

## ECONOMIC ANALYSIS OF POULTRY EGG PRODUCTION IN GWAGWALADA AND KUJE AREA OF ABUJA, NIGERIA

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### Abstract

*This study examined economics of poultry egg production in Kuje and Gwagwalada Area Councils of FCT Abuja, Nigeria. Data were collected from forty (40) randomly selected poultry farms using structured questionnaire. Data were analyzed using descriptive statistics, farm budgetary model and multiple regression analysis. The results revealed that most of the sampled poultry farms had capacity more than 2000 layers. Estimated costs and returns analysis gave the gross margin and net farm income of ₦1, 547,932.93 and ₦989, 531 respectively. Multiple regression analysis revealed a Coefficient of Multiple Determinations ( $R^2$ ) of 0.583 which implies that 58.3% of the dependent variable was explained by the independent variables included in the model. The cost of drugs and vaccine, cost of day old chicks and cost of feed were significant at  $P < 0.05$ ,  $P < 0.1$  and  $P < 0.01$  respectively. High cost of feed, expensive drugs and disease outbreaks were identified as the major problems of poultry egg production in the study area. Poultry farmers should form cooperatives societies so that they can be identified by government and also enable them access to financial credit facilities to enable them increase their stock capacity and hence expand their production.*

**Keywords:** Poultry Egg Production, Nigeria.

### Introduction

The demand for agricultural products is expected to reach unpredictable levels in the year future, as world population is expected to double in 50 years to about 11 billion with 98% of future population growth likely to be in developing countries (United Nations Population Fund, 1993). In Nigeria, poverty is found to be more pronounced (Federal Office of Statistics, 1998, 1999). There is also high rate of rural urban migration, high prices of food items and devastating food security situation (Okunmadewa, 2001). This makes the citizens vulnerable to dietary associated diseases. At least 41% of the Nigerian population is food insecure with 16% being severely undernourished (Olayemi, 1996). The level of protein intake is of great concern to the developing countries among which Nigeria is one, where the proportion being contributed by livestock is small (Olayemi, 1996). This could be attributed to inadequate education, poor livestock productivity, poor nutrition, breeding and disease control, inadequate purchasing power and population explosion (Tonye *et al*, 1997). The overall value of livestock in Nigeria in 2004 to the 1990 constant basic prices was put at N11.45billion (Tonye *et al*, 1997). This represents 9.5 percent of the agriculture GDP (Gross Domestic Product) and about 3.3 percent of the nations GDP (Central Bank of Nigeria, 2004). Though the value of livestock resources have grown in absolute terms in recent years, the contribution of livestock sub-sector to agricultural and national GDP has been on the decline over the years (CBN, 2004). For instance in 1985, livestock as a percent of agricultural GDP was as high as 33.4 percent and 7.9 percent of national GDP (CBN, 2004). The implication is that, currently the contribution of livestock to agricultural GDP has been reduced by two-third, while its contribution to national GDP has been halved (CBN, 2004). This has nutritional implications as the human population has been

growing steadily. From 88.5 million as at the 1991 census, Nigeria's population is now estimated to have increased to 130 million (National Population Commission, 2006). Poultry is a collective name given to species of bird which have been domesticated by man as a result of their economic value, under these terms; we have ducks, guinea fowls, geese, turkey, chicken and other domestic fowls, which are the most common among them (Kekeocha, 1982). About half a century ago in Nigeria, birds were kept mainly as backyard hobby for the purpose of obtaining eggs and meat. Poultry meat and eggs are said to be one of the most popular sources of protein in Nigeria and elsewhere. As the standard of living in Nigeria rises, the demand for eggs and poultry meat becomes substantially increased. Therefore it becomes necessary to pay more attention to the poultry egg industry through better management. It should be recalled that, the commercialization of poultry industry in the country began in the early 1970's when the government initiated Operation Feed the Nation (OFN) and provided implements such as battery ages, day-old chicks, and loans at subsidized rates to poultry farmers. The government then also provided feed millers for the production of suitable rations as poultry feeds (Ikpi and Akinwumi, 1981). The lapses of the industry started with the withdrawal of government in egg marketing scheme formed after independence 1960 without arrangement for its replacement (Taiwo, 1999). The situation was further worsened after the introduction of structural adjustment programme (SAP) 1986 when poultry began to operate at 30% below capacity with about 30% reduction in the numbers of eggs laid per day owing to unstable foreign exchange that contributed to increase feed price (Atteh, 1998). In recent times egg production in Nigeria is said to have pick up again (Ajakaiye *et al*, 1999), this is in spite of the fact that 500 percent rise in poultry products prices has not being able to offset the increased cost of production (Guobadra, 1996).

The vast attributes of poultry notwithstanding, put a question mark on the economic status of its production in Nigeria. In spite of the advantages, the industry is yet to attain the high cost of production (Omeje *et al*, 1999). For example, poultry egg farmers are faced with the problem of extremely high cost of day old chicks, drugs and other poultry inputs beside the egg glut problem. Poultry production is generally believed to be a profitable enterprise (Oluyemi and Robert, 1998). The demand and supply gap especially with poultry egg product in Nigeria still remains wide owing to low egg production. Most analysis of profitability (Abdularahim and Salem, 1996; Bamgbose *et al*, 1998; and Ajibefun and Daramola, 2003) in egg production have shown great inconsistency which arose from various factors of production and marketing, notwithstanding the cost minimization approach (minimization of feed wastage), using the conservative intensive management system for commercial production. This study intends to provide answers to the following research questions:

- (i) What is the capacity of poultry farms engaged in poultry egg production in the study area?
- (ii) What are the factors that affect poultry egg production in the study area?
- (iii) What are the costs and returns analysis for poultry egg production in the study area?

The broad objective of the study is to analyze economics of poultry egg production in Kuje and Gwagwalada Area Councils of FCT Abuja. The specific objectives are to: -

- (i) identify capacity of poultry farmers that engaged in poultry egg production in the study area.
- (ii) evaluate the factors influencing poultry egg production in the study area.
- (iii) determine the costs and returns analysis for poultry egg production in the study area.

## **Methodology**

The study was conducted in two area councils of the Federal Capital Territory (FCT), Abuja namely Gwagwalada and Kuje. The climate of the Federal Capital Territory is characterized by two main seasons: rainy (April to October) and dry (November to December) the other months are typical of the harmattan and as such the temperature also varies, from 30°C-37°C in the hot (dry) season which may drop to about 7°C in the rainy season. The annual rainfall ranges from 1,100mm to 1,600mm (ADP, 2011). The soil type is generally shallow and sandy in nature. It is predominantly a grassy savannah region, thus has potentials to produce both forest root crops and tubers such as yam and cassava. It also sustains legumes (groundnut and cowpea), grains (maize, sorghum and rice) seeds and nuts (melon seed and benniseed), animal products (goats, cattle, and sheep) fruits and vegetables (ADP, 2011). Gwagwalada is geographically located at Latitudes 8° 56' 59" (8.95 Degrees) North of equator and

Longitudes 7° 5' 59" (7.1 degrees) East of prime meridian on the map of the World. It shares boundaries with Kwali (which is 13.5Km from it), Kuje (which is 16.9Km from Gwagwalada) and the FCT Abuja (which is 19.4Km from it) (ADP, 2011). The high humidity in the area gives a heat trap effect which makes Gwagwalada uncomfortably hot. It has an area of 1,043Km<sup>2</sup> and a population of 1,571,770 people (NPC, 2006). Kuje is geographically located at Latitudes 8° 53' 47" North of the Equator and Longitudes 7° 14' 35" East of the prime meridian on the map of the World. It lies adjacent to Gwagwalada and is about 40Km South West of Abuja, FCT. Kuje has an area of 1,644Km<sup>2</sup> and a population of 97,367 people (NPC, 2006).

The sampling method that was employed is a two-stage sampling technique. The first stage involved a purposeful sampling of two area councils out of the five (5) area councils in the Federal Capital Territory, Abuja. The choice of Gwagwalada and Kuje Area Councils is based on; first the population of poultry farmers (most especially predominance of poultry egg producing farms) of large, medium and small scale production and secondly the proximity of the area councils to the researchers. The second stage involved a simple random selection of forty (40) poultry farms from the area councils making a total sample size of forty (40) poultry (layer) farms. The sampling frame of poultry farmers in the study areas was estimated to be about a sixty (60) poultry farms (ADP, 2011). Structured questionnaire and interview schedule were the instruments used for the data collection.

The following analytical tools were used to achieve the stated objectives

(i) Descriptive Statistics: This involved the use of percentages and frequency distribution to collate and analyze the data collected from the survey of the farms. This was used to achieve the specific objective one (1)

- (ii) Farm Budget Technique
- (iii) Multiple Regression Analysis.

### **Farm Budgeting Technique**

The farm budget analysis involves operations leading to the estimate of total revenue and total cost of production period. The difference between the two parameters is a measure of profit or (loss) or net return for that period. The farm budget techniques give a measure of profitability of farming and resources used on the farm.

- i. Gross Margin (GM) = Total Revenue (TR) – Total Variable Cost (TVC)
- ii. NFI = Gross Margin – Total Fixed Cost (TFC)

Where, NFI = Net Farm Income, TVC = Total Variable Cost  
TFC = Total Fixed Cost and GI = Gross Income, TR = Total Revenue  
This technique was used to satisfy specific objectives three (3).

### **Multiple Regression Techniques**

Output of egg (Y) was assumed to be dependent upon five (5) inputs which are: cost of day old chick (X<sub>1</sub>); cost of feed (X<sub>2</sub>); cost of vaccine (X<sub>3</sub>); cost of labour (X<sub>4</sub>) and cost of housing equipment (X<sub>5</sub>). The model employed is implicitly stated as:-

$$Y = F(X_1, X_2, X_3, X_4, X_5, U_i)$$

- Where, Y = Number of Egg Laid (Unit)  
X<sub>1</sub> = Cost of Day Old Chicks (₦)  
X<sub>2</sub> = Cost of Feeds (₦/Kg)  
X<sub>3</sub> = Cost of Drugs and Vaccines (₦/litres)  
X<sub>4</sub> = Labour Cost (₦/Man hour)  
X<sub>5</sub> = Cost of Housing and Equipments (₦)  
U<sub>i</sub> = Error term

This was used to achieve specific objective two (2). Three (3) equations were fitted into the model above, these include: linear, semi-log and double-log equations. Explicitly, the equations can be represented thus:-

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + U_i \text{ (Linear)}$$

$$\text{Log } Y = a + b_1\text{log}X_1 + b_2\text{log}X_2 + b_3\text{log}X_3 + b_4\text{log}X_4 + b_5\text{log}X_5 + U_i \text{ (Double log)}$$

$$Y = a + b_1 \log X_1 + b_2 \log X_2 + b_3 \log X_3 + b_4 \log X_4 + b_5 \log X_5 + U_i \text{ (Semi-log)}$$

### Results and discussion

Table 1 revealed that thirty-seven (37) percent of sampled poultry layer farms in both Kuje and Gwagwalada Area Councils had less than 1000 poultry birds as its stocking capacity. Furthermore, fifty-two (52) percent of sampled poultry layer farms had equal to or greater than 2000 poultry birds as their stocking capacity. Table 1 mainly shows the stocking capacity of layer of the poultry farms as such focus was mainly on layer birds irrespective of any broiler birds section which might be in place.

**Table 1: Stocking Capacity of Poultry (Layer) Farms**

Capacity	Frequency	Percentage (%)
<1000	15	
1000-1999	4	37.50
2000 and above	21	10.00
<b>Total</b>	<b>40</b>	<b>52.50</b>
		<b>100.00</b>

Source: Field Survey, 2011

### Factors Affecting Poultry (Layer) Egg Production

The factors influencing poultry egg production in Kuje and Gwagwalada Area Councils are expressed in multiple regression analysis (Table 2). The variables examined in the model include :- cost of day old chicks ( $X_1$ ); cost of feed ( $X_2$ ); cost of drugs and vaccines ( $X_3$ ); cost of labour ( $X_4$ ); cost of housing and equipment ( $X_5$ ), Cobb-Douglas functional form (Double-log) was selected as the lead equation. In the lead equation all the estimated regression coefficients are positive except cost of feed ( $X_2$ ). The cost of drugs and vaccines ( $X_3$ ) was significant at 5% probability level. The cost of day old chicks ( $X_1$ ); cost of feed ( $X_2$ ) were significant at 10% probability level. The Coefficient of Multiple Determinations ( $R^2$ ) is 0.583. This implies that 58.3% of variations in the dependent variable is explained by variations in the explanatory variables included in the model. Estimates obtained from the double-logarithms functional form (Cobb-Douglas) are direct elasticities. For instance the estimated coefficient for cost of drugs and vaccines was 0.331. This implies that the cost of drugs and vaccines increased by 1% holding other variables constant, the dependent variable will increase by 0.331. The sum of regression coefficients determines if the enterprise is either decreasing or increasing return to scale.

**Table 2: Multiple Regression Analysis (Cobb-Douglas Functional Form as Lead Equation)**

Variables	Regression Coefficient	Standard Error	t-Value	P-Value
Cost of Day Old Chick ( $X_1$ )	1.406	0.749	1.876*	0.069
Cost of Feed ( $X_2$ )	-12.676	0.683	1.856*	0.072
Cost of Drug and Vaccines ( $X_3$ )	0.331	0.290	2.172**	0.037
Cost of Labour ( $X_4$ )	0.050	0.490	0.102	0.919
Cost of Housing and Equipment ( $X_5$ )	0.036	0.290	0.134	0.894
Constant	0.981	3.721	0.264	0.794
Sample Size	40			
$R^2$ Value	0.583			
Adjusted $R^2$ Value	0.462			
F-Value	1.518			

Source: Field Survey, 2011

\* Significant at 10% level of probability

\*\* Significant at 5% level of probability

\*\*\* Significant at 1% level of probability.

### Costs and Returns Analysis of Poultry Egg Production

The farm budget model was employed to estimate costs, returns and net farm income of the farmer. Table 3 presents the result of the farm budgeting analysis. Furthermore, gross margin analysis revealed an estimated value of ₦1, 547,932.93 per annum. The results were obtained after the total variable cost (TVC) was deducted from total revenue (TR). This implies that poultry egg production in the area is profitable from the analysis in Table 3. Revenue refers to money or benefits that accrued to the farmer from sales of farm produce. This was computed by, multiplying the egg output by the prevailing unit market price, the sale of the culled and spent hens, sale of feed bags and sale of the litter wastes. These amounted to revenue of ₦6, 482,829.11. The net farm income (NFI) which was obtained by subtracting total cost from gross farm income was found to be ₦989, 531.33.

**Table 3: Net Farm Income Analysis of Sampled Poultry Farms**

Items of Cost	Mean Value (₦)/ Annum	Percentage (%)
<b>Variable Cost</b>		
Cost of Chicks	621757.14	11.32
Feeds	4185139.14	76.19
Wages/Labour	38166.67	0.69
Drugs/Vaccines	8094.33	0.16
Light	779.17	0.01
Heating Energy	15801.25	0.29
Electricity	31829.17	0.58
Litter Materials	2464.20	0.04
Transport Cost	30865.02	0.56
<b>Total Variable Cost</b>	<b>4934896.18</b>	<b>89.84</b>
<b>Revenue Items</b>	<b>Mean Valve (₦) Annum</b>	<b>Percentage (%)</b>
Sales of Eggs	5,534,363.51	85.37
Sales of Culled Items	36,888.24	0.57
Sales of Spent Items	889,562.50	13.72
Sales of Feed Bags	6,702.00	0.12
Litter Waste Sales	15,312.86	0.24
<b>Total Revenue</b>	<b>6,482,829.11</b>	
<b>Gross Margin</b>	<b>1,547,932.93</b>	
<b>Total Fixed Cost</b>	<b>558,401.60</b>	
<b>Net Farm Income</b>	<b>989,531.33</b>	

Source: Field Survey, 2011

### Conclusion and recommendations

From the findings it can be concluded that poultry egg production in the study area is profitable. It is recommended that poultry farmers in the study area should form and join cooperatives societies so that they can be identified especially by the government in policy related issues and also enable the poultry farmer's access financial credit facilities that will assist them increase their capacity and hence expand their production.

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