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COST AND RETURN STRUCTURE OF POULTRY EGG PRODUCTION IN EGBA DIVISION OF OGUN STATE

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Abstract
The study investigated the cost and benefit structure of poultry egg production in Egba Division of Ogun State, Nigeria. A total of eighty (80) respondents were randomly selected and interviewed through structured questionnaires. The study looked at the socio-economic characteristics of poultry eggs farmers, the costs and returns of poultry egg enterprises, examined the socio-economic variables that influence output (crate of eggs) the study area. The method of data analysis included descriptive statistics such as frequency tables, mean and percentages. Budgeting technique which yielded gross margin and net farm income were used to determine the benefits of poultry egg production in the study area. The study revealed that in terms of age, it was revealed that majority (51.3%) of the respondents were aged between 41 and 50 years while the study also revealed that majority 85.0% of the poultry egg farmers were males. Majority (100.0%) of the household heads possess some form of formal education, which is predominantly at the secondary and/or tertiary level. Majority (96.3%) of the household heads were married as expected and a typical household in the study area is made up of 4 to 6 members. Majority (35.0%) of the households' heads have farming as their main occupation, and with 5 to 10 years poultry farming experience making up majority of the respondents (60.0%). The result on profitability shows that poultry egg production in the study area is viable and profitable and the analysis done on the socio-economic factors and poultry egg output revealed that capital position, marital status and educational level of the respondents are statistically significant in determining the level of output of the egg production in the study area. It is recommended that Government should improve on the credit guarantee schemes which they have made available to the public as the capital position of the farmer is a significant factor that determine their output.

Key Word: *Egg, Cost, Production, Poultry, Households*

Introduction

Before the discovery of oil, agriculture was the key area contributing to the Nigeria economy. It was the main source of foreign exchange earnings and accounted for over 60% of its Gross Domestic Product (GDP) in the 1960s. The share of agricultural products both processed and unprocessed was high far back then. During the period, Nigerian economy was described as an agricultural economy because the engine of growth of the overall economy for the country was agriculture (Wahab and Lawal, 2011).

Agricultural sector accounted for less than 50% of Nigeria's GDP in 2004 and since then the contribution of agriculture continue to decline which is now around 23% (CBN, 2014), and Nigeria has been facing serious poverty challenges and the insufficiency of basic food needs. The contribution of the livestock sub-sector to both the agricultural and national GDP had been on the decline over the years. The contribution of livestock to agricultural GDP has been reduced by two thirds while its contribution to national GDP has been halved. This has nutritional implications as human population has been growing steadily.

The livestock industry is very vital in the Nigerian economy because it provides a good source of animal protein such as milk, meat and egg that are rich in the essential amino acids required for body functions. Excess released from such products could as well be exported for foreign exchange (Adepoju, 2008). Livestock production, according to Ekunwe and Soniregun (2007) is an important part of farming in Nigeria agriculture. People depend on livestock production for supplies of food, clothing, fertilizer and draught power to sustain the economy. Livestock farming also serves as a subsidiary occupation to supplement the income of small and marginal farm families. Among livestock based vocations, poultry is pivotal because of its enormous potential to bring about rapid economic growth, particularly benefiting the weaker section. Poultry egg production is one of leading key lucrative economic undertakings to the small scale farmers in Maiduguri, Borno State of Nigeria. The poultry egg production alongside providing employment and a livelihood to thousands of people in Nigeria, also provides high quality nutritious food. The egg is a complete protein with excellent quality; one egg will give 6g of protein and egg-white protein has a biological value of 100, the highest biological value of any single protein (FAO, 2005).

Poultry meat and egg accounted for about 30% of the total livestock output in Nigeria, of which eggs accounted for over 80% (Evbuomwan, 2006). It needs low capital investment and yet assures quick returns within weeks and months in case of broilers and layers respectively. Eggs and poultry meat have emerged next to milk as a contributor to the output from livestock sector in recent years (Ekunwe and Soniregun, 2007). The percentage contribution of eggs and poultry meat was 4.47% in 1951-1952, which reached to later over 9% in 1995-1996 (Ekunwe and Soniregun, 2007).

Poultry meat and egg accounted for about 30% of total livestock output in Nigeria, of which eggs accounted for over 80% (Evbuomwan, 2006). Poultry production takes place in all parts of the country (Ekunwe and Soniregun, 2007). 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 (Adewuyi *et al.*, 2009). Population explosion together with poor distribution of food are among the world's greatest problem today. In Nigeria, production of food is threatened by the increasing population and there is no compensation for population increase by the total farm output (Adepoju, 2008). Food and Agriculture Organisation (FAO, 2007) confirmed that food production in Nigeria increase at the rate of 2.5% while food demand increase at a rate more than 3.5% due to the high rate of population growth of 2.83%. 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 (Abubakar, 2000). In same vein, Ojo (2003) 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.

The Food and Agricultural Organization of the United Nations (FAO) stipulates a daily requirement of 65 gm-75 gm total protein, out of which 40% should be derived from animal protein. The average level of animal protein consumption in Nigeria is 15g/head/day which is grossly below the Food and Agricultural Organization (FAO, 1998), recommended level of 35g/head/day for the production of livestock. Protein from livestock is said to be nutritionally superior to that of vegetable origin because it contains a complete range of amino acids that are essential for maintenance of health. Thus protein from livestock is required to supplement those from vegetable origin to correct the serious imbalances in the nutritive value of the Nigerian diet which are dominated by foodstuffs rich in carbohydrate (Evbuomwan, 2006).

In realization of the importance of animal protein, the various governments in Nigeria have been pursuing Programmes at National, State and Community levels to boost the mass production of livestock products, to ensure the attainment of food and agricultural organization (FAO) (1998), recommendation of 35g per capita of animal protein per day. The poultry egg production industry is faced with constraints such as technical know-how on proper use of farm inputs (labour, feed, and cost of equipment) among others that results in low production of poultry and poultry products to attain the populace demand and for socioeconomic sustainability of livelihood. Egg production in Nigeria is also troubled by unstable trends in the economy. These problems make it very difficult to expand the scale production and new egg producers find it hard to start a business. Other problems that hinder egg production in Nigeria agricultural sector includes high cost of feed, outbreaks of diseases, and marketing problems (Nmadu, 2014). 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. Cost and returns are important considerations, as they are used to evaluate the efficiency or performance of the business. Shittu *et al*. (2004) suggested that egg-producing farmers should pay particular attention to major cost components by seeking a way of maximizing effectiveness, quality, method and utilization of materials. Thus, Hassan (2002) concluded that profitability in egg production is not only a function of increase in the scale of production, but also how efficiently the resources are being utilized.

Nigeria has a rapid growing population whose living standards change so rapidly. The country is gradually finding it difficult to sustain per capital consumption of food including meat and eggs. In commercial egg production enterprise, egg is the major source of revenue, the egg price must be

reasonable to be able to make profit but egg price does not seem to favour poultry farmers in Nigeria. Egg price does not vary proportionately with the rise in feed prices and this has been an area of major concern to poultry farmers, researchers and policy makers. Egg production in Nigeria has been troubled by unstable trends in the economy. The problems of the industry make it difficult for expansion and new producers find it hard to start a business. Such problems include high cost of feed, outbreaks of diseases and marketing problem. 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. 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 egg imported in 1999 (United States Department of Agriculture, 2001).

Poultry business like nearly every other productive enterprise passes through periods of relative prosperity and depression. Profit from poultry keeping depends mainly on favourable relationship between the costs involved in producing poultry product and income received from the products. Other factors that affect profits of egg producers include egg production per birds during the laying 3 year, the extent of mortality in the flock management efficiency cost of inputs particularly of feed and egg prices received by the farmers.

Objectives of the Study

The broad objective of this study is to examine Cost and Return Structure of Poultry Egg Production in Egba Division of Ogun State, Nigeria. The specific objectives are to compute the cost and return structure of poultry enterprises and examine socio-economic variables that influence number of eggs produce in the enterprises

Research Methodology

Study Area

The study area is Egba Division of Ogun State in Southwest Nigeria. Southwest Nigeria consists of six states namely: Ogun, Oyo, Osun, Ondo, Ekiti and Lagos States. Yoruba is the predominant ethnic group in the region while the Egbas make up a major sub ethnic group in Ogun State. Other sub ethnic groups include: Ijebus, Egbatedos, Aworis, Eguns and the Remos. Egba Division of Ogun State consists of six local government areas namely; Obafemi-Owode, Odeda, Abeokuta North and Abeokuta South, Ewekoro and Ifo. The area lies within longitude 3°02′-3°48′ E and latitude 6°39′-7°30′ N. Egba Division is particularly noted for farming of arable crops like maize, cassava, plantain, melon and oil palm. Livestock such as poultry, cattle, sheep and goats are also reared by these farmers. (Odugbemi, 1992; NPC, 2006).

Sources and Methods of Data Collection

Both primary and secondary data were used for this study. Primary data were collected through the use of structured questionnaire and interviewed schedule to the poultry producers in the selected area of study while Secondary data were obtained through journals, textbooks, bulletin and statistical reports.

Sample Size and Sample Techniques

A two-stage sampling technique was employed for the collection of data from the poultry egg farmers in Egba division. The first stage involved a purposive selection of four out of the six zones that made up Egba division (Abeokuta North, Obafemi-Owode, Odeda and Ifo). This

was due to the predominant position of the four zones in poultry egg production. The second stage involved a random selection of 20 poultry farms from each of the selected Local Government Area, making a total 80 sampled respondents.

Methods of Data Analysis

The tools for data analysis that was used for this research work include descriptive statistics, farm budgeting model and multiple regression analysis. Descriptive statistics, such as mean, frequency distribution and percentage was used to describe the socio-economic characteristics of the respondents. Farm budgeting model was used to analyze cost and return structure, which has to do with profitability of the enterprise in the area. Multiple regression analysis was used to examine influence of socio0-economic variables on number of eggs produced.

Farm Budgeting Model

Farm budget is a detailed physical and financial plan for operation of farm for a certain period (Olukosi and Erhabor, 2005) which was used to determining the profitability of a farm. This was used to examine the profitability of the farm enterprises in the study area through the estimation of total expenses and returns. The total cost incurred during the production period is obtained by multiplying the various input resources by their unit market prices, while the term revenue refers to the sum of outputs multiplied by their unit price which is also known as the Gross Income (GI). The model is expressed (Tijani, 2007) as follows:

NFI = GI – TVC or NFI = TR – TC

Where, NFI = Net Farm Income (N)

GI = Gross Income (₦)

TVC = Total Variable Cost (₦)

Multiple Regressions

Multiple regression models were used in order to examine socio-economic variables that influence output (crate of eggs). The linear function is select on the basis of the magnitude of the coefficient of determination (R^2), the priority expectation and the statistical significance of the estimated regression coefficients .The multiple regression analysis is estimated in liner functional form as:

$Y_i = a_o + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + e_i$

Where:

Y = Value of Egg Output (₦) produced)

X_1 = Capital position (₦)

X_2 = Age (number of years)

X_3 =Years of experience (number of years)

X_4 = Marital Status (married 1, single 0)

X_5 = Education all level (number of years in school)

X_6 = Household Size (number of persons)

a_o = Constant

$b_1 – b_6$ = Regression coefficients.

e_i = error term

Results and Discussion

Table 1: Socio-Economic Characteristics of the Respondents

Variable	Frequency	Percentage
Age (years)		
31-40	5	6.3
41-50	41	51.3
51-60	28	35.0
>60	6	7.5
Sex		
Male	68	85.0
Female	12	15.0
Educational Level		
Secondary	39	48.8
Tertiary	41	51.3
Marital Status		
Married	77	96.3
Divorced	2	2.5
Widow	1	1.2
Household Size (persons)		
1-3	22	27.5
4-6	49	61.3
7-9	9	11`.2
Occupation		
Farming	28	35.0
Trading	14	17.5
Civil servant	21	26.3
Artisan	17	21.2
Farming Experience		
(years)	48	60.0
5-10	29	36.3
11-15	3	3.8
16-20		
Management System		
Deep litter system	-	-
Battery cage system	80	100.0
Source of Finance		
Personal savings	66	82.5
Friends and relative	7	8.8
Bank	6	7.5
Cooperative	1	1.3
Total	80	100

Data in Table 1 revealed that the age of the respondents is an important factor that affects their level of productivity and overall coping ability within the business. Age is believed to influence the level of physical work. In terms of age shows that majority (51.3%) of the respondents were between 41 and 50 years. As much as 6.3 per cent were aged between 31-40 years. This confirms the commonly reported aging rural farm population in Nigeria (Lewis *et al*., 2007), and suggested that

availability of off-farm livelihood options might be necessary to retain youths within the rural farm sector. This implies that majority of farmers are still within the working age. This will bring about efficiency because the respondents are agile and willing to increase their production level and profit. Poultry production especially with respect to farming practices is generally tedious and energy demanding and as a result is often termed a man's job while the women are left with the processing and sometimes marketing or sales activities. Table 1 shows the gender distribution of the poultry farmers revealed that 85.0% of the poultry farm operators were male. This is a reflection of the prevailing custom of the area where most of the households are male-headed.

Education is seen as a social capital that has the ability to impact positively on the ability of the household to take good and well-informed production and nutrition decisions. Education is vital in eradicating ignorance and increases the farmers' exposure and ability to make use of new farming practices and innovation. Meanwhile, the results showed that all the respondents (100.0 %) possess some formal education, which is predominantly at the secondary or tertiary level. Majority of the respondents (51.3%) had tertiary education. This implies that education and knowledge acquired will enhance effective management of poultry egg production.

Marital status indicates a condition of being Married (by Law, Religion and/or Tradition) or Unmarried (Single, Widow/Widower, Divorced and Separated). Majority (96.3%) of the poultry farmers were married as expected while just 3.7% were unmarried (widow or divorced). This implication may happen due to the fact that married respondents are more responsible and would always be careful in their dealings.

The total household size of the respondents comprises the head of the home, the wives, children as well as all other dependants resident in the house. Household size and its composition are important factors to consider in analyses of rural farm households, most especially as it determines the availability of labour to household farm economic pursuits. The result showed that household size distribution of the sampled farming households and it was revealed that majority 61.3% of the respondents had household size between 4 and 6 members. This implies that the number of household size may tackle the issue of labour when the size is much but it will also increase the consumption expenses of the household and may affect the output from the farm.

The major occupation of the rural dwellers is farming. However, due to the nature and several challenges associated with egg production, many have had to seek occupational opportunities in several other areas. Distribution of respondents by primary occupation revealed that majority (35.0%) of the respondents had farming as their main occupation while 26.3% were civil servants.

Farming experience (years) is expected to play vital roles in agricultural practice, decision making and risk management on the farm. An experienced farmer would be expected to have a better understanding of his production environment than someone else that is relatively new in the practice. Data in Table 1 also shows that farmers having between 5 and 10 years poultry farming experience constitutes majority of the respondents having 60.0%, while 36.3%

represents those having 11-15 years of experience in poultry production.This implies that the poultry farmers in the study area possess enough experience to help improve their profitability as majority of them are not new to the poultry farm business.

The findings revealed that majority (87.5%) of the respondents were breeding cinnamon queen layers for egg production while about 12.5% only breed the black sex link layers. However, it is expected that greater proportion recorded in Cinnamom Queen (CQ) breed of layer could be that they are highly resistance to pests and diseases, have a high laying rate, lay quality and healthy brown eggs as well as are efficient in productivity all year round. Thus Cinnamom Queen breed are profitable and lucrative and easy to manage in the study area.

All sampled poultry farm respondents (100.0%) used the battery cage management system. Rajendran and Mohanty (2003) in his study on comparative economic analysis and constraints in egg production under cage and deep litter systems of rearing and stated that the fixed investment per farm is found to be more on battery cage system of rearing for poultry egg production. The system is easily managed and the eggs are collected clean.

The sources of farm finance distribution of the sampled farming households. It is evident from the result of the study in Table 1 that majority (82.5%) of the respondents sourced their capital through personal saving, while about 8.8% sourced finance through friends and relatives. 7.5% sourced their capital from banks and 1.3% from cooperative society. This implies that are business capital raised mostly by the poultry business owners themselves with aid of little assistance from other external sources of fund.

Cost and Return Structure of Poultry Egg Production

The estimated costs and return of poultry egg production was analyzed using the budgetary analysis technique and the result revealed on the cost component of an average poultry egg farmer indicated that an average poultry egg farmer invested about ₦412,803.29 as total costs of production (Table 2). These included costs of purchase of feed, cost of water, cost of drugs/ veterinary services, cost of stocking, cost of labour, cost of electricity and transportation. The cost of feed constituted the largest share of the cost (about 52.7%). These results support the findings of Yusuf and Malomo (2007) and Oladeebo and Ojo (2012) 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. The Gross Income and Net Income on the average for poultry egg farmers are ₦241,696.50 and ₦229,737.68 respectively. This indicates that the poultry egg production business is viable and profitable in the study area. Also, it is profitable in term of yields and return per annum, compare to the cost of inputs invested into the business.

Table 2: Budgetary Analysis Results of Poultry Egg Production

Items	Mean (Amount ₦)	Percentage (%)
Variable Costs		
Transportation	13645.62	3.3
Stocking	92476.87	22.4
Labour	48567.50	11.76
Water	2253.12	0.5
Feeding	176303.36	52.7
Vet service/drugs	57860	14.01
Electricity	9737.5	2.3
Total Variable Cost	*400,844.47*	
Fixed Costs		
Drinkers	1256.87	0.30
Feeders	1524.65	0.369
Empty crates	3533.33	0.855
Buildings	5643.97	1.366
Total Fixed Cost	*11958.82*	
Total Cost (TVC+TFC)	*412,803.29*	
Revenue		
Egg revenue	546,160.8	
Spent layers	70,675.07	
Bags and droppings	25705.10	
Total Revenue	*642,540.97*	
Gross Income	*241,696.50*	
Net Income	*229737.68*	

Socio-Economic Variables that Influence Number of Eggs Produce

A multiple regression analysis was carried out in four functional forms (linear, semi-log, exponential and double-log forms). Based on the statistics, the linear function was chosen as the lead equation. The linear regression function was chosen as the lead equation based on the value of R^2 (0.501), F-Ratio value (2.364), conformity of the signs with *a priori* expectations of the model and the highest number of significant variables (three variables). The coefficient of multiple determinations (R^2) was found to be 0.501 (50.1%). This is an indication that 50.1% of the variation in the number of eggs produced was explained by the explanatory variables (socio-economic characteristics). Hence, the findings present the marginal effects of the estimated econometric analysis. The F-ratio (2.364), which determines the overall significance of the econometric model, is significant at 5% level of probability, hence concludes that the farmers socio-economic characteristics are significant determinants of number of eggs produce. The estimated parameters and the relevant statistical test results obtained from the analysis are presented in Table 3. It had an adjusted R^2 value of 0.327. This implies that about 32.7% of the variation in output (Y) is accounted for by the variables (X_1-X_6) included in the model. The F-value is positive and statistically significant at the 5% level, indicating that the variables

included in the model adequately explained the output in the survey area.

Out of the 6 variables modeled, capital composition, marital status and educational level are statistically significant in determining the level of output of the egg produced in the study area. The coefficient of capital, marital status and educational level were statistically significant in determining the level of output of the egg production in the study area. This implies that there is a positive relationship between the farmer's capital position, marital status, level of education and total output of egg produced. This implies that increase in farmer's capital position and level of education will lead to an increase in the egg output of the farmers in the study area.

Table 3: Linear Regression Analysis Result of Total Egg Output Determinants

Variables	Linear	Semi-log	Double -log	Exponential
(Constant)	13.795**	-3198.476	4.911	6.432***
	(2.135)	(-0.831)	(0.046)	(10.536)
Capital Position (X_1)	0.001*	161.899	0.068	3.91E-7
	(1.761)	(1.300)	(0.878)	(1.468)
Farmer's Age (X_2)	1.930	487.542	0.250	0.007
	(0.741)	(0.544)	(0.447)	(0.679)
Experience (X_3)	4.038	-400.242	-0.171	-0.022
	(1.184)	(-0.914)	(-0.626)	(-0.864)
Marital Status (X_4)	8.095*	844.805*	0.484	0.461
	(1.787)	(1.852)	(1.702)*	(1.633)
Educational Level (X_5)	3.904*	470.935	0.241	0.015
	(1.670)	(1.421)	(1.166)	(0.961)
Household Size (X_6)	9.683	-30.166	-0.028	0.007
	(0.354)	(-0.190)	(-0.285)	(0.401)
R^2	*0.501*	*0.088*	*0.063*	*0.075*
Adjusted R^2	*0.327*	*0.013*	*-0.014*	*-0.001*
F-value	*2.364*	*1.167*	*0.816*	*0.982*

*** = *Sig. at 1%;* **= Sig. at 5%; * = Sig. at 10%. (Values in parenthesis are T-values)

Conclusion and Recommendations

The study examined the Cost and Returns Structure of Poultry Egg Production in Egba Division of Ogun State. The study made use of primary and secondary data which were collected from 80 respondents selected by a multi-stage sampling technique. The data were collected through the use of a well-structured questionnaire and interview. Descriptive statistics was used to describe the socio-economic characteristics of the respondents while the budgetary technique was used to determine the cost and return structure of the poultry egg farmers and the linear regression model was used to identify the determinants of poultry egg output of the farmers. The result on profitability shows that poultry egg production in the study area viable and profitable and the analysis done on the socio-economic factors that affect poultry egg output revealed that capital position, marital status and educational level of the respondents are statistically significant in determining the level of output of the egg production. The egg production output is being determined by the farmer's capital

position, marital status and level of education. It was also denoted the farmers sourced their fund through personal savings and poultry egg production is dominated by the men who have some form of formal education and having poultry keeping experience of more than 5 years. It was concluded from the study carried out and denoted that poultry egg production in the study area tends to be profitable and viable.

Based on the findings of this study, the following are recommended for high production and improved profitability level in the study area;

i. Government should improve on the credit guarantee schemes which they have made available to the public as the capital position of the farmer is a significant factor that determine their output.
ii. Any measure adopted to reduce the cost of feed will lead to increased profitability. Therefore, there is need for the poultry-egg producers associations and corporate bodies to establish at least a modern feed mill in the State to provide feeds to the farms at cheaper rates. Research should focus on developing feed using local materials available in the country so as to make feed available and affordable to the poultry-egg producers.
iii. Availability and adequate supply of animal drugs to the study area will also enhance the production of poultry eggs.

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