



# Challenges of Native Poultry Farming in Nilphamari District, Bangladesh

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## ABSTRACT

Poultry farming in Bangladesh is an essential part of the mixed farming system, contributing notably to household nutrition, economic development, and employment opportunities for women. The present study aimed to evaluate the current status and future prospects of local poultry (chicken and duck) farming in six sub-districts of Nilphamari, Bangladesh, to inform decisions on technological interventions and enhance the farming system. A cross-sectional survey of 210 households across six sub-districts of Nilphamari, Bangladesh, was conducted using a simple random method from July 2024 to June 2025. The current results indicated that women dominated poultry farming (86.77%), while household heads were mainly engaged in labor (29.24%), agriculture (27.14%), and business (20.95%). The literacy status of the respondents indicated that 36.19% had education below the secondary school level, 18.09% were illiterate, 11.43% could only sign, and 29.33% attained higher education levels. The average annual household income and expenditure were 252,029.52 BDT (2059.90 USD) and 166,062.85 BDT (1357.28 USD), respectively. Most households (55.71%) maintained small flocks, averaging seven native chickens each, while 14.26% of households reared ducks and only 3.33% reared commercial chickens. Native chickens had an average annual egg production of 64 eggs with a mean egg weight of 35.83 g, while native ducks produced 108 eggs annually with an average egg weight of 55.23 g. The majority of farmers (97.14%) practiced semi-intensive systems, with rice and broken rice being the main feed. Vaccination coverage was extremely low for chickens (17.14%) and ducks (9.68%), leading to high prevalence of Newcastle disease (75.24%) in chickens, followed by fowl pox (40.95%), fowl cholera (25.24%), infectious coryza (21.90%), and coccidiosis (21.43%). Prevalence of avian influenza was low (4.28%), and duck plague was reported at 35.48% in ducks. Morbidity and mortality rates were 66.64% and 35.10% for chickens, and 63.68% and 24.37% for ducks, respectively, due to disease, nutritional scarcity, and predation. Major constraints in poultry farming included predatory attacks, disease outbreaks, feed costs, and knowledge gaps. Poultry farming remains a vital livelihood strategy, highlighting the urgent need for training, technological assistance, and enhanced breeds to boost productivity and sustainability in the study area.

**Keywords:** Constraint, Native chicken, Poultry production, Vaccination

## INTRODUCTION

Poultry is a vital component of the livestock sector, providing valuable nutrition to people and serving as an income source for rural women and other poultry farmers. Poultry farming in Bangladesh plays a significant role in poverty alleviation and entrepreneurship development (Rahima et al., 2023). According to the BBS (2024-2025), the poultry population (chickens and ducks) in Bangladesh was approximately 406,652,000, the largest among livestock species. Approximately 80% of rural households in Bangladesh are involved in poultry rearing (ICDDR, 2008). The majority of rural women's households involved in backyard farming systems play a crucial role in supplying family nutrition and help earn money with minimal labor, thereby contributing to the family income (Islam et al., 2025a). In poultry farming, women owned 90.58% of farms, and 93.94% of women took responsibility for poultry care (Ahmed et al., 2021a).

In developing countries such as Bangladesh and India, approximately one-fifth of dietary protein is supplied by poultry meat and eggs (Alders et al., 2009). According to Guèye (2002), family poultry production plays an important role in supplying high-quality protein to maintain food security, and women utilize any surplus as a source of income. In poultry farming systems, most farmers rear indigenous chickens, ducks, and pigeons, although a few rear crossbred and foreign poultry with limited facilities (Alam et al., 2014). At the community level, farmers practice backyard farming and do not provide standard housing, ventilation, space, or light. Additionally, farmers do not provide standard feeding, drinking, hygienic care, biosecurity, and health management for their poultry (Islam et al., 2025a). The primary food source is household waste, supplemented by food grains provided by farmers (Rahima et al., 2023). Free-ranging and semi-scavenging rearing systems are common in the locality, where farmers follow backyard poultry farming (Chowdhury et al., 2013). In Bangladesh, poultry is affected by common diseases, such as Newcastle disease, fowl pox,

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fowl cholera, and duck plague, which pose major drawbacks (Alam *et al.*, 2014). Newcastle disease and fowl pox affect 26.9% of farms in eight distinct locations of Bangladesh (Islam *et al.*, 2024), causing high mortality, reduced growth rates, decreased egg production, and increased treatment and management costs, ultimately leading to substantial economic losses for poultry farmers (Attia *et al.*, 2024). High disease prevalence in poultry is shaped by multiple interrelated factors, including the impacts of climate change, which alter environmental conditions and increase pathogens' survival and transmission (Attia *et al.*, 2024). Inadequate farm management practices, such as poor housing, hygiene, and biosecurity, further contributed to disease prevalence (Islam *et al.*, 2025b). Irregularly or improperly timed vaccination programs, faulty storage or handling of vaccines, such as cold chain failure, compromised vaccine potency or quality, lack of antigenic match between the vaccine strain and the prevailing field serotype, and failure to achieve protective antibody titers following immunization collectively heighten the risk of disease outbreaks in poultry flocks (Birhane and Fesseha, 2020). In addition, limited societal awareness and low community engagement in disease prevention reduce the effectiveness of control measures. Strengthening farmer education, community participation, and preventive health programs is therefore essential to reduce poultry disease burden (Islam *et al.*, 2025a). Although poultry production encounters numerous challenges, it continues to be a highly profitable enterprise that demands minimal investment. Additionally, limited land resources can be efficiently utilized for poultry farming in densely populated countries such as Bangladesh. The present study aimed to examine the current status of poultry farming in the Nilphamari district of Bangladesh and to identify the gaps and constraints affecting poultry production.

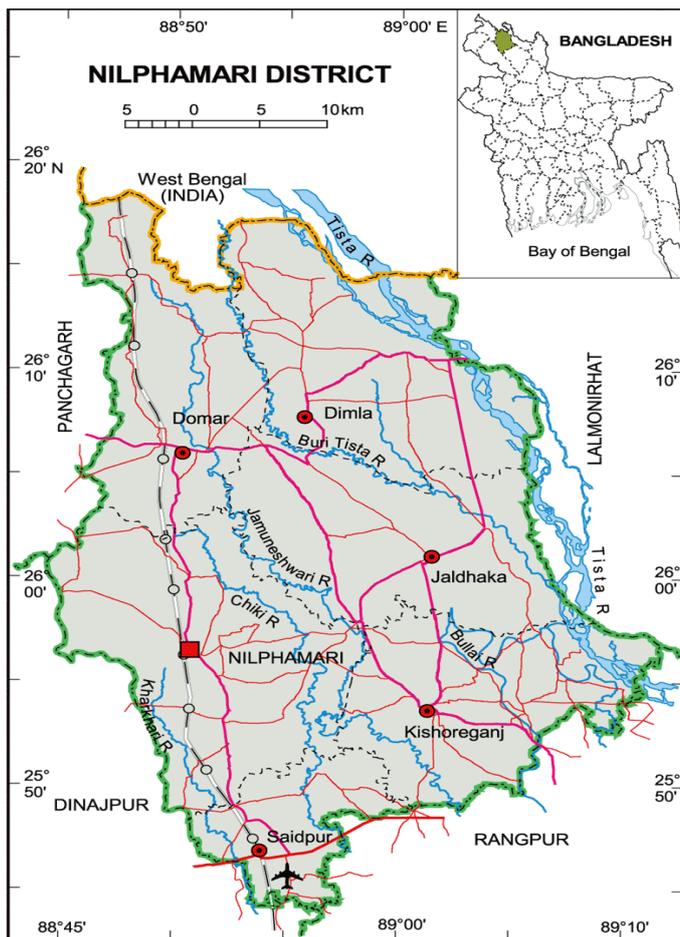
## MATERIALS AND METHODS

### Ethical approval

The study data were collected after obtaining farmers' consent from six sub-districts of Nilphamari and approval from the research project expert team of the Bangladesh Livestock Research Institute, Savar, Dhaka, Bangladesh.

### Study location

A total of six sub-districts in Nilphamari, Bangladesh, including Saidpur, Nilphamari Sadar, Jaldhaka, Kishoreganj, Dimla, and Domar were chosen for data collection, and the study was conducted from July 2024 to June 2025 (Figure 1).



**Figure 1.** Study location in Nilphamari district, Bangladesh. Six sub-districts are included: Saidpur, Nilphamari Sadar, Jaldhaka, Kishoreganj, Dimla, and Domar. Source: Nilphamari District Map (2016)

### Data collection

A baseline survey was conducted using a pretested questionnaire to understand the livelihood status of farmers' education, occupation, family size, family income, and poultry dynamics (types of poultry, productivity of native poultry, and their management system) in Nilphamari district, with constraints and demands to mitigate the challenges at the community level. A cross-sectional survey was conducted with 210 poultry-keeping households randomly selected from six sub-districts (35 from each) in Nilphamari, Bangladesh, following the study by [Shahjahan and Bhuiyan \(2016\)](#). Having at least native chickens was the inclusion criterion, and those without native chickens were excluded from the present study. Structured interviews were used to collect quantitative (chickens' body weight, egg production age) and qualitative data (sex of participants, challenges faced by farmers, purpose of rearing) from 210 households, among which all farmers reared native chickens, and 31 farmers reared only ducks. A total of 210 local poultry farms were categorized into three categories based on the number of chickens, including small ( $n \leq 10$ ), medium ( $n = 11-15$ ), and large farms ( $n > 15$ ) according to the study of [Islam et al. \(2025a\)](#). Several parameters were considered in the study areas, including the socioeconomic status of the farmers, flock size, production metrics, housing, feeding, healthcare practices, disease outbreak, morbidity and mortality rates, and farmer perceptions.

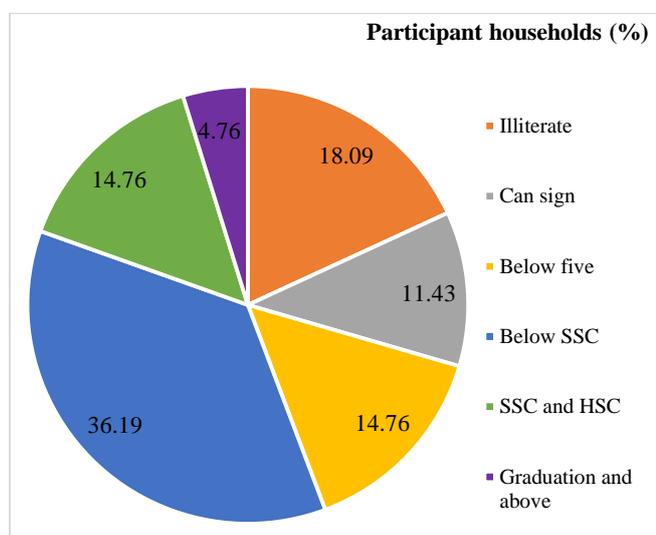
### Statistical analysis

The collected data were then sorted, assembled, and arranged in a Microsoft Excel worksheet. Statistical analysis of the data was performed using SPSS software version 25. Descriptive statistics were performed to assess the percentage, mean, and standard error. The chi-square was used to assess the significance level of the collected data, ensuring accurate, reliable, and meaningful statistical interpretation of the findings. Statistical significance was set at a p-value less than 5% ( $p < 0.05$ ).

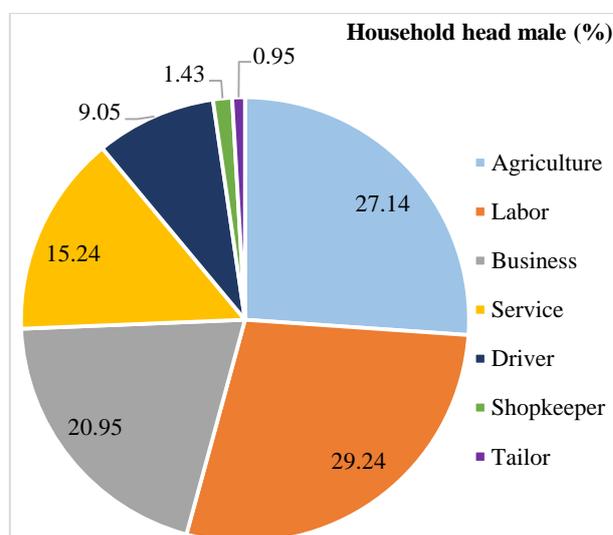
## RESULTS

### Demographic and economic status of farmers

The present study revealed that the majority of participants were female (86.77%), followed by males (13.33%). The education level of the participants exhibited that the majority of respondents were below the secondary school certificate (SSC) level, at 36.19%, followed by 18.09% who were illiterate, 11.43% who could only sign, 4.76% who had completed their education, and 29.33% who were highly educated. In addition, 14.76% of participants were below class five, and 14.76% had completed their SSC and higher secondary school certificate (HSC) degrees (Figure 2). The primary occupations of the household head males were labor (29.24%), agriculture (27.14%), business (20.95%), and service holder (15.24%; Figure 3). The average number of household members was about five, and the number of earning members was nearly two (Table 1). The average annual income from different income-generating sources was 252,029.52 BDT (2059.90 USD), and the average family expenditure was 166,062.85 BDT (1357.28 USD). The farmer's overall farming experience was 16.62 years.



**Figure 2.** Education level of the participants in the Nilphamari district of Bangladesh from July 2024 to June 2025. SSC: Secondary school certificate, HSC: Higher secondary school certificate



**Figure 3.** Occupation of household heads in the Nilphamari district of Bangladesh from July 2024 to June 2025

**Table 1.** Livelihood status of poultry-rearing farmers at Nilphamari district of Bangladesh from July 2024 to June 2025

| Family size and household economics | Outcomes<br>(Mean ± SE) |
|-------------------------------------|-------------------------|
| Average family member               | 5.07 ± 0.12             |
| Average earning member              | 1.59 ± 0.11             |
| Annual income (BDT)                 | 252029.52 ± 8932.19     |
| Annual expenditure (BDT)            | 166062.85 ± 4191.77     |

SE: Standard errors

### Poultry farming practices and trends

A total of 210 poultry farms were categorized into three categories, including small (number of chickens: 1-10), medium (number of chickens: 11-15), and large farms (number of chickens >15) according to the study of Islam et al. (2025a), where the majority of farms (55.71%) followed small-scale operations, holding an average of 6.50~7 chickens per household in different location of Bangladesh. Approximately 23.33% of medium-sized farms had a mean flock size of 13.02 ~13 chickens, while only 20.95% of the farms were classified as large-scale, with an average of 24.31 ~24 chickens. The Chi-square test result ( $\chi^2 = 47.51$ ) indicated a highly significant difference among farm sizes in Nilphamari, Bangladesh ( $p < 0.05$ ). The average farm size and number of chickens per household in the Nilphamari district of Bangladesh are presented in Table 2. The mean number of chickens per farm across all categories was 11.75 ~12. The highest flock size (13.62 ~14) was observed in Kishoreganj, followed by the lowest in Saidpur 9.97 ~10. The flock size in Jaldhaka and Domar was almost the same at around 13 chickens, while in Nilphamari Sadar and Dimla sub-districts of Bangladesh, the average number of chickens per farm was 11 (Figure 4).

Commercial poultry rearing was relatively uncommon among the surveyed households. Only 3.33% of farmers reared commercial chickens; among them, 0.48% raised broiler chickens, 2.38% kept Sonali chickens, and 0.48% reared both Sonali and layer chickens (Figure 5). A total of 14.26% of farm households reared ducks, whereas 3.81% raised Khaki Campbells, 9.52% kept native ducks, and only 1.43% reared a combination of duck breeds. The average number of ducks per family was 6.48 (Figure 6).

### Poultry rearing systems, purpose, and housing

The present results indicated that chicken rearing was dominated by the semi-intensive system across all study areas (Figure 7). In Saidpur and Nilphamari Sadar, 94.29% of farmers practiced semi-intensive rearing, while 2.86% used intensive and 2.86% used scavenging systems. In Kishoreganj and Domar, chicken rearing was entirely semi-intensive (100%). In Jaldhaka and Dimla, 97.14% of farmers used the semi-intensive system, and only 2.86% relied on scavenging. Overall, semi-intensive rearing accounted for 97.14% of chicken production, followed by intensive (0.95%) and scavenging (1.9%) systems, indicating that semi-intensive management was the most preferred and widely adopted method for chicken farming in the Nilphamari region. An intensive rearing system was practiced by a small number of farmers, primarily for raising commercial poultry, such as broiler chickens, layer hens, and Sonali chickens.

The housing materials used for poultry farming in the study area are presented in Table 3. About 55.71% of the farmers utilized bamboo cages or provided temporary night shelters. Housing made of tin and wood was reported by 32.38% of the farmers, while wood combined with straw was used by 9.05%, and only 2.86% of farmers reported using wood-and-mud housing structures. There was a highly significant difference among farmers in their use of poultry housing materials, with bamboo cages or temporary night shelters as the highest preference at 55.71%. The primary purpose of poultry rearing differed significantly among the farmers ( $p < 0.05$ ). Approximately 77.14% of farmers kept poultry for both consumption and sale, while 22.86% reared poultry solely for household consumption.

**Table 2.** Farm size and chicken holdings per household at Nilphamari district of Bangladesh from July 2024 to June 2025.

| Farm size                          | Chicken number<br>(Mean ± SE) | Farm percentage  |
|------------------------------------|-------------------------------|------------------|
| Small size (1-10 chickens)         | 6.50 ± 0.23 <sup>a</sup>      | 55.71% (n = 117) |
| Medium size (11-15 chickens)       | 13.02 ± 0.20 <sup>b</sup>     | 23.33% (n = 49)  |
| Large size (more than 15 chickens) | 24.31 ± 1.67 <sup>c</sup>     | 20.95% (n = 44)  |

n: Number of households, SE: Standard errors. <sup>a,b,c</sup> Means different superscript letters within the same column differ significantly ( $p < 0.05$ ).

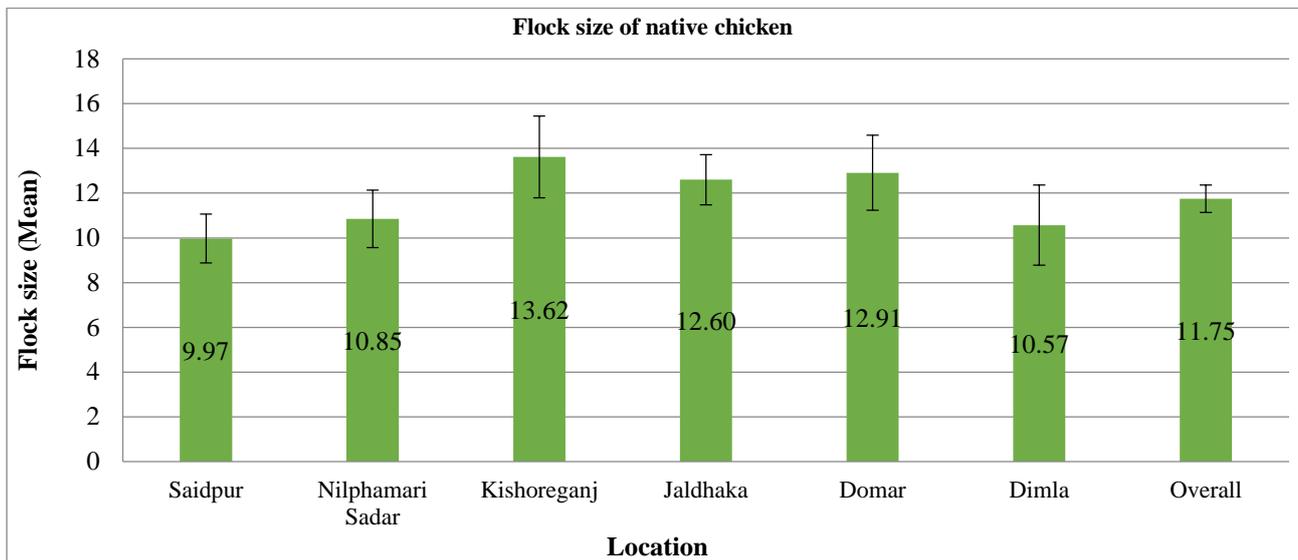


Figure 4. Flock size of native chicken in six sub-districts of Nilphamari, Bangladesh, from July 2024 to June 2025

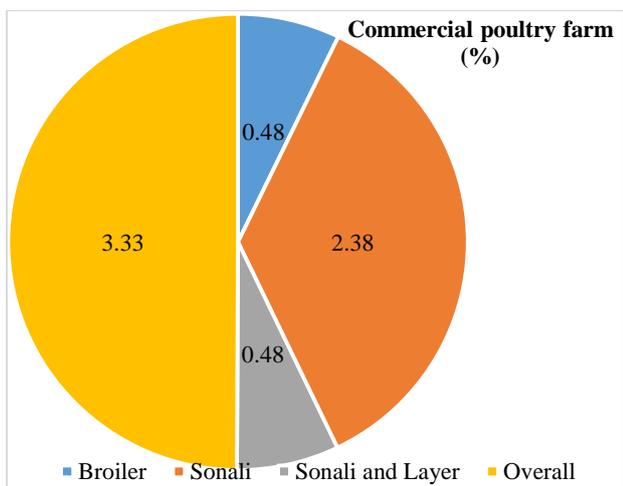


Figure 5. Commercial poultry farm status in the Nilphamari district of Bangladesh from July 2024 to June 2025

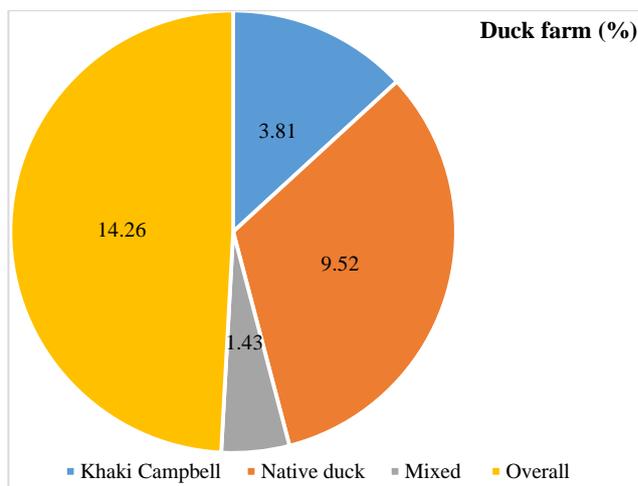


Figure 6. Duck farm status in the Nilphamari district of Bangladesh from July 2024 to June 2025

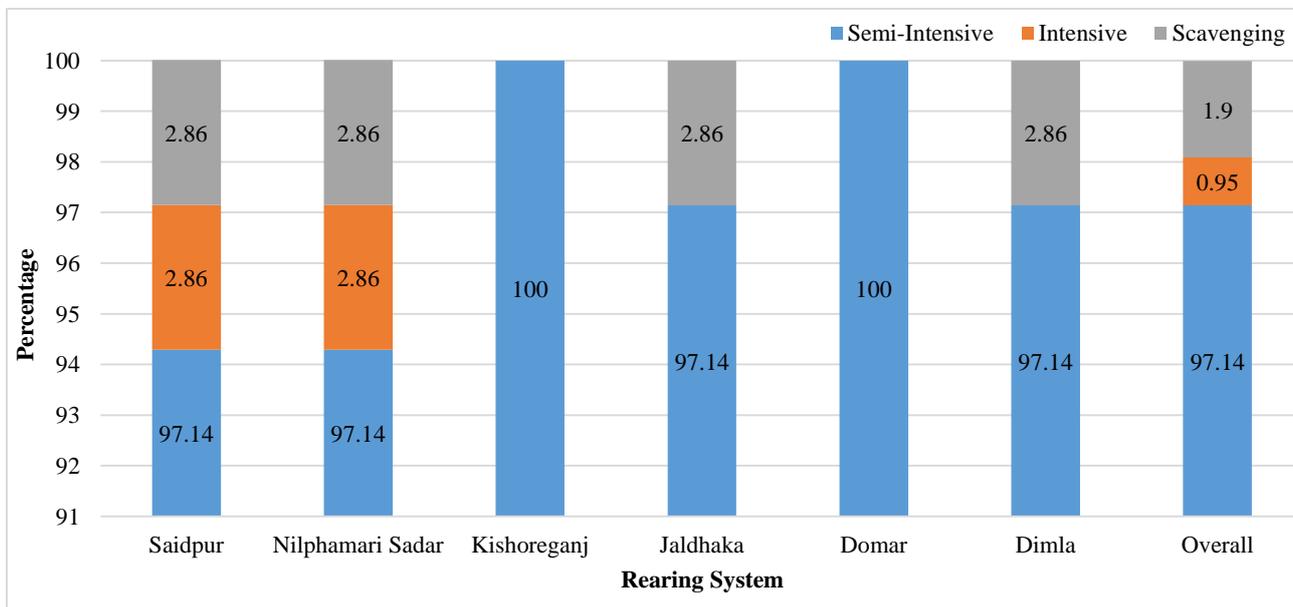


Figure 7. Rearing poultry pattern in six locations of Nilphamari district of Bangladesh from July 2024 to June 2025

**Table 3.** Housing materials for local poultry farming in the Nilphamari district of Bangladesh from July 2024 to June 2025

| Housing materials                      | Household percentage          |
|--|-------------------------------|
| Tin and wood                           | 32.38% (n = 68) <sup>b</sup>  |
| Wood and mud                           | 2.86% (n = 6) <sup>d</sup>    |
| Wood and straw                         | 9.05% (n = 19) <sup>c</sup>   |
| Bamboo cage or temporary night shelter | 55.71% (n = 117) <sup>a</sup> |

n: Number of households. <sup>a,b,c,d</sup> Mean different superscript letters within the same column differ significantly (p < 0.05).

### Dietary supplements and feeding schedule

The most commonly supplied feed item was rice or boiled rice, used by 95.24% of the farmers, followed by broken rice (89.05%) and paddy (73.81%). Crushed maize was used by 29.71% of farmers, while 18.57% reported supplementing their poultry with ready feed; less frequently used ingredients included wheat (3.81%) and salt (1.90%; Table 4). These were the major feed ingredients that farmers can supply to all poultry in family poultry production. Some other feed ingredients were given to different types of poultry, but their effects were not significant. Approximately 80.95% of farmers fed their poultry more than three times per day. Feeding three times daily was reported by 19.71% of farmers, while only 3.33% fed their poultry twice a day. For commercial poultry, farmers ensured continuous 24/7 access to feed during the initial period. In contrast, indigenous chickens and ducks received feed based on the feeding schedule specified in Table 4.

**Table 4.** Supplied feed ingredients and the feeding schedule of the local poultry in the Nilphamari district of Bangladesh from July 2024 to June 2025

| Feed ingredients            | Households percentage |
|-----------------------------|-----------------------|
| Rice/ boiled rice           | 95.24% (n = 200)      |
| Broken rice                 | 89.05% (n = 187)      |
| Paddy                       | 73.81% (n = 155)      |
| Crushed maize               | 29.71% (n = 54)       |
| Wheat                       | 3.81% (n = 8)         |
| Ready feed                  | 18.57% (n = 39)       |
| Salt                        | 1.90% (n = 4)         |
| Feeding schedule            | Households percentage |
| Twice daily                 | 3.33% (n = 7)         |
| Thrice daily                | 15.71% (n = 33)       |
| More than three times a day | 80.95% (n = 170)      |

n: Number of households

### Productivity and hatchability

Table 5 presents the adult body weights, productive performance, and egg-hatching patterns of chickens and ducks in the Nilphamari district of Bangladesh. The average body weight of adult male chickens was recorded at  $1.37 \pm 0.01$  kg, while that of females was  $1.05 \pm 0.01$  kg. The chickens began laying eggs at an average age of  $184.20 \pm 0.91$  days, with the annual egg production per hen being  $64.13 \pm 1.69$  eggs. The average egg weight was measured at  $35.83 \pm 0.23$  g in the study area. The mean body weight of male ducks was  $1.86 \pm 0.06$  kg, while that of female ducks was  $1.53 \pm 0.06$  kg, and the average age at first egg production was  $187.42 \pm 3.21$  days. The mean annual egg production per duck was  $107.87 \pm 8.49$ , with average egg weight  $55.23 \pm 0.59$  g. Natural incubation was the most commonly used method for hatching eggs among the surveyed poultry farms, reported by 99.05% of farmers, and only 0.95% of farms employed artificial incubation techniques for hatching chicken eggs. In the case of ducks, 100% of farmers followed the natural hatching of eggs by using hens (Table 5).

**Table 5.** Body weight, egg production, and hatchability of local poultry in the Nilphamari district of Bangladesh from July 2024 to June 2025

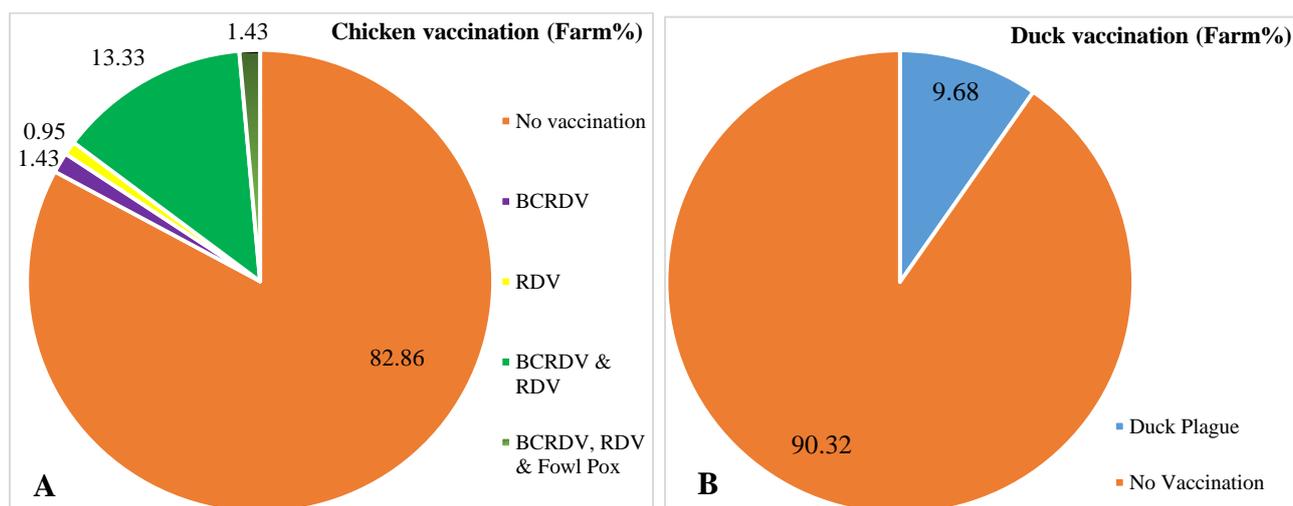
| Parameters                         | Native chicken (Mean $\pm$ SE) | Duck (Mean $\pm$ SE) |
|------------------------------------|--------------------------------|----------------------|
| Adult male body weight (kg)        | $1.37 \pm 0.01$                | $1.86 \pm 0.06$      |
| Adult female body weight (kg)      | $1.05 \pm 0.01$                | $1.53 \pm 0.06$      |
| Average age at first laying (days) | $184.20 \pm 0.91$              | $187.42 \pm 3.21$    |
| Number of egg production/year      | $64.13 \pm 1.69$               | $107.87 \pm 8.49$    |
| Egg weight (g)                     | $35.83 \pm 0.23$               | $55.23 \pm 0.59$     |

SE: Standard errors, g: Grams, kg: Kilograms

### Health management and disease outbreak

Figure 8 represents the vaccination practices of native chickens and ducks. Approximately 82.86% of native chicken owners did not vaccinate their chickens, while 17.14% of farmers followed overall vaccination practices. Only 8.57% of farmers practiced regular vaccination, while another 8.57% vaccinated their chickens irregularly in the Nilphamari district of Bangladesh. Among the farms that practiced vaccination, the most commonly used combination was baby chick Ranikhet disease vaccine (BCRDV) and Ranikhet disease vaccine (RDV) to protect chickens against Newcastle Disease. The BCRDV and RDV were reported by 13.33% of the farmers. The BCRDV alone was used by 1.43%, while RDV was used by 0.95% of farmers. A small proportion of farmers (1.43%) used a combination of BCRDV and RDV, and fowl pox vaccine. Farmers did not use infectious bronchitis and avian influenza vaccines for their local chickens, which represented a major gap and challenge in poultry farming. The absence of these important vaccinations increased the risk of disease outbreaks, reduced flock productivity, and led to higher mortality rates. This irregular and no vaccination situation reflected limitations in farmer awareness, access to veterinary services, and availability of vaccines at the field level. Addressing those health management gaps through training, extension support, and improved vaccine distribution is essential for strengthening disease prevention and improving the sustainability of local chicken production systems. The vast majority of farmers (90.32%) did not vaccinate their ducks. Only 9.68% of farmers vaccinated their ducks against duck plague but no vaccines were applied against duck cholera. The vaccines that farmers usually used for vaccination were mainly produced by the Livestock Research Institute, Mohakhali, Bangladesh, and supplied by the Department of Livestock Services.

In terms of disease outbreaks, Newcastle disease, known as Ranikhet disease in the Indian sub-continent, was the most frequent disease in Nilphamari district of Bangladesh, affecting 75.24% of farms. Fowl pox was also common, occurring on 40.95% of farms, whereas fowl cholera and infectious coryza were reported in 25.24% and 21.90% of farms, respectively. Avian influenza outbreaks were relatively low (4.28%), and coccidiosis was noted in 21.43% of farms. Additionally, 13.33% of farms reported disease outbreaks of unknown cause. A relatively high morbidity rate of 66.64% and a mortality rate of 35.10% were found among the surveyed chicken population (local and commercial). Among the 31 duck-raising families in the study areas, 51.61% of farmers experienced at least one disease outbreak. Duck plague was the most prevalent disease, affecting 35.48% of farms. Duck cholera was reported in 9.68%, while a combination of duck plague, duck cholera, and suspected poisoning was observed in 6.45% of farms. The morbidity rate of ducks was 63.68%, while the mortality rate was 24.37%. More than half of the respondents (57.14%) slaughtered sick poultry for consumption, indicating a lack of public health awareness, which can increase the risk of zoonotic diseases. About 22.86% of farmers separated their sick poultry, while 20.00% kept them in the same shed. In terms of house cleaning practices, 55.24% of the poultry farmers followed regular cleaning practices, while 44.76% of farmers reported that the cleaning of their poultry house was performed irregularly for both ducks and chickens.



**Figure 8.** Vaccination practices in local poultry farms in the Nilphamari district of Bangladesh from July 2024 to June 2025. **A:** Chicken vaccination, **B:** Duck vaccination. BCRDV: Baby chick Ranikhet disease vaccine, RDV: Ranikhet disease

### Constraints in poultry farming

A very common problem across all areas of the Nilphamari district of Bangladesh was predatory animal attack (overall 71.9%), with the highest rates in Dimla (82.86%) and Domar (80.00%), and the lowest in Jaldhaka (54.29%). The knowledge gap was the second most common constraint (overall 70.95%), and it was particularly high in Domar (94.29%) and Dimla (91.43%), while it was relatively low in Nilphamari Sadar (51.43%).

Disease outbreaks were a widespread concern, affecting 69.52% of the farms. Farmers' response in terms of taking control measures against diseases was the highest in Domar (91.43%) and Dimla (82.86%), while the lowest response was observed in Nilphamari Sadar (54.29%). Feed prices posed a significant challenge, affecting 60.0% of farmers. This problem differed across sub-districts and was particularly severe in Jaldhaka, where 82.86% of farmers were affected. Poor-quality poultry was the moderate constraint (overall 50.95%), followed by poor productivity, which affected around

40.95% of farmers in Nilphamari, Bangladesh. Lack of veterinary services (31.90%) and unavailability of vaccines (29.05%) were also major constraints, with high variability across locations (Figure 9).

The present data revealed that the majority of community poultry farmers strongly demand technological support (85.23%) and training (82.85%) to improve their farming practices. Technical support and training needs indicated that farmers in Nilphamari district, Bangladesh, lacked adequate technical knowledge and modern tools to boost production. As a result, capacity-building programs were considered a top priority across all regions in Nilphamari district, Bangladesh. A large proportion of farmers (61.43%) emphasized the need to reduce feed costs, as feed was the most expensive input in poultry farming and a major barrier to profitability across the surveyed sub-districts in the Nilphamari district of Bangladesh. Similarly, half of the respondents (50.95%) expressed a demand for highly prolific breeds, reflecting farmers' interest in increasing egg and meat productivity through improved genetic resources. On the financial side, approximately 23.33% of farmers reported a need for loans, particularly in Nilphamari Sadar (40%) and Domar (34.29%), highlighting the crucial role of credit access in sustaining poultry farming. Meanwhile, 8.57% of farmers requested a reduction in vaccine and medicine costs, indicating concern about animal health expenses. Only 4.29% of farmers noted the need to enhance market facilities, indicating that production constraints were more urgent than marketing concerns in Nilphamari district, Bangladesh (Figure 10).

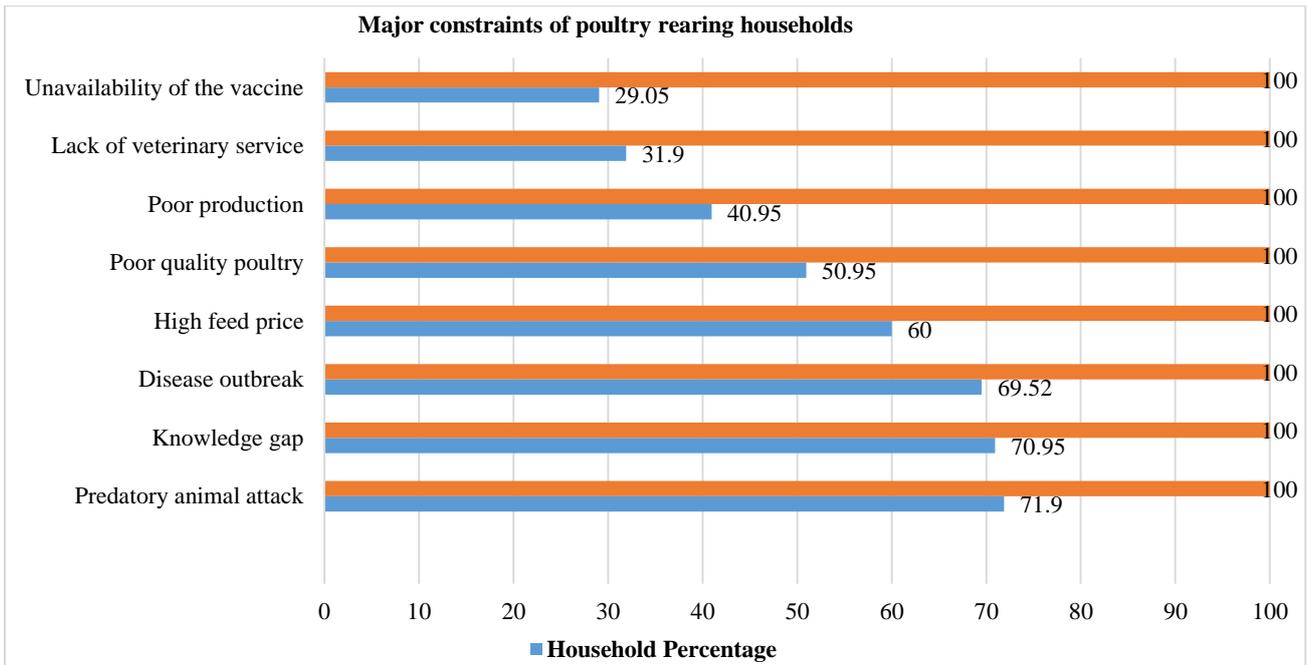


Figure 9. Constraints in local poultry farming in Nilphamari district of Bangladesh from July 2024 to June 2025. The orange line at 100% indicates the maximum possible percentage for clear visual comparison of constraint prevalence.

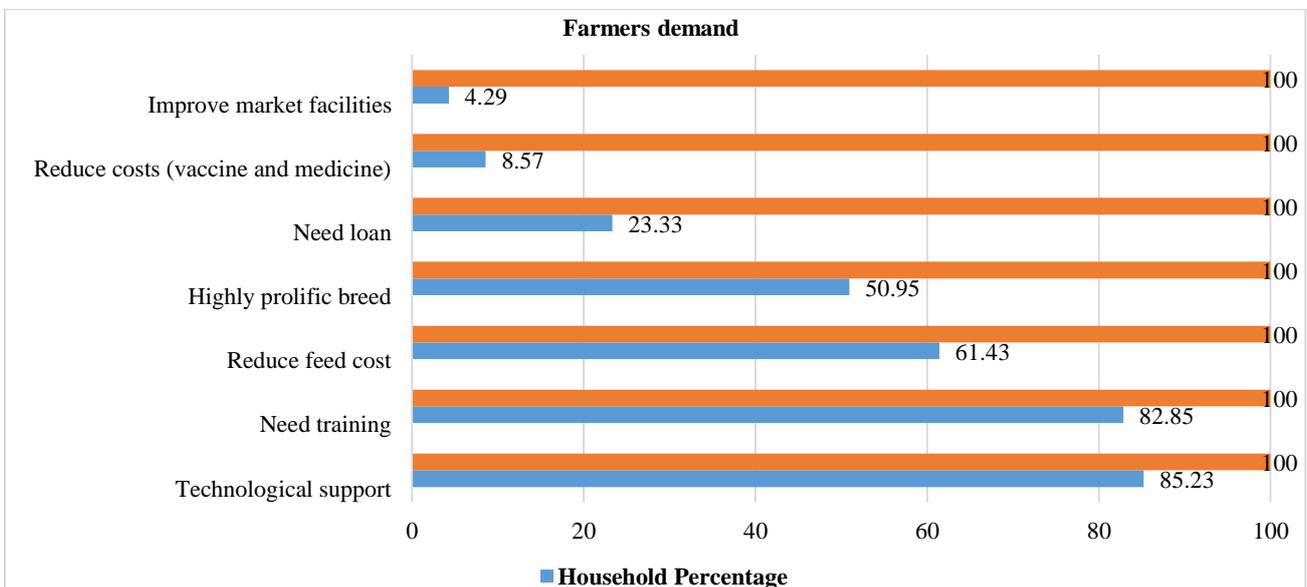


Figure 10. Farmers' demands to mitigate the challenges of the local poultry sector in the Nilphamari district of Bangladesh from July 2024 to June 2025. The orange line at 100% indicates the maximum possible percentage for clear visual comparison of constraint prevalence.

## DISCUSSION

The study found that most respondents involved in indigenous poultry rearing were women, which aligns with the typical situation in rural Bangladesh where women mainly handle community poultry activities. This finding was consistent with those of [Bharti et al. \(2018\)](#) in Uttar Pradesh, India, who reported a higher proportion of women engaged in native poultry rearing. [Islam et al. \(2021a\)](#) similarly observed that 83.00% of respondents involved in indigenous chicken farming in India were women. Furthermore, the illiteracy rate among poultry-rearing households in Mymensingh, Bangladesh, was about 67%. Among literate farmers, most had only primary (17%) or secondary (14%) schooling, and only 0.72% had higher education, as reported by [Shahjahan and Bhuiyan \(2016\)](#), which was lower than the current findings. This literacy level depends on the study location and period of study. The present results were nearly similar to the [BBS \(2022\)](#) report, which indicated that nationally, 74% of people were literate and 26% were illiterate in Bangladesh. [Billah et al. \(2013\)](#) reported comparable illiteracy rates in Bangladesh (38%), which were higher than those in the current findings. Such differences might be attributed to geographical variations, access to educational institutions, inequality, and differences in study periods ([Khan and Islam, 2010](#)). Regarding occupation, [Islam et al. \(2015\)](#) found that the primary occupation of poultry farmers in the Mymensingh district of Bangladesh was agriculture (43%), followed by business (20%), service (10%), and other occupations (27%). In contrast, the present findings indicated that most farmers relied on day labor, with agriculture, business, service holder, and other occupations being secondary, likely due to limited access to cultivable land.

Household size and income demonstrated some differences. According to the [Population and Housing Census \(2022\)](#), the average family size in Nilphamari district of Bangladesh was 4.10, slightly lower than the present findings, which may be due to the study's focus on selected households rather than the entire population. Similarly, national averages of Bangladesh reported by the Household income and expenditure survey of [HIES \(2022\)](#), a monthly income of 32,422 BDT (264.5 USD) and expenditure of 31,500 BDT (257.1 USD), which were equivalent to annual incomes and expenditures of 389,064 BDT (3,174.0 USD) and 378,000 BDT (3,083.0 USD), respectively. The national statistics for income and expenditure were higher than those observed in the present study. These national statistics reflected the national household average, which encompasses diverse income streams, including salaried employment, business activities, and urban earnings. In contrast to the present study, the surveyed poultry farmers primarily relied on small-scale farming, agriculture, and manual labor with limited production capacity, and the data were collected mainly from rural communities, which did not represent the entire population of Bangladesh. Finally, farming experience in Nilphamari, Bangladesh, was slightly higher at 16.62 years than the 12.76 years reported by [Islam et al. \(2021c\)](#) in Assam Pradesh, India, likely reflecting local differences in livelihood patterns and data collection methods within the Nilphamari community.

[Islam et al. \(2025a\)](#) reported that most local poultry farmers in Bangladesh maintained small chicken farms, which aligns with the current findings. In contrast, [Shahjahan and Bhuiyan \(2016\)](#) observed the lowest average flock size (5.62) in Mymensingh, Bangladesh, whereas [Sultana et al. \(2025a\)](#) reported the highest flock size (24.05) in the Barishal area of Bangladesh. [Alam et al. \(2014\)](#) documented an average flock size of 10.4 in Mymensingh, Bangladesh, which was comparable to the current results. These variations in flock size may reflect differences in study location, farmer resources, and management practices.

In Bangladesh, although the number of commercial poultry farms is expanding rapidly, with more than 70,000 operations, the majority are small-scale ([Grain Feed and Milling Magazine, 2026](#)). The sector comprises backyard systems, which account for approximately 65-70% of the nation's poultry population. These backyard operations are generally managed by women and are acknowledged as a vital strategy for poverty alleviation among community households ([Grain Feed and Milling Magazine, 2026](#)). Consequently, the number of commercial poultry farms in the Nilphamari district was lower than that of backyard poultry farms in the present study. The average flock size of ducks in Mymensingh district of Bangladesh was reported as 9.95 by [Alam et al. \(2014\)](#), slightly higher than the present findings, whereas [Shahjahan and Bhuiyan \(2016\)](#) reported a smaller average flock size of 3.81. Duck farming was relatively rare in the Northern districts of Bangladesh, notably in Nilphamari, due to the unavailability of suitable wetland habitats, such as haors, canals, rivers, and ponds.

[Sultana et al. \(2025a\)](#) reported that 75% of indigenous chickens in the Barishal area of Bangladesh were reared under a semi-intensive system, which was slightly lower than the current findings, likely due to the smaller flock sizes observed in the Nilphamari districts of Bangladesh. [Rahima et al. \(2023\)](#) reported that 97.64% of farmers reared their backyard poultry under semi-intensive farming in Jhenidah district of Bangladesh, which was similar to the current findings. Similarly, [Chaturvedani et al. \(2016\)](#) noted that in Chattisgarh, India, small coops for indigenous chickens were typically constructed from locally available materials such as bamboo, mud, wood, netting, tin, and straw, which corresponded with the housing practices observed in the present study. Additionally, [Sultana et al. \(2012\)](#) found that

87% of households in Rajshahi, Bangladesh, reared poultry in separate cases or night sheds, on verandas, or in designated parts of the yard, a practice that closely resembled the housing arrangements used by farmers in the Nilphamari district, Bangladesh. [Shanta et al. \(2017\)](#) reported that the majority of households (76%) raised poultry for both consumption and egg and meat sales, while 12% raised poultry solely for consumption, which was lower than the present findings. In addition, the current findings indicated that 22.86% of farmers reared poultry solely for household consumption, which was nearly the same as [Argaw \(2015\)](#), who reported that 22.2% of farmers in Ethiopia reared poultry for household consumption.

[Alam et al. \(2014\)](#) found that about 62% of poultry farmers of Mymensingh, Bangladesh, used boiled rice and rice polish as feed, while [Popy et al. \(2018\)](#) observed that farmers in Moulvibazar, Bangladesh, commonly provided extra grains such as paddy, rice, or wheat, which was consistent with the present findings. In contrast to the present study, farmers who supplied supplementary feed more than three times a day indicated that they frequently responded to poultry interactions, reflecting a more attentive, interactive feeding practice in the study area.

The mean body weights of cocks were 1.45 kg and hens 1.15 kg, and the age at egg production was 177.98 days, as mentioned by [Sultana et al. \(2025b\)](#) in Bangladesh, which was nearly similar to the current findings. Similarly, [Bhuiyan et al. \(2005\)](#) reported mature body weights of indigenous chickens in Bangladesh ranging from 1.0 to 1.3 kg, supporting the current results. Egg production in indigenous chickens has been reported by [Popy et al. \(2018\)](#) to be 35-40 eggs per year, which was lower than the present findings, while [Sultana et al. \(2025b\)](#) reported higher egg production in Jaypurhat ( $95.00 \pm 2.15$  eggs) and Rangpur ( $105.34 \pm 2.51$  eggs) districts of Bangladesh compared to the current study. Under scavenging conditions, [Bhuiyan et al. \(2005\)](#) reported annual egg production per hen of 50-55 in Deshi chickens and 45-50, with egg weights of 35-39 g, which was consistent with the present findings. Furthermore, 97.7% of farmers used natural hatching systems ([Sultana et al., 2025b](#)), which aligns with the current results.

Regarding native ducks, [Islam et al. \(2025c\)](#) reported drake (male duck) and duck weights of 1.92 kg and 1.66 kg, respectively, in the Haor region of Bangladesh, comparable to the present findings. [Islam et al. \(2016\)](#) recorded higher egg production per duck per year (117.5 eggs) with an average egg weight of 63.8 g, supporting the present results. Additionally, [Islam et al. \(2016\)](#) noted that 100% of farmers incubated duck eggs under broody hens in Mymensingh, Bangladesh, which was consistent with the current findings. Vaccination practices among village poultry farmers remain limited due to poor knowledge, limited vaccination skills, and low awareness. In India, [Islam et al. \(2021b\)](#) reported an even lower vaccination rate of 4.5% among chicken farmers. Similarly, [Islam et al. \(2024\)](#) reported that approximately 76.9% of farmers did not vaccinate their native chickens, which was consistent with the current findings. In the case of ducks, [Ahmed et al. \(2021b\)](#) reported that 85% of small-scale farmers of Sylhet, Bangladesh, did not vaccinate their duck flocks, supporting the current findings.

Newcastle disease continues to be the leading cause of death among poultry in Bangladesh. [Islam et al. \(2021c\)](#) reported that 84.5% of poultry mortality in local farms in Assam, India, from August 2017 to July 2018 was due to Newcastle disease, consistent with the current results. Similar patterns of poultry disease prevalence have been reported in Gazipur and Kishoregonj district of Bangladesh, where fowl pox, fowl cholera, and coccidiosis were among the most common infectious diseases ([Hassan et al., 2016](#); [Al Mamun et al., 2019](#); [Islam et al., 2021a](#)). These diseases were largely associated with poor biosecurity, inadequate vaccination practices, and suboptimal farm management conditions, particularly in small-scale and rural poultry systems. Additionally, comparable findings were reported in Ethiopia by [Abebe and Gugsa \(2018\)](#), indicating that similar agro-ecological and management factors contributed to disease persistence. Therefore, these studies highlighted the ongoing challenges in poultry health management in developing countries. Mortality rates differed across studies; [Rahima et al. \(2023\)](#) observed lower mortality rates for deshi chicken (28.79%), sonali chicken (30.35%), and duck (14.50%) in Jhenidah, Bangladesh, indicating that mortality rates varied across poultry species or breeds. In the present study, disease outbreaks were the dominant cause of mortality among poultry. In contrast, in the Rajshahi region of Bangladesh, although diseases were the primary cause of mortality, predation and adverse environmental conditions contributed more substantially to poultry losses ([Dutta et al., 2013](#)). In ducks in Jhenidah, Bangladesh, [Rahima et al. \(2023\)](#) identified duck plague as the most prevalent disease, followed by duck cholera, findings consistent with the present findings.

Regarding management practices, [Shanta et al. \(2017\)](#) reported that 49% of slaughtered or defeathered sick poultry in Bangladesh was slightly lower than the current findings. [Islam et al. \(2024\)](#) and [Sultana et al. \(2025c\)](#) reported that 70.4% of farmers in the selected eight areas of Bangladesh regularly cleaned poultry houses, which supports the present results. This cleaning practice was probably adopted because most farmers use basic night shelters, such as cages or temporary houses, in which poultry are kept overnight for protection against predators and adverse weather. Since chickens stay in these confined spaces for several hours, droppings and waste accumulate quickly, making daily cleaning necessary to maintain hygiene, reduce disease risk, control odor, and ensure a healthy environment for the chickens.

Selam and Kelay (2013) identified high chicken mortality due to disease, predation, and mismanagement as major constraints in Ethiopia, which supported the present results. Islam et al. (2025a) highlighted disease outbreaks, predator attacks, vaccine shortages, and high feed costs as key challenges in the poultry sector of Bangladesh, consistent with the current observations. In duck farming, Begum et al. (2020) reported that high feed prices, a lack of extension services, and the unavailability of quality ducklings were major constraints in the Northeastern regions of Bangladesh, reflecting the experiences and observations of poultry farmers in Nilphamari districts of Bangladesh. Frequent disease outbreaks led to high mortality rates, reduced growth, and lower egg production, while inadequate vaccination increased the risk of rapid disease spread across farms in Nilphamari, Bangladesh. Predator attacks were common in backyard and small-scale systems due to weak housing and poor biosecurity, leading to sudden chicken losses. Meanwhile, rising feed costs have considerably increased production expenses, as feed accounted for the largest share of poultry farming costs, making it difficult for farmers to preserve profit margins and keep their operations going. To address these challenges, Islam et al. (2025a) highlighted the importance of providing healthy, genetically sound chickens that are suitable for efficient poultry production.

## CONCLUSION

The present study revealed that poultry farming in Nilphamari district of Bangladesh was mainly managed by women and was characterized by small flock sizes, free-ranging systems, and reliance on locally available feed. Indigenous chickens and ducks exhibited poor body weights, with ducks ranging from 1.5 to 1.8 kg and chickens from 1.0 to 1.4 kg. Egg production was about 64 eggs per year for chickens and 107 eggs per year for ducks, with natural hatching being the most common method. Farmers encountered several significant challenges, including a high prevalence of disease, affecting 69.52% of farms, notably Newcastle disease, which impacted 75.24% of farms, as well as low vaccination coverage, predation, feed expenses, and restricted technical expertise among farmers. To enhance community poultry farming in Nilphamari, Bangladesh, it is essential to improve vaccination coverage and disease prevention through targeted extension programs that educate farmers on biosecurity and health management. Technical training on poultry rearing, feeding practices, and housing construction should be provided to increase productivity and reduce mortality. Access to healthy chickens suitable for efficient poultry production, affordable feed, and low-interest loans can help farmers maintain and expand their flocks. Additionally, the development of proper night shelters and low-cost housing can protect poultry from predators and environmental stress. Policy interventions should prioritize support for women farmers, who play a central role in managing poultry at the community level, to strengthen their capacity and livelihood opportunities.

## DECLARATIONS

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### Competing interests

There are no conflicts of interest regarding this manuscript.

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### Ethical considerations

All authors have been screened for ethical issues, including plagiarism, consent for publication, ethical violations, data falsification, and multiple publications or submissions. AI was not used to generate data, perform statistical analyses, or interpret the data findings. All sections of the manuscript related to the methodology, results of the study, and conclusions were written entirely by the author based on the findings of the present study.

### Availability of data and materials

The authors confirmed that all data supporting the findings of this study are included within the manuscript.

### Authors' contributions

Sydidul Islam designed the study, wrote the protocol, collected the data, and wrote the manuscript. Md. Ashraful Islam, Sharmin Sultana, and Razia Khatun contributed to data collection and manuscript writing. Md. Sahidul Islam and

Md. Sazedul Karim Sarker wrote the manuscript. Md. Sazedul Karim Sarker and Razia Khatun provided support and guidelines for writing this article. All authors read and approved the final edition of the manuscript.

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