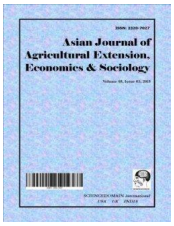

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Costs and Return Analysis in Poultry Egg Production in Lafia Local Government Area (LGA) of Nasarawa State, Nigeria

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Authors' contributions

This work was carried out in collaboration between all authors. All authors read and approved the manuscript.

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ABSTRACT

The study assessed the costs and return of poultry egg enterprises in Lafia Local Government Area of Nasarawa State, Nigeria. Sixty (60) poultry egg producers were randomly selected from the 10 wards in Lafia Local Government Area. Data were collected using structured questionnaire for in-depth interview with selected respondents. Descriptive statistic (such as frequency distribution, percentage and means) and multiple regressions used to analyse the data. Results indicate that most (86.7%) of the respondents were male, within the ages of 31- 40 years. Findings further revealed that majority (83.3%) were married with household sizes of 1-5 inhabitants. Larger proportion (41.7%) of the respondents had 501-1000 birds, with same proportion (41.7%) of the respondents generating up to N 200,000 monthly. The total revenue (TR), Gross Margin (GM), Total variable cost (TVC), and Return on Naira Invested (ROI) were: N1, 575, 362.4 N1, 028, 681.9, N546, 680.5, and N0. 88 respectively. Also, the variables (R^2) included in the regression model explained 89% of variation in the revenue generated by poultry egg farmers in the study area. Coefficients for land and drinker/feeder were significant at 1% level of significant, housing was

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significant at 10% level of significant, while increase in feed and increase in labour were significant at 5% respectively. However, labour had a negative coefficient. Some of the identified constraints were; inadequate improved technology, unavailability of raw material, poor extension/training facilities and managerial problems, high cost and poor availability of feed, high cost of labour, and poor finance . Respondents should be encouraged to form cooperative societies or join the existing ones to be able to access loan to their business and government could also make funds available to assist the layers poultry farmers. Stakeholders should be encouraged to cultivate food crops such as cereals and legumes to make feed stuff available to poultry farmers.

Keywords: Costs; return; analysis; poultry; egg; enterprises.

1. INTRODUCTION

In Nigeria, before and immediately after independence, agriculture was the main-stay of the economy, [1]. However, its contribution to the economy has been declining since the oil boom of the 1970's. [2] reported that agriculture in the post independent years was the main stay of the Nigeria economy but suffered neglect due to the oil boom of the 1970's.According to [3] Agriculture continues to be the mainstay of developing economies and predominant source of livelihood for people in Nigeria in particular.

Nigeria, like many other developing countries suffers from protein deficiency compounded as a result of rapid population growth, low productivity in the agricultural sector, rural urban migration, and decline in productivity of the livestock sub-sector [4]. In same vein [5] also asserted that apart from Nigeria's agriculture not meeting up in its food production to meet the food requirement of the increasing population, its greatest problem is that of inadequate animal protein in the diet of a large proportion of the population especially in the rural areas which constitutes over 70% of the Nigeria population. Hence the significance of poultry and livestock in general for sustainable food production and fostering of widespread provision of animal protein cannot be over emphasized. It is therefore clear that much needs to be done to accelerate the transformation to commercial poultry husbandry and sustain the interest of present and intending modem poultry farmers in Nigeria.

The role of poultry industry in terms of its contribution to the provision of animal proteins cannot be over-emphasized. As reported by [6] when compared to beef industry poultry enjoys a relative advantage of ease of management, higher turnover, quick returns to capital investment and wider acceptance of its product for human consumption. The poultry industry is very important to the Nigerian economy because it provides a good source of animal protein in the form of meat and eggs. Proteins play important roles in the formation of a balanced human diet which is essential for the good health, vigor, and productive capacity of the people. The Poultry egg industry, apart from providing employment as a source of livelihood to thousands of people in Nigeria, the egg is a complete protein with excellent quality; one egg will give 6grams of protein. Egg production in Nigeria has been affected by the unstable trends in the economy. The problems of the industry make it very difficult for expansion and new producers find it hard to join the business. Such problems include the high cost of feed, outbreaks of diseases, and marketing problems. This situation has forced many small scale poultry farms to close down and those still managing to survive are producing at very high cost with serious input limitations, [7]. Poultry meat and egg accounted for about 30% of the total livestock output in Nigeria, of which eggs accounted for over 80% [8]. Eggs and poultry meat has emerged next to milk as a contributor to the output from livestock sector in recent years [9]. The percentage contribution of eggs and poultry meat was 4.47% in 195 1-1952, which reached to over 9% in 1995- 1996 [9].

1.1 Problem Statement

The early government agricultural programmes in Nigeria emphasized poultry farming and contained substantial subsidies in day-old chick's feeds. This attracted millions of peasant farmers, civil servants, professionals and entrepreneurs into poultry farming at small, medium and large scales. Following changes in governments and government policies, particularly during the structural adjustment programme, the huge subsidies in the agricultural sector were withdrawn, and many poultry farmers had to close down in the face of rising feed costs, stock

and raw materials. With the launch of the National Economic Empowerment and Development Strategy [10] there is renewed emphasis on the agricultural sector, being the main-stay of the economy. Under the NEEDS programme, agricultural development is aimed at achieving food security, economic empowerment, employment generation and poverty reduction. Among the target set for the agricultural sector is the reduction of food imports from 14.5 percent of total imports to 5 percent by 2007; hence, the banned on the importation of poultry products and other foods that can be produced locally, under the Presidential Initiatives. The problems of the industry make it very difficult for expansion and new producers find it hard to start a business. In Nigeria, despite growth in the egg production industry since 2000, local demand has not been matched by local supply. With reported egg imports of 730 million in 2000, which was down slightly from 732 million eggs imported in 1999 [11].

Over the years, there has been a clarion call to improve the nutritional status of developing countries, through protein intake especially animal protein. Production of poultry egg products in Nigeria has not been able to meet with the demand of her increasing population, [12]. There are assertions that the poultry enterprise is locally not profitable. The costs incurred in production may be too high and hence the enterprises are not profitable. There is dearth of knowledge and hence, the basis for this study.

It is against this background that the study has formulated the following research questions;

i. What are the socio-economic characteristics of the Poultry egg producers?
ii. What are the determinants of poultry egg production in the study area?
iii. What are the cost and returns associated with Poultry egg production in the study area
v. What are the production constraints associated to Poultry egg in the study area?

1.2 Objectives of the Study

The general objective of the study is to analyze the costs and return in poultry egg production in Lafia Local Government Area (LGA) of Nasarawa State, Nigeria, while the specific objectives are to:

i. Describe the socio- economic characteristics of Poultry egg farmers in the study area;
ii. Determine the determinants of profit from poultry eggs production in the study area
iii. Examine the costs and return associated with poultry eggs production in the study area
iv. Identify constraints associated to Poultry egg production in the study area.

1.3 Hypotheses of the Study

The hypotheses of this study were set in null form as follows;

$H0_i$: Poultry egg production is not profitable in the study area.
$H0_2$: Socioeconomic characteristics of the poultry egg producers do not significantly affect the profitability of poultry egg production in the study area

2. METHODOLOGY

2.1 Study Area

The study area for the research was Lafia Local Government Area of Nasarawa State. Lafia itself is the capital of the State and also one of the thirteen local government areas of the State. The LGA has a population of 330,712 [13]. The study area lies between latitude 7º and 9º North of the equator and longitude 7º and 10º East [14]. The LGA shares common boundary with Nasarawa- Eggon LGA in the East, Doma LGA in South, Kaduna State in the North, Kogi State and FCT in the West [15]. Nasarawa State covers a land area of about 27,137.8 Sq km a population of 1,863,275 million people and a projected population of 1,969,180 million inhabitants using a growth rate of 2.8% for year 2016 [13]. The State capital is about 165 kilometers away from Abuja, the capital of Nigeria.

2.2 Sampling and Sampling Technique

The study was carried out in Lafia Local Government Area (LGA) of Nasarawa State, Nigeria. Firstly, a purposive sampling was applied in the selection of six out of the ten wards

A map of Nasarawa State showing the study area
Source: [15]

that comprised the LGA based on the concentration of poultry egg producers. The ten wards are; Ombi, Kwandere, Gandu, Kawo, Tudun Gwandara, Shabu, Lafia town, Bukan Sidi, Damba and Agunji respectively. Secondly, ten (10) respondents were selected randomly from each of the selected six wards thus; making a total of sixty (60) respondents for the study. The six selected wards include; Kwandere, Kawo, Tudun Gwandara, Shabu, Lafia town, and Agunji respectively.

2.3 Data Collection

Data for the study were obtained through both primary sources using structured questionnaire designed to capture information on Socio-economic characteristics of the various poultry egg producers, age, sex, marital status, household size, educational level, production experience, source of inputs and their related cost and quantities, quantity of eggs produced and their related cost, quantity of labour and its associated cost, source of finance, amount of capital obtained, problem of egg production marketing among others. A 3-Point numerical rating scale of; very, seriously affect = 1, slightly affect = 2 and does not affect; was to assess the constraints affecting poultry egg production enterprises.

2.4 Method of Data Analysis

The data collected was analyzed using both descriptive and inferential statistics. The descriptive statistics was applied in the analysis of the socio-economic characteristics of the farmers as well as the problems militating against the productivity of Poultry egg farmers (objectives i & iv), while Inferential statistics were used in achieving objectives ii and iii.

The computed Weighted Average for the three point scale is as follows

$$X_w \frac{3(N1)+2(N2)1-1(N3)}{60}$$

Where:

X_w = Weighted average
$N_1 + N_2 + N_3$:= Rating scale
F = Frequency of respondents = 60

i. The calculate mean score of respondents

$$X = \frac{3+2+1}{60}$$

2.5 Net Farm Income (NFI) Analysis

The Net farm income was used in the determination of the profitability of Poultry egg production in the study area. It is obtained from the differences between gross farm income (total income) and total cost of production (variable and fixed cost) [16]. It is given as:

$$NFI = GM — TFC \quad (1)$$

Where;

NFI = Net farm income (N/ha)
GM = Gross margin
TFC = Total fixed cost

2.6 Regression Analysis

The implicit form of the production function for poultry egg production enterprises in the study area is stated as follows:

$$Y = f(X_1, X_2, X_3, X_4, X_5, + U) \quad (2)$$

Where,

Y = Profit N)
X_1 = Housing (N)
X_2 = cost of Equipment's (feeder and drinker Depreciated) (N)
X_3 = Labour (man-days)
X_4 = Quantity of feed (kilogram)
X_4= Total cost of drugs and medications (N)
X_5= Flock size (number of laying birds)
U = error term
X_1, ... $X_5$are the explanatory variables

3. RESULTS AND DISCUSSION

3.1 Socio-economic Characteristics of Respondents

Gender: Results from Table 1 shows that majority (86.7%) of the respondents were males, while only 13.3% were females. This indicates that more men are involved generally in agricultural activities; however, poultry egg production is a less strenuous job and does not require more energy and agility. This is in line with the findings of [17] who reported that majority of the poultry egg producers were male.

Age: The results also reveals that majority (61.7%) of respondents were within the age range of 31- 40 years, whereas 21.7% were below 30 years of age while only 15.0% and 1.7% of the respondents were within the age ranges of 41 -50 years and above 50 years respectively. The mean age was approximately 36. This shows that a large number of the respondents are young and in their productive years. This finding agrees with the report of [18] that majority of poultry farmers are relatively young and still in their active age.

Marital status: Tables 1 also revealed that majority (83.3%) of the respondents were married, while 16.7% were still single. The high number of married respondents could increase the release of family labour, thus making more hands available for productive activities on respondents' egg poultry farms in the study area. This result is in line with [17] Albot (2008) who indicated that married people account for majority of egg poultry farmers' population.

Educational status: Also, results from the findings (Table 1) revealed that larger proportion (48.3%) of the respondents had secondary education, while 45.0% represented tertiary education, whereas 6.7% represents the respondent with no formal education. This findings support the result obtained by [18] who stated that majority of the poultry farmers had tertiary and secondary education meaning that they are literate.

Household size: Majority (76.7%) of the respondents had more than 4 persons in the household while 16.7% had between 11-15 household members. The mean age household size was approximately 3.0. This implies that respondents with family size above 4 people would have more hands to work in their poultry farms which could aid increase in their output. [19] stated that family poultry contributing 68.9% of the total poultry meat produced in Nigeria.

Major occupation: Table 1 also revealed the majority (61.7%) did not see poultry egg production as their major occupation. This is probably because majority of the respondents were educated and hence have diversified into other business ventures that may be more profitable and less strenuous.

Years of experience: Table 1 also shows the level of experience of the respondents to be 71.7%, 26.7% and 1.7% representing 0-5, 6-10, ii and above years respectively. The mean years of experience were approximately 3.0 years. Low years of experience could be the reason for low egg production among the small-scale egg farmers. The knowledge on management, which is a key to profitable poultry production, is gained through years of experience of the poultry farmer [20].

Flock size: The results also reveals that larger proportion (41.7%) of the respondents had 501-1000 birds, 35.5% had above 1000 birds, while 23.3% of the respondents had 100-500 birds. This result therefore revealed that high percentages of the poultry egg farmers in the area were small scale producers with 64.0% having a bird population of less than or equal to 1000. The mean flock size was 751. This confirmed the earlier report by [21] that poultry production is mostly at small or medium sized level.

Table 1. Socio-economic characteristics of respondents

Characteristics	Frequency	Percentage
Gender		
Male	52	86.7
Female	8	13.3
Total	60	100
Age		
Below 30	13	21.7
31-40	37	61.7
41-50	9	15.0
Total	60	100
Mean value	35.5	
Marital status		
Single	10	16.7
Married	50	83.3
Total	60	100.0
Educational status		
Secondary education	29	48.3
Tertiary education	27	45.0
Non formal education	4	6.7
Total	60	100
Household size		
1-5	46	76.7
6-10	10	16.7
11-15	4	6.7
Total	60	100.0
Mean Value	3.2	
Poultry primary occupation		
Yes	23	38.3
No	37	61.7
Total	60	100
Years in poultry egg production		
1-5	43	71.7
6-10	16	26.7
11 above	1	1.7
Total	60	100
Mean value	3.4	
Size of poultry farm		
100-500	14	23.3
501-1000	25	41.7
1001 and above	21	35.0
Total	60	100
Mean value	750.5	
Monthly income		
50,000-100,000	23	38.3
101,000-200,000	25	41.7
301,000 and above	3	5.0
Total	60	100
Mean value	151,000	
Sources of finance for business		
Agricultural banks	8	13.3
Commercial banks	3	5.0
Friends/relatives	7	11.7
Cooperative societies	7	11.7
Personal savings	35	58.7
Total	60	100

Source: Field survey, 2016

Income: The results from Table 1 indicates that larger proportion (4 1.7%) of the respondents generated up to N200,000 monthly, while 38.3% of the respondents generate between N50,000-Nl00,000 per month. Only 12.0% of the respondents generate above 300,000 naira per month from their poultry business. The mean income was N 51,000 This agree with [22] who stated that low income from poultry business is one of the constraints to increased productions faced by small scale poultry farmers.

3.2 Sources of Finance of Poultry Egg Farmers

Results in Table 1 revealed that majority (58.3%) of the respondents sourced their fund through their personal savings. This may be that most of the farmers are involved in other forms of business which avail them the opportunity to fund their poultry business. Also, since they are small scale farmers, they may not have enough collateral to secure loan from credit institutions as only 18.0% were able to source fund through credit institutions. These results collaborate with the findings of [23] that poultry farmers in rural areas are mostly operate on small level.

3.3 Determinants of Profit in Poultry Egg Enterprises in the Study Area

According to the result, the variables included in the regression model explained (R^2) 89% of variation in the profit generated by poultry egg farmers in the study area. The study also revealed that, use of vaccine, chick number (flock size), water utilization, type of trait, land, housing, drinker and the amount of feed used were the factors that positively determined the level of poultry egg output by the farmers. This implies that increase in any of these factors would lead to higher profit. This result compares favorably to that of [24] who reported that proper vaccination schedule, increase in number of flock and adequate housing are positively correlated to poultry output.

Coefficients for land and drinker/feeder were significant at 10% probability level, housing was significant at 1%, while increase in feeds and labour were significant at 5% respectively. However, the use of labour had a negative coefficient. This implies that as more labour are used in the poultry farm, more expenses in term of the amount spent increases.

3.4 Costs and Return Associated with Poultry Egg Production

The results of Table 3 present the costs and return of poultry egg production in the study area. It was revealed that, the total variable cost (TVC) was N546, 680.5 which represents 40.0% of the total cost of production. The total cost of production of poultry egg was N1,390,824.4 with a total revenue (TR) generated, Gross Margin (GM) obtained and Return on Naira Invested (ROI) by poultry egg farmers were: N1,575,362.4, N1,028,681.9, and N0.88 respectively. The positive value of the net farm income obtained from the study indicated that egg production is profitable. Also it was observed that for every naira invested, a return on investment of N0.88 was realized. Information from the cost and return analysis shows that poultry egg production is a viable business in the study area with a profit margin of N 184,537.8. This result agreed with the findings of [25].

Table 2. Determinants of poultry egg production

Variables	Coefficients	Standard error	t-value
(Constant)	52977.561	29600.751	1.790*
Vaccine	.720	.976	.737
Chick	.006	.047	.129
Water	.007	.462	.016
Type of trait	.067	.422	.158
Land	.447	.070	6.416***
Housing	.097	.036	2.708*
Drinker/feeder	.519	.075	6.934***
Feeds	1.895	.646	2.239**
Cost of Labour	-.580	.228	-2.543**
R^2= 0.891			
F-value = 44.502, and			

*Source: Field survey, 2016 *significant at 1%, **significant at 5%, ***significant at 10%*

Table 3. Costs and return associated with poultry egg production

Variable	Mean value (N)	Percentage of variable cost
(A) Variable Cost (VC)		
Labour	50,584.7	9.3
Feed	194,687.1	35.6
Vaccines	18800.2	3.4
Day old chicks	274,337.3	50.2
Water	8,271.2	1.5
Total Variable Cost (TVC)	546,680.5	
(B) Fixed Cost (FC)		
Land	317,796.6	
Housing (depreciated????)	393,983.1	
Feeder/drinker	132,364.4	
Total Fixed Cost (TFC)	844,144.1	
(C)Total Cost (TC)= TVC+TFC	1,390,824.6	
(D) Total Revenue (TR)	1,575,362.4	
Net Return (NR)= TR-TC	184,537.8	
Gross Margin= TR-TVC	1,028,681.9	
Net Farm Income (GM-TFC)	184,537.8	
Gross Margin per Naira invested	0.88	

Field survey, 2016

Table 4. Constraints associated with poultry egg production

Constraints mean value	Mean value	Effect
Unavailability of raw material 1.88	1.88	
Inadequate Improved technology 2.02	2.02	Slightly affect
Control measures 1.95	1.95	Slightly affect
High feed cost and low egg prices 1.80	1.80	Slightly affect
Poor transport/storage facilities 1.98	1.98	Slightly affect
Finance 1.95	1.95	Slightly affect
Labour problem 1 95	1 95	Slightly affect
Power supply 1.68	1.68	Slightly affect
Marketing 1.87	1.87	Slightly affect
Export facilities 2.27	2.27	Slightly affect
Health coverage 1.87	1.87	Slightly affect
Managerial problems 1.98	1.98	Slightly affect
Poor Extension and training facilities 2.02	2.02	Slightly affect
Grand Mean score 1.94	**1.94**	

Source: Field Survey, 2016
Mean value between 1-1.35 (seriously affect)
Mean value between 1.36-2.35 (slightly affect)
Mean value between 2.3 6-3.0 (does not affect)

3.5 Constraints Associated with Poultry Egg Production

Table 4 presents the major constraints faced by poultry egg producers in the study area. The constraints were rank as seriously affecting, slightly affect or do not affect the poultry farmers. All the constraints were observed to slightly affect the poultry egg farmers with export facility (M 2.27) ranked as the highest constraints. This is followed by inadequate improved technology (M = 2.02) and poor extension services (M 2.02) which were seen as the second most ranked constraints. Other constraints that affect poultry egg farmers in the study area were poor transport/storage facilities (M 1 .98), and managerial problem (M1 .98) were also pointed by respondents as constraints. Also, finance with mean score (1.95) [26] opined that lack of good management is a major constraint that militates against poultry production. Also, availability of raw materials with a mean score of (1.88) and high cost of feed with mean score (1.95) were also indicated by the respondents as constraints affecting them. The high cost of feed could be linked also to the lack of quality ingredient for feed formulation because the available quality ingredient may be costly and thereby affecting the price of the feed. The implication of this is that if the cost of feed is high and small scale poultry farmer could not afford it then it will affect the number of birds they can keep. Lack of feed for the mother hen and the chicks was the main reason for not confining poultry birds, chick confinement has been known to reduce losses from predators; however, it comes at a cost to the farmer in terms of increased feed [27]. Also, poor marketing had a mean value of M 1 .8 7. This is in line with the findings of [28] who stated that poultry farmers do not have favourable market to accelerate their production. Inadequate electricity/power supply (M l .68). Power/electricity is a major factor that can affect the output of poultry business because it can serve as a source of energy to keep the flock especially in cooler region. If this variable is made available, production will increases and hence revenue. This is in consonance with [29] who stated that the activities of poultry flock increases when the adequate light intensity is made available.

4. CONCLUSION AND RECOMMENDA-TIONS

4.1 Conclusion

From the various parameters, it is clear that small scale poultry egg production is profitable, with wider opportunities for expansion. The value of the (R^2) indicated that 89% of variations in the profit generated by poultry egg farmers in the study area were explained by the variables included in the regression model. The results of the analysis revealed that majority (58.3%) of the respondents sourced their fund through their personal savings with majority (86.7%) as males while significant level (83%) of the respondents are in their productive age of below 50 years . The results of the findings further revealed that poultry egg production in the study area was profitable as indicated by the various results calculated and captured in the relevant Tables. The total cost of production of poultry egg was estimated at N1,390,824.4 with a total revenue (TR) generated, Gross Margin (GM) obtained and Return on Naira Invested (ROI) by poultry egg farmers as: N1,575,362.4, N1,028,681.9, and N0.88 respectively. The mean monthly

income of the respondents was also documented as N 151,000. The positive value of the net farm income of N 184,537.8 as obtained from the study indicated that egg production is profitable. However, the respondents were faced with some constraints which can hamper their output and thus revenue. These constraints include high cost and inadequate feeds, high cost of labour, and poor finances.

4.2 Recommendation

Based on the findings it is therefore recommended that;

- ✓ Small-scale layer poultry farmers should be encouraged to form cooperative societies or join the existing one to be able to access loan to their business and government could also make fund available to assist the layers poultry farmers.
- ✓ Stakeholders are encouraged to cultivate food crops such as cereals and legumes to facilitate the production of poultry feeds thereby helping in bringing down the cost of the feeds and making them readily available as at when needed.
- ✓ Capacity training of poultry farmers to enable them to cope with the challenges of labour requirement by adopting modern and possibly local technologies of poultry farming through reduced manual labour requirements.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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