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Financial Profitability and Resource Use Efficiency of Broiler Farming in a Selected Area of Bangladesh

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Abstract

The present study was undertaken to investigate the socio-economic characteristics of the broiler farmers, to estimate the costs, returns and profitability of broiler enterprise and to determine the contribution of the key variables to the production of broiler farms in some selected locations of Dhaka district, Bangladesh. It was mainly done on primary data which were collected through face to face interview from the respondents of broiler production in 2014. 80 broiler farm owners were selected by using simple sample randomly technique. Both tabular and econometric techniques were used to find out the results. The results of the analysis showed that on average total cost of broilers per farm per year was Tk. 301142.103. It was found that the variable cost per farm per year stood at Tk. 238728.73 which accounted for 79.28 percent of total cost. The total fixed cost per farm per year accounted to Tk. 62413.373. The net return over total cost per farm per year was calculated at Tk. 130257.90. The benefit cost ratios of broiler farming were 1.80 on variable cost basis and 1.43 on total cost basis. The functional analysis indicated that most of the selected variables had significant impact on the production of broiler farms. This study also identified some economic, marketing, technical, social and natural problems in broiler production. Finally, on the basis of findings of this study, some recommendations were made for the development of broiler farming in Bangladesh.

Keywords: Broiler Production; Financial Profitability; Resource Use Efficiency.

1. Introduction

Bangladesh is a densely populated developing country and its economy mostly depends on agriculture. The overall contribution of the agriculture sector is 16.33 percent to GDP at current price (GOB, 2014). About 47.33 percent of total human power of Bangladesh is related to agriculture (GOB, 2014). Livestock plays a crucial role in the agricultural economy. About 36 percent of the total animal protein comes from the livestock products in our everyday life (DLS, 2014). It also helps to earn foreign exchange every year. In Bangladesh, about 25 percent people are directly engaged in livestock sector, and 50 percent partly associated in livestock production (DLS, 2014). The contribution of livestock sub-sector to the GDP is 1.78 percent (GOB, 2014). Broiler production has a considerable significance to the rural, urban as well as the national economy and also is an important source of animal protein. The poultry industry in Bangladesh started to grow in 1947 and currently became a vibrant agricultural sub-sector and supplying about 95 percent of chicken meat and eggs in the country (Wikipedia, 2013). Poultry is a part of subsistence farming system in Bangladesh and broiler is one of the main products of poultry farming. Broiler meat contain 24 gm protein and 6.6 gm fat means broiler contains higher protein and lower fat than other animal (USDA, 2012). Total poultry production in Bangladesh is 2626.28 millions in number whereas chicken covers 2213.94 millions. A total of 7.98 million tones of chicken meat were produced during the year 2012 (DLS, 2013). Poultry meat particularly from broiler is superior to other meats available for human consumption from the point of its palatability, tenderness and digestibility. Poultry meat and eggs offer considerable potential for meeting human needs for dietary animal supply. Some socio economic studies have so far been conducted on broiler farming in different area of Bangladesh. Previously studies have been conducted among

others, by Khatun *et al.* (2005); Kulkarni (2006); Peter and Mia (2006); Ironkwe and Ajayi (2007); Etuk *et al.* (2007); Rahaman (2007) ; Leone and Estevez (2008); Akhter and Rashid (2008) ; Raihan (2008); Sultana (2009); Akhter (2009) ; Halcyan (2011); Rana *et al.* (2012); Khan (2013); Mitu (2013). The present study updates the profitability and resource use efficiency status of broiler production with some more insights. Moreover, this study was conducted using latest data to get recent information regarding production and will help both the researcher and the farmers concerned with broiler farming. The overall objective of this research is to investigate various socioeconomic aspects of broiler farming in a selected area in Dhaka district, Bangladesh. The specific objectives of the study are as follows:

i. To determine the financial profitability of broiler farming;

ii. To measure the resource use efficiency of broiler production;

iii. To identify the constraints to broiler farming, and to suggest policy guidelines for overcome the present conditions.

2. Methodology

For this study, survey method has been adopted for collecting data. There are 398 villages in Dhamrai Upazila. From there 4 villages were randomly selected for the study. There are 200 broiler farms in four villages. Among them 80 broiler farms were randomly selected for the present study. Generally there are two types of broiler such as white feature and brown feature. The researcher was collected data from white feather (Coff-500) broiler farmers. For the present study, data were collected during the month of October and November 2014 through face to face interview with the respondents. All of the primary data was edited coded tabulated summarized and processed for analysis.

2.1 Analytical Techniques

The following techniques were used to fulfill the purpose of the study:

2.1.1 Tabular Analysis

Tabular techniques were applied with the help of seine statistical measures like the sum, average, percentage, etc., to show the comparative performance of broiler farming. Profitability analysis was done on the basis of variable cost, fixed cost, etc. The following equation was applied to assess the profitability of broiler farms.

$$\Pi = P_bQ_b + P_LQ_L - \sum(P_{xi}.Xi) - TFC$$

Where,

Π =Profit (Tk./farm/year);

P_b = Per unit price of live broiler (Tk./kg);

Q_b = Quantity of live broiler (Kg./year);

P_L= Per unit price of used litter and excreta (Tk./kg);

Q_L= Quantity of waste litter (Kg./farm/year);

P_{xi} = Per unit price of ith (variable) inputs used in the broiler farm (Tk.);

Xi= Quantity of ith (variables) inputs used in Kg;

i= (1,2, 3,……..……80) and

TFC = Total fixed cost

2.1.2 Functional Analysis

To determine the contributions of the most important variables to the returns of a broiler farm, the Cobb-Douglas production function was used in this study. The model took the following shape:

$$\mathbf{Y = aX_1^{b1}X_2^{b2}X_3^{b3}X_4^{b4}X_5^{b5}X_6^{b6}e^{Ui}}$$

The function was estimated as follows:

$$\mathbf{\ln Y = \ln a + b_1 \ln X_1 + b_2 \ln X_2 + + b_3 \ln X_3 + b_4 \ln X_4 + b_5 \ln X_5 + b_6 \ln X_6 + Ui}$$

Where,

Y= Gross return (Tk./kg);

a = Constant or intercept value;

X_1= Cost of feed for ith farm (Tk./year);

X_2 = Cost of day old chicks for ith farm (Tk./year);
X_3 = Cost of hired labor for ith farm (Tk./year);
X_4= Veterinary expanses for ith farm (Tk./year);
X_5 = Cost of electricity for ith farm (Tk./year);
X_6 = Cost of litter for ith farm (Tk./year);

Ui = Error term;

i= 2, 3,.....80;

b_1,b_2,b_3,b_4,b_5,b_6= Regression co-efficient of respective variables and

ln = Natural log.

3. Result and Discussion

In this section, the costs, returns and profitability of raising broiler birds were estimated and to focus on the main factors affecting return of broilers production. In estimating cost of rearing broiler birds, total costs per farm per year were considered. Variable costs were determined for day old chick, feed, veterinary expenses, hired labor, litter costs, electricity cost and transportation cost. On the other hand, fixed cost included housing cost, tools and equipment, family labor, and interest on operating capital etc. On the return side, gross margin, net return, returns per taka invested on total cost were estimated.

3.1 Cost of Broiler Production

The cost here refers to the total amount of funds used in production. In the present study, the total cost of broiler production was estimated at Tk. 301142.103 per farm per year. Total costs of broiler production were presented in table 1. Total variable cost and total fixed cost were 79.28 and 20.72 percent of total cost, respectively.

Table 1: Total Cost of Broiler Production Per Farm Per Year

Cost Items	Unit	Unit Price	Per Farm Per Year		Percentage of Total Cost
			Quantity	Total Cost	
A. Variable cost	Tk.			238728.73	79.28
a) Feed cost	Tk.	40	3012.69	120507.60	40.03
b)Day-old-chick cost	No	40	1865	74600	24.77
c) Hired labour	Man-day	350	29	10150	3.37
d) Veterinary service and medicine cost	Tk.			20500	6.80
e) Electricity cost	Tk.			4788.13	1.59
f) Litter cost	Tk.			3970	1.32
g)Transportation cost	Tk.			4213	1.40
B. Fixed cost	Tk.			62413.373	20.72
a) Housing cost	Tk.			30888.75	10.25
b) Family labour cost	Man-day	350	10	3500	1.16
c)Tools& equipments cost	Tk.			4151.75	1.38
d)Interest on operating capital	Tk.			23872.873	7.93
Total cost (A+B)	Tk.			301142.103	100

Source: Field Survey, 2014

3.2 Returns from Broiler Production

Gross return was calculated by adding income earned from sale of live broiler, used litter and excreta. It can be noticed from the Table (2) that, on average, price of live broiler received by broiler farmers was Tk. 120/kg. An average farmer produced 3545 kg broiler per year. The gross return was Tk. 431400 per farm per year.

Table 2: Gross Return from Broiler Production Per Farm Per Year

Items	Unite	Unite Price	Per Farm/Year	
			Quantity (Kg)	Value(Tk.)
1.Live broiler	Kg	120	3545	425400
2.Used litter & excreta	Sack			6000
Total (1+2)	-			431400

Source: Field Survey, 2014

3.3 Gross Margin

The argument for using gross margin analysis is that the farm owners like to maximize return over variable cost. Moreover in the context of short run analysis and farm planning, the gross margin analysis is widely used. It is evident from Table 3 that gross margin per farm per year was Tk. 192671.27.

Table 3: Gross Margin, Net Return, and Benefit Cost Ratio Per Broiler Farm Per Year

Margins & Returns	Per farm /Year	Percent
A. Gross return	431400	
B. Total variable cost	238728.73	79.28
C. Total cost	301142.103	100
D. Gross margin (A-B)	192671.27	
E. Net return (A-C)	130257.90	
F. Return per taka invested (Variable cost basis) A/B	1.80	
G. Return per taka invested (Total cost basis) A/C	1.43	

Source: Field Survey, 2014

3.4 Net Return

Net return on total cost was arrived at by deducting all the costs from the gross return. Net return per broiler farm per year stood at Tk. 130257.90 (Table 3).

3.5 Benefit Cost Ratio

It is evident from the study that the benefit cost ratios of broiler farming generates on 80 percent on variable cost basis and 43 percent on total cost basis. Thus it emerges that broiler farming is a profitable enterprise for the farmers.

3.6 Regression Analysis

The regression co-efficient of feed cost and Day old chick cost were significant at 1% level. It implies that 1 percent increase in feed cost, keeping other factors remaining constant, would result in an increase of return by 0.431 percent and 0.206 percent. The regression co-efficient of hired labor cost, veterinary expenses, tools and equipment were

significant at 5% level. It implies that one percent increase in the human labor, veterinary expenses, tools and equipment keeping other factors constant, would result in an increase of the gross return by 0 .176,0.016, and 0.180 percent respectively.

Table 4: Estimated Values of Co-Efficient and Related Statistics of Cobb-Douglas Production Function for Broiler Farms

Explanatory Variables	Estimated values of coefficient		
	Co-efficient	Standard error	T-Values
Intercept	1.986	0.430	4.617
Feed (X_1)	0.431***	0.072	5.991
Day-old chicks(X_2)	0.206***	0.068	3.033
Hired labor (X_3)	0.176**	0.074	2.387
Veterinary expenses (X_4)	0.016**	0.022	0.714
Tools and equipment (X_5)	0.180**	0.056	3.009
Litter (X_6)	-0.124	0.053	-2.136
R^2	0.957		
Adjusted R^2	0.953		
F-value	227.621***		
Returns to scale	0.885		

Note: *** Significant at 1% level, ** Significant at 5% level

The sum total of all the production co-efficient of the equation for broiler production was 0.885. This indicates that the production function exhibits decreasing returns to scale.

3.7 Resource Use Efficiency

The marginal value product (MPV) is obtained when the marginal physical product (MPP) is multiplied by the product price. The price of one unit of input is called marginal factor cost (MFC). The optimum use of a particular input would be ascertained by the equality condition of MVP and MFC:

$$\frac{\mathbf{MVP}}{\mathbf{MFC}} = \mathbf{1}$$

Since all the variables of this model were measured in monetary unit in the function represented the MVP, which was computed by multiplying the production co-efficient of a given resource with the ratio of geometric means of output and input variables.

$$\frac{\mathbf{dy}}{\mathbf{dxi}} = \mathbf{b_i}\frac{\mathbf{Y(G.M)}}{\mathbf{Xi(G.M)}}$$

Where,

Y= Mean value (GM) of output.

Xi= Mean value (GM) of ith input.

i=1,2,3,4.

Therefore MVP (Xi) = $b_i \frac{Y(G.M)}{Xi(G.M)} P_{yi}$

b_i = Co-efficient

P_{yi} = Per unit price of output

G.M = Geometric mean

Table 5: Marginal Value Products (MVP) and Marginal Factor Cost (MFC) of Different Inputs Included in Production Function

Variables (Quantity)	Geometric mean	Co-efficient	MVP	MFC	Ratio of MVP to MFC	Comment
Output (Y)	3088.16					
Feed (X_1)	2589.72	0.431	61.70	40	1.54	Underutilized
Day-Old Chick (X_2)	1711.63	0.206	44.59	40	1.11	Underutilized
Hired labor(X_3)	27.47	0.176	2374.6	350	7.37	Underutilized
Veterinary and medicine (X_4)	202.55	0.016	29.27	50	0.59	Overutilized

Source: Field Survey, 2014

From Table 5 it is evident that, the ratio of MVP and MFC of broiler feed (1.54), day-old chick (1.11) and hired labor (7.37) was positive and greater than unity indicated that the use of feed, day-old chick and hired labor for broiler production was under used. So, the broiler farmer needed to increase the use of these inputs to attain the efficient level respectively. On the other hand, the ratio of MVP and MFC of veterinary and medicine (0.59) was positive and less than unity indicated that the use of veterinary and medicine for broiler production was over used. So, the broiler farmer was needed to decrease the use of these inputs to attain the efficient level respectively.

3.9 Problems of Broiler Farming

The major problems in case of broiler farming were Higher price of DOC, Higher price of feed, Rumor, Non-availability of day-old chicks, Political unrest etc. The problems mentioned by respondents are represented and ranked in Table 6.

Table 6: Problems Faced by the Broiler Farming

Problems	Number of Responding Farmers (n=80)	Percent	Ranking
A. Economic Problem			
a. Higher price of DOC	76	95	1
b. Higher price of feed	67	83.75	2
c. Price fluctuation of broiler	62	77.5	3
d. Lack of capital	60	75	4
e. Non-availability of credit	45	56.25	5
B. Marketing Problem			
a. Rumor	60	75	1
b. Lower price of broiler	57	71.25	2
c. Late payment	50	62.5	3
C. Technical Problem			
a. Non-availability of day-old chicks	52	65	1
b. Electricity problem	46	57.5	2
c. Lack of training facilities	45	56.25	3
D. Social and natural problems			

a. Political unrest	50	62.5	1
b. Out break of diseases	45	56.25	2
c. Social restriction	30	37.5	3

Source: Field survey, 2014

4. Conclusions and Recommendations

It can be concluded that raising of broiler is a profitable business in the study area. There is a wider scope for the development of broiler farming in this country. The findings suggest that the enterprise is helpful in employment generation and poverty alleviation which are now the major concern of the planning process of the country. Poultry is making a key contribution to the national economy through creating employment opportunity, generating local income and improving nutrition level of the low income people. Lot of problems and difficulties were found in broiler production in the study area. To overcome these difficulties of broiler raising and to make broiler production more profitable in the country, the following recommendations are put forward in order to improve the existing production of live broiler.

On the basis of findings of the study, the following recommendations are made:

i) Necessary steps should be taken by the government to reduce price of day-old-chick.
ii) Government should offer price support during the critical situation to make sure that broiler producers receive minimum profit.
iii) Regular monitoring and promotion of quality control that are related to broiler production should be ensured.
iv) There is a need for a better co-ordination among the different stakeholders like hatchery owners, government organizations, broiler farmers, and input dealers at market level.
v) More research should be undertaken to improve the quality of poultry production.

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