



Socio-Economic Status of Duck Farmers and Duck Production Systems in Chalanbil, Singra Upazila, Natore

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Abstract

This study explored the socio-economic status and production systems of duck farming in Chalanbil, Singra Upazila, under the district of Natore, Bangladesh. Data were collected from a purposively selected sample of 50 duck farmers through structured questionnaires in March 2024 and analyzed using descriptive statistics. The farmers' average age was 41.64 ± 12.47 years, with 84% lacking formal education and 70% being landless. All farmers relied solely on duck farming for egg production, using semi-intensive systems with an average experience of 13.43 ± 10.54 years. The dominant breed was Khaki Campbell (90%), with an average flock size of 585.43 ± 203.74 ducks. Key performance indicators showed that the age at sexual maturity and first laying were 3.07 ± 0.39 and 5.46 ± 0.72 months, respectively. The average egg production per duck was 261.43 ± 36.34 eggs, weighing 80.71 ± 13.85 grams. Adult male and female ducks weighed 2.2 ± 0.30 kg and 1.8 ± 0.21 kg, respectively. The average mortality rate was $11.79 \pm 6.19\%$, despite 82% of farmers following vaccination schedules. Daily feed intake averaged 200 grams per bird, costing 10.33 ± 1.53 Bangladeshi Taka (BDT). The average annual income for farm owners was 2.54 ± 0.96 lakh BDT. The major challenges included declining duck product market prices, rising feed costs, scarcity of quality commercial feed, disease outbreaks and limited access to veterinary services. In conclusion, addressing these challenges through targeted interventions could greatly enhance the profitability and sustainability of duck farming in the Chalanbil wetland ecosystem.

Keywords: Bangladesh, Chalanbil, Duck farming, Production system, Socio-economic status

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Introduction

Bangladesh is mainly an agricultural country, where poultry farming plays a vital role in the subsistence economy. The livestock sector contributes 16.54% to the total agricultural GDP, accounting for 1.81% of the national GDP (DLS, 2025). Among different poultry species, ducks are second to chickens in both meat and egg production. The growing demand for animal protein highlights the potential of duck farming to meet this need. Ducks are known for their adaptability to different environmental conditions, which has increased the importance and popularity of the duck industry. In Bangladesh, the duck population is around 70.58 million (DLS, 2025). Duck farming offers a practical way to reduce poverty among resource-poor smallholder families in low-income countries (Pym et al., 2002). Ducks are considered valuable assets and a key source of income, especially for ultra-poor rural women. Participating in small-scale duck farming has proven to be profitable for marginal and landless farmers and provides a promising form of self-employment for youth and women in need (Jabbar, 2004). The benefits of duck production are many, making ducks a versatile poultry species. They efficiently use agricultural by-products like kitchen scraps, seeds, grains, garden refuse, insects and green grasses and they also help control weeds, pests and plant diseases. Additionally, ducks contribute to improving soil quality and aeration, which can boost crop yields (Hasan et al., 2017; Huo et al., 2021). Ducks require less care and management compared to other livestock. They can utilize natural water sources such as marshes, Haors, rivers, ponds and canals. In Bangladesh, about one-ninth of the land consists of low-lying areas that are especially suitable for duck farming. Rearing ducks is simple, as they need less space and smaller amounts of feed, housing and overall management. Despite these numerous advantages, as noted by Kunnath and Kumar (2018), this practice has traditionally received less attention in the country than chicken farming. Sankaralingam and Mahanta (2022) highlight that duck farmers in Bangladesh face many challenges, including outbreaks of diseases like duck plague, duck cholera and avian influenza. Moreover, interest among the younger generations is declining, worsened by reductions in scavenging areas and natural feed resources, depletion of water bodies, excessive pesticide use in paddy fields, a shift from paddy to cash crop cultivation and the impacts of industrialization and urbanization. The potential for duck farming in Chalanbil, Singra Upazila, Natore, Bangladesh, is notably increased by the presence of extensive low-lying water bodies that retain water year-round. These aquatic environments are rich in natural resources, including various kinds of vegetation, fish, snails, insects and leftover grains, which are essential nutritional sources for ducks raised in scavenging and semi-scavenging systems. To improve duck productivity, it is important to assess the current conditions, challenges and future prospects of economic duck rearing in Bangladesh. Therefore, this study was undertaken to examine the present status and production systems of ducks, as well as to identify issues and opportunities for duck farming in the rural areas of Chalanbil,

Singra Upazila, Natore.

Materials and methods

Survey area

The survey was carried out in various villages of Chalanbil, Singra Upazila, within the Natore district (Figure 1).

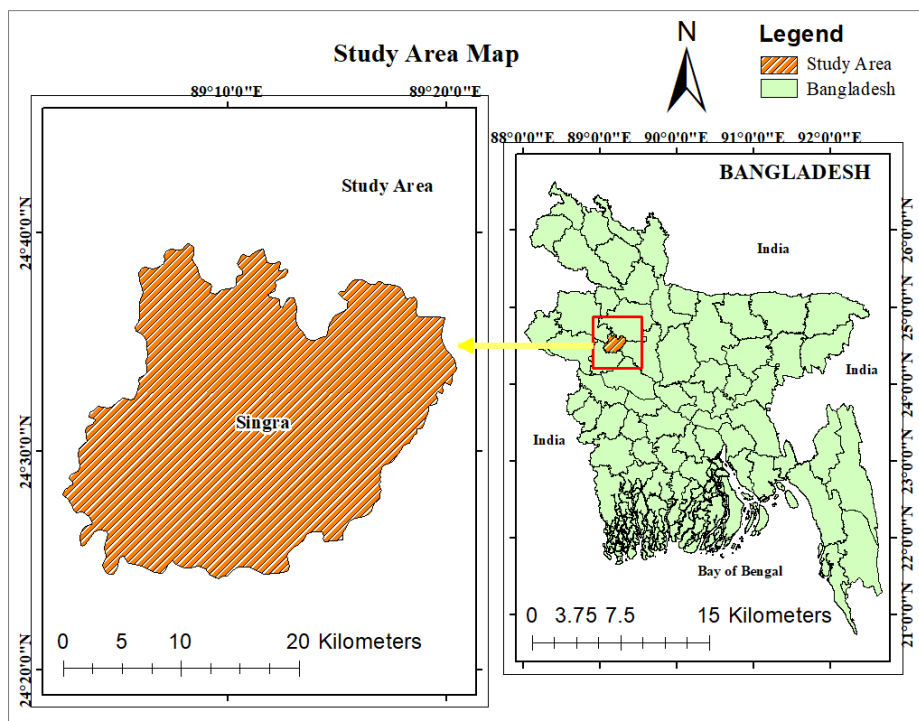


Fig. 1. Survey area

Duration of the survey

The survey was carried out over one month, from 1 March 2024 to 31 March 2024.

Data collection

The research involved collecting data through interviews with a purposively chosen sample of 50 male duck farmers actively involved in duck farming, supplemented by Key Informant Interviews (KIIs) for qualitative insights. The data collection process was designed to be unbiased, ensuring the accuracy of the information gathered. As the respondents did not have specific written records, they relied on their memories during the interviews. These interviews usually took place in the respondents' homes at times convenient for them, enabling a more relaxed and open exchange of information.

Data analysis

The data collected was coded after the data collection phase was completed. Then, the information was compiled, organized into tables and analyzed. A careful tabulation of the data was carried out, followed by a descriptive analysis.

Results and discussion

Age of duck farmers

In the surveyed area of Chalanbil, the age of duck farmers ranged from 20 to 65 years, with an average age of 41.64 ± 12.47 years. This demographic profile indicates that duck farming is primarily performed by middle-aged individuals, a finding that aligns with the observations by Rahman (2009), who reported an average age of 43.52 years among duck rearers. Similarly, Islam et al. (2016) noted a mean age of 42.02 years among farmers in the Mymensingh district. Islam et al. (2025b) documented average ages of 40.41 and 41.11 years in Haor and Coastal areas, respectively. However, the demographic profile may differ regionally, as Alam et al. (2012) observed a notably younger demographic in the Rajshahi region, with a mean age of 34.48 years.

Education of duck farmers

Educational background is a crucial factor influencing farm management practices and the adoption of new technologies. In this study, a notable 84% of farmers had no schooling, with only 16% possessing any primary or secondary education. This illiteracy rate is exceptionally high compared to other farming communities. For example, Rahman et al. (2009) reported that in Noakhali and Lakshmipur, 30% of farmers had primary education, 18% secondary and 9% higher education. Similarly, Islam et al. (2016) noted a much lower illiteracy rate of 32% in Mymensingh. Zahan et al. (2016) found that only 20% of farmers in Thakurgaon lacked formal education. Even in the coastal district of Bhola, the illiteracy rate was comparatively lower at 43% (Rahman et al., 2020). The significant lack of education in the Chalanbil area could be a major obstacle to adopting modern and scientific farming techniques.

Occupation of duck farmers

Regarding primary livelihood, all participants (100%) in the current study rely solely on duck farming, with 70% of them being functionally landless. This complete dependence on farming contrasts with regions that have more diversified income sources. Alam et al. (2012) noted that in Rajshahi, 50% of duck owners primarily identify as farmers, while others engage in agriculture (32%) or business (13%). Furthermore, gender and occupational dynamics vary greatly in certain areas; Rahman et al. (2020) highlighted that in Bhola, 67% of duck farmers are housewives, underscoring the vital role of duck rearing as a supplementary income stream for rural women.

Rearing experience of duck farmers

The experience of duck farmers in rearing ducks reflects their understanding of effective management practices. The present study found that rearing experience varied widely, ranging from 5 to 40 years, with an average of 13.43 ± 10.54 years. This average closely matches the findings of Islam et al. (2016), who reported a mean rearing experience of 13.9 ± 11.30 years. Additionally, the wide range of experience observed in this study aligns with Hoque et al. (2010), who noted farming experiences from 1 to 50 years. In contrast, Sultana et al. (2025) reported a slightly lower average experience of 9.08 ± 1.43 years.

Duck breeds

Breed selection in the study area is mostly focused on high-yielding varieties, with 90% of the surveyed farmers selected Khaki Campbell ducks, while Jinding (8%) and local Deshi (2%) made up the rest (Figure 2). This preference is naturally driven by the breed's renowned egg-laying capacity. Notably, nearly all farmers keep mature ducks primarily for egg production. Typically, these ducks are kept for six months during the dry season, when natural feed sources are available in the low-lying areas and canals surrounding Chalanbil. Only a few farmers choose to raise ducklings. A similar pattern prevailed in the coastal district of Satkhira, where Touhiduzzaman et al. (2024) found that 88.9% of the flocks were Khaki Campbells. However, regional preferences persist; in Sylhet's Jaintiapur area, the local 'Sylhet Mete' duck is the preferred breed for 50-60% of farmers, while Khaki Campbells account for only about 35% of the population (Ahmed et al., 2021).

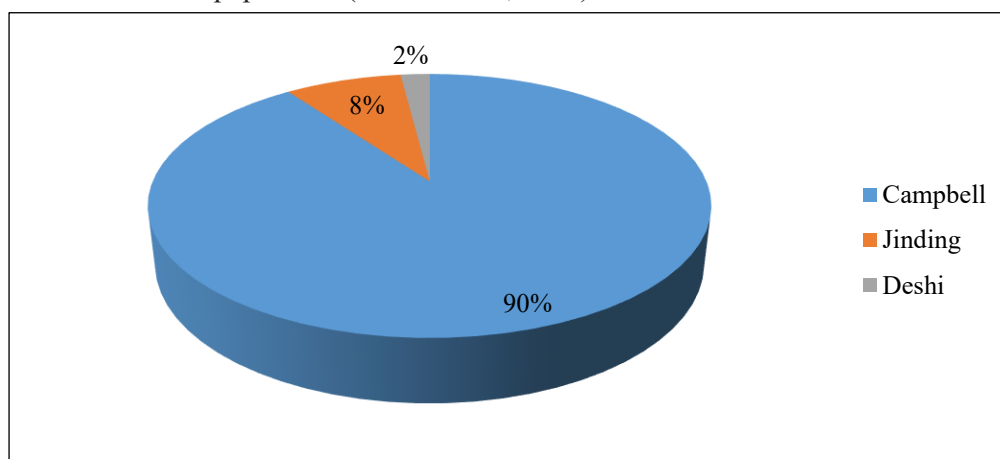


Fig. 2. Breeds of ducks raised by farmers

Source and price of duckling

In this study, many farmers bought ducklings from the Sylhet and Sirajganj areas, while others obtained them from Rajshahi, Rangpur, Bogura and local markets.

Sourcing ducks from local markets and hatcheries is common, as noted by Islam et al. (2025b), who found farmers buying from markets, other farmers and hatcheries. Similarly, Ahmed et al. (2021) and Sheheli et al. (2023) observed farmers collecting ducklings from hatcheries and local agents. The cost of ducklings in this study ranged from 25 to 40 BDT, with an average of 33.43 ± 4.42 BDT. This aligns closely with the prices reported by Islam et al. (2020) at 35.0 BDT and Ahmed et al. (2021) at 26-35 BDT. Some studies reported lower prices, like 23.4 BDT (Islam et al., 2016) and 20.00 BDT (Rima et al., 2025), while Islam et al. (2025b) reported a higher average price of 66.72 BDT. It's important to recognize that accessing quality ducklings remains a challenge; multiple researchers have identified the lack of quality ducklings, high prices and unavailability at the right time as major constraints for duck farmers (Rahman et al., 2009; Begum et al., 2020; Sultana et al., 2025).

Population of ducks

The analysis of the present study area revealed an average of 585.43 ± 203.74 ducks per farm, with males averaging 59.64 ± 32.12 and females averaging 507.93 ± 173.86 . This large flock size is quite similar to the findings of Ahmed et al. (2021), who observed an average of 444 ducks and noted that 50% of farmers kept more than 700 ducks. However, this differs considerably from several other studies reporting much smaller household or scavenging flock sizes. For instance, Islam et al. (2016) reported an average of 11.1 ducks per household, while Ghosh et al. (2012) and Hoque et al. (2010) reported averages of 6.46 ± 1.81 and 8.1 ± 0.15 ducks, respectively. Touhiduzzaman et al. (2024) also documented small flock sizes, ranging from 5.00 to 7.28, depending on the duck breed. These differences are often linked to the farming system and location; as Islam et al. (2025b) pointed out, Haor areas tend to have larger flocks (over 100 ducks), whereas coastal regions usually have smaller flocks of 1-25 ducks. Additionally, farmers in this study generally maintained a ratio of 10 males for every 100 females in their duck populations.

Rearing system and housing

In the studied area, every farmer practiced duck farming using a scavenging system during the dry season and switched to a semi-scavenging system during the flood season. The findings showed that nearly all farmers, about 100%, built their duck houses from bamboo, polythene and netting (Figure 3). During the dry season, farmers set up temporary shelters in different parts of Chalanbil. However, during the flood season, only a few farmers continued to keep ducks and built housing on their homesteads. In other water-abundant zones, scavenging remains the main method. Islam et al. (2025b) reported that 81.11% of farmers in Coastal areas and 41.11% in Haor areas rely on free-range scavenging. Farmers used various materials to build their duck houses. Rahman (2009) stated that 65.5% of farmers used wood and tin, 17.5% used bamboo, 10.25% combined straw and bamboo and the remaining 6.75% used soil and other materials for their duck housing needs. Recently, floating duck houses on ponds made from plastic drums have been proposed as a cost-effective

structural innovation for semi-intensive systems (Rima et al., 2025), which could greatly benefit Chalanbil farmers.



Fig. 3. Housing of duck

Bedding materials for duck

Analysis of bedding material practices in duck houses revealed considerable variation among farmers. The findings showed that 90% of farmers used bedding materials, while 10% did not use any. Nearly all farmers who used bedding, almost 100%, chose straw and paper. The high usage rate of litter is supported by Islam et al. (2016), who found that 94% of farmers used bedding; however, their farmers mainly used sand (42%) and a mixture of sand and ash (28%), with only 8% using paper. A preference for ash and sand was also documented by Ahmed et al. (2021). Alternatively, Rahman et al. (2020) reported that 90% of the farmers in their coastal study area used sawdust. In contrast to these practices, Touhiduzzaman et al. (2024) observed that 100% of the farmers in their study did not use any litter materials.

Feeds and feeding of duck

During the dry season in Chalanbil, ducks feed naturally in the lower lands and canals (Figure 4). Farmers typically use two management systems: either keeping ducks in temporary net enclosures for all-day scavenging with supplementary feeding two to three times daily, or allowing them to scavenge twice a day with morning and evening supplemental feeds. Conversely, during the flood season, duck rearing greatly declines and the remaining flocks are strictly confined to homesteads and fed entirely on supplemental feed. Farmers use various supplementary feeds for their ducks, including rice, maize, crushed wheat and snails. The recorded feed supply per duck ranges from 100g to 250g per day, with an average of 200 ± 104.50 g daily. This variation depends on factors such as the health status, body size, age and production stage of the ducks. Additionally, the average cost of feed per duck per day is about 10.33 ± 1.53 BDT. According to Rahman (2009), farmers typically provide 120g of supplemental feed daily for each duck at a cost of only BDT 0.42, which is significantly lower than the current study's findings. Feeding practices often depend on local availability. Islam et al. (2025b) noted that in Haor and Coastal zones, farmers nearly exclusively feed their ducks paddy and rice bran. To maximize

profitability, Parvez et al. (2020) suggested that combining scavenging with a precise 25g daily supplementary feed yields higher net returns than over-supplementation. Furthermore, adding specific feed additives like Vitapoultry® at 2 g/kg has been shown to significantly increase egg weight and fertility in Khaki Campbell flocks (Hasan et al., 2017). Farmers generally collect eggs each morning.

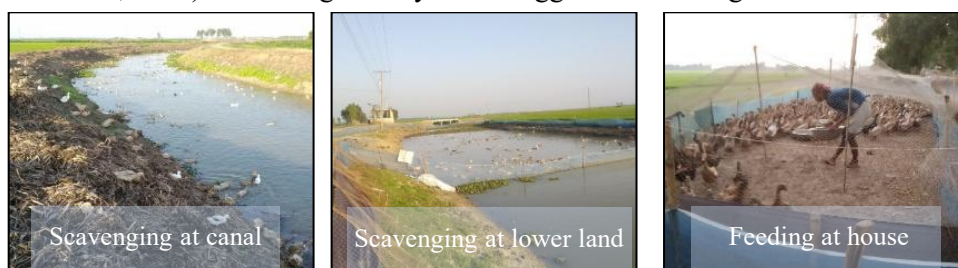


Fig. 4. Feeding of duck

Diseases, health and mortality

Health management in Chalanbil appears proactive, with a high vaccination adherence rate of 82%, contributing to a manageable mortality rate of $11.79 \pm 6.19\%$. This mortality rate is slightly higher than the 6-9% for indigenous ducks reported by Islam et al. (2003) and Sarker (2005), but much better than the 27.1% recorded in Netrokona by Khanum et al. (2005). The vaccination practice in this study differs from that in southern coastal districts, where Rahman (2009) found that 85% of farmers completely ignored vaccination protocols. Despite good coverage, diseases such as plague, diarrhea and cholera remain common. This aligns with Rahman (2009), who identified plague and cholera as predominant in Noakhali and a recent study by Islam et al. (2025a), where duck plague was the most prevalent disease on duck farms, with rates of 83.33% and 90.00% in the Haor and Coastal areas, respectively.

Productive and reproductive parameters of duck

The research investigated various productive and reproductive parameters of ducks, as shown in Table 1. The average age at which ducks reached sexual maturity in the studied region was found to be 3.07 ± 0.39 months. This indicates faster maturation compared to several other studies. For example, Zahan et al. (2016) reported the average age at sexual maturity as 119.26 ± 1.70 days. Additionally, Islam et al. (2016) found it to be 183.6 ± 7.15 days, while Islam et al. (2020) reported that Deshi ducks mature at 5.5 to 6.0 months. Rahman et al. (2009) noted this age as 26.63 ± 0.14 weeks. Hoque et al. (2010) observed that 26% of farmers' ducks reached sexual maturity within ≤ 22 weeks, while 74% took longer than 22 weeks. The average age for laying the first egg was 5.46 ± 0.72 months. This result aligns well with Ghosh et al. (2012), who reported it as 5.85 ± 0.35 months. In contrast, Touhiduzzaman et al. (2024) reported the age at first laying as 6.50 months for Deshi, 6.67 months for

Jinding and 6.18 months for Khaki Campbell ducks. Islam et al. (2024) reported 225.33 ± 5.70 days for Indigenous Deshi, 210.00 ± 4.88 days for Rupali and 205.33 ± 6.23 days for Nageswari. Additionally, Islam et al. (2025b) found the age at first laying to be 176.75 ± 2.53 days in Haor areas for Native ducks and 170.36 ± 1.98 days for Khaki Campbell ducks, while in Coastal areas, it was 161.70 ± 2.43 days and 173.92 ± 2.14 days, respectively. The total average egg production during the study was 261.43 ± 36.34 eggs. Zahan et al. (2016) reported 233.66 eggs for Khaki Campbells in Thakurgaon and Islam et al. (2025b) recorded 205 eggs in coastal regions. The economic advantage of raising improved breeds like Khaki Campbell is evident when compared to unimproved indigenous ducks, which typically produce only about 79 eggs annually (Hoque et al., 2010). In the surveyed area, the average duration of egg production was 8.64 ± 1.39 months, affected by various factors. Egg weights ranged from 70 to 100 grams, with a mean of 80.71 ± 13.85 grams. Islam et al. (2003) and Sarker (2005) indicated that the average egg weight from indigenous ducks is approximately 65 grams. This is also higher than the 58.73 grams average reported for Khaki Campbell by Zahan et al. (2016) under backyard conditions. The larger egg size observed in Chalanbil may be due to the specific natural protein sources, such as snails, available in the wetland ecosystem. Regarding body weights, the average duckling weight in this study was 132.5 ± 10.84 grams. This is notably higher compared to the weights of day-old ducklings reported in other studies, such as 53.17 ± 0.41 grams by Sultana et al. (2025) and 60.43 ± 2.08 grams by Rahman et al. (2020). This variation could be due to differences in the specific age at which ducklings were weighed or breed characteristics. The weight of adult male ducks ranged from 2 to 2.5 kg, while females ranged between 1 and 1.5 kg, with averages of 2.2 ± 0.30 kg and 1.8 ± 0.21 kg, respectively. The adult male duck weight observed in this study is higher than what was reported by Islam et al. (2024) for Rupali (1.78 ± 0.05 kg), Nageswari (1.56 ± 0.04 kg) and Indigenous Deshi (1.45 ± 0.05 kg) ducks. Islam et al. (2025b) reported native and Khaki Campbell male duck weights in Haor areas as 1.92 ± 0.07 kg and 1.67 ± 0.03 kg, respectively and in coastal areas as 1.81 ± 0.04 kg and 1.85 ± 0.05 kg. Sultana et al. (2025) recorded the male weight at 10 weeks as 2025.50 ± 61.48 g, and Islam et al. (2016) noted an average adult weight of 1.69 ± 0.155 kg. Similarly, the average adult female duck weight in this study (1.8 ± 0.21 kg) is higher than the weights of Rupali (1.57 ± 0.06 kg), Nageswari (1.37 ± 0.06 kg) and Indigenous Deshi (1.25 ± 0.11 kg) females reported by Islam et al. (2024). Islam et al. (2025b) found native and Khaki Campbell female duck weights to be 1.66 ± 0.07 kg and 1.50 ± 0.02 kg in Haor areas and 1.46 ± 0.03 kg and 1.47 ± 0.06 kg in coastal areas, respectively. Zahan et al. (2016) recorded body weight at first laying as 1.543 ± 0.06 kg, while Sultana et al. (2025) reported a female weight of 2009.50 ± 73.98 g at 10 weeks.

Table 1. Productive and reproductive parameters of duck

Parameters	Mean±SD
Sexual maturity (months)	3.07±0.39
Age at first laying (months)	5.46±0.72
Egg production (no.)	261.43±36.34
Egg production length (months)	8.64±1.39
Egg weight (gm)	80.71±13.85
Duckling weight (gm)	132.5±10.84
Adult male duck weight (kg)	2.2±0.30
Adult female duck weight (kg)	1.8±0.21

Marketing of eggs and ducks

The study shows that 100% of duck farmers prefer to sell their eggs to the local middlemen (locally known as 'foria') and local markets, which aligns with the findings of Rahman (2009). The dependence on local markets is also supported by Hoque et al. (2010), who found that 85% of duck products were sold locally and Islam et al. (2020), who noted that 80% of eggs were sold to nearby markets. The absence of an organized marketing channel is often seen as a major challenge in duck farming (Begum et al., 2020; Ahmed et al., 2021). In the study area, the average price for a single egg was 16.21±1.25 BDT and the average price for an adult duck was 460±65.19 BDT. Prices for both eggs and adult ducks change with the seasons, influenced by supply and demand as well as environmental factors affecting production. The adult duck price in this study is similar to what Islam et al. (2025b) reported, which was 500.28 BDT for females and 587.66 BDT for males. However, it is much higher than prices reported in other studies, such as 188.5 BDT (Islam et al., 2016), 250 BDT (Islam et al., 2020; Ahmed et al., 2021) and 321.00 BDT (Rima et al., 2025). The low prices of duck eggs and meat continue to be a serious issue for farmers trying to increase their profits (Begum et al., 2020; Sheheli et al., 2023).

Problems and constraints

The main constraints identified in this study include lower market value for products, rising feed costs, scarcity of quality commercial feed, recurring disease outbreaks and insufficient veterinary support. These challenges reflect the broader national situation. Sheheli et al. (2023) listed disease outbreaks and high feed prices as the two leading problems that crippled Haor farmers. For Pekin duck farmers in Dhamrai, increasing feed prices and a shortage of quality day-old ducklings were the main obstacles (Sultana et al., 2025). Additionally, Alam et al. (2012) pointed out that the low market price of duck meat and eggs, compared to production costs, greatly reduces profitability in areas such as Rajshahi.

Prospects

The practice of duck farming provides a financially sustainable opportunity, mainly because of its relatively low initial capital costs. This method effectively maximizes the use of feed resources in aquatic environments, thus reducing feed waste. Additionally, ducks are known for their higher egg production rates compared to chickens. The extensive lowland areas of Bangladesh offer an ideal environment for setting up duck farming operations. Furthermore, this industry helps create jobs in rural areas, especially benefiting unemployed youth and women.

Conclusion

Duck farming in the Chalanbil region has great potential to improve the socio-economic status of rural farmers, offering a valuable source of income and jobs for landless and vulnerable communities. However, knowledge of scientific duck-rearing practices, such as breeding, feeding and disease management, remains noticeably limited. To fully realize this sector's potential, targeted extension programs that raise awareness and build technical skills within the farming community are essential. Additionally, creating organized marketing channels through value chain development and providing appropriate technical & veterinary support can help overcome major economic hurdles.

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