A QUANTITATIVE ANALYSIS ON FACTORS AFFECTING PROFITABILITY OF SMALL SCALE BROILER PRODUCTION

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ABSTRACT

The purpose of this study was to demonstrate the use of the profit function regression model as a decision support tool in small scale commercial broiler production. The study was carried out in major broiler production areas in Sri Lanka. Data were collected form 120 broiler rearing farmers. The factors considered in the model were Sale price of broiler (SLR/kg LW), Price of purchased chick (SLR/chick), Price of feed (SLR/kg), Cost of labor (SLR/kg LW), Cost of veterinary service and medicine (SLR/LW), Feed Conversion Rate - FCR (kg feed consumed per kg LW gain).

As observed in the field, the most important factors affecting profit in this study were the feed conversion ratio and the price of feed. It was also found that except the cost of labor all the other factors were significant in the model and thus were the determinants of the profitability.

The fact that the estimated impact factors affecting profitability on the profit per kg live-weight were similar to those observed in the field indicates the power of the model as a decision support tool in broiler production.

Key Words: *Commercial broiler production, profit function, decision support tool.*

INTRODUCTION

Poultry meat is an important source of high quality protein, minerals and vitamins to balance the human diet. Until 1950 s poultry enterprise was found mostly in the yards of many homes of rural and small town's in Sri Lanka. Flocks were small and use for the production of household consumption of eggs and some local retail egg sales while chicken meat was considered a byproduct of the egg enterprise.

In 1940s Agricultural research brought new technologies to the poultry industry including were the introduction of new breeds for meat, better nutrition and disease control, better management of confined poultry, processes that correctly sexed chicks and the candling of eggs. However the broiler industry began in the late 1950s when strains were selectively bred for aiming high quality meat production. Earlier broiler chickens took about 84 days to rear. Today broilers reach the same body weight in only 42 days. These practices allowed Sri Lankan farmers to the possibility of raising broilers for commercial consumption.

Then the industry was transformed from a back yard industry, which feed the immediate family and local market to broiler operations which produce 99,521 metric Tons at the present (FAO statisistics,2005). Broiler production has increased rapidly during the last two decades in Sri Lanka. There is a higher demand for broiler meat in Sri Lanka compared to other meat. Earlier market age (6-7 weeks only), high feed conversion efficiency (least amount of feed is required for unit body weight

gain comparison to other livestock) and rapid returns over the invested capital, have increased the popularity of broiler farming. And also, in Sri Lanka chicken has only limited religious connotations and is therefore widely accepted as food for the human population. Today the broiler industry is one of the most tightly coordinated of the major commodity sub sector in Sri Lanka.

The broiler industry offers a vivid example of how various Agricultural sectors are interrelated and depended on one another (Lasley, Henson and Jones 1985). All segments such as farmers, processors, hatcheries, geneticists, nutritionists, veterinarians, suppliers, marketing firms and consumers have combined to transform the industry from a minor sideline enterprise into a complex agribusiness.

However as broiler production can be increased more rapidly than other farm animals. It offers an opportunity for developing countries which demand a higher standard of human nutrition for rapid growth.
Small scale commercial broiler production (SSCBP) is an easy entry and easy exit industry, with the producers being price takers in the market for inputs since the input suppliers are mainly oligopolistic (few). Inputs are bought mainly from the wholesalers, retailers, agents and producers and the common mode of payment is cash. In terms of its impact on livelihoods of SSCBP, provides a steady source of major family income or additional income and gainful employment to farmers throughout the year or a part time employment. The industry also plays a critical role in the development and linkage of small-scale commercial business activities.

Sri Lankan small scale commercial broiler farmers usually rear fiver or six

batches of chickens a year. Two or three weeks are needed between batches to allow the sheds to be cleared and disinfected. During the season of high demand (especially in April –new year festival and December- X mas), most of the farmers tend to rear few batches simultaneously by giving one week gap in between the batches.

As we identified most of the SSCBP farmers who are practicing their own business belong to the poor people of rural areas or the day wage earner of the tea estate sector. Although farmers who engage in buy-back system are found in small town families closer to the Colombo district. (Capital commercial district in Sri Lanka).In buy- back system, production practices are closely specified and many inputs including baby chicks, eggs and veterinary service are supplied by the contractor. So the farmers and the contractors adjust their management decisions in response to anticipation income stability and to ensure their business survival.

The major markets for the Sri Lankan SSCBP are not the large wholesale outlets but they sell directly to village retailers or to the customers, (neighbors in the village and the communities around them). The reasons for choosing this channel include; lack of shelf space in retail outlets, increased cost of transportation, maintain the cold chain for chickens and competition from large suppliers and others.

Numerous factors like flock size, mortality, age, and weight at the time broilers are marketed; floor construction and better utilization of available facilities could affect the performance of the broilers. Any how the success in the business is mainly determined by the abilities of entrepreneurs to control the

production cost. So it is necessary to find out the factors which govern the cost of production and their quantitative contribution.

It is possible to estimate factors affecting profit with profit function models. A linear profit function model has frequently been used to determine and quantify factors affecting broiler production and milk production to determine long term strategies for breeding programmes.

Though profit function model is used as a decision support tool for the management of broiler production, during the literature review, we did not come across any study applying a profit equation for this purpose in Sri Lanka and conventional accounting tools have frequently been applied up to now. However a similar kind of a research has been done by Cevger Y, *et al*, to estimate the profitability of broiler farming considering factors responsible for profit per live weight. Another study has been done by Farooq M, *et al*, to determine Factors affecting cost of production and net profit per broiler in the subtropics. The results of both researches were encouraging as they were similar to the practical situations to a great extent.

RESEARCH PROBLEM

Small scale broiler industry plays a significant role in domestic livestock sector. Profitability is the key factor which decides the long term survival of the industry as well as the farmers involved in broiler production. There are many factors which affect the profitability of broiler rearing such as sale price of broiler, Price of purchased chick, Price of feed, cost of labor, and cost of veterinary service and medicine, etc. Relative impact of these factors in profitability is important as a decision

tool to be used by the broiler farmers and any other institution involved in broiler industry directly or indirectly. Therefore this study was carried out to find out the relative importance of factors affecting profitability of broiler farming which can also be expressed as a quantitative model to decide the factors affecting profitability of broiler production.

From this point of view, this research is aimed to estimate the factors affecting profit in broiler production, to explore its possible use as a practical decision support tool in the field by small scale broiler producers.

MATERIALS AND METHODS

The required data were obtained from 120 broiler production enterprises in Colombo, Ratnapura and Badulla districts. Semi structured interviews were conducted with a pre-tested questionnaire. Entrepreneurs themselves were involved in providing data so the reliability and accuracy of data were encouraging.

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.

A multiple 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 can be depicted as

$$Y = f(X_1, X_2, X_3, X_4, X_5, X_6)$$

Y: Profit (SLR) per kg live-weight (LW)

X1 Sale price of broiler (SLR/kg LW)
X2: Price of purchased chick (SLR/chick)
X3: Price of feed (SLR/kg)
X4: Cost of labor (SLR/kg LW)
X5: Cost of veterinary service and medicine (SLR/LW)
X6: Feed Conversion Ratio - FCR (kg feed consumed per kg LW gain)

Before carrying out the multiple regression analysis the relationships between the dependent variable Y and each explanatory variable were examined by drawing scatter graphs for linear, quadratic and cubic forms. The relationships between Y and all explanatory variables were observed to be linear. Only their linear terms were, therefore, included in the model.

RESULTS AND DISCUSSION

Some Qualitative Remarks

Especially in upcountry the day wage earn estate laborers are involved in broiler rearing as their additional income source. The average flock size was 50 in the broiler batches. But the average flock size increases up to 150 as far as all the farmers are concerned. It was clearly observed among the interviewed among the interviewed farmers that lager batch rearing farmers keep birds only for 45 days but small batch rearing farmers extended the life time of than 50 days expecting higher body weight gain. In this case small batch rearing farmers tried to give more weights for the birds. In upcountry areas the mortality in the brooding period was nearly 3% and in growing period it was nearly 5-6 %. Many farmers viewed that birds undergo a sudden death at the latter part of the growing period due to a sort of high pressure conditions. In the other areas the mortality in the

brooding period was around1- 2% % and in the growing period it was 3-4%. General carcass weight of a slaughtered bird in up country was 1.3kg in 42 days and in other areas it was 1.62 kg. The method for heat generation in the brooding period in upcountry was mainly the use of bulbs but in other areas barrel method seems to have become more popular in recent times. In all the areas subjected to study there was a dominant input supplier whom farmers relay on veterinary advises as well.

Though the conditions of the poultry houses were good in most of the cases the required spaces for the birds have not been provided by many farmers. Many small scale broiler farmers found to have temporarily closed the business in the recent fear of bird flue but now have again restated. Farmers who rear less than 200 birds under non-buyback system used three wheelers to transports day old chicks as well as feeds while farmers, rear more than 200 birds used Lorries.

The quantitative analysis

The estimated regression results are presented in Table 1. As can it be seen from the table, amongst the explanatory variables entered in the model, the statistical association of labor costs (X4), was not found to be significant showing less p value than .05 at 95 percent confidence level thus was dropped from the model. The reasons for labor cost to be not significant in the model may be due to high use of family labor by the entrepreneurs. This study was not concerned about family labor as a kind of labor. The other factors, i.e. Sale price of broiler, Price of purchased chick, Price of feed, Cost of veterinary service and medicine, Feed Conversion

Rate - FCR were significant in the model.

The model explains 64% of the variation of the dependent variable so it reassures the precession of the model and data gathered. Each coefficient demonstrates the marginal impact of an independent variable in question on the profit per kg live body weight.
The Feed Conversion Ratio (FCR) was the highest factor contributing to the profitability showing the coefficient -4.45. This implies that the amount of feed given to achieve a given weight gain is negatively correlated with the profits. This is due to some farmers

keep birds for more than 50 days and accordingly incur a high FCR. The next was the price of feed showing -3.021 as the coefficient.

The coefficients were negative for price of chick, price of feed, and cost of veterinary service, and FCR while the positive coefficient was observed for sale price of broiler. This is because all the factors except the latter are cost factors in broiler production. Most importantly these findings were similar to the theoretical concepts pertaining to the factors estimated.

Table 01: Results of the regression analysis

Factor	Coefficient	Standard Deviation	P value
Constant	14.765	4.467	.000
X1	0.843	0.765	.000
X2	-0.671	0.341	.000
X3	-3.021	0.243	.003
X4	-1.345	1.23	.220
X5	-2.067	0.987	.000
X6	-4.45	2.12	.000

$R^2 = 0.64$
Durbin Watson   Value= 2.12
N = 120

Therefore the estimated model can be depicted as

Y = 14.765+ 0.843 X1 - 0.671 X2 - 3.021X3 -1.345 X4 - 2.067 X5 - 4.45X6

CONCLUSION

The profitability of small scale Broiler farming depends on several factors. They are sale price of broiler, price of purchased chick, price of feed, cost of veterinary service and medicine, Feed

Conversion Rate (FCR). However the labor cost is not a significant parameter as given in deciding profitability. These findings could be compared with the practical values with regard to each variable and therefore they were not bias.

The Feed Conversion Ratio (FCR) was found to be the factor which has the highest impact on the profitability showing the coefficient - 4.45.

With regard to qualitative findings of the study certain highlights can be

found. Technical knowledge of farmers on broiler rearing was not satisfactory and in some cases was poor. This was quite noticeable among the farmers who handled small batches. The effect of feed price also has a great impact on profitability because feed price was varying according the brand, purchased amount, the distance between the farm and the market and the dealer. For an example farmers who bought in bulk had the price advantage but those who bought small amounts did not. On the other hand this is coupled with the fact that some farmers are used to buy feed at several times per one production cycle and hence more transport cost is added. The mortality rate found was controversial to the theoretical value being 3 % at the brooding stage. While it is said to be 10 % in theory.

All in all the estimated model for the factors affecting profitability of commercial small scale broiler production can assumed to be more realistic due to its compatibility with the practical values and the accuracy of data gathering and analysis procedure.

References

Farooq, M., M. A. Mian and A. Asghar (2001), *Factors affecting cost of production and net profit per broiler in the subtropics,* Livestock Research for Rural Development (13) 1

Holsheimer, J. P. and C. H. Veerkamp (1992), *Effect of dietary energy, protein and lysine content on performance and yields of two strains of male broiler chick,* Poultry Science 71(5) 872-879.

Mishra, M., G. Pattanaik and S. N. Mohanty (1988), Economic *efficiency of poultry broiler farms of different sizes under hot, humid condition,* Indian Journal of Animal Production Management. 4 (2) 87-91.

Park, H K and E. S. Joeng (1990), *Studies on the meat productivity by the broiler breeds*, Korean Journal of Animal Science 32(8) 504-513.

Steel, R. G. D. and J. H. Torrie (1981), *Principles and procedures of statistics*; A biometrical approach, (Second edition) McGraw-Hill, Singapore.

Yavuz, C., and Y. Cengiz (2002), *A Quantitative Model to Determine Factors Affecting Profits of Broiler Enterprises*

Wonnacott, R. J. and I. H. Wonnacott (1985), *Introductory statistics*, 4th Ed. John Wiley & sons, New York. pp. 450.