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

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Abstract: 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. Amount spent on veterinary services was the only significant determining factors of revenue accruable to poultry egg farmers.

Keywords: 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 egg, apart from supplying protein is 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 up with the demand for eggs. The desire to solve these problems informed 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?
- What are the significant determinants of revenue accruable to the poultry egg farmers?

Thus, the objectives of this study are 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 and Bamiro, 2008), none of these studies has appraised economically the performance of egg production by scale in the study area.

MATERIALS AND METHOD

The study was conducted in Ijebu North Local Government Area in the 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 6°N and 8°N and longitudes 2.5°E and 5°E. The state has a land area of about 16, 409 square kilometers and an estimated 2006 population census figure of well over 3 million people. The study area was chosen because agriculture is the main occupation of the people where they engage in crop and livestock farming, poultry keeping and saw milling (FOS, 1998).

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 Ladele, 1988).

Primary data which were obtained through the use of structured questionnaire were used for the study. 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.

Budgetary and regression technique were employed to analyze the data. Budgetary 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. Budgetary technique involves the estimation of net farm income (π). Thus the net farm income (π) was estimated as:

\[ \pi = \text{GM} - \text{TFC} \]  

Where:

- \( \pi \) represents net farm income
- GM represents gross margin (TR – TVC)
- TVC represents total variable cost
- TR represents total revenue
- TFC represents total fixed cost

Following the method employed by Aihonsu, et al (2007), 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).

i. Rate of return on investment (ROI) shows the amount gained on every naira invested. It is measured as:

\[ \text{ROI} = \frac{E}{C} \times 100 \]

Where:

- \( E \) represents profit before tax
- \( C \) represents total cost

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ii. Operating Ratio (OR) =
\[
\frac{\text{Total Operating Expenses (TVC)}}{\text{Net Sales (₦)}}
\]

--- 3

iii. Fixed Assets Turnover (FAT) =
\[
\frac{\text{Total Sales (₦)}}{\text{Fixed assets (₦)}}
\]

--- 4

iv. Total Assets Turnover (TAT) =
\[
\frac{\text{Total sales (₦)}}{\text{Total assets (₦)}}
\]

--- 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:
\[
Y = f(X_1, X_2, X_3, X_4, X_5, X_6, \varepsilon_i)
\]

Where:
- \(Y\) represents revenue from sales of egg produced (₦)
- \(X_1\) represents amount of feed (kg)
- \(X_2\) represents cost of water (₦)
- \(X_3\) represents veterinary services (₦)
- \(X_4\) represents amount of labour (man days)
- \(X_5\) represents electricity cost (₦)
- \(X_6\) represents costs of purchase of day old chicks (₦)
- \(\varepsilon_i\) represents the stochastic error term

RESULTS AND DISCUSSION

Budgetary 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 ₦1441 and ₦28124 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. 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); Yusuf and Malomo (2007) which claimed that feed cost is the most 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 costs for medium scale poultry egg farmers (about 15%). It is also revealed in Table 1 that total revenues of ₦1745 and about ₦50602 were 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 ₦304 and ₦22478 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 compared favourably with findings of Okafor et al (2006); Amos (2006); Yusuf and Malomo (2007).
Table 1: Cost and Return Analysis Per Poultry Egg Farmer Per Annum

<table>
<thead>
<tr>
<th>S/N</th>
<th>Item</th>
<th>Small Scale</th>
<th>Medium Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Revenue (₦)</td>
<td>1745</td>
<td>50601.7</td>
</tr>
<tr>
<td>B</td>
<td>Variable costs (% of TVC)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cost of feed</td>
<td>977.2</td>
<td>3000.07</td>
</tr>
<tr>
<td></td>
<td>Cost of water</td>
<td>10.6</td>
<td>328.1</td>
</tr>
<tr>
<td></td>
<td>Cost of drugs</td>
<td>44.8</td>
<td>742.8</td>
</tr>
<tr>
<td></td>
<td>Labour cost</td>
<td>29.95</td>
<td>505.0</td>
</tr>
<tr>
<td></td>
<td>Electricity cost</td>
<td>5.25</td>
<td>1106.8</td>
</tr>
<tr>
<td></td>
<td>Bird stock cost</td>
<td>263.4</td>
<td>839.6</td>
</tr>
<tr>
<td></td>
<td>Tax</td>
<td>-</td>
<td>896.6</td>
</tr>
<tr>
<td>C</td>
<td>Total variable cost (TCV)</td>
<td>1331.2</td>
<td>7418.9</td>
</tr>
<tr>
<td>D</td>
<td>Gross Margin (GM) = (TR – TVC) (₦)</td>
<td>413.8</td>
<td>43182.8</td>
</tr>
<tr>
<td>E</td>
<td>Fixed cost (₦)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Depreciation cost (₦)</td>
<td>109.7</td>
<td>20705.2</td>
</tr>
<tr>
<td>F</td>
<td>Total production cost (₦)</td>
<td>1440.9</td>
<td>28124.1</td>
</tr>
<tr>
<td>G</td>
<td>Net farm Income (₦)</td>
<td>303.9</td>
<td>22477.6</td>
</tr>
</tbody>
</table>

Source: Survey data analysis  ᾽120.57 = $1

Table 2: Summary of Performance Ratios for the two farm types

<table>
<thead>
<tr>
<th>Ratio</th>
<th>Small scale</th>
<th>Medium scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROI</td>
<td>21.09</td>
<td>76.73</td>
</tr>
<tr>
<td>OR</td>
<td>0.76</td>
<td>0.15</td>
</tr>
<tr>
<td>FAT</td>
<td>15.91</td>
<td>2.44</td>
</tr>
<tr>
<td>TAT</td>
<td>1.21</td>
<td>1.80</td>
</tr>
</tbody>
</table>

Source: Survey data analysis

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 ₦76.73 return on a naira invested while the small scale poultry egg farmers had ₦21.09 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 support the above 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 revenue function analysis of the ‘best fit’ linear functional form are presented in Tables 3 and 4 for 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 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 conform to the findings of Amos (2006).

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

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficient</th>
<th>T-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-2469.75</td>
<td>-0.2981</td>
</tr>
<tr>
<td>Amount of feed</td>
<td>4358.91</td>
<td>1.399</td>
</tr>
<tr>
<td>Cost of water</td>
<td>-326.25</td>
<td>-0.308</td>
</tr>
<tr>
<td>Veterinary services</td>
<td>783.83</td>
<td>6.66*</td>
</tr>
<tr>
<td>Amount of labour</td>
<td>-0.716</td>
<td>-0.787</td>
</tr>
<tr>
<td>Electricity cost</td>
<td>19.02</td>
<td>0.562</td>
</tr>
<tr>
<td>Cost of purchase of day old chicks</td>
<td>0.153</td>
<td>0.8821</td>
</tr>
</tbody>
</table>

\[ R^2 = 0.741, \quad \text{Adjusted } R^2 = 0.67, \quad F = 16.999 \]

*Significant at 5%

Source: Survey data analysis

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

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficients</th>
<th>T-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-5296.87</td>
<td>-1.373</td>
</tr>
<tr>
<td>Amount of feed</td>
<td>-115.03</td>
<td>-0.65</td>
</tr>
<tr>
<td>Cost of water</td>
<td>338.65</td>
<td>1.250</td>
</tr>
<tr>
<td>Veterinary services</td>
<td>-5.369</td>
<td>-4.083*</td>
</tr>
<tr>
<td>Amount of labour</td>
<td>0.028</td>
<td>0.873</td>
</tr>
<tr>
<td>Electricity cost</td>
<td>0.002</td>
<td>0.349</td>
</tr>
<tr>
<td>Cost of purchase of day old chicks</td>
<td>0.055</td>
<td>1.772</td>
</tr>
</tbody>
</table>

\[ R^2 = 0.84; \quad \text{Adjusted } R^2 = 0.72, \quad F = 20.12 \]

*Significant at 5%

Source: Survey data analysis

**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 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 level of profit depended on the scale of production. Medium scale poultry egg producers were observed to have had a far higher profit than their small scale counterparts. The study revealed that 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 deriving maximum profit from poultry egg enterprise while meeting the increasing demand for poultry eggs.

**Acknowledgement**

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**References**


