is a crucial component of disease management (Adel et al., 2023). However, small-scale poultry farms often lack sufficient biosecurity measures (East, 2007), and their practices are often inadequate (Yitbarek et al., 2016). Many duck farmers report poor biosecurity practices, limited vaccination, and insufficient access to treatment facilities (Agbolosu and Aawona 2021). In the Sylhet areas of Bangladesh, the major challenges include improper house cleaning, irregular vaccination, inappropriate disposal of dead ducks, and poor veterinary facilities (Jha et al., 2015). The mortality rate of ducks due to diseases was 29.71% in Hatia, where 21.1% died due to duck plague, and 32.1% due to a bacterial disease called duck cholera (Hoque et al., 2011). Moreover, the production cost, ranging from 72% to 87%, is influenced by the seasonal availability of natural feed resources (Uddin et al., 2020).

Despite the fact that several studies have examined duck-rearing methods, feeding strategies, disease outbreaks, and health management practices in Bangladesh, there remains a lack of region-specific research on biosecurity and health management practices in duck farming. Therefore, the present study was carried out to assess the current state of duck health and biosecurity management, to identify the major challenges faced by duck farmers in the Haor and Coastal areas, and to explore farmers' expectations for addressing and mitigating these challenges.

MATERIALS AND METHODS

Study area

The study was conducted in six districts of Bangladesh: Patuakhali, Pirojpur, Gopalgonj, Kishoregonj, Netrokona, and Sunamgonj. These districts were selected from six divisions, with three representing the Haor areas and three representing the Coastal areas. Within each district, at least one upazila (sub-district) was chosen for data collection. These areas were selected based on the high density of small-scale duck farms. Prior to data collection, consent was obtained from the farmers, and coordination was established with local leaders and Upazila Livestock Officers.

Methodology

A baseline survey was carried out in the selected six districts. Primary data were collected from duck farmers through face-to-face interviews, key informant interviews (KIIs) with Livestock Officers, and Focus group discussions. Secondary data were obtained from the Department of Livestock Services, relevant journals, reports, and official publications, from July 2023 to June 2024. In each district, a total of 30 duck-raising farmers were interviewed using a structured questionnaire. Additionally, direct observations were made at farmers' households to know the current state of health, biosecurity practices, disease outbreaks, operational challenges, and the needs of duck-rearing farmers. In total, data from 180 farmers were collected in the selected districts. Simple and clear questions were used to ensure easy understanding by the farmers and maximize the accuracy of the obtained data.

Statistical analysis

Microsoft Excel sheets were used to enter, sort, assemble, tabulate, and arrange the collected data for statistical analysis. Descriptive statistical analyses, including frequency distribution and percentages, were conducted using the Statistical Package for the Social Sciences (SPSS), Version 25.

RESULTS

Health and disease management of ducks

Table 1 summarizes the vaccination and deworming practices of duck-raising farmers in the Haor and Coastal regions. The majority of farmers in the Haor area used both duck plague and duck cholera vaccines (31.11%), whereas most farmers in the Coastal areas used only the duck plague vaccine (25.56%) to protect their birds. Deworming of ducks was carried out using levamisole or piperazine to protect the ducks against nematodes, particularly infections from roundworms. It was also observed that 41.11% of the farmers in the Haor region and 12.22% of the farmers in the Coastal region vaccinated their ducks every six months. Similarly, 40.00% of Haor farmers and 7.78% of Coastal farmers dewormed their ducks at three-month intervals. In addition, 18.89% of Haor and 20% of Coastal farmers reported vaccination at six-month intervals, with 16.67% and 21.11%, respectively, deworming their ducks over the same period. Annual vaccination and deworming practices were followed by only 7.78% and 5.56% of farmers in the Coastal region, respectively. Regarding overall practices, 60.00% of farmers in Haor and 40.00% in Coastal areas practiced vaccination. Deworming was reported by 56.67% of Haor farmers and 34.44% of those in the Coastal regions.

Table 1. Vaccination and deworming of ducks from July 2023 to June 2024 in selected Haor and Coastal regions

Parameters	Percentage (number)	
	Haor	Coastal
Type of vaccine		
Duck plague	28.89 (26)	25.56 (23)
Both duck plague and cholera	31.11 (28)	14.44 (13)
Vaccination interval		
6 Months	41.11 (37)	12.22 (11)
9 Months	18.89 (17)	20 (18)
12 Months	-	7.78(7)
Overall vaccination	60.00 (54)	40.00 (36)
Deworming of ducks		
3 Months	40.00(36)	7.78 (7)
6 Months	16.67 (15)	21.11 (19)
12 Months	-	5.56 (5)
Overall deworming	56.67 (51)	34.44 (31)

Table 2 presents the farmers' responses regarding disease prevalence and mortality rates in ducks, revealing notable regional differences between the Haor and Coastal areas. The most prevalent disease was Duck Plague, impacting 83.33% of flocks in the Haor regions and 90.00% in the Coastal regions. Duck Cholera exhibited a higher prevalence, affecting 30.00% of duck flocks in the Haor and 64.44% in the Coastal areas. Avian Influenza was less frequently reported, affecting 1.11% of flocks in the Haor and 3.33% in the Coastal regions. Other diseases were also reported, including Brooder Pneumonia and poisoning. Brooder Pneumonia affects 12.22% of duck farms in the Haor and 21.11% in the Coastal regions. Poisoning was observed only in the Coastal areas, affecting 2.22% of the flocks. The present finding indicates a need for targeted disease management strategies to address the specific challenges faced in the studied regions. The age of disease outbreak was a significant concern, with ducklings in the Coastal areas experiencing higher outbreaks reported by 71.11% of farmers compared to the Haor farmers at 33.33%. About 81.11% of the farmers in the Hoar areas reported higher outbreaks observed in growing ducks (8 to 16 weeks of age) as compared to 32.22% of the farmers in the Coastal regions. Adult ducks were less frequently affected in both regions, with 3.33% of farmers reporting outbreaks in the Haor and 18.89% in the Coastal areas. Seasonally, the majority of outbreaks occurred during the monsoon season (June to October) in the Haor regions mentioned by 77.78% of farmers, while more incidents were reported by farmers in the summer (46.66%) and winter (56.67%) in the Coastal areas.

Mortality rates also varied across regions and age groups. Among ducklings, the Coastal regions had a higher mortality rate as reported by 63.33% of farmers, compared to the Haor areas with 37.78% of farmers reporting so. In contrast, growers had a higher mortality rate reported by 50.00% of farmers in the Haor regions, compared to 28.89% of farmers in the Coastal areas. The feedback on adult mortality rates by farmers was relatively low, with 12.22% in the Haor and 7.78% in the Coastal regions. Regular excrement cleaning was more commonly practiced by 74.44 % of farmers in the Coastal region than in the Haor practiced only by 64.44% of farmers. Contact with wild birds was also more frequently reported by farmers in the Haor regions (32.22%) than those in the Coastal areas (6.67%).

Table 2. Farmers' responses on disease prevalence and mortality rates from July 2023 to June 2024 in Haor and Coastal regions, Bangladesh

Disease prevalence	Percentage (n)		Age wise disease prevalence	Farmers' response % (n)	
	Haor	Coastal		Haor	Coastal
Avian influenza	1.11 (1)	3.33 (3)	Duckling (below 8 weeks)	33.33 (30)	71.11 (64)
Duck cholera	30.00 (50)	64.44 (58)	Growing (8 to 16 weeks)	81.11 (73)	32.22 (29)
Duck plague	83.33 (75)	90.00 (81)	Adult (above 24 weeks)	3.33 (3)	18.89 (17)
Brooder pneumonia	12.22 (11)	21.11 (19)	**Season of incidence**		
Poisoning	-	2.22 (2)	Summer (March-June)	24.44 (22)	46.66 (42)
Others	8.89 (8)	2.22 (2)	Monsoon (June-October)	77.78 (70)	22.22 (20)
Mortality rate			Winter (November - February)	52.22 (47)	56.67 (51)
Ducklings	37.78 (34)	63.33 (57)	**Other parameters**		
Growers	50.00 (45)	28.89 (26)	Contact with wild bird	32.22 (29)	6.67 (6)
Adults	12.22 (11)	7.78(7)	Regular excrement cleaning	64.44 (58)	74.44 (67)

Biosecurity and duck farm management

The use of disinfectants during cleaning was notably low in both areas, with only 3.33% of Haor farmers and 1.11% of Coastal farmers practicing this method (Table 3). In the Haor region, 91.11% of farmers disposed of duck excreta by dumping, compared to 76.67% in the Coastal area. Using excreta as fertilizer was more common in the Coastal areas, practiced by 23.33% of the farmers, whereas only 8.89% of the farmers in the Haor regions adopted this method.

The findings revealed notable differences in sick birds and mortality management practices between the Haor and Coastal areas (Table 4). For sick bird management, a majority of farmers in both regions isolated sick ducks in separate sheds, with 56.67% in the Haor and 35.56% in the Coastal regions. However, 6.67% of Haor farmers and 2.22% of Coastal farmers kept sick birds in the same shed. Interestingly, 18.89% of Coastal farmers sold sick birds, while only 2.22% of Haor farmers did so. The slaughtering of sick birds by farmers was more common in the Coastal region (38.89%) than in the Haor region (34.44%). To manage dead ducks, 44.44% of Haor farmers and 43.33% of Coastal farmers buried dead ducks. Meanwhile, 36.67% of Coastal farmers disposed of dead ducks by throwing them into open fields, compared to 16.67% in the Haor regions. Additionally, 10.00% of Haor farmers burned the carcasses, while this practice was absent in the coastal regions.

Treatment facilities and vaccine sources

Farmers in both Haor and Coastal regions utilized a range of sources for duck health treatments, with veterinary hospitals being the primary facility, followed by pharmacies, quack practitioners, and self-treatment methods. Overall, 70% of farmers in Haor and 87.78% of farmers in the Coastal areas obtained treatment facilities for their ducks from the aforementioned sources (Table 5). The main source of vaccine was veterinary hospitals (44.44% in Haor and 47.78% in Coastal areas) as there was only limited availability of duck vaccines in the local market (with 5.56% both in the Haor and the Coastal areas).

Operational constraints regarding duck farming

Duck-rearing farmers faced different challenges in duck rearing, as outlined in Table 6. The most critical issue across both regions was the outbreak of diseases, cited by 66.67% of farmers in Haor and 87.78% in Coastal areas.

Reported diseases included duck plague, duck cholera, avian influenza, and brooder pneumonia. In the Haor areas, the second most frequently reported constraint was the high price of feed (63.33%), followed by lack of vaccines (50.00%), unavailability of ducklings (48.89%), lack of treatment facilities (47.78%), theft of ducks (32.22%), high mortality of ducklings/ducks (31.11%), lack of quality ducklings (30.00%), predator attacks (25.56%), high cost of ducklings (22.22%), and the risk of failing to obtain the desired profit (3.33%).

In contrast, farmers in the Coastal areas identified the lack of quality ducklings as the second major constraint (66.67%), as there were not enough hatcheries for incubation, hatching, and brooding. This was less of an issue in the Haor areas, where some hatcheries are locally available.

Other major constraints for Coastal farmers included the high mortality rate of ducklings/ducks (63.33%), high feed price (62.22%), lack of vaccine (43.33%), predatory animal attacks and profit uncertainty (30.00%), lack of treatment facilities (21.11%), high price of ducklings (17.78%), unavailability of ducklings year-round (12.22%), and theft (8.89%).

Farmers' demands and opinions regarding challenges in duck farming

To mitigate the mentioned operational challenges faced by the farmers, some opinions and demands obtained from policymakers are presented in Table 7. The reduction of feed prices and making it affordable for farmers were demanded by the highest number of farmers in both the Haor and the Coastal areas at 70.00% and 66.67%, respectively. As feed cost is the major cost in duck farming, it is urgently needed to make feed prices more affordable.

In the Haor regions, the second most common demands were ensuring the availability of quality ducklings and improving access to treatment facilities, both cited by 52.22% of respondents. These were closely followed by the adequate supply of vaccines (50.00%), training opportunities to improve farming skills (44.44%), and access to low-interest loans to support commercial duck farming initiatives (25.56%). In contrast, in the Coastal areas, the second most cited demand was for training and capacity-building programs, mentioned by 53.33% of farmers. The least prioritized issue in this region was the availability of low-interest loans, requested by only 5.56% of farmers (n = 5).

Table 3. Duck farm cleaning system in Haor and Coastal regions, Bangladesh from July 2023 to June 2024

Parameter	Percentage (n)	
	Haor	Coastal
Cleaning materials used		
Broom	81.11 (73)	80.00 (72)
Water and broom	15.56 (14)	18.89 (17)
Water, disinfectant, and broom	3.33 (3)	1.11 (1)
Excreta management method		
Dumping	91.11 (82)	76.67 (69)
Used as fertilizer	8.89 (8)	23.33 (21)

Table 4. Biosecurity and farm management from July 2023 to June 2024 in Haor and Coastal regions, Bangladesh

Parameters	Percentage (n)	
Sick duck management	**Haor**	**Coastal**
Kept in the same shed	6.67 (6)	2.22 (2)
Kept in separate sheds	56.67 (51)	35.56 (32)
Sold	2.22 (2)	18.89 (17)
Slaughtered	34.44 (31)	38.89 (39)
Death duck management		
Thrown into open fields	16.67 (15)	36.67 (33)
Buried	44.44 (40)	43.33 (39)
Burnt	10.00 (9)	-
Left in water	28.89 (26)	24.44 (18)

Table 5. Treatment facilities, vaccine source, and women's contribution from July 2023 to June 2024 in Haor and Coastal regions, Bangladesh

Parameters	Percentage (n)	
Source of treatment	**Haor**	**Coastal**
Veterinary hospital	44.44 (40)	47.78 (43)
Quack	4.44 (4)	21.11 (19)
Own	2.22 (2)	1.11 (1)
Veterinary pharmacy	18.89 (17)	17.79 (16)
Total treatment facility obtained	70.00 (63)	87.78 (79)
Source of vaccine		
Veterinary hospital	50.00 (45)	42.22 (38)
Market/company	5.56 (5)	5.56 (5)

Table 6. Operational constraints regarding duck farming in Haor and Coastal regions, Bangladesh

Farmers' constraints in duck rearing	Haor percentage (n)	Ranking	Coastal percentage (n)	Ranking
Disease outbreak	66.67 (60)	I	87.78 (79)	I
Higher feed price	63.33 (57)	II	62.22 (56)	IV
Lack of quality duckling	30.00 (27)	VIII	66.67 (60)	II
High mortality rate of ducklings/ducks	31.11 (28)	VII	63.33 (57)	III
Lack of vaccines	50.00 (45)	III	43.33 (39)	V
Lack of treatment facilities	47.78 (43)	V	21.11 (19)	VII
Unavailability of ducklings year-round	48.89 (44)	IV	12.22 (11)	IX
Attacks by predatory animals	25.56 (23)	IX	30.00 (27)	VI
Theft	32.22 (29)	VI	8.89 (8)	X
High prices of ducklings	22.22 (20)	X	17.78 (16)	VIII
high risk of obtaining the desired profit	3.33 (3)	XI	30.00 (27)	VI

Table 7. Farmers' demands and opinions regarding challenges in duck farming in the Haor and Coastal regions, Bangladesh

Farmers' opinions/demands	Haor percentage (n)	Coastal percentage (n)
Affordable feed prices	70.00 (63)	66.67 (60)
Sufficient training opportunities	44.44 (40)	53.33 (48)
Ensuring the availability of quality ducklings	52.22 (47)	44.44 (40)
Vaccine availability	50.00 (45)	43.33 (39)
Proper treatment facilities	52.22 (47)	36.67 (33)
Low-interest loan facilities for duck farming	25.56 (23)	5.56 (5)

DISCUSSION

The findings of the present study provide valuable insights into the health and disease management, biosecurity practices, operational challenges associated with duck farming, and the demands of farmers for duck farming in the Haor and Coastal areas of Bangladesh. These findings are consistent with earlier studies, while also offering updated and region-specific data. Previous research by Jha et al. (2015) revealed that approximately 30.50% of farmers in the Sylhet district did not follow a regular vaccination schedule. Interestingly, only 14.50% of farmers consistently adhered to a regular vaccination schedule. The vaccination profile was observed in 35% of cases, while vaccines were predominantly used only in commercial farms. According to Ahmed et al. (2021), 85% of small-scale farmers did not vaccinate their ducks, although around 50% were vaccinated against Duck Plague and 40% against Duck Cholera.

In the Coastal regions, Rahman et al. (2009) also noted low vaccination rates (14.5%), and Islam et al. (2023) observed similar practices in India, where a lack of vaccine availability and farmer training contributed to the absence of vaccination. The findings of the current study are closely similar to the reported data, as most of the farmers in the Haor and Coastal areas had poor knowledge of vaccination and deworming practices. Duck plague occurred in 8% of the farms, and other duck diseases were reported in 3.11% of the farms, as recorded by Khan et al. (2018) in the Haor region, which was lower than the current findings. Islam et al. (2016) observed that Duck Cholera affected 52% of flocks, Duck Plague 26%, limber neck poisoning 12%, and Avian Influenza 2%, which aligns with the present findings, although the farmers' perceptions of duck plague disease were much higher. Seasonality appears to influence disease outbreaks; Khan et al. (2018) noted a higher prevalence of duck plague during the summer, with 12.9% at the farm level and 5.82% at the flock level in the Haor areas. During the rainy season, 10.1% prevalence was observed at the farm level and 4.96% at the flock level, as compared to other seasons. Rahman et al. (2009) reported a maximum prevalence of 100% for duck cholera and duck plague in their study, with disease outbreaks most frequent in the summer (34.18%), followed by the rainy season (2.25%). Gosh et al. (2012) observed seasonal variations in the prevalence of duck plague and duck cholera in the southern coastal areas of Bangladesh: 13.3% in summer, 23.3% during the monsoon, and 63.3% in winter. Similarly, Debnath et al. (2020) identified duck plague and duck cholera as the most prevalent diseases in duck farms in India. These variations in prevalence rates can be attributed to differences in geographic location, duration of the studies, and data collection methods, including reliance on farmers' feedback from diverse socio-economic conditions**.** In the present study, young adult ducks in the Haor areas were more frequently affected by diseases, whereas ducklings were more susceptible in the coastal regions. Khan et al. (2018) similarly found higher disease outbreaks among young adult ducks in the Haor areas. In these regions, most farmers purchase ducklings from hatcheries or commercial farms and initially follow recommended guidelines. However, after a few weeks, they release the growing ducks into natural water bodies with minimal feed supplementation. Other causes include overcrowding, poor ventilation, temperature fluctuations, improper disposal of dead ducks into water bodies, contact with migratory birds, rising water levels during the rainy season, poor nutrition supplies for young ducks after proper management of ducklings, and the introduction of unvaccinated new flocks.

In the Coastal areas, poor brooding systems, inadequate vaccination practices, and management-related problems are key causes of disease outbreaks and high duckling mortality. However, ducks that survive to adulthood tend to adapt to harsh environmental conditions. Environmental challenges such as floods and low winter temperatures also impact duck health and agricultural productivity in the Haor regions (Ferdushi et al., 2019). Flash floods damage farms and pollute water sources,

endangering duck health and safety. Sudden temperature changes, especially during cold winters, may also affect duck productivity and overall well-being. Furthermore, overcrowding due to high stocking densities can hinder growth, elevate stress levels, and increase the risk of disease among ducks. According to Delaporte and Maurel (2016), two-thirds of Bangladesh lies below 5 meters above mean sea level, making it highly vulnerable to riverine and rainwater flooding, and in coastal areas, to tidal flooding during storms. Nearly one-third of the country is susceptible to tidal inundation, and nearly 70% of the country is flooded during heavy monsoons (Delaporte and Maurel, 2016). Increased salinity in Coastal water bodies makes water unsuitable for ducks, reducing their productivity. Environmental changes also elevate the risk of disease outbreaks and duck mortality due to natural disasters such as floods and storm surges. Jha et al. (2015) found in the Haor area that 50.50% of farmers did not clean their farmhouses regularly, 35.50% maintained regular cleaning practices, and 14% never cleaned them at all. These findings align with the current study. In the context of biosecurity, regular cleaning is widely practiced; however, the use of disinfectants remains limited. Khan et al. (2018) found that only 3.73% of farmers regularly vaccinated their ducks, no farms used disinfectants, and only 0.3% practiced any form of biosecurity in the Haor areas. In the case of sick bird management, Agbolosu and Aawona (2021) reported that 24.1% of farmers slaughtered their sick ducks, 33% treated them, and 12.1% kept them in the flock till death. Practices such as isolation or proper burial were not followed, which was similarly noted by Khan et al. (2018) in the Haor areas. Jha et al. (2015) found that 18% of farmers in the Haor areas disposed of dead ducks outside, while Rahman et al. (2009) found that only 9.75% of farmers buried dead ducks; the remaining 90.25% disposed of them in open fields or water bodies such as ponds. These improper disposal methods pose environmental risks to humans, livestock, and poultry species. The biosecurity and disposal practices observed in the present study are consistent with these prior findings. Alam et al. (2012) also reported that an average of 71% of farmers relied on village doctors for veterinary services, while only 18% had the facility to consult directly with the nearest veterinary doctors. Moreover, 11% of farmers never sought veterinary advice for the treatment and medication of their diseased ducks.

In the present study, the challenges faced by the farmers varied across different geographical locations and specific parameters, though some key constraints were consistent in both regions. These findings align with Sheheli et al. (2023), who identified disease outbreaks as the primary constraint in duck farming. Currently, outbreaks of different duck diseases, such as duck plague, duck cholera, and avian influenza, have been reported to cause significant economic losses in duck production (Ajieh and Oyibojoba, 2018; Churchil and Jalaludeen, 2022; Sankaralingam and Mahanta, 2022). Such outbreaks lead to high mortality rates among ducks and ducklings, impair production performance, and ultimately reduce farm profitability in both study areas. Operational challenges, such as high feed prices, emerged as the second most significant constraint, consistent with the second study of Sheheli et al. (2023). Farmers in both areas complained about the escalating prices of feed, a concern also highlighted by Begum et al. (2020) and Zannat et al. (2018) in studies conducted in the North-Eastern Region and the Haor areas of Netrokona district in Bangladesh. Additionally, the scarcity of ducklings was identified as a critical issue, negatively affecting production and leading to economic losses. Inadequate veterinary service further exacerbated challenges, becoming particularly critical during disease outbreaks with high mortality rates. Other constraints, ranked in order of severity, included a lack of training and difficulties in protecting ducks from theft. It is important to note that the last problem ranked by the farmers was the risk of obtaining profit in the Haor areas, whereas theft was a more pressing concern in the Coastal areas. Roughly similar operational challenges have been documented in other duck farming regions, especially in the Haor areas (Kishoregonj district, Jaintiapur Upazila, Sylhet district), and southern Coastal areas of Bangladesh (Afrin et al., 2016; Ahmed et al., 2021; Sheheli et al., 2023). Vignesh et al. (2018) also reported comparable issues in Tamil Nadu, India, citing the unavailability of quality ducklings, non-availability of feed at affordable prices, diseases, high mortality, predatory animal attacks, theft, lack of veterinary services, and vaccination. Similarly, Wongtangtintharn et al. (2025) identified disease outbreaks and feed costs as key challenges in Thailand's poultry industry. Ahmed et al. (2021) suggested several strategies to diminish the challenges faced by the farmers in duck farming, including farmer training programs, government investment in hatcheries, and monitoring for quality duckling production, adequate production and proper distribution of vaccines to ensure year-round availability and financial support such as the provision of low-interest loans. These recommendations align with the findings of the current study. Alam et al. (2012) conducted

a study on the socio-economic profile of duck farmers and duck management practices in the Rajshahi region of Bangladesh and reported similar farmer demands and opinions, further supporting the present research.

CONCLUSION

The findings of the present study highlight several critical issues affecting duck farming in the Haor and Coastal areas of Bangladesh. Chief among them are poor vaccination and deworming practices, a high prevalence of Duck Plague and Duck Cholera, and deficiencies in biosecurity, treatment facilities, and modern farming knowledge. Due to these factors and challenges, farmers demanded several steps to improve overall management and duck farming practices. Considering these factors, it is essential to provide hands-on training on vaccination practices, waste management, disease control, biosecurity measures, disposal methods of dead ducks, and enhancement of treatment facilities in duck-rearing areas.

DECLARATIONS

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Author's contributions

This study was carried out in collaboration among all authors. Syidul Islam conceptualized and designed the study and wrote the protocol and manuscript. Syidul Islam and Md. Ashraful Islam wrote the Methodology, completed the formal analysis, and wrote the manuscript. Md. Ashraful Islam and Sharmin Sultana helped in data collection. Md Sazedul Karim Sarker helped to write the original manuscript. Syidul Islam, Md Ashraful Islam, and Sharmin Sultana edited the manuscript for final submission. Razia Khatun provided guidelines for writing the manuscript and financial support for the manuscript. All Authors read and agreed to the last version of the manuscript.

Availability of data and materials

The data are available upon reasonable request from the corresponding author.

Ethical considerations

All authors affirm compliance with the ethical standards for scientific research and publication as required by the Journal of the World's Poultry Research, including fabrication of data, double publication and submission, redundancy, plagiarism, consent to publication, and misconduct.

Competing interests

There is no conflict of interest regarding this article.

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