Socio-economic Status, Rearing System and Disease Prevalence of Poultry in Southern Part of Chattogram, Bangladesh

A Production Report Submitted by

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ABBREVIATIONS

ADB=Asian Development Bank

DLS= Department of Livestock Service

OHPH=One Health Poultry Hub

DOC= Day Old Chick

Sq. Km= Square Kilometer

HSC = Higher Secondary Certificate

UVH= Upazila Livestock Office And Veterinary Hospital

USD= United States Dollar

BDT= Bangladeshi Taka

IBD= Infectious Bursal Disease

ND= New-Castle Disease

AI= Avian Influenza

CRD= Chronic Respiratory Disease

AMR=Antimicrobial Resistance

Abstract

The study was conducted in the southern part of Chattogram (Patiya upazilla) to know about the socio-economic condition, rearing system, and disease prevalence of poultry in the concerned area. The data were collected from randomly selected 100 poultry farmers from fourteen unions. STATA was used to do a statistical analysis on the data. Most of the farmers were male (95%) and middle-aged (65%). More than half of the farmers chose poultry farming as their major vocation, even though only 32% had received training on poultry farming. 95% farms were gable-type (91%) tin-roofed, where broilers and sonali were raised in a litter system and layers were farmed in a cage system. 62% of the farms were in an east-west direction, while 10% of the farms were non-directional. Sawdust was the most frequently used litter material (56%), while rice husk mixed with sawdust were also reported by 32% of farmers. Heat stress is a regular phenomenon in all poultry farms and accounts for 18% of the farms directly affected by excess heat, but farmers took various steps such as using fans, sprays, and sprinkling to reduce the effect of scorching heat. 58% farmers faced a 5-10% mortality rate, and 82% of farmers did postmortem to identify the disease. It is alarming to see that just 12% of farmers were aware of antimicrobial resistance (AMR), despite 66% of farmers having a basic understanding of antibiotics and their applications. The prevalent diseases encountered by the farmers were Infectious Bursal Disease (31%), Newcastle Disease (8%), Aspergillosis (18%), Salmonellosis (20%), Colibacillosis (16%), and Coccidiosis (2%). The occurrence of the disease was due to insufficient biosecurity measures. Only 4% of the farms practiced the fumigation process while 5% of the farms had footbath facilities. Farmers also faced various problems that hindered their poultry farming, among them higher costs of feed and raw materials (97%), a higher price of Day Old Chick (94%), and fluctuating market prices (87%) of poultry products were some on top. The government should provide accessible loan facilities, subsidized costs for feed and DOC, and steady market prices so that the poultry sector becomes more promising and lucrative.

Keywords: Biosecurity, Disease prevalence, Socio-economic status, Poultry

CHAPTER 1: INTRODUCTION

1.1 Background of the study

Bangladesh, a developing country in Southeast Asia with a population of 169.8 million (BBS, 2022), faces significant socio-economic challenges, including unemployment and poverty. Approximately 68.34% of its population lives in rural areas, and despite having a large labor force, the country struggles to achieve desirable economic development. The unemployment rate stood at 4.2% in 2018 (Sultana, 2020), while 18.7% of the population lives below the national poverty line, with malnutrition and undernourishment still prevalent (ADB, 2022). In this context, the poultry sector plays a crucial role in addressing both economic and nutritional challenges by providing affordable, high-quality protein and generating employment.

Poultry farming is a significant livestock subsector in Bangladesh, with around 385.7 million poultry, including 319.7 million chickens and 66 million ducks (DLS, 2023). This sector contributes to about 20% of direct employment and 50% of indirect employment, particularly benefiting rural populations (Bounds and Zinyemba, 2018; Kemi, 2019). If supported and encouraged this sector can play a major role in lowering unemployment and poverty (Sumy *et al.*, 2010). Poultry farming not only helps in alleviating poverty but also provides employment opportunities, especially for rural women, as small-scale operations dominate the industry. Organized farming can enhance production efficiency, reduce costs, and improve economic sustainability (Rahman *et al.*, 2021). In recent years, the commercial poultry sector in Bangladesh has grown rapidly, with broiler and sonali chicken farming becoming increasingly popular due to their short production cycles and high demand. Broiler meat, rich in high-quality protein and essential nutrients, plays a significant role in improving the health and nutrition of undernourished rural populations, particularly children (Barroeta, 2007; Neumann *et al.*, 2002). After layer farming, 80% of farmers said their socioeconomic situation had improved and the production procedures were substantial and lucrative in terms of generating money, employment, and profitability (Mukta *et al.*, 2021). Sonali chickens, a crossbreed resembling local varieties, are also favored for

their adaptability and economic potential, providing a sustainable livelihood for small-scale farmers (Uddin *et al.*, 2014; Islam, 2021).

The Southern part of Chattogram districts holds significant importance for poultry farming due to its strategic location and agricultural focus. Namely Patiya upazila, a large area of around 310 sq. km. located in this part; benefits from its proximity to Chattogram city, the second-largest city in Bangladesh, which offers easy access to urban markets, particularly for poultry products such as eggs and chicken. Located near the Chittagong-Cox's Bazar highway, Patiya has a well-connected transportation network, making it a hub for commerce and agriculture. It's closeness to the Karnaphuli River also facilitates access to the port and industrial zones in Chattogram, enabling efficient import of poultry feed, medicine, and technology. As a result, Patiya's poultry industry is well-positioned to meet the growing demand for poultry products in the region.

Despite its advantages, many poultry farmers in Patiya continue to face financial challenges, fluctuating feed prices, and disease outbreaks that hinder productivity. Addressing these issues by improving production practices, enhancing disease management, and providing better access to resources can significantly boost the sector's potential.

This study aims to analyze the socio-economic conditions, rearing systems, and disease prevalence among poultry farmers in Patiya Upazilla, Chattogram District. By focusing on broiler, layer, and Sonali chicken farming, the research seeks to offer insights that could help optimize resource allocation, enhance productivity, and promote sustainable development in the poultry sector. The findings will assist policymakers, farmers, and stakeholders in identifying challenges and opportunities for growth, contributing to poverty reduction and economic development in Bangladesh.

1.2 Aim and objectives of the study

This study aims to analyze the socio-economic conditions, rearing systems, and disease prevalence among poultry farmers in Patiya Upazila, Chattogram District. By focusing on broiler, layer, and sonali farmers, the study seeks to provide valuable insights into the social and economic situations, rearing practices, and common diseases affecting poultry in this area. The findings may assist producers and newcomers in making informed decisions, optimizing resource allocation, and creating sustainable self-employment opportunities.

Specific Objectives

1. Describe the general farm characteristics and socio-economic profiles of farm owners of southern Chattogram (Patiya).
2. Evaluate the production and performance metrics, knowledge and attitudes towards antimicrobial resistance, biosecurity practice of existing poultry farming systems in the area.
3. Analyze the disease prevalence among poultry in the selected region.

CHAPTER 2: MATERIALS AND METHOD

2.1 Study area

The study was conducted in Patiya upazila which is located at 22°13' to 22°21' north latitude and 91°52' to 92°07' east longitude in the southern part of Chittagong district. In all, the upazila comprises 17 unions of which data was gathered from 14 union including Habilashdwip, Dhalghat, Kusumpura, Jiri, Heidgaon, Kolagaon, Kharna, Kashiyish, Kelishahar, Baralia, Kachuai, Shobhandandi, Chanhara and South Bhurshi. The map is created by using QGIS (3.14.16).

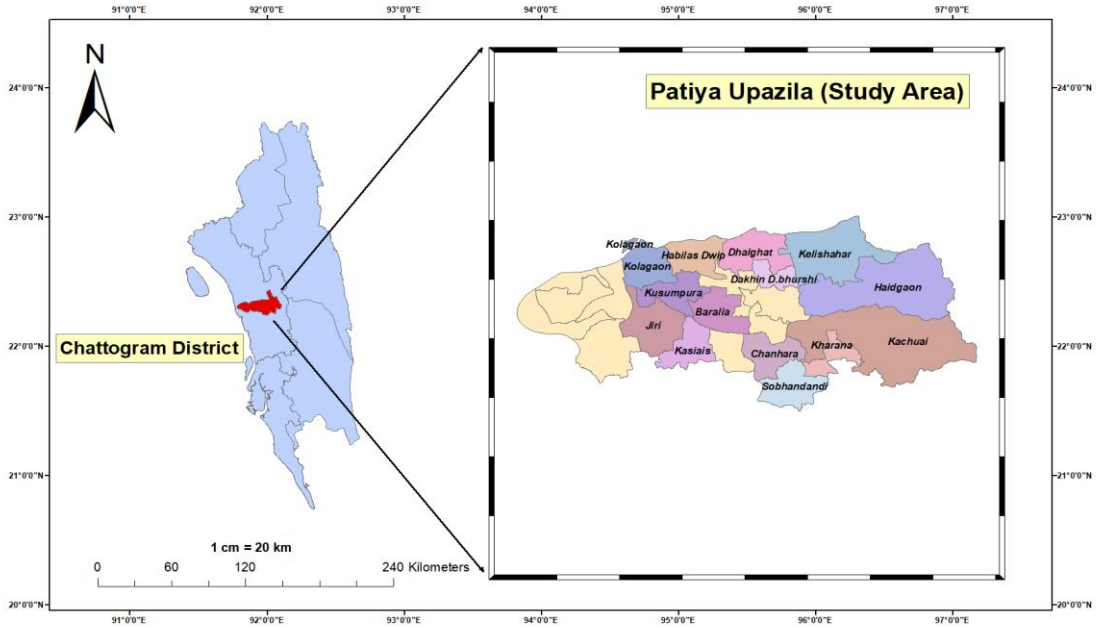

Figure 1: Study areas showing in map

2.2 Study period

The investigation was completed during period from 21st February to 1st July 2024. During this period, 100 farms were chosen for study and data were collected by utilizing a meeting plan through eye-to-eye meeting and collection of necessary data.

2.3 Preparation of questionnaire

Related questions regarding socioeconomic status of the farmers, rearing system of the poultry and disease prevalence in the selected area were assembled in MS word and printed out in A4 size paper before going to the field. While some questions just required a broad response, the majority of the questions were in multiple choice form.

2.4 Population and sample size

All the poultry farms of the locale occupied with poultry flock were considered as population and a sample size of 100 farms were chosen using a stratified random sampling method for the study (Table 1).

Table 1. Descriptive characteristics of the total sampling population

Types of poultry	No. of farms
Broiler	87
Layer	10
Sonali	3
Total	**100**

2.5 Sampling method

Patiya Upazila of Chattogram District was chosen in inclination (Non-arbitrary determination) and 100 farms of Patiya upazilla from various unions were chosen arbitrarily (Stratified random sampling). Extended interviews with farm personnel**,** usually the owner or the worker served as the primary basis for the farm evaluation.

2.6 Methods of data collection

Data were collected from both primary and secondary sources. Using the prepared questionnaire, the researchers personally questioned the chosen farm owner or employees to gather primary data; secondary data were gathered from a variety of sources, including as theses, papers, journals, government documents, and Bangladeshi statistics yearbooks. Straightforward inquiries were made in order to gather data.

2.7 Data analysis

Data were collected, tabulated and coded in MS EXCEL and the data was analyzed by using statistical software STATASE 18 (Statacorp LLC, Lakeway drive, Texas, USA). We performed descriptive analysis to determine the frequency, percentage and 95% confidence interval of the variables.

CHAPTER 3: RESULTS AND DISCUSSION

3.1 Socioeconomic status of the poultry farmers:

The socioeconomic status of the poultry farmers is presented in the Table 2. In this part the current status of poultry farming practices and socioeconomic characteristics of farm owners and status of their farms are discussed.

3.1.1 Age

From the results indicated in Table 2, it reveals that the majority of the owners fall within the range of 30 to 50 years old, comprising 65%, with 95% Confidence interval(CI) (54.81-74.27) of the sample, while those below 30 years constitute 7%; 95% CI (2.86-13.89), and those above 50 years represent 28%; 95% CI (19.47-37.86). Similar findings were found in Nigeria (Getso and Hassan, 2020) that showed that the majority of the owner fall in the 30-45 years age group (78%) than the older age group (above 45) which occupies 22.7% while the young belonging to age below 30 years retains 7.33%. Slightly dissimilar results were reported in Chhattisgarh (Chaturvedani *et al.*, 2017) where it turned out that, 58.33% belonged to the middle-aged group(30-50 years), 36.67% to the young age group(below 30), and 5.00% to the elderly age group (above 50) where the young owner surplus the elder one's.

3.1.2 Gender

It showcases a significant gender imbalance within the sample, with males comprising the overwhelming majority at 95%; 95% CI (88.71–98.35), while females make up only 5%; 95% CI (1.64–11.28). It suggests that in the research location, male family members were somewhat more involved in poultry raising, which is also supported by (Getso & Hassan, 2020), where male poultry farmers make up the majority of this sector (82.67%), with female farmers making up the minority (17.33%) in Nigeria. This high male-to-female ratio may have been caused by customs that support farmers' lifestyles more than anything else, such as that males ought to decide for the family. However, some reports have contradicting data, indicating that 58% of respondents were women and 42% were men (Isiorhovojaq, 2013) which may be due to geographical variation.

3.1.3 Marital Status

The vast majority of participants are married, comprising 95%; 95% CI(88.71-98.35) of the sample, with only 5%; 95% CI(1.64-11.28) categorized as unmarried. The current findings of (Getso and Hassan, 2020) showed that 90.7% farmers were married while 8% remained single. This result is consistent with other study that found that married people made up the majority of Kaduna State's farmers (Jatto, 2012).

3.1.4 Education

The participants' levels of education in Table-2 illustrates that 41%; 95% CI (31.26–51.28) of the population having just completed elementary school, individuals with an HSC certificate come in second at 37%; 95% CI (27.55–47.23), while graduates make up 22%; 95% CI (14.33–31.39) of the group. It may be due to the individual choices of educated people.

3.1.5 Primary Occupation

It elucidates the diverse range of occupations within the sample. The most prevalent occupation is farming, encompassing 56%; 95% CI (45.71-65.91) of participants, followed by business at 34%; 95% CI (,24.82-44.15), with smaller percentages in professions like banking, government jobs and others which supports the findings of (Kabir *et al.,* 2016) where agriculture (40%) and business (22%) were the top 2 occupations of the people rearing poultry in Mymensingh.

3.1.6 Experience in farming

The majority of participants have more than five years of experience in farming, constituting 83%; 95% CI (74.18-89.77) of the sample, while those with less than five years of experience make up 17%; 95% CI (10.22-25.81). It implies that the industry is predominantly managed by individuals who likely have developed significant knowledge, skills and expertise over time. It also highlights a strong presence of seasoned professionals alongside a smaller cohort of newcomers.

3.1.7 Income (Monthly)

In terms of income, the majority of the study population falls within the range of 50,000 to 100,000 BDT, comprising 70%; 95% CI (60.01–78.75) of the sample, with smaller percentages earning below (18%) and above (12%) this range. This income source enables the farmers to do subsidiary poultry business to improve socio-economic conditions and add an extra income source for the family.

3.1.8 Training status

It shows whether participants have received any training on poultry farming or management, where only 32%; 95% CI (23.02-42.07) indicating they have and 68%; 95% CI (57.92-76.97) reporting that they didn't received any training. Additionally, all those who received training had it specifically in poultry farming from UVH, Patiya. During our discussion with the farmers who didn't receive any training, they revealed that they do poultry farming on the basis of their previous experience, and we also found out that most of the layer farmers were trained in farming.

Table 2. Factors associated with Socio-economic status of the poultry farmers of Patiya

Variables	Categories	Frequency (n)	Percentage (%)	95% CI
Age	<30	7	7	2.86-13.89
	30-50	65	65	54.81-74.27
	>50	28	28	19.47-37.86
Gender	Male	95	95	88.71-98.35
	Female	5	5	1.64-11.28
Marital Status	Married	95	95	88.71-98.35
	Unmarried	5	5	1.64-11.28
Education	Primary	41	41	31.26-51.28
	HSC	37	37	27.55-47.23
	Graduate	22	22	14.33-31.39
Primary	Farming	56	56	45.71-65.91
Occupation	Business	34	34	24.82-44.15
	Bank employee	3	3	0.62-8.51
	Govt. Job	1	1	0.02-5.44
	Other	6	6	2.23-12.60
Experience of	0-5 years	17	17	10.22-25.81
farming	>5 years	83	83	74.18-89.77
Income(Monthly)	<50000tk*	18	18	11.03-26.94
	50-100000tk*	70	70	60.01-78.75
	>100000tk*	12	12	6.35-20.02
Training received	Yes	32	32	23.02-42.07
	No	68	68	57.92-76.97
Training on	Farming	32	100	96.37-100

Tk*= BDT (1 USD=119 BDT)

3.2 Rearing and management system

3.2.1 Rearing System

The majority (89%); 95% CI (81.16–94.3) (Table 3.) of poultry farms in the study sample use a litter-based rearing system mainly for broiler and sonali rearing, which typically involves covering the floor with materials like sawdust or rice husk. Compared to cage or slatted systems, this kind of setup has significance because it allows birds to practice their natural behavior partially and provides better waste management and bird comfort. All the layer farmers in my study area use cage-rearing systems. It may be due to the advantages over a litter-based rearing system, as cage rearing provides better hygiene and disease control, good egg quality, better space utilization, ease of management and monitoring, and reduced labor costs. The use of litter material also varies among different farmers, with a significant proportion (62.22%); 95% CI (51.38–72.23) using only sawdust, while sawdust and rice husk mixtures (35.56%); 95% CI (25.74–46.34) are also prevalent. It was reported in a study (Islam *et al.*, 2013) that the majority (55.77%, 63.46%) of broiler farmers in Jessore and Bhola use rice husk as litter material. This variation may be due to the availability of rice husks in the study area. As litter material, rice husk is better than sawdust, but due to its unavailability and higher cost, sawdust is preferred by most farmers in Patiya. The thickness of litter material also varies among different farms, ranging from 2 to 6 inches in height.

3.2.2 Floor and Roof

Concrete floors are overwhelmingly common (98%); 95% CI (92.96-99.75) in poultry farming of the study area. Katcha floors, made of natural earth, are less common (2%); 95% CI (0.24-7.03), likely due to concerns about hygiene, biosecurity and difficulty in management. The dominance of concrete floors may be due to its durability, ease of cleaning, and prevents diseases associated with dampness and muddy floor. While the kind of floor had no effect on broiler live performance, broilers grown on hard-packed dirt floors had greater rates of deaths in general and unexpected deaths (Abreu *et al.*, 2011). Tin roofs are extensively used (95%); 95% CI (88.71-98.35) in poultry houses as it is durable, weather resistance and cost-effective compared to concrete roofs (5%);

95% CI (1.64-11.28). The choice of roof type plays a vital role for maintaining optimal conditions inside the poultry house. The concrete roof appears to have an impact on chicken mortality, but roofing has no effect on the birds' productivity (Mesa *et al.*, 2017). Gable roofs dominate (91%); 95% CI (83.6-95.8) providing good ventilation and ample space for heat dissipation, crucial for poultry health. Monitor roofs (4%); 95% CI (1.10-9.92) and multi-storied roofs (5%); 95% CI (1.64-11.28) are less common. It showcases farmers are involving with modern techniques to manage poultry health and improve production.

3.2.3 Orientation

It shows in Table 3. that the majority of the farm orientation (62%); 95% CI (51.74-71.52) is in East-West direction which usually help manage temperature and sunlight exposure to the farm. North-South directed farm comes in second (28%); 95% CI (19.47-37.86) which may be due to geography or land location of the farm owner. The non-directional (10%) orientations are those farm that is located in the rooftop of the house.

3.2.4 Feeding

All broiler and sonali farmers use crumble feed during the brooder stage and pellet type feed obtained from different companies for the remaining period, and all layer farmers in the research region utilize mesh type feed according to their growth stage. Majority (88%); 95% CI (79.97-93.64) of the farmers provide more than two times feed in a day where the rest of them provide only two times feed a day. Our findings is in line with (Tadesse *et al.*, 2017) who found that 69.2% of farmers feed their chickens three times a day, compared to 9.6% and 21.2% who supply once and twice a day, respectively. It is also supported by (Moradi *et al.*, 2013) who found out that feeding schedules of twice and three times a day, as opposed to one, increased rate of egg production. The supplied water to the poultry are from tube well either shallow or deep. During data collection, all the farmers admitted that only tube well water are supplied to their poultry. The biggest obstacle to raising broilers is the availability of water in many parts of the world. In some areas, productivity will be directly impacted by the quality of the water (Barton, 1996).

3.2.5 Vaccination

All the respondents in the study area reported vaccinating their poultry flock. The broiler farmer reported using three and sometimes four vaccines (BCRDV, IBD, and ND killed) during the rearing period, while the sonali farmer used the fowl pox vaccine along with the previous four vaccinations. The layer producers strictly follow the vaccination schedule for the layer. It is established that poultry farmers follow vaccination schedule in Bangladesh (Aini, 1990).

3.2.6 Heat Stress Management

In the research region, fans account for 22%; 95% CI (14.33-31.39) of heat stress management techniques, followed by fans with spray (64%); 95% CI (53.78-73.35), fans with sprinkling (11%); 95% CI (5.62-18.83), and mixtures of these techniques (3%); 95% CI (0.62-8.51). To reduce stress, heat stroke and to maintain optimum production heat stress management is a mast for poultry production in hot weather condition. Heat stress is an important reason for the fiscal losses, particularly in tropical and dry parts of the world (Saeed *et al.*, 2019), due to its effect on production, reproduction, gut health, immune response, and overall food safety (Nawab *et al.*, 2018). Along with special equipment, e.g., fans, sprayers, and sprinklers, it is also suggested to design houses according to the need; special feed formulation, feeding strategy, and density of the flock help to reduce heat-induced stress (Holik, 2009), which is also supported by Lin *et al.* (2006), who found genetic selection along with nutritional and feeding strategies enhance heat resistance in poultry.

Table 3. Rearing and Management system of poultry in Patiya (N=100)

Variables	Categories	Frequency (n)	Percentage (%)	95% CI
Rearing system	Litter	89	89	81.16-94.3
	Cage	10	10	4.90-17.62
	Slatted	1	1	0.02-5.44
Floor	Concrete	98	98	92.96-99.75
	Katcha	2	2	0.24-7.03
	Sawdust, Rice husk	32	35.56	25.74-46.34
Litter material	Only sawdust	56	62.22	51.38-72.23
	Sawdust, sand	2	2.22	0.27-7.79
Roof	Concrete	5	5	1.64-11.28
	Tin	95	95	88.71-98.35
Roof type	Gable	91	91	83.6-95.8
	Monitor	4	4	1.10-9.92
	Multi-storied	5	5	1.64-11.28
Orientation	East-West	62	62	51.74-71.52
	North-South	28	28	19.47-37.86
	Non-directional	10	10	4.90-17.62
Feed type	Pellet	90	90	82.37-95.09
	Mesh	10	10	4.90-17.62
Phase Feeding	Yes	100	100	96.37-100
	No	0	0	0
Frequency of feed supply	Two times	12	12	6.35-20.02
	>2 times	88	88	79.97-93.64
Source of water	Tube well	100	100	96.37-100
Vaccination	Yes	100	100	96.37-100
	No	0	0	0
"All in all out" system	Yes	14	15.56	8.77-24.72
	No	76	84.44	75.27-91.22
Average profit per batch	Yes	98	98	92.96-99.75
	No	2	2	0.24-7.03
Heat stress management	Fan	22	22	14.33-31.39
	Fan, spray	64	64	53.78-73.35
	Fan, sprinkling	11	11	5.62-18.83
	Fan, spray, sprinkling	3	3	0.62-8.51

3.3 Biosecurity

Farm biosecurity involves a set of practices aimed at preventing the entry and spread of diseases among poultry. In terms of six (fencing, traffic control, disposal of litter and carcasses, pest control, sanitation, and isolation) points considered during the study, the maximum (91%); 95% CI (83.6–95.8) (Table 4.) farm implements 3–4 measures indicating moderate biosecurity practice, whereas a small number of farms (8%); 95% CI (3.51–15.15) put into practice more than four measures of the above-mentioned points. The majority (58%); 95% CI (47.71–67.80) of the farms located near the house indicate poor conceptual biosecurity, which may also be due to a shortage of land. That is why 9%; 95% CI (4.19–16.39) of the study population built poultry houses on roofs. A small proportion (5%); 95% CI (1.64–11.28), and (4%); 95% CI (1.1–0.92) of the farms use footbath and fumigation, respectively, which concords with the findings of (Uddin *et al.*, 2020), where it was found that only 24.29% and 1.43% of the farms in Dinajpur have footbath and use fumigation, respectively.

Table 4. Biosecurity practices in poultry farms at Patiya (N=100)

Variables	Categories	Frequency (n)	Percentage (%)	95% CI
Biosecurity	Yes	100	100	96.37-100
Biosecurity measures	<3 measures	1	1	0.02-5.44
	3-4 measures	91	91	83.6-95.8
	>4 measures	8	8	3.51-15.15
Location of the farm	Near to house	58	58	47.71-67.80
	Far from house	23	23	15.17-32.48
	Rooftop	9	9	4.19-16.39
	Attached to house	10	10	4.90-17.62
Footbath	Yes	5	5	1.64-11.28
	No	95	95	88.71-98.35
Fumigation	Yes	4	4	1.1-9.92
	No	96	96	90.07-98.89

3.4 Disease prevalence and attitude towards antibiotic

In Table 5, the disease prevalence of poultry in Patiya Upazilla is demonstrated, where it is evident that IBD is the major cause of bird mortality, holding 31%; 95% CI (22.12-41.03), followed by salmonellosis (20%); 95% CI (12.66-29.18). ND is also prevalent in this region, with 8%; 95% CI (3.51–15.15) affecting the farm. This finding supports Islam *et al.*(2003) who reported 24.26% and 6.73% incidences of IBD and ND, respectively, in the Sylhet region.

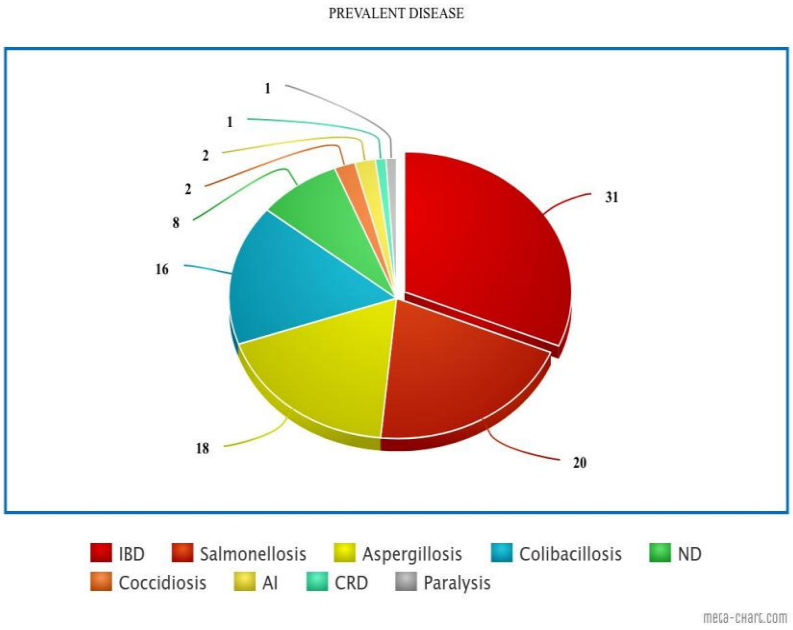

Figure 2. Prevalent disease of poultry

Other studies (Al Mamun *et al.*, 2019; Uddin *et al.*, 2010) also had similar results, where it was found out that during the summer season IBD (29.56%), salmonellosis (24.43%) and ND (13.88%) affect poultry in Kishorganj, whereas IBD (24.96%) and ND (8.92%) affect poultry in Narsingdi. Aspergillosis and colibacillosis account for 18%; 95% CI (11.03–26.94), 16%; 95% CI (9.43–24.67), respectively. Slightly dissimilar result observed in (Bari *et al.*, 2018), where it is reported to found IBD (16.42%), ND (8.95%), salmonellosis (4.48%), colibacillosis (11.94%) and Aspergillosis (5.95%) in Chattogram metropolitan area in winter season. This variation may be due to seasonal variation and location of the farm. Avian Influenza (AI), Chronic Respiratory Disease (CRD), and coccidia account for a little of the cause of

mortality. Mix infection includes IBD and salmonellosis, salmonellosis and colibacillosis, colibacillosis and coccidiosis, aspergillosis and salmonellosis that has affected 23%; 95% CI (15.17-32.48) of poultry farms of the total study population. Slightly similar result also found in (Uddin *et al.*, 2010) where it was reported to found 16.94% mix infection in Narsingdi. This similarity may be due to similar climatic condition of the study area. Apart from disease, heat stroke has been a cause of bird mortality due to frequent heat waves, which affected 18%; 95% CI (11.03–26.94) of the farms. 9%; 95% CI (4.19-16.39) cause of birds death was due to managemental origin.

Table 5. Disease prevalence and cause of mortality of poultry in Patiya (N=100)

Variables	Frequency (n)	Percentage (%)	95% CI
IBD	31	31	22.12-41.03
ND	8	8	3.51-15.15
Aspergillosis	18	18	11.03-26.94
Heat stroke	18	18	11.03-26.94
Colibacillosis	16	16	9.43-24.67
Salmonellosis	20	20	12.66-29.18
Coccidia	2	2	0.24-7.03
Management	9	9	4.19-16.39
CRD	1	1	0.02-5.44
AI	1	1	0.02-5.44
Paralysis	1	1	0.02-5.44
Mix infection	23	23	15.17-32.48

The mortality rate of farms were also recorded (Table 6). Less than 5% mortality rate was found in 33 farms (33%), whereas 5–10% mortality rate was found in 58 farms (58%), and more than 10% mortality rate was found in 9 farms (9%). Similar results were found in the work of Uddin *et al.* (2020). About 82%; 95% CI (73.05–88.96) of the farm owner participated in postmortem to diagnose the disease. Whereas 74%; 95% CI (64.26-82.26) prescription was given by veterinarians but 25%; 95% CI (16.87-

34.65) of the farm owner medicated their poultry on their own or with consultation with Quack without performing a postmortem. A somewhat different outcome was obtained by Hossain *et al.* (2021), where postmortem (98%) was done to diagnose disease and farmers contracted with certified veterinary physicians at a greater rate (95%) compared to local treatment (5%) in Brahmanbaria. But the alarming news is that around 66%; 95% CI (55.84-75.17) of the farm owners have idea about antibiotics and their uses, however only 12% know about antimicrobial resistance, where most of them learned about it from veterinarians. About 97.9% of commercial poultry farms use antibiotics (Imam *et al.*, 2020) and 86.5% were in touch with the notion of antibiotics and 51% had heard about AMR (Siddiky *et al.*, 2022). But the satisfactory news is that a small proportion (n = 3) of the farm owners learned about AMR on their own, which is a positive sign that people are becoming more involved in reducing AMR. It was also found out that most farms maintain the dosage and withdrawal period of antibiotics before selling the product.

Table 6. Treatment and attitude towards antibiotic of farmers (N=100)

Variables	Categories	Frequency (n)	Percentage (%)	95% Cl
Mortality	<5%	33	33	23.91-43.11
	5-10%	58	58	47.71-67.80
	>10%	9	9	4.19-16.39
Post Mortem	Yes	82	82	73.05-88.96
	No	18	18	11.03-26.94
Treatment	Own	25	25	16.87-34.65
	Veterinarians	74	74	64.26-82.26
	Pharmacy	1	1	0.02-5.44
Knowledge of antibiotic	Yes	66	66	55.84-75.17
	No	34	34	24.82-44.15
Knowledge of antimicrobial resistance	Yes	12	12	6.05-20.02
	No	88	88	79.97-93.64
AMR education	Own efforts	3	25	16.87-34.65
	Veterinarian	9	75	65.34-83.12
Application of antibiotic	Owner	45	45	35.03-55.27
	Worker	55	55	44.72-64.96
Maintenance of dosage	Yes	99	99	94.55-99.97
	No	1	1	0.02-5.44
Maintenance of withdrawal period	Yes	88	88	79.97-93.64
	No	12	12	6.34-20.02

3.5 Challenges faced by poultry farmers

The farmers complained about many aspects (Table 7) that they believe are impacting their farming and resulting in lower profits in poultry business. Higher costs of feed (97%) and DOC (94%) are the top two constraints reported by the farmer. Similar results were observed in Islam *et al.* (2012), where 85% of the respondents thought that higher feed costs were the main constraint of farming. 87% of the farmers think

that fluctuating market prices are a big threat to earning maximum profit which is corroborated by other research (Mandal and Khan, 2017). Our findings has similarities with the findings of Kawsar *et al.* (2013) who found price instability, lack of technical knowledge, middleman influence as some major problems of the small scale farmers. Lack of technical support and insufficient training facilities rank 5^{th} and 6^{th}, respectively, which hinder scientific poultry farming using modern technologies and tools. Comparable results observed in (Jabbar *et al.*, 2011). Due to the higher inflation rate, management costs have increased accordingly. Similarly, lack of knowledge, capital shortages, and heat waves are also impeding farmer's ability to produce quality meat and eggs in the study region.

Table 7. Problems of poultry farming in Patiya (N=100)

Challenges	Frequency (n)	Percentage (%)	Rank
Higher price of DOC	94	94	2
Higher cost of feed and raw material	97	97	1
Higher managemental cost	67	67	7
Fluctuating market price	87	87	3
Disease occurence	81	81	4
Insufficient training facilities	68	68	6
Lack of technical support	77	77	5
Lack of knowledge	57	57	8
Middle man effect	81	81	4
Heat Wave	45	45	10
Inadequate biosecurity	27	27	11
Capital shortage	47	47	9

CHAPTER 4: CONCLUSIONS

The socioeconomic circumstances, poultry farming practices, and disease prevalence in Patiya Upazilla were examined in the research. Adults (65%) choose poultry farming as their primary career (56%). Nonetheless, a lackluster education in chicken farming and management (68%) lead to a reduction in earnings. 62% of farms were in east-west oriented, and majority of the broiler and sonali chickens were raised in the litter technique while the layers in cages. Despite phase feeding, the majority of farmers provided commercial feed more than twice a day. Since most farms were near dwellings and lacked footbath and fumigation, they were more prone to infections. IBD (31%) was the most common disease in the concerned area. This was due to the inadequate use of footbaths and fumigation. Farmers employed a variety of techniques to cut the heat. 82% of farms conducted post-mortems to identify the disease, however 25% of the farmers medicated their own flock resulting in increasing the risk of AMR as only 12% of owners were aware of AMR. Despite accepting poultry farming as a profitable business, farmers faced several drawbacks like higher feed, DOC and management costs, fluctuating market prices of poultry products, lack of training, disease occurrence, and heat waves. Middlemen has also significantly influencing poultry product costs.

Limitations

The primary research restriction was that, owing to time and financial constraints, the required data could only be obtained from individual poultry farmers during a single visit. Information was gathered from the farm logs of the most recent batch of raised chickens. Some farmers attempted to conceal the true farming circumstances and deceive us with statistics, not cooperating completely during the data collection process. The sample size was small, and data was collected randomly from different parts of Upazilla.

Recommendations

The recommendations for poultry sector improvement would be subsidized costs for feed and chicks, quality chick production, accessible credit facilities, training in farm management, disease prevention and biosecurity, stability in market price and electricity. Further more emphasis on eliminating middlemen, and enhancing infrastructure underscores the suggestions for sustainable poultry farming. More detailed yearlong study should be conducted to come up with a more precise result. Though all farmers faced many problems in the raising and marketing of poultry meat and egg under unorganized farming system, there is no doubt that the poultry sector is a promising and profitable sector.

REFERENCES

Abreu, V. M. N., Abreu, P. de, Jaenisch, F. R. F., Coldebella, A., & Paiva, D. de. (2011). Effect of floor type (dirt or concrete) on litter quality, house environmental conditions, and performance of broilers. Brazilian Journal of Poultry Science, 13, 127-137.

ADB (2022). Bangladesh: poverty. Asian development bank

Aini, I. (1990). Control of poultry diseases in Asia by vaccination. World's Poultry Science Journal, 46(2), 125-132.

Al Mamun, M., Islam, K. M., & Rahman, M. M. (2019). Occurrence of poultry diseases at Kishoregonj district of Bangladesh. MOJ Proteom. Bioinform, 8(1), 7-12.

Bari, M. S., Rana, E. A., Abid, M. H., Akter, N., & Sayeed, M. A. (2018). Prevalence of poultry diseases in winter season in Chittagong and efficacy of challenge vaccine against Newcastle disease. Research in Agriculture Livestock and Fisheries, 5(2), 201-208.

Barroeta, A. C. (2007). Nutritive value of poultry meat: Relationship between vitamin E and PUFA. World's Poultry Science Journal, 63(2), 277-284.

Barton, T. L. (1996). Relevance of Water Quality to Broiler and Turkey Performance. Poultry Science Journal, 75(7), 854-856.

BBS (2022). Statistical Year Book of Bangladesh. Bangladesh Bureau of Statistics, Statistical Division, Ministry of Planning, Government of the People's Republic of Bangladesh, Dhaka, Bangladesh.

Bounds, M., & Zinyemba, O. (2018). Poultry farming: Lessening poverty in rural areas. South African Journal of Agricultural Extension, 46(1), 59-70.

Chaturvedani, A. K., Lal, N., Pratap, J., & Khyalia, N. K. (2017). Socio-economic status of tribal backyard poultry rearers in Bastar district of Chhattisgarh. Indian Journal of Extension Education, 53(4), 116-120.

DLS (2023).Livestock statistics of Bangladesh, Department of Livestock Services, Dhaka.

Getso, M. M., & Hassan, A. M. (2020). Socio-economic factors associated with poultry production. Journal of Environmental and Agricultural Sciences, 22(3), 7-12.

Holik, V. (2009). Management of laying hens to minimize heat stress. CABI Digital Library.

Hossain, M., Momu, J., & Miah, M. (2021). Assessment of constrains confronted by poultry farmers and crisis management practices during COVID-19 lockdown at Brahmanbaria, Bangladesh. Journal of Global Agriculture and Ecology, 12, 1-8.

Imam, T., Gibson, J. S., Foysal, M., Das, S. B., Gupta, S. D., Fournié, G., Hoque, M. A., & Henning, J. (2020). A cross-sectional study of antimicrobial usage on commercial broiler and layer chicken farms in Bangladesh. Frontiers in Veterinary Science, 7, 576113.

Isiorhovojaq, R. A. (2013). Socioeconomic factors as predictors of entrepreneurial behaviour in poultry farm. Mediterranean Journal of Social Sciences, 4(1), 511-517.

Islam, M. R., Das, B. C., Hossain, K., Lucky, N. S., & Mostafa, M. G. (2003). A study on the occurrence of poultry diseases in Sylhet region of Bangladesh. International Journal of Poultry Science, 2(5), 354-356.

Islam, M. S. (2021). Productivity and Profitability Estimates for Sonali Chicken Farms in Rajshahi, Bangladesh Journal of Science and Resources, 13(3), 989-998.

Islam, M. S., Hossain, M. M., Kamal, M. M., & Hashem, M. A. (2013). Comparative Study on Commercial Broiler Rearing Pattern in Plain and Coastal Regions of Bangladesh. Journal of Environmental Science and Natural Resources, 6(1), 89-97.

Islam, M. S., Kabir, A., & Dutta, R. K. (2012). Productivity, cost-benefit analyses, market prices and constraints to poultry farming in the northern Districts of Bangladesh. Journal of Life Earth Science, 7, 21-27.

Jabbar, M. A., Rahman, M. H., Talukder, R. K., and Raha, S. K. (2011). Exit from Bangladesh's poultry industry: causes and solutions.

Jatto, N. A. (2012). Economics and social characteristics of registered poultry egg producers in Ilorin, Kwara State. Russian Journal of Agricultural and Socio-Economic Sciences, 11, 18-23.

Kabir, M., Asaduzzaman, M., & Dev, D. (2016). Livelihood improvement through family poultry farming in Mymensingh district. Journal of Bangladesh Agricultural University, 13, 247-256.

Kawsar, M. H., Chowdhury, S. D., Raha, S. K., & Hossain, M. M. (2013). An analysis of factors affecting the profitability of small-scale broiler farming in Bangladesh. World's Poultry Science Journal, 69(3), 676-686.

Kemi, A. O. (2019). Reduction of Unemployment in Nigeria through Agriculture (A Case Study of FCT Poultry Farming). World Journal of Innovative Research, 6(2), 139-141.

Lin, H., Jiao, H. C., Buyse, J., & Decuypere, E. (2006). Strategies for preventing heat stress in poultry. World's Poultry Science Journal, 62(1), 71-86.

Mandal, M. S., and Khan, A. (2017). Poultry industry in Bangladesh: Which way to sustainable development. Proceedings of the 10th International Poultry Show and Seminar. WPSA-BB.

Mesa, D., Muniz, E., Souza, A., & Geffroy, B. (2017). Broiler-Housing Conditions Affect the Performance. Brazilian Journal of Poultry Science, 19, 263-272.

Moradi, S., Zaghari, M., Shivazad, M., Osfoori, R., & Mardi, M. (2013). The effect of increasing feeding frequency on performance, plasma hormones and metabolites, and hepatic lipid metabolism of broiler breeder hens. Poultry Science, 92(5), 1227-1237.

Mukta, S. P., Miah, T. H., Rashid, M. H.-A., Fardhous, S., & Bhuyan, R. M. (2021). Effects of layer farming on socio-economic condition of farmers at Sakhipur Upazila of Tangail district in Bangladesh. International Journal of Natural and Social Sciences, 8(2), 58-68.

Nawab, A., Ibtisham, F., Li, G., Kieser, B., Wu, J., Liu, W., Zhao, Y., Nawab, Y., Li, K., & Xiao, M. (2018). Heat stress in poultry production: Mitigation strategies to overcome the future challenges facing the global poultry industry. Journal of Thermal Biology, 78, 131-139.

Neumann, C., Harris, D. M., & Rogers, L. M. (2002). Contribution of animal source foods in improving diet quality and function in children in the developing world. Nutrition Research, 22(1-2), 193-220.

Rahman, M., Chowdhury, E. H., & Parvin, R. (2021). Small-scale poultry production in Bangladesh: Challenges and impact of COVID-19 on sustainability. German Journal of Veterinary Research, 1(1),19-27.

Saeed, M., Abbas, G., Alagawany, M., Kamboh, A. A., Abd El-Hack, M. E., Khafaga, A. F., & Chao, S. (2019). Heat stress management in poultry farms: A comprehensive overview. Journal of Thermal Biology, 84, 414-425.

Siddiky, N. A., Islam, S., Sarker, M. S., Begum, R., & Samad, M. A. (2022). Knowledge, Attitude and Practices of Poultry Farmers on Antimicrobial Use, Resistance and Farm Hygiene Management in Bangladesh.

Sultana, N. (2020). Contemporary State of Unemployment of Bangladesh: A Critical Analysis. European Journal of Business and Management, 12(2).

Sumy, M. C., Khokon, M. S. I., Islam, M. M., & Talukder, S. (Eds.). (2010). Study on the socio-economic condition and productive performances of backyard chicken in some selected areas of Pabna district. Journal of the Bangladesh Agricultural University, 8(1).

Tadesse, H., Getu, M., Awalom, T., Tadelle, H., & Tadesse, G. (2017). Assessment of Chicken Feed, Feeding Management and Chicken Productivity in Intensive Poultry Farms at Selected Farms of Three Zonesin Tigray Region. Journal of Veterinary Science & Technology, 8.

Uddin, M. B., Ahmed, S. S. U., Hassan, M. M., Khan, S. A., & Mamun, M. A. (2010). Prevalence of poultry diseases at Narsingdi, Bangladesh. International Journal of Biological Research, 1(6), 9-13.

Uddin, M. T., Mitu, S. J., & Begum, I. A. (2014). Production of Sonali chicken in selected areas of gazipur district-an economic study. Bangladesh Journal of Animal Science, 43 (1), 56-61.

Uddin, S., Juli, S., Rahman, M. S., Akther, M., & Nurnoby, M. (2020). Investigation of biosecurity in commercial poultry farms of Dinajpur district. International Journal of Natural and Social Sciences, 7(1), 14-20.

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BIOGRAPHY

Mohammad Mehedi Hasan, son of Abul Kashem and Rasheda Begum, hails from Patiya, Chattogram. He received his Secondary School Certificate (SSC) from Patiya Adarsha High School in 2016, followed by his Higher Secondary Certificate (HSC) from Patiya Govt. College in 2018. He is now enrolled at the Faculty of Veterinary Medicine at Chattogram Veterinary and Animal Sciences University (CVASU) in Bangladesh, where he will pursue his Doctor of Veterinary Medicine (DVM) degree. He is currently doing his internship and hopes to complete it by the end of 2024. In the future, he wants to continue his research work in veterinary medicine.

APPENDIX

"A Questionnaire for Research Work on Socioeconomic Status, Rearing System and Disease Frequency of Poultry in Patiya upazila, Chattogram"

ID: Latitude **:**

A. Owner's Information: Longitude **:**

1. Name –

2. Address-Vill: Union:

3. Age-

<30		30-50		>50	

4. Sex-

Male		Female	

5. Marital Status-

Married		Unmarried	

6. Education-

Illiterate	
< Class 8	
HSC	
Graduate	

7. Primary Occupation-

Farming	
Govt. Jobs	
Non-Govt. Jobs	
Businessman	
Self-employed	
Others	

8. Experience of farming-

<2Years	
2-5 years	
>5 years	

9. Ownership-

Owned	
Shared	
Other	

10. Income (Monthly)

<50,000	
50-1,00,000	
>1,00,000	

11. Nature of finance-

Own	
Shared	
Own and bank loan	

12. Training received-

Yes	
No	

13. Training on-

Farming	
Management	
Marketing	
Other	

B. Farm Information:

1. Type of poultry-

Broilar		Layer		Sonali	

2. No. of birds-

<1000		>1000	

3. Purchasing chick-

Dealer		Local market		Own incubator		Others	

❖ **Housing:**

4. Rearing system-

Litter		Cage		Slatted	

5. Litter material-

Sawdust_Ricehusk		Only sawdust		Sawdust_sand	

6. Floor-

Concrete		Slatted		Deep litter		Other	

7.. Roof-

Tin		Concrete		Wood		Other	

8. Roof type-

Gable		Monitor		Multistoreyed	

9. Orientation-

North-South		East-West	

10. Location-

Attached to house		Near to house		Far from house		Roof top		Other	

❖ **Feeding:**

11. Type of feed-

Pellet		Mesh		Homemade		Other	

12. Supply of feed according to stage of growth-

Yes		No	

13. Source of feed-

Dealer		Market		Homemade	

14. Source of water-

Tube well		Pond		Other	

15. Frequency of feed supply-

Once		Twice		>2times	

16. Regular cleaning of feeder and drinker-

Yes		No	

oDuration between cleaning-

❖ Preventive measures:

17. Vaccination Schedule- ○Yes ○ No;

Name of V. = Mareks-IB+ND/ND-IBD-Pox-IC-FC

18. Biosecurity - ○Yes ○No ; If Yes. What are they-

1. 2.

3. 4.

19. Footbath- ○ Present ○Absent

20. Follow "All in all out" system- ○ Yes ○ No

21. Fumigation of farm between 2 batch - ○ Yes ○ No

C. Disease:

1. Mortality% -
2. Common disease- ○ IBD ○ND ○CRD ○AI ○Salmonellosis ○Colibacillosis ○ Pox ○Coryza ○IB/ILT ○ NE ○ Other ○ Nutritional
3. Sign/Symptom-

IBD	NE:
ND :	Pox:
CRD :	Coryza:
Pullorum :	IB/ILT:
Colib.:	Nutritional:
Other:	

4. PM : o Yes o No

5. PM lesion: 1. 3. 5.
   2. 4. 6.
6. Treatment-○Vet. ○Quack ○ Own Rx ○Pharmacy Rx
7. **Antibiotic** usage-

1) Knowledge about antibiotic : o Yes o No
2) Knowledge about antibiotic resistance : o Yes o No
3) How farmer learned about AR : o Dr. o Pharmacy o Own efforts o Extension Programs
4) Name of antibiotic used in farm :
5) Who apply the antibiotic? o Owner o Worker o Family member o Other personnel
6) Maintenance of Dosage : o Yes o No
7) Withdrawl period maintained : o Yes o No

8. Heat stress management-

   Measures...

   1. 2.
   3. 4.
9. Challenges faced by farmers-

   1. 2. 3.
   4. 5. 6.
   7.

❖ **Marketing:**

10. Selling of product-

    ○In market/store ○To middleman ○To consumer ○ Other

11. Gross Income -

Birds	
Egg	
Poultry Manure	
Other	
Total	

12. Cost -

Feed	
Medicine (Dr.+ Drug+ Vaccine)	
DOC	
Litter material	
Electricity + Labor	
Miscellaneous	
Total	

13. Average profit per batch = GI - Cost

=

=

Signature of interviewees-

Signature of interviewer-