

Economic Analysis and Biosecurity Practices in Commercial Broiler Farming at Patiya Upazila



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List of Abbreviation

Abbreviation and symbol	Elaboration
BCR	Benefit cost Ratio
BDT	Bangladeshi taka
CVASU	Chattogram Veterinary and Animal Sciences University
DOC	Day Old Chick
DVM	Doctor of Veterinary Medicine
Etc.	Et cetera
Et al	et alia (and others)
Govt.	Government
SSC	Secondary School Certificate
Hs	Higher Secondary
Tk	Taka
UVH	Upazila_Veterinary_Hospital
%	Percentage

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Abstract

This study was conducted to understand the profitability and biosecurity practices of broiler farming in Patiya Upazila .On the basis of available information, a total number of 34 farms were selected following random sampling technique from Patiya upazila under Chittagong district of Bangladesh through a pre-formed questionnaire. The objectives of the study were achieved through descriptive, statistical and economic methods. According to the study, 85% of the total farmers completed their secondary education with 5 years of experience in farming. About 65% of the farmer earned Tk. 25000-50000 as monthly income. Gross margin was Tk. 253651±847855. Net return was Tk. 194889±804828 per batch of broiler. The BCR was 1.12 indicating that broiler farming is still profitable in the study area. The study also identified 5 main challenges faced by the broiler farmers: High cost of feed, High cost of DOC, Chick mortality, Stable prices of poultry feed, Developing the sector veterinary service. The demand for broiler is increasing day by day. In this situation, the government and other relevant agencies should make sufficient efforts to improve the industry and try to reduce the cost of feed by taking appropriate measures.

Key words: Broiler farming, Gross margin, Net return, BCR

Introduction

Background of the Study

Bangladesh's economy is heavily reliant on agriculture. The livestock subsector accounts for 13.45% of Bangladesh's total agricultural GDP (DLS, 2021). This subsector provides 20% of direct employment and half of the national economy (DLS 2021). According to the Bangladesh Poultry Industries Central Council (BPICCC), the poultry industry contributes about 1.5% to the country's GDP and provides jobs for 3 million people. Broiler farming is a major part of the poultry industry, making up around 90% of total poultry production.

Poultry has the potential to be a major source of economic and employment growth for the agricultural sector in Bangladesh. It is one of the most expeditious methods of increasing protein production. The commercial broiler farming sector in Bangladesh is a major contributor to the agricultural sector, supporting thousands of farmers and supplying the nation's demand for poultry products.

Broiler farming is becoming more and more popular in both urban and rural areas. People from different backgrounds, like farmers, landless workers, educated unemployed, and industrialists, are setting up broiler farms on a small and large scale. The growth performance of the broiler birds might just be a result of eating more food. The feed consumption followed the same pattern as the weight gain. These small differences in growth performances don't mean much, but they do support the findings (Oliveira et al, 1974), (Shanmugasundaran et al, 1976), (Haque & Chowdhury, 1994), (Anisuzzaman & Chowdhury, 1996), (Hussain et al, 1996) & (Sarica et al, 1998) The study clearly shows that all the broiler farms made money.

The implementation of biosecurity has the potential to reduce, control and prevent the proliferation of disease-causing organisms within the poultry flocks, as well as the potential for the occurrence of zoonosis through poultry management. The current outbreak of the disease, combined with a lack of bio-security measures and management practices, has resulted in a decrease in the average production performance of commercial and small-scale poultry farms in Bangladesh. (FAO, 2008 and Talukdar et al., 2010). Disease at any stage of broiler has a direct impact on the farm's productivity. Reduced mortality can be achieved by preventing overpopulation, using brood-grow houses efficiently under proper maintenance, maintaining an

appropriate light schedule, (Farooq et al., 2002). Biosecurity measures are a set of systems and procedures to reduce the impact of any disease-causing agents on the farms, thereby avoiding the negative consequences of disease on the farms. Cardona and Douglas argued that a comprehensive biosafety program should comprise three main components; isolation, control of traffic and sanitation. Isolation could include the installation of fences or barriers around the poultry house; quarantine of sick chickens by healthy chickens before administering medications; compulsory footbaths for all who enter the poultry house prior to being granted access for any purpose. Control of traffic could include restricting the entry of humans, animals, vehicles and poultry equipment to the poultry farm, as well as the entry of any new flock of day old chickens. Sanitation includes regularly cleaning and disinfecting poultry houses and poultry equipment; Protective cloth, footwear and compartment should be provided to all visitors to poultry house on each visit.

Justification of the Study

At present, there are a number of broiler farms located in Patiya upazila, Chittagong District. . More and more broiler farms are being established in the recent times. The profitability of broiler farming has increased significantly in recent times, leading to a surge in interest in the sector. However, no research has been conducted in this area to assess the current state of the broiler industry and compare it to other areas. There has not been much research of this kind. Very Few number of research paper had been published but no study have been taken in this area. Without such research, the farms are unlikely to progress further. Therefore, this work has been conducted to provide an estimation of profitability of broiler farming in the study area.

Objectives of the Study

The specific objectives of the research are:

- i. To identify the Socio-economic status of broiler farming.
- ii. To know the present status of biosecurity maintained in commercial broiler farming.
- iii. To assess the profitability of broiler farming.

Materials and methods

Study Area:

The study was conducted during my 2-month internship in Patiya upazila, Chattogram District. The purpose of the study was to identify the potential and constraints of the area for broiler farming. The geographical scope of the study is shown in the Map below-

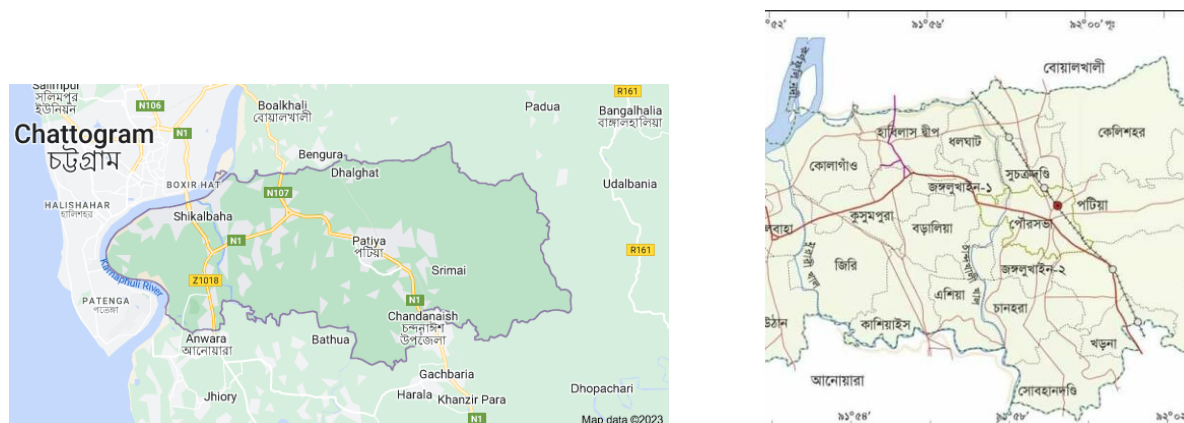


Figure 1: The pictures shows the study area.

Study Period

The necessary information for the study was collected during the period from April 16, 2023 to June 16, 2023 in Patiya upazila. Actively worked and gathered information during this period on the future prospects and problems associated with the broiler farming in the area.

Population and Sample Size

The study involved the use of a pre-defined questionnaire and the average size of the flock of broiler was 2890 birds per farm. A total of 34 broiler farms were selected in the Patiya upazila for collect necessary data.

Methods of Data Collection

A questionnaire was created to take the info from the interviews. On the basis of questionnaire the size of the farm, the way the chickens are housed, types of litter, waterer, types of feed, biosecurity tools had been recorded. Socio-economic parameters of the farmers' like education, training, experience, credit and how many people are involved in broiler farming.



Figure 2 : Collection of Data from broiler farm.

Data Analytical Techniques

The data was analyzed after coding, decoding and summarizing the raw data collected. The data obtained was analyzed using basic statistical methods such as mean, percent, standard deviation, etc. using Excel program to meet the objectives of the study.

Statistical Analysis

Socioeconomic characteristics, cost and return estimation related to broiler were identified using descriptive and econometric method respectively. Farm profitability were analyzed by the following equations.

Estimation of costing

- i. Total Cost (TC) = (Total variable cost + Total fixed cost).
- ii. Total variable cost (TVC) = (Feed cost + Veterinary cost + Labor cost + Medicine + Miscellaneous cost).
- iii. Total fixed cost = (Depreciation of housing cost + Depreciation of equipment cost).

Here,

1. **Variable cost:** Variable costs include the costs associated with production, like feed, DOC costs, veterinary costs, labor costs and miscellaneous cost.

Feed cost: The feed cost is the amount of feed consumed per day by the bird & multiplied by the market price of the feed.

Veterinary cost: It includes vaccination, medication costs.

Labor cost: Hired labor and family labor were both taken into account in the study.

Miscellaneous cost: It includes electricity cost, water cost, litter cost.

2. Fixed cost: Fixed cost includes the depreciation of housing costs and the depreciation of equipment costs.

The depreciation of housing and equipment was calculated using the straight line method (Shiyani et al, 1989). The formula is as follow;

$$\text{Depreciation} = \left[\frac{\text{Original value} - \text{Salvage value}}{\text{life of the house or equipments}} \right]$$

Here, life of housing was considered 15 years and life of equipment's was considered 5 years.

Profitability analysis

For Profitability analysis following equations was used:

i) $\pi = TR - TC$

ii) $GM = TR - TVC$

iii) $BCR \text{ (Full cost basis)} = \frac{TR}{TC}$

iv) $BCR \text{ (Cash cost basis)} = \frac{TR}{TVC}$

Where,

π = Profit or net return from per batch of broiler (Tk.).

TR = Total return.

TC = Total cost.

TVC = Total variable cost.

GM = Gross margin.

BCR = Benefit cost Ratio.

Results

Socio-economic characteristics of the farmer

Socio-economic status of the farmers includes age, education, family size, occupation, training, credit were calculated.

Table 1: Socio-economic characteristics of Broiler farm owners. (N=34)

Parameters	Category	Frequency	Percentage
Age (year)	20-35	14	41.18%
	36-45	12	35.29%
	46-55	06	17.65%
	56-65	02	5.88%
Family size(Number)	<3 (Small)	6	17.64%
	4-6 (Medium)	18	52.94%
	>6 (Large)	10	29.42%
Credit	Yes	04	11.76%
	No	30	88.24%
Training	Yes	13	38.24%
	No	21	61.76%

Note : Training , Credit : Dummy variable , Yes =1, No=0.

Source: Field survey, 2023.

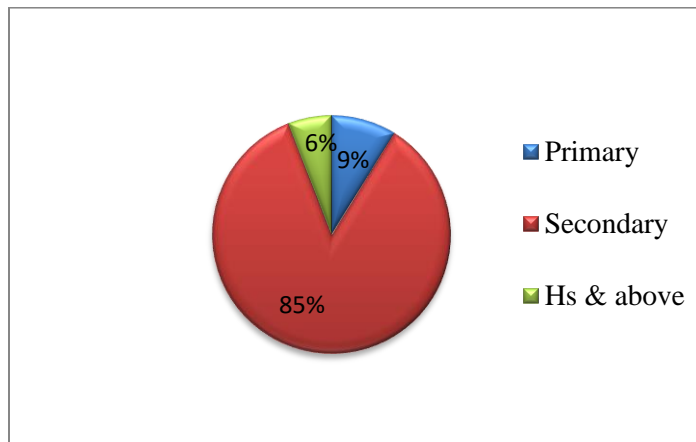


Figure 3: Educational status of the farmers.

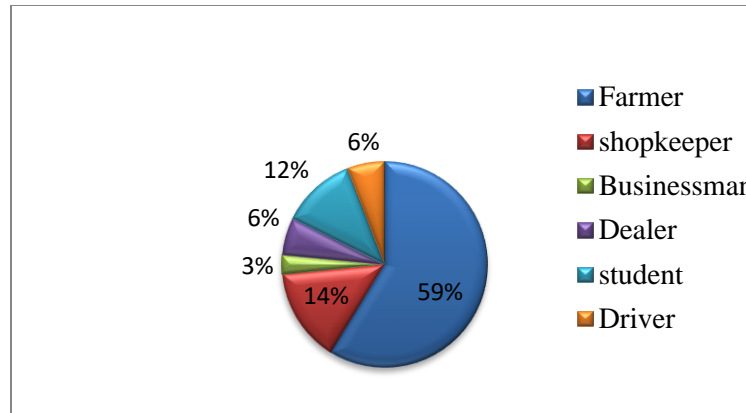


Figure 4: Occupation of the farmers.

Age of the farmers

The majority of the farmers 41.18% were in between age group (20-35) and only 35.29% of the farmers were in between age group (36-45) and 17.65% farmers were in the group of (46-55) where age of the farmers average were 35 years indicating that the farmers related to broiler are adults (Table 1).

Educational status

From Figure 3 it is seen that 9% of them had primary schooling. 85% of the farmers had completed secondary schooling and 6% farmers were HSC pass or above.

Family size

The study shows that most of the farmers 52.94% had medium family size (4-6 members) where 17.64% of the farmers had small family size (<3 members) and 29.42% of the farmers had large family size (above 6 members). As a result most of the time they have to undergo hard labor to support their family financially.

Occupational status

According to (DLS, 2021) almost 70% of the people in Bangladesh directly 20% and indirectly 50% depends on livestock for their livelihood. Most people in rural and urban area depends on agriculture and livestock for their livelihood. From Figure 2 it is seen that 59% of the respondents were broiler farmers and 41% others. Among others, although majority of the respondent were shopkeepers (14%), student (12%), Dealer (6%), Driver (6%) and businessman (3%) but they mainly depends on broiler farming for their income generation.

Training

Table 1 shows that 38.24% farmers had received training related to livestock and their management and have better outcome compared to other 61.76% farms who didn't attend any training program on broiler farming .

Credit

Table 1 shows that 11.76% farmers had received credit compared to other 88.24% farms who had not received any credit.

Cost and Return analysis of farm

For profitability analysis both variable cost (feed cost, DOC cost, labor cost, veterinary cost, other cost etc.) and fixed cost (depreciation of housing and equipment's cost) were calculated as total cost.

Table 2: Cost in per batch of broiler in study area. (N=34)

Cost and return item	Amount(Tk.)
Labor cost	9264±10156
DOC cost	211463±245189
Feed cost	408348±347636
Medicine cost	25220±11906
Other cost	7873±7298
Total variable cost (TVC)	783487±707641
Depreciation of housing	6529±5897
Depreciation of equipment's	52232±47176
Total fixed cost (TFC)	58761±53076
Total cost (TVC+ TFC)	842248±760715
Total Return (TR)	1037138±1485022

Source: Field survey, 2023.

Table 2 presents that the feed cost was Tk. 58761±53076. Total variable cost were Tk. 783487±707641 per batch of broiler which is almost 93.02% of total cost and total cost which was Tk. 842248±760715 per batch of broiler.

Fixed cost in broiler farming comprise of depreciation on housing cost and equipment's cost. From Table 2 depreciation of housing and equipment's were Tk. 6529±5897 and Tk. 52232±47176 respectively. Total fixed cost were Tk. 58761±53076 per batch of broiler which is (6.98%) of total cost.

Return in broiler farming is mainly generated from selling of broiler. The broiler that produced meat results in higher return and makes the farm more economic. From Table 2 it is seen that total return from the farm was Tk. 1037138±1485022.

Profitability analysis

Table 3 : Profitability of broiler farming per batch .

Items	Amount(Tk.)
Total cost (TC)	842248±760715
Total Return (TR)	1037138±1485022
Net return (NR)	194889±804828
Gross margin (GM)	253651±847855
BCR(Full cost basis)	1.12±0.3
BCR(Cash cost basis)	1.2±0.33

Source: Field survey, 2023.

Measuring farm profitability is very important for sustainability of the farm. Farm income depends on amount of broiler production per batch and amount of broiler sale with a reasonable price. Decreased broiler production has a direct effect on the profitability of a farm.

Profitability of a farm can be calculated by calculating gross margin, net return and BCR. From Table 3 it is observed that gross margin was Tk. 253651±847855. Net return was Tk. 194889±804828 indicating the profit of farm per batch.

Benefit Cost Ratio Analysis (BCR)

BCR is the ratio of total return and total cost. Figure 5 represents BCR of cash cost and BCR of full cost basis for per batch of broiler. Table 3 represents Benefit cost ratio (Full cost basis) and Benefit cost ratio (cash cost basis) were 1.12 ± 0.3 and 1.20 ± 0.33 , respectively that indicates if the farmer invest Tk. 1.0 in dairy farming he will get return of Tk. 1.12 ± 0.3 and Tk. 1.20 ± 0.33 for full cost and cash cost basis, respectively. However, BCR 1.12 ± 0.3 indicates that broiler farming is still economically profitable in the study area.

Biosecurity analysis

Water

From the table 4 it is seen that 79.41% of the broiler farmer use Deep tube-well water for broiler. 17.65% of the broiler farmer use shallow tube-well water and 2.94% of the farmer use pond water.

Table 4 : Biosecurity analysis of Broiler farming.

Parameters	Category	Frequency	Percentage
Water	Deep tube-well	27	79.41%
	Shallow tube-well	06	17.65%
	Pond	01	2.94%
Fumigation	Yes	21	61.76%
	No	13	38.24%
Cloth, shoe	Yes	30	88.24%
	No	4	11.76%
Footbath	Yes	19	55.88%
	No	15	44.12%
Litter	Burn	17	50%
	throw	10	29.41%
	sell	07	20.59%

Fumigation

Table 4 shows that 61.76% farmer had used fumigation in the farm and 38.24% the farmer didn't use fumigation.

Cloth, Shoe

Table 4 shows that 88.24% farmer had used cloths , shoes in the farm during entry and 11.76% the farmer didn't use cloths , shoes in the farm during entry.

Footbath

Table 4 shows that 55.88% farmer had used footbath in the farm during entry and 44.12% the farmer didn't use footbath in the farm during entry.

Litter

Table 4 shows that 50% farmers had burn litter after finishing of every batch. 29.41% of the farmer throw the litter in an open field and 20.59% farmer sell the litter.

Finally 67.06% the farmer maintained the proper bio-security in their farm. Profitability of broiler farm depends on bio-security. As majority farmer maintained proper bio-security in their farm business.

Discussion

Socio-economic status of broiler farmers

In the study area, only 41.18% of the farmers were in between age group (20-35) where average age of the farmers were 34 years which isn't similar to Begum, K.(2007) . They found that most of the farmers (42%) were above 41 years old and average age of the farmers were 45 years. 85% of the farmers had completed secondary schooling that didn't agree with Begum, K.(2007). It showed that most of the farmers were illiterate and had completed their primary schooling. The study shows that most of the farmers 52.94% had medium family size (4-6 members). Average family size was 6.23. Begum, K. (2007) also found that most of the family size was 2 to 6 persons with an average family size of 5.1. Almost 59% of the respondents were broiler farmers and 41% others. 38.24% famers had received training related to broiler farming and almost 11.76% famers had received credit compared to other 88.24% farms who had not received any credit.

Economic analysis

Cost Return Analysis

Broiler farming is highly profitable business. Cost in broiler farm includes feed cost, DOC cost, labor cost, medication cost, vaccination cost, and miscellaneous cost. Among the costs feed cost is the major cost. Broiler farming creates employment opportunities as it requires both family labor and hired labor which is the second most major cost. Miscellaneous costs included electricity cost and litter cost. Medication cost in broiler farming is comparatively high because broiler are more susceptible to variety (Rahman, M., 2003). Total variable cost were Tk. 783487±707641 per batch which is almost 93.02% of total cost. (Haque and Chowdhury., 1994) also found that total variable costs were 94.3% of the total cost.

Profitability Analysis

Gross margin was Tk. 253651±847855 per batch. Net return was Tk. 194889±804828 per batch indicating profit of broiler farming. Here total cost of farming per batch was Tk. 842248±760715 and total return from the farm was Tk. 1037138±1485022 per batch. Rahman, M. (2003) also found the similar total return were Tk. 1235000±1590500. As total return is higher than total cost the farmers can generate a healthy amount of income from broiler farming.

BCR

Benefit cost ratio (full cost basis) and Benefit cost ratio (cash cost basis) were 1.12±0.3 and 1.20±0.33, respectively. Haque and Chowdhury. (1994) also found that the BCR of broiler is above 1.10. BCR 1.12±0.3 indicates that broiler farming is still economically profitable in the study area.

Limitations

Due to time constraints, the information needed for the study was collected on a single visit. As the study covered only one district, it cannot provide a comprehensive picture of the entire country. The majority of the farms had no recording system, making it challenging to obtain valid data.

Conclusion

It can be concluded from the above discussion that Patiya Upazila under Chittagong district is a very suitable and prospectious zone for broiler farming and broiler production. Biosecurity have direct relationship in the profitability of broiler farming. But the study found poor bio-security condition on broiler farming in Patiya upazila. If the farmer maintain the proper biosecurity of broiler farming, then the farm would be profitable. Government should be needed to take proper steps and play an important role for establishment of a poultry zone in this area by solving the all problems and giving more opportunities for the existing farm owners.

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Biography

I am Mohammad Al Readul Huque, son of MD. Omar Faruk and Ambia Begum. I passed my SSC from Chittagong Ideal High School, Patiya in 2015 (GPA 5.00) and passed my HSC from Patiya Govt. College, Chittagong in 2017 (GPA 4.42). Currently I am an intern veterinarian under the Faculty of Veterinary Medicine in Chattogram Veterinary and Animal Sciences University. I want to be a vet practitioner in the future. I love Microbiology, Medicine and Surgery. I want to do some research in the near future.