Full Length Research Paper

Economic appraisal of small and medium scale performance in poultry egg production in Ogun State, Nigeria

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The study was carried out majorly to appraise economically the performance of poultry egg farmers by scale in Ogun State, Nigeria. Specifically, the study examined cost structure and profit level in the industry at different scale levels as well as the factors that determine the revenue of the poultry egg farmers. Purposive sampling procedure was used to select 50 representative poultry egg producer from whom primary data were obtained. The results of data analysis showed that costs of feed constituted the largest share of the total costs for the two categories of farm size. Although, poultry egg production was profitable in the study area, the level of profit depended on the scale of operation. The amount spent on veterinary services was the only significant determining factors of revenue accruable to poultry egg farmers.

Key words: Scale performance, poultry egg production, economic appraisal.

INTRODUCTION

Livestock farming contributes to the proper utilization of land resources and furnishes invaluable foods for proper nourishment, wool and leather for clothing. It also produces useful ingredients and specialized product that are useful in medicine. According to Bamiro et al. (2006), poultry egg production is one of the major sub-sectors in Nigerian agricultural industry which supply protein, lipids and vitamins of high zoological value to man. Poultry eggs, apart from supplying protein are also a good source of high energy nutrients. Egg production is the major index of performance of commercial layer producers and is very often useful for policy purposes. In recent times, the experience of poultry farmers in Nigerian has shown that the industry has been suffering

from some setbacks caused by increasing cost of feeds which had caused significant reduction in the net returns from the industry (Oyetunde, 2003). There is also the problem of lower productivity which has not met with the demand for eggs. The desire to solve these problems formed the objectives of this study. Hence, the study provides answers to the following research questions such as: How profitable is each scale of poultry egg enterprise? And what are the significant determinants of revenue accruable to the poultry egg farmers? Thus, the objectives of this study was to determine and compare the profit level in the poultry egg industry at different scale levels as well as to determine the significant factors influencing the revenue accruable to the poultry egg farmers in Ogun State of Nigeria. It should be noted that the subject of economic analysis of poultry production in Nigeria has received considerable attention in the literature (Ojo, 2003; Adebayo and Adeola, 2005; Amos, 2006; Okafor et al., 2006;Bamiro et al., 2006; Bamiro, 2008) and none of these

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studies has appraised economically the performance of egg production by scale in the study area.

MATERIALS AND METHODS

Study area

The study was conducted in Ijebu North Local Government Area in Ijebu division of Ogun State of Nigeria. Ogun State is a fast developing state created in February 1976 and is located in the South-Western part of Nigeria. The state lies within latitudes 60°N and 80°N and longitudes 2.50°E and 50°E. The state has a land area of about 16, 409 km^2 and an estimated 1991 population of well over 2 million people. The study area was chosen because agriculture was the main occupation of the people where they engage in crop and livestock farming, poultry keeping and saw milling (FOS, 1998).

Sampling procedure

Purposive sampling procedure was used to select a total of 20 small-scale poultry egg farmers (farms having less than 1000 birds) and 30 medium scale poultry egg farmers (farms having between 1000 and less than 5000 birds) based on the preponderance of each category of farmers by their scale of operation (Omotesho and Oladele, 1988).

Types of data and method of data collection

Both primary and secondary data were obtained for the study. The primary data were obtained through the use of structured questionnaire while the secondary data were obtained from relevant literature. Information on inputs and output together with various prices on relevant variables were obtained for the poultry egg farmers through the use of structured questionnaire administered by trained enumerators.

Analytical techniques

Budgeting and regression techniques were employed to analyze the data. Budgeting technique was used to determine the performance of poultry egg producers by scale while ordinary least square regression technique was used to determine the significant variables influencing the revenue of poultry egg farmers at different scale levels. Straight line depreciation method was used to estimate the depreciation value of fixed items used during the production season. Budgeting techniques involves the estimation of net farm income (π). Thus, the net farm income (π) was estimated as:

$$\pi = GM - TFC \qquad (1)$$

Where, π represents net farm income; GM represents gross margin (TR – TVC), TVC represents total variable cost, TR represents total revenue and TFC represents the total fixed cost.

Following the method employed by Aihonsu et al. (2005), economic ratios employed to measure economic performance of the two groups of farms were: Rate of return on investment (ROI), operating ratio (OR), fixed asset turn over (FAT) and total asset turnover (TAT). They are analyzed follows:

1. Rate of return on investment (ROI) shows the amount gained on

every naira (N) invested, measured as:

$$ROI = \frac{E}{C} \times 100 \qquad (2)$$

Where, E represents the profit before tax (N) and C represents the total cost (N).

$$Operating\ ratio\ (OR) = \frac{Total\ Operating\ Expenses\ (TVC)}{Net\ Sales\ (N)} \qquad (3)$$

$$Fixed\ assets\ turnover\ (FAT) = \frac{Total\ Sales\ (N)}{Fixed\ assets\ (N)} \qquad (4)$$

$$Total\ assets\ turnover\ (TAT) = \frac{Total\ sales\ (N)}{Total\ assets\ (N)} \qquad (5)$$

The relationship between the factors involved and revenue obtained from poultry egg production was investigated by the use of regression technique of analysis. Of all the functional forms fitted to the data namely; linear, semi-logarithmic and exponential, linear functional form was chosen as the lead equation based on economic, econometric and statistical reasons. The model is expressed as:

$$Y = f (X_1\ X_2,\ X_3,\ X_4,\ X_5,\ X_6,\ \varepsilon_i) \qquad (6)$$

Where, Y represents the revenue from sales of egg produced (N); X_1 represent the amount of feed (kg); X_2 represents the cost of water (N); X_3 represents veterinary services (N); X_4 represents the amount of labour (man days); X_5 represents electricity cost (N); X_6 represents the costs of purchase of day old chicks (N) and ε_i represents the stochastic error term.

RESULTS AND DISCUSSION

Budgeting analysis

Table 1 shows the cost component of an average poultry egg farmer for the two categories of farms. The results indicated that an average poultry egg farmer invested about N1441 and N28124 as total costs of production for small and medium scale farms, respectively. These included costs of purchase of feed, water, drugs/ veterinary services, chicks, labour, electricity and other necessary materials. The cost of feed for the two categories of farms constituted the largest share of the cost (about 73 and 40% for small and medium scale farms, respectively). These results support the findings of Effiong and Onyenweaku (2006) and Yusuf and Malomo (2007) which claimed that feed cost is the major important cost item associated with poultry egg production probably due to increase in cost of maize, groundnut cake, soya bean meal and the attendant scarcity of wheat plus corn offal (Okafor et al., 2006). This was followed by cost of drugs/veterinary services for small scale poultry egg farmers (3.37%) and electricity cost for

Table 1. Cost and return analysis per poultry egg farmer per annum.

S/N	Item	Small scale		Medium scale	
A	Revenue (N)	1745	-	50601.7	-
	Variable costs (N)	% of TVC	-	% of TVC	-
	-Cost of feed	977.2	73.41	3000.07	40.44
	-Cost of water	10.6	0.80	328.1	4.42
B	-Cost of drugs/vet	44.8	3.37	742.8	10.01
	-Labour cost	29.95	2.25	505.0	6.81
	-Electricity cost	5.25	0.39	1106.8	14.92
	-Cost of bird stock	263.4	19.78	839.6	11.32
	Tax	-	-	896.6	12.08
C	Total variable cost (TCV) (N)	1331.2	100.0	7418.9	100.0
D	Gross Margin (GM)=(TR– TVC)(N)	-	413.8	43182.8	-
E	Fixed cost (N)	-	-	-	-
	Depreciation cost	109.7		20705.2	
F	Total production cost (N)	1440.9	-	28124.1	-
G	Net farm Income (N)	303.9	-	22477.6	-

Survey data analysis, N120.57 = $1.

Table 2. Summary of performance ratios for the two farm types.

Ratio	Small scale	Medium scale
RO1	21.09	76.73
OR	0.76	0.15
FAT	15.91	2.44
TAT	1.21	1.80

ROI, Rate of return on investment; OR, operating ratio; FAT, fixed asset turn over; TAT, total asset turnover. Source: Survey data analysis.

medium scale poultry egg farmers (about 15%). It is also revealed in Table 1 that total revenue of N1745 and about N50, 602 was earned by an average small and medium scale poultry egg farmer, respectively. The analysis in Table 1, further revealed that net farm income of about N304 and N22478 was received by an average small and medium scale poultry egg farmer, respectively.

The budgeting analysis for the two categories of poultry egg producers revealed that poultry egg production was profitable and the level of performance depends on level of scale where farmers face similar market conditions. The results obtained here were compared favorably with the findings of Okafor et al. (2006), Amos (2006) and Yusuf and Malomo (2007). Table 2 shows the summary of performance ratios of the farm types. It could be seen from the table that medium scale poultry egg farmers had higher return on investment (ROI) than their small scale counterparts. The medium scale poultry egg farmers obtained N76.73 return on a naira invested while the small

scale poultry egg farmers had N21.09 return on a naira invested. This is an indication of the fact that medium scale poultry egg farmers were able to minimize operating expense better than their small scale counterparts probably due to economies of size. The values 0.79 and 0.15 obtained for operating ratios for small and medium scale poultry egg farmers respectively also supports the aforementioned claim. Table 2 also shows that more fixed and total assets were used up in poultry egg production by the two categories of farms. Thus, in terms of net farm income, medium scale poultry egg farmers performed far better than their small scale counterpart (Table 1).

Regression result

The estimates of production function analysis of the 'best fit' linear functional form are presented in Tables 3 and 4 for

Table 3. Production function estimates for small-scale poultry egg farmers.

Variable	Coefficient	T-value
Constant	-2469. 75	-0.2981
Amount of feed	4358.91	1.399
Cost of water	- 326.25	-0.308
Veterinary services	783.83	6.66*
Amount of labour	- 0.716	-0.787
Electricity cost	19.02	0.562
Cost of purchase of day old chicks	0.153	0.8821

R^2 = 0.741; Adjusted R^2 = 0.67; F = 16.999; *Significant at 5% (Survey data analysis).

Table 4. Production function estimates for medium – scale poultry egg farmers.

Variable	Coefficient	T-value
Constant	-5296.87	-1.373
Amount of feed	-115.03	-0.65
Cost of water	338.65	1.250
Veterinary services	-5.369	- 4.083*
Amount of labour	0.028	0.873
Electricity cost	0.002	0.349
Cost of purchase of day old chicks	0.055	1.772

R^2 = 0.84; Adjusted R^2 = 0.72; F = 20.12; * Significant at 5% (Survey data analysis).

small and medium poultry egg farmers respectively. The results showed that there was goodness of fit of the production function based on their significant F-values. Table 3 showed that 67% of the adjusted variability in the revenue obtained by small scale poultry egg farmers was explained by the included explanatory variables in comparison with 72% of the adjusted variability in the revenue obtained by their medium scale counterparts (Table 4). This study revealed that only the amount spent on veterinary services is the major determinant of revenue accruable to the poultry egg farmers. Veterinary cost had positive coefficient for small scale poultry egg farmers as compared with negative coefficient obtained for their medium scale counterparts. The implication of the negative coefficient is that the average cost expended on veterinary services per bird for medium scale poultry egg farmers will be lower than their small scale counterparts. The coefficient of other factors determining revenue from poultry egg production was not significant and hence, the result should be taken with caution for policy purposes. The results of the regression analysis conformed to the findings of Amos (2006).

feed constituted the largest share of the total cost of egg production for the two categories of farm size (about 73 and 40% for small and medium scale poultry egg farms, respectively). The study revealed that poultry egg production was profitable in the study area where the level of profit depend on the scale of production. A medium scale poultry egg producer was observed to have had a far higher profit than their small scale counterparts. The study revealed that the amount spent on veterinary services was the only significant determinant of revenue accruable to poultry egg farmers in the study area. The study recommends that policy focus should be geared towards how small scale poultry egg farmers will increase their scale of operation in order to enjoy the benefits of economies of scale and thereby derive maximum profit from poultry egg enterprise while meeting the increasing demand for poultry eggs.

Conclusion

This study dwelt on economic appraisal of small and medium scale performance in poultry egg production in Ogun State of Nigeria. It is shown in the study that cost of

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