Economic analysis of poultry egg production in Maiduguri and environs of Borno State, Nigeria

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The study on the economic analysis of poultry egg production was carried out in Maiduguri and environs of Borno State, Nigeria. The specific objectives were to: estimate the costs and returns in poultry egg production; determine input / output relationship in poultry egg production; and identify the problems association with poultry egg production in the study area. Purposive sampling technique was employed for the study. Ten (10) wards out of the existing fifteen (15) wards in the area were selected. These areas where poultry egg producers are predominantly found. From each of the ten (10) wards, five (5) poultry egg producers were randomly selected, giving a total sample size of fifty (50) respondents for the study. Structured questionnaire were administered to fifty (50) poultry egg producers. Descriptive statistics, farm budgetary technique and multiple regression models were used as analytical technique. Analysis of the finding of costs and returns associated with poultry egg production showed that costs of feed and hired labour accounts for 80.65 and 5.25% of the total costs in poultry egg production respectively. The gross revenue, total cost and net farm income were ₦10,500.00, ₦4960.00 and ₦5,540.00, respectively in the study area. The result of input / output relationship in poultry egg production also indicates that the coefficients of the cost of hired labor, flock size, feed, depreciating cost of equipment and other operating expenses were all positive and significant at 5, 1, and 10% respectively. High cost of feed, inadequate drug, lack of governmental support, poor management practices, high mortality rate, high bird density and inadequate ventilation among others were the major problems associated with poultry egg production in the study area. It was recommended that farmers should form agricultural co-operative groups that will enable them obtain credit from government and financial institutions; and extension agents in the state should be properly trained and provided with all necessary technological packages required to teach and guide farmers on improved poultry egg production.

Key words: Poultry egg, economics, Maiduguri, Borno State, Nigeria.

INTRODUCTION

Agriculture provides a primary means of employment and accounts for more than one third of the total Gross Domestic Product (GDP) and labour force in Nigeria (Evbuomwan, 2006). FOS (1996) reports that food production in Nigeria increases at the rate of 2.5% while food demand increased at a rate more than 3.5% due to high rate of population growth of 2.83%. Nigeria, like other developing countries suffers from protein deficiency due to rapid population growth, low productivity in the agricultural sector, rural-urban migration and decline in productivity of the livestock sub sector (Abubakar, 2000). FAO (1998) puts the current average level of animal
protein consumption in Nigeria at 15 g/head/day, which is grossly below the FAO recommended level of 35 g/head/day. Amos (2006) reported that the poultry industry has become a diverse industry with a variety of business interests such as egg production, broiler production, hatchery and poultry equipment business.

Evuomwan (2006) analyzed cost and returns to commercial table egg production in Lagos state and indicated an improvement in gross margin despite the astronomical increase in prices of all inputs that confirmed increase in production cost price are automatically transferred to the consumers. Ojo (2003) reported that egg products were very profitable in Osun State. It has a mean value of ₦2, 158, 162.53, which was further confirmed by a net return of ₦1498.88 per bird. Similarly, Ekunwe and Soniregun (2007) also reported that the total revenue from egg and other sources per bird was ₦253.16, which gave a net return of ₦3, 168.7 per bird. This implies that the return per naira was 12.5:1, that is, for every ₦1 invested, the farmers get ₦12.5. In this same vein, the findings of Ibrahim et al. (2009) revealed that average net farm income of ₦85, 558.30 with a return on capital invested of about 40%, thus, poultry egg production business was said to be highly profitable.

In another report, Ala and Boniface (2009) affirmed that farmers made an average net farm income of about ₦194, 698.39 per production season from poultry egg enterprises in Sokoto Metropolis of Sokoto state. Olayemi (1985) asserted that a prospective commercial egg producer requires enough capital to start the business. Since the introduction of modern poultry in Nigeria decade ago, it has passed through many stages of development, each with its problems (Aromolaran, 1999). Inadequate information and background knowledge on the primary determinants of market supply and demand of eggs makes many prospective poultry farmers skeptical to venture into the business (Adewuyi et al., 2009). This was affirmed by the findings of Adepoju (2008) that the several problems plaguing the poultry production industry made it difficult for existing firms to expand while new ones were reluctant to go into the business and such problems include: high cost of feed, other production cost disease and marketing problems. Murtala (2004) observed that the price of egg does not vary proportionately with the rise in prices of feed and the cost involved in commercial poultry production enterprise.

The study therefore, analyzed the economics of poultry egg production in Maiduguri and its environs, Borno State, Nigeria and was designed to provide answers to the following research questions:

1. What are the costs and returns in poultry egg production?
2. Is there any relationship between inputs and output obtained in poultry egg production?
3. What are the problems associated with poultry egg production?

**METHODOLOGY**

**Study area**

Maiduguri is situated between latitudes 12° 30”N and 14° 30”N and longitudes 10° 30”E and 14° 45”E (MLS, 2011). Maiduguri comprises of 15 wards and shares boundaries with Konduga, Jere and Mafa Local Government areas with an estimated population of 2,733,696 in 2008 based on 3.8% growth rate (NPC, 2006). The study area lies within the Sudan savanna of the country’s vegetation with amount of rainfall ranging from 300 to 700 mm/annum, with minimum and maximum temperature of 19 and 48°C respectively. The predominant ethnic groups in the study area are the Kanuri, Shuwa, Hausa and sprinkles of Fulani. Crop production and livestock farming are the predominant occupation of the people while other economic activities include trading and craftsmanship. Major crops grown in the region include maize, millet, guinea corn, rice, cowpea, fruits and vegetables.

**Sampling technique**

Purposive sampling technique was employed for the study. Ten (10) wards were purposively selected out of the existing fifteen (15) wards in the area. These are areas where poultry egg producers are predominantly found. From each of the ten (10) wards, five (5) poultry egg producers were randomly selected, giving a total sample size of fifty (50) respondents for the study.

**Sources of data**

The sources of data used for the study are primary data and secondary information. The primary data generated was through structured questionnaires administered to randomly selected respondents. The secondary sources of information include textbooks, journals, articles, conference proceedings, bulletins, annual reports and other relevant publications.

**Analytical techniques**

The analytical tools used for the study include descriptive statistics, farm budgetary technique and multiple regression models.

**Descriptive statistics**

The descriptive statistics used include frequency, percentages and ranking order. These were used to organize the data and identify the problems associated with poultry egg production to achieve objectives iii.
Table 1. Estimated costs and returns associated with poultry egg production.

<table>
<thead>
<tr>
<th>Items</th>
<th>Average value (₦)/ Bird</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spent layer</td>
<td>900.00</td>
<td></td>
</tr>
<tr>
<td>Average crates (12)</td>
<td>9,600.00</td>
<td></td>
</tr>
<tr>
<td>Gross revenue</td>
<td>10,500</td>
<td></td>
</tr>
</tbody>
</table>

Variable inputs costs:
- Family labour: 240.00 (4.84%)
- Hired labour: 260.00 (5.24%)
- Feed: 4,000.00 (80.65%)
- Depreciating cost of equipment: 210.00 (4.23%)
- Operating expenses: 250.00 (5.04%)
- Total: 4,960.00 (100%)
- Net farm income: 5,540.00


**Farm budgetary technique**

The Net Farm Income (NFI) was employed to estimate profitability of poultry egg production to achieve objective i. The model is expressed (Tijani, 2007) as follows:

\[ NFI = GI - TVC \]

Where,
- NFI = Net Farm Income (₦)/ crate
- GI = Gross Income (₦)/ crate
- TVC = Total Variable Cost (₦)/ crate

**Multiple regression model**

Production function model was used to determine the physical relationship between inputs and output obtained (Tijani et al., 2010), in poultry egg production to achieve specific objective ii. The implicit form of the model is expressed as follows:

\[ Y = f (X_1, X_2, X_3, X_4, X_5, X_6, e) \]

Where:
- Y = Output of poultry egg production (crate)
- \( X_1 \) = Family labour (man-day/hour)
- \( X_2 \) = Hired labour (man-day/hour)
- \( X_3 \) = Flock size (number)
- \( X_4 \) = Feed (kg)
- \( X_5 \) = Depreciating cost of equipment (₦)
- \( X_6 \) = Other operating expenses (₦)
- e = Error term.

In the analysis, different functional forms were used which include linear, semi-log, double-log and exponential functions, and the double log function was selected and used as the lead equation. The choice of the best functional form (lead equation) selected was based on both statistical and econometric criteria (T-test, F-statistics, and \( R^2 \)), number of significant variables and the *a priori* expectation of the signs of the coefficients. The \( X_1, X_4, \) and \( X_5 \) coefficients of *a priori*, was expected to be positive, while those of \( X_2, X_3 \) and \( X_6 \) negative.

**RESULTS AND DISCUSSION**

**Cost and returns associated with poultry egg production**

Costs refer to the value of inputs used in production or expenses incurred in the course of production of a particular produce, while return is the gain made at the end of production. The net farm income represents the difference between the gross revenue and the total cost, and serves as a proxy for measuring profitability (Tijani, 2007). Table 1 shows the estimates and findings of the costs and returns in poultry egg production. Analysis of the findings in Table 1 shows that costs of feed and hired labour accounts for 80.65% and 5.25% of the total costs in poultry egg production respectively. The result reveals that costs of feed constitute the larger proportion of the total cost of poultry egg production.

The gross revenue, total cost and net farm income were ₦10, 500.00, ₦4960.00 and ₦5, 540.00, respectively in poultry egg production in the study area. The result also indicates that poultry egg production is a profitable enterprise in the study area.

**Input/ output relationship in poultry egg production**

In order to determine the input/output relationship in poultry egg production, number of egg crates obtained in poultry farm by farmers was regressed against variables such as family labour, hired labour, flock size, feed, depreciating cost of equipment and operating cost. Table 2
Table 2. Double-log multiple regression result for input/output relationship in poultry egg production.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Estimated parameters</th>
<th>Coefficients</th>
<th>Standard errors</th>
<th>T-Values</th>
<th>Significant levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>$X_0$</td>
<td>3.865</td>
<td>0.348</td>
<td>11.096</td>
<td>0.000*</td>
</tr>
<tr>
<td>Family labour</td>
<td>$X_1$</td>
<td>0.082</td>
<td>0.157</td>
<td>0.523</td>
<td>0.603</td>
</tr>
<tr>
<td>Hired labour</td>
<td>$X_2$</td>
<td>0.064</td>
<td>0.072</td>
<td>0.883</td>
<td>0.038**</td>
</tr>
<tr>
<td>Flock size</td>
<td>$X_3$</td>
<td>0.893</td>
<td>0.147</td>
<td>6.074</td>
<td>0.000*</td>
</tr>
<tr>
<td>Feed</td>
<td>$X_4$</td>
<td>0.020</td>
<td>0.058</td>
<td>0.349</td>
<td>0.072*</td>
</tr>
<tr>
<td>Depreciating cost of equipment</td>
<td>$X_5$</td>
<td>0.222</td>
<td>0.235</td>
<td>0.943</td>
<td>0.057**</td>
</tr>
<tr>
<td>Operating expenses</td>
<td>$X_6$</td>
<td>0.467</td>
<td>0.239</td>
<td>1.955</td>
<td>0.067***</td>
</tr>
</tbody>
</table>

Diagnostics statistics:

$R^2 = 0.990$

F-value $= 702.403$

$n = 50$

Source: Field survey 2011; * = Represent coefficient that are significant at 1%; ** = coefficient significant at 5%; *** = coefficient significant at 10%.

Analysis of the result in Table 2 shows that all the parameters estimated carry positive signs, which imply that family labour ($X_1$), hired labour ($X_2$), flock size ($X_3$), feed ($X_4$), depreciating cost of equipment ($X_5$), and operating cost ($X_6$) all have direct relationship with farmers output in poultry egg production. The T-ratios showed that hired labour ($X_2$), flock size ($X_3$), feed ($X_4$), depreciating cost of equipment ($X_5$), and operating expenses ($X_6$) were all significant at 1, 5 and 10%, respectively. The F-value, 702.403, showed that all explanatory variables taken together have a significant effect on the dependent variable ($Y$). $R^2$ value of 0.990, implies that 99% of the variation in the dependent variable has been explained by the independent variables such as hired labour ($X_2$), flock size ($X_3$), feed ($X_4$), depreciating cost of equipment ($X_5$) and operating expenses ($X_6$), and that the remaining 1% was as a result of random variable, $\varepsilon$.

The result indicates that the coefficient of the cost of hired labor was positive and significant at 5%. This contradicts with the a priori expectation. The positive coefficient of the cost of hired labour suggests that the higher the cost of hired labour, the more poultry farmers obtain crates in poultry egg production. The reason is that, the more farmers spend on hired labour, the higher the number of man-days working, on the farm and the larger the number of poultry birds on farm and attention received by the birds receive. Thus, the more the number of eggs lay by the birds, the higher will be the income obtained by farmers in poultry egg production.

The coefficient of the flock size was positive and significant at 1%. The positive coefficient of flock size indicates that increase in the flock size will bring forth a corresponding increase in the number of poultry output (egg). This finding is in line with the report of Ajibefun and Daramola (2000), Subahash et al. (1999) and Bamiro et al. (2006) that the larger the flock size of a poultry farm, the higher, the number of eggs and income farmers generate in poultry production. Feed also has a positive coefficient and is significant at 10%. This agrees with a priori expectation. This suggests that the more the quantity of feeds allocated to the poultry birds; the larger will be the size of the birds and thus, the higher the number of eggs and income obtained by poultry farmers.

The coefficients of depreciating cost of equipment and other operating expenses were all positive and significant at 5 and 10%, respectively. These suggests that the more the depreciating cost of equipment and other operating expenses provided to the poultry farm, the better the attention received by the birds. Thus, the higher the number of poultry eggs and income obtained by the poultry farmer (Bamiro et al., 2001).

Problems associated with poultry egg production

The farmers engaged in poultry egg production in the study area ranked the major problems affecting poultry egg production in ascending order of importance. The findings are as shown in Table 3. The result in Table 3 shows that high cost of feed was a major problem as indicated by 34% of the poultry farmers in the study area. High cost of feed such as grower, finisher, and layer mesh etc were the most pronounced problem associated with poultry production in study area.

The finding also reveals that administration of inadequate drug was the second major problem as indicated by 20% of the poultry farmers in the study area. It might be due to inadequate drugs for poultry production that has made most of the farmers in the study area to be small-scale farmers who operate at subsistence level. Inadequate drugs might have caused mortality in the birds, which has in no doubt led to small scale.

The result shows lack of Government support was a
Table 3. Problems associated with poultry egg production.

<table>
<thead>
<tr>
<th>Major problems</th>
<th>Rank order</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High cost of feed</td>
<td>1</td>
<td>17</td>
<td>34</td>
</tr>
<tr>
<td>Inadequate drug</td>
<td>2</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>Lack of Governmental support</td>
<td>3</td>
<td>7</td>
<td>14</td>
</tr>
<tr>
<td>Poor management practice</td>
<td>4</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>High mortality rate</td>
<td>5</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>High bird density</td>
<td>6</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Inadequate Ventilation</td>
<td>7</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>51</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Filed survey, 2010.

CONCLUSION AND RECOMMENDATION

The finding reveals that poultry egg production is profitable in the study area. Analysis of the result also showed that inputs such as family labour, hired labour, flock size, feed, depreciating cost of equipment and operating expenses have significant relationship with poultry egg output in the study area. High cost of feed, insufficient drugs, financial constraint and high mortality rate were the major problems associated with poultry egg production in the study area. Based on the finding, the following recommendations are made:

i. Farmers should form agricultural cooperative groups that will enable them obtain credit from government and financial institutions.

ii. Farmers should be provided loan and credit facilities at low interest rate in order to help them boost their poultry egg production level in the study area.

iii. Availability of farm input such as drugs and vaccine to the farmers at the right time and at subsidized prices.

iv. Extension agents in the state should be properly trained and provided with all necessary technological packages required to teach and guide farmers on improved poultry egg production.

REFERENCES

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