

Factors Affecting Production and Profitability of Poultry Enterprises in Eravurpattu DS Area, Batticaloa District

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Abstract

This study aimed to determine the factors affecting production and profitability of broiler enterprises in the EravurPattu DS, Batticaloa District. It was based on primary data which were collected through a structured questionnaire. The sample consisted of forty broiler farmers selected through a system of random sampling. Analytical tools used were percentages, mean and regression models. The factors feed cost, price of purchased chick, medical cost and Feed Conversion Efficiency had significant effect on profitability while labour cost had a negative impact. The factors affecting broiler production significantly were cost of feed, quantity of feed consumed, and day old chick costs but capital investment had a negative impact. It is recommended that feed subsidies by the government, provision of adequate supporting services, releasing of loans to farmers, and organizing trainings to increase awareness on profitability of broiler production would help develop the industry in Eravur Pattu DS division.

Keywords: Broiler production, Feed Conversion Efficiency, regression model, profitability.

Introduction

Poultry are the domesticated birds including chicken, duck, goose, turkey, guinea fowl, pheasant, quail, peacock etc, for the main purpose of meat and egg production. Now a day's poultry production has developed and occupies a place of pride among the livestock enterprises due to its rapid monetary turnover. This single reason among others has made the enterprise attractive and popular among small, medium, as well as large – scale poultry farmers. (Bandara and Dassanayake, 2007).

Chicken is one of the most important poultry species in Batticaloa district, which plays a vital role by nourishing the people all over the district through their produces. It is also a promising source of additional income and quick return from investment. Profitability is the key factor which decides the long term survival of the industry as well as the farmers involved in broiler production. Poultry farmers in Batticaloa district currently face various problems such as high cost of feeds, lack of marketing channels, high cost of labour, seasonal changes and its reflection on the price of the product, lack of availability of medicines and drugs, high cost of day old chicks, imperfect infrastructure

facilities and inadequate supply of feeds at proper time. In addition most of the poultry farmers in this district receive low income due to unawareness of market prices and technical know-how for better poultry farming.

Even though many of the farmers are involved in poultry farming over a long period of time, it has not been a successful business yet. Their business activities are not economically viable and sustainable due to number of problems they face while carrying out poultry farming. Their products are sold at lower prices due to high influence of intermediaries which leads to fewer profit margins. Further, financial support and technical support is lacking. Therefore, the present study intended to identify factors affecting poultry production, to perform an investment analysis and analyze the factors impacting profitability of poultry farming in the EravurPattu Divisional Secretariat division of Batticaloa district.

Literature Review

Previous study on broiler production (Bandara & Dassanayaka, 2006) indicated the cost of chicks, price of feed, Feed Conversion ratio, medical cost and the sale price of broilers affected profitability. Iroshan *et al* (2011) in a study on profitability analysis of broiler production in Gampaha found that the sales price of broiler chicken had a significant positive impact on profits, while the price of day-old chicks and feed conversion ration had a negative impact on profits. They concluded that broiler production was not a profitable venture. A very high demand for chicken meat and eggs was observed in the country following the post-war situation, leading to a huge demand for both broiler and layer chicks. This has resulted in increased importation of grand-parent and parent stocks, causing sharp increases in production levels of DOC, broiler in particular. The production of chicken meat had increased accordingly (Kothalawala, 2010). Rusaina (2009) conducted an economic analysis of broiler production in some selected areas of Ampara District. The study was undertaken to analyze the socio economic characteristics of poultry farm owners and to determine the costs and returns as well as the profitability of broiler farms. Paranthaman and Uthayakumar (2011) conducted a study on Cost-volume-profit analysis on poultry farming in the Manmunai North Divisional Secretariat division of the Batticaloa district. They found that broiler poultry farming is more profitable than the layer farming. Market prices of chicks, meat, and feed in Sri Lanka vary and these variations can affect enterprise profitability. When the price per kg of meat goes down, feed costs tend to decrease. When the price per chick increases, the price per kg of meat also tends to increase, thus compensating for the increased cost per chick (Iddamal goda *et.al* 1998).

A study in Bangladesh (Rana *et al*, 2012) identified that broiler production was profitable and that the major factors affecting production were feed cost, cost of day-old chick, labour cost and litter cost. While Unang (2003) in a study of profitability and efficiency of the broiler industry in Indonesia, found it to be an efficient industry. The larger farmers enjoyed more profit relative to the smaller firms. It was also identified that the levels of efficiency and profitability were influenced by the prices of feed and chicks as well as broiler output. In a study on profitability and constraints in broiler production in Ghana, Etuah *et al.* (2013) found that broiler production was profitable with a return of 27% on investments and the major production constraints identified, in order of severity, were high feed cost, lack of access to credit, competition from cheap poultry imports and lack of government support. Al-Masad (2010) in a study on factors affecting profits of broiler industry in Jordan found that sale price of broiler meat had a positive impact on

profits, while day-old chick price, price of feeds, veterinary services & medicine costs, depreciation costs, lighting/heating costs, chick mortality rate and feed conversion ratio had a negative effect on profits. Kitsopanidis *et al.* (1996) studied the effects of the most important factors on the profitability of the poultry meat farming in Greece. The most important factors for poultry meat production were mortality and age of final live weight (FLW) of broilers, because they affected the total feed consumed and the total FLW of broilers achieved.

Research Methodology

Sampling and data collection

The present study was carried out at 10 villages in the EravurPattu Divisional Secretariat Division. Eravur Pattu DS division consists of 39 GN divisions. A total of 40 broiler farmers from the 10 GN divisions were selected for the study through the random sampling technique. The necessary data for this study was collected from the broiler farmers using a pre-tested structured questionnaire, secondary data from reports also was utilized. Secondary data were gathered from the Department of Animal Production and Health (DAPH), Private chicken and mash dealers and District Secretariat, Batticaloa. The selected villages and distribution of samples is presented in Table 1 below.

Table 1. Selection of Sample from each Grama Niladhari division, EravurPattu DS

	GN division	No. of farmers
1	Mavadivembu-01	5
2	Mylampavelly	2
3	Mavadivembu-02	4
4	Vantharumoolai East	6
5	Vantharumoolai West	5
6	Palacholai	3
7	Chenkalady -02	5
8	Karadianaru	4
9	Illuppachichenai	4
10	Sittandy	2
	Total	40

Source: Survey data, 2014

The data collected included information reported in the income and expenditure statements or the profit and loss accounts, production accounts; and general information on the assets of the farm. Some secondary data collected included the bank's lending rates. The data on socio-economic aspects of broiler farmers, investment and cost of production, broiler management practices, disease problem, return from the production and problem face during the management etc. were collected through questionnaires.

Analytical framework

Data were analyzed using the Microsoft Excel and SPSS 16.0 Version software. The descriptive statistics analysis that were employed using charts, percentages, means, variances and standard deviations in examining the broiler production system as well as farmers socio-economic characteristics. Data were analyzed with the purpose of achieving the objectives of the study. In the present study, the following techniques were used.

Broiler Production

To determine the most important variables in the broiler production process, the Cobb-Douglas form of production function was finally estimated because of the best-fit of the sample data. To explore the input- output relationship of broiler production, the selected Cobb-Douglas production function model may be expressed as:

$$Y = a_0 X_1^{a_1} X_2^{a_2} \dots \dots \dots X_n^{a_n} + e_i \quad (1)$$

Where, the exponents' a_1, a_2, \dots, a_n respectively, denote exponent coefficients.

The Cobb-Douglas production function was linearized by transforming it into the following double log form so that it could be solved by the least squares method.

$$\ln Y = \ln a_0 + a_1 \ln X_1 + a_2 \ln X_2 + \dots \dots \dots + a_n \ln X_n + e_i \quad (2)$$

The model used is depicted below:

$$\ln Y = \ln a_0 + a_1 \ln X_1 + a_2 \ln X_2 + a_3 \ln X_3 + a_4 \ln X_4 + a_5 \ln X_5 + a_6 \ln X_6 + a_7 \ln X_7 + e_i \quad (3)$$

Y: Total production of live weight of birds

X₁: Cost of equipment (Rs/batch)

X₂: Cost of feed (Rs/batch)

X₃: Quantity of feed (kg/batch)

X₄: Purchased price of DOC (Rs/batch)

X₅: Experience in broiler farming (Years)

X₆: Flock size per batch (Numbers)

X₇: Invested Capital per bird (Rs)

e_i: Error term

The definition and measurements of the above variables are as follows:

Broiler Production (Y) as dependent variable = Poultry production –meat production in kgs.

(X₁ – X₇) are factors related to broiler production.

Cost of equipment (X₁) –purchase price of both feeder and waterer.(Rs.)

Cost of feed (X₂) – cost for broiler feeds up to age of marketing.(Rs.)

Quantity of feed (X₃) - amount of food consumed up to age of marketing (Kgs)

Purchased price of DOC (X₄) - total money invested for purchasing day old chicks in one batch (Rs.)

Experience in broiler farming (X₅) - number of years involved in broiler rearing (Years)

Flock size (X₆) - total number of chicks in one batch (Nos.)

Capital Investment (X₇) - investment spent by the farmers for the broiler production (Rs.).

Profitability Analysis

The data obtained via interview surveys were processed to calculate profit per kg live-weight and other relevant information for inclusion in the profit function model. A linear profit function model was used to determine factors affecting profitability of broiler production. Gross margin analysis was done to obtain profit of broiler production. A simple linear regression analysis was used to estimate the model and violation of assumptions of ordinary least squares (OLS) were checked before interpreting the results. The model used was in the form of $Y = f(X_1, X_2, X_3, X_4, X_5, X_6)$.

$$Y_i = \alpha_0 + \alpha_1 X_1 + \alpha_2 X_2 + \alpha_3 X_3 + \alpha_4 X_4 + \alpha_5 X_5 + e_i \quad (4)$$

Where:

Y: Profit (Rs) per kg live weight (LW)

X₁: price of purchased chick (Rs/kg)

X₂: price of feed (Rs/kg)

X₃: labour cost (Rs/hour)

X₄: cost of medicine (Rs/ LW)

X₅: other cost (Rs/ LW)

X₆: feed conversion ratio (kg feed consumed per kg LW gain)

The definition and measurements of the above variables are as follows:

Profit (Y) as dependent variable = financial gain, especially the difference between the revenue and the expenses in buying inputs (DOC cost, feed cost, equipment cost) and operating (medicine cost and interest) cost.

Cost of medicine (X₄) - money spent for medicine and drugs.

Feed conversion efficiency (X₆) - amount of feed required to produce one kilogram of live weight. Total food consumption was divided by the total live weight to obtain FCE.

Results and Discussion

Factors affecting Broiler Production

The effects of some important variable inputs on gross return of broiler production were analyzed through the log linear regression function. Results of linear regression analysis on factors affecting broiler production are presented here. The mean value of the variables used in the analysis is shown in Table 2.

Table 2. Descriptive Statistics - Broiler Production (n=40)

Variables	Mean	Std. Deviation
Total Production of Live Weight (kg)	310.22	551.62
Cost of Equipment (Rs)	5.43	3.07
Cost of feed (Rs)	3.63	0.31
Quantity of feed (kg)	466.65	883.04
Experience in broiler farming (Years)	3.10	1.36
Flock size per batch (Numbers)	118.62	212.68
Day Old Chick Cost per bird (Rs)	123.28	9.86
Invested Capital per bird (Rs)	392.05	168.38

Source: Data Analysis– SPSS output, 2014

After a series of experimental Cobb-Douglas function runs, the form of broiler production function was considered acceptable in terms of signs and magnitudes of the co-efficient, adjusted R² and F-value. The estimated values of the co-efficient related statistics of the Cobb-Douglas production function of broiler farms are shown in Table 3. The co-efficient of multiple determinations, R² (adjusted) value of 0.814 indicated that 81 percent of the variations in the output are explained by the independent variables included in the equation.

The significant factors affecting broiler production were cost of feeds, quantity of feed consumed while capital had a negative significant on production. The negative impact of capital invested was observed due to the money being spent on buildings, equipment and feeders, which had no direct impact on broiler production.

Table 3. Regression results of Production function analysis

Model	Coefficients		T
	B	Std. Error	
(Constant)	-4.228	0.545	-7.752**
Ln Cost for Equipment	0.126	0.188	0.672
Ln Cost of Feeds	1.709	2.404	1.711*
Ln Quantity of Feed consumed	0.996	0.438	2.274**
Ln Experience in broiler rearing	0.022	0.022	1.005
Ln Flock Size	0.514	0.591	0.870
Ln Price of DOC	0.682	0.855	0.797*
Ln Capital investment	-1.126	1.870	-0.602*

Dependent Variable: Total Production of broiler live weight (kgs)

$R^2=0.838$, Adjusted $R^2=0.814$, $F=63.002$ ($P < 0.01$), * = Significant at

$P \leq 0.01$, ** = significant at $P \leq 0.05$

Factors affecting profitability

The data obtained were processed to calculate profit per kg live weight and other relevant information for inclusion in the profit function model. A linear profit function model was used to determine factors affecting profitability of broiler production. The factors affecting broiler production significantly were cost of feed, quantity of feed consumed, and day old chick costs but capital investment had a negative impact on profitability.

Table 4. Results of Regression Analysis – Profitability of Broiler Production

Variables	Coefficients	t- value
Intercept	-324.683	-0.938*
Price of purchased Chick (Rs/batch)	0.065	0.564**
Feed Cost (Rs/batch)	0.780	6.026***
Labour cost (Rs/batch)	-0.092	-1.284*
Medical Cost (Rs/batch)	0.057	0.700**
Other cost (Rs/batch)	0.264	3.929
FCR	-0.397	-1.146***

Dependent Variable: Profit per batch (Rs.)

$R^2 = 0.889$, adjusted $R^2 = 0.868$, $F = 71.85$ ***

($P < 0.01$), *** = Significant at $P \leq 0.01$, ** = Significant at $P \leq 0.05$, * =

Significant at $P \leq 0.1$

The co-efficient of multiple determinations (R^2) was 0.87. It indicates that 87 percent of the variations in the profit per batch was explained by the independent variables included in the model. The F-value (71.85) of the equation of broiler farms was significant at 1 percent level of confidence; imply good fit of the model. The factors that had a significant negative impact on profits were labour costs and feed conversion factor. While feed costs had a significant positive effect on profits from broilers through increased weight gain of broilers.

Conclusions

The factors feed cost, price of purchased chick, medical cost and Feed Conversion Efficiency had significant effect on profitability while labour cost had a negative impact. The factors affecting broiler production significantly were cost of feed, quantity of feed consumed, and day old chick costs but capital investment had a negative impact. It is recommended that feed subsidies by the government, provision of adequate supporting services, releasing of loans to farmers, and organizing trainings to increase awareness on profitability of broiler production would help develop the industry in Eravur Pattu DS division.

References

- Al-Masad, Motasem (2010). Factors affecting Profits of Broiler Industry in Jordan: A Quantitative Approach. *Research Journal of Biological Sciences*, 5 (1): 111-115, 2010.
- Bandara, R.M.A.S. and D.M.W.K.Dassanayake, 2007. A Quantitative Analysis of Factors Affecting Profitability Of Small Scale Broiler Production. *The Journal of Agricultural Sciences*, 2006, Vol.2, No.3. Sabaragamuwa University, Belihul Oya.
- Etuah, Seth; G.K.Nurah and Akwasi Ohene-Yankyera (2013) Profitability and Constraints of Broiler Production: Empirical Evidence from Ashanti Region of Ghana. *Journal of Business & Economics*, Vol.5 No.2 (July-December 2013) pp. 228-24.
- Kitsopanisdis G. and Manos, B. (1996). The effect of the most important factors on the profitability of the poultry meat farming in Greece, Proceedings of the 44th seminar of the European Association of Agricultural Economists Thessaloniki, Greece, 11-14 October 1995, 196-204
- Kothalawala, K.A.C.H.A (2010) - *Livestock Statistical Bulletin*. Department of Animal Production and Health, Peradeniya.
- Iddamalgodu, A. Sugiyama, M. Oguri, K. Arahata K. and Premasiri, H.P.(1998) - A Study on Development of Sri Lankan Poultry Industry – Importance of Rural Poultry Sector, July 16, 1998.
- Iroshan, B.C.G, F. Abeyratne and S.N. Dissanayake (2011). Profitability Analysis of Broiler Production: A Case Study in Gampaha District. 5th Annual Research Forum, 2011. Sri Lanka Agricultural Economics Association, University of Peradeniya, Peradeniya.
- Paranthaman, T and Uthayakumar, R (2011) Cost-Volume-Profit (CVP) analysis on poultry farming in the Manmunai North Divisional Secretariat division of the Batticaloa District. Proceedings of the 4th Annual Research Conference-2011, Eastern University, Vantharumoolai, Sri Lanka.
- Rana, K. M. A. Al-Mamun, M. S. Rahman and M. N. Sattar (2012). Profitability of Small Scale Broiler Production in some selected areas of Mymensingh. *Progress. Agric.* 23(1 & 2): 101 – 109, 2012.
- Rusaina, M.H (2009) - An Economic analysis of Broiler Production in Ampara District. An unpublished Final Year Research Report submitted to the Faculty of Agriculture, Eastern University, Vantharumoolai, 2009.
- Unang, Ir (2003). Profitability and Efficiency of the Broiler Industry in Tasikmalaya. Faculty of Agriculture, University of Siliwangi Tasikmalaya, Indonesia, 2003.