Profitability evaluation of poultry production in Lagos state, Nigeria

Aminu FO✉, Hermanns U

Department of Agricultural Technology, School of Technology, Yaba College of Technology, Epe Campus, P. M. B. 2011, Yaba, Lagos State, Nigeria

✉**Corresponding author:**
Department of Agricultural Technology, School of Technology, Yaba College of Technology, Epe Campus, P. M. B. 2011, Yaba, Lagos State, Nigeria; E-mail: folaafe02@gmail.com

ABSTRACT

The study assessed the costs and returns to poultry production in Lagos State, Nigeria. Primary data was collected with the aid of questionnaire from 120 poultry farmers selected through multistage sampling techniques and analysed using descriptive statistics, farm budgetary and multiple regression analysis. Results revealed that poultry farming in the study area was dominated by male (69.2%) with a mean age of 43 years. Majority (72.5%) of the farmers had tertiary education, married (59.2%) with mean household size of 5 persons. About 51% of the poultry farmers engaged in broiler production, 37.5% engaged in layer production while 11.7% were cockerel producers. The mean flock size was 335 birds. Result from the budgetary analysis revealed that, an average total cost of ₦730,575.23, ₦742,455.31 and ₦391,802.32 were invested in the production of broiler, layers and cockerel respectively, per production cycle in the study area. The mean gross revenue that accrued from the sales of matured birds were ₦1,131,101.25 forbroiler,₦1,106,120.55 for layers and ₦602,643.88 for cockerels, thereby returning a gross margin and net farm income of ₦604,933.61 and ₦400,526.02 for broilers; ₦602,210.55 and ₦363,665.24 for layers; ₦379,243.58 and ₦210,841.54 for cockerel. The

results of the profitability ratios revealed that, the returns per naira invested were 0.55, 0.49 and 0.54 for broiler, layers and cockerels respectively, implying that poultry production is a profitable enterprise in the study area. Age of farmer, sex, educational status, experience, household size, flock size, operating expenses, cost of feed and membership of cooperative society were the factors influencing profitability of poultry production in the study area. Therefore, policies aimed at reducing the cost of production such as cost of feed, medicines, day old chicks among others should be formulated and implemented by the government and other stakeholders in the study area.

1. INTRODUCTION

Livestock production constitutes an essential part of the agricultural economy of Nigeria. It provides meat, clothing, fuel, fertilizer and draught power to sustain the economy (Yusuf *et al.,* 2016; Olorunwa, 2018). Livestock farming also serves as additional income earning activities to small and marginal farm families (Ekunwe and Soniregun, 2007). Livestock, such as cattle, fish, sheep, goat, pigs and poultry is a major source of animal protein in Nigeria. Poultry production is the management of domestic birds for food, income and other purposes. It has incredible potentials for expanding protein supply in Nigeria and plays a significant role among the livestock based vocations because of its enormous potentials to bring about rapid economic growth and quickest returns to investment outlay (Akinyosoye, 1992; Ekunwe and Soniregun, 2007). Poultry is a major source of eggs and meat which have a high nutritional value particularly in the supply of protein (Esiobu *et al.,* 2013). Apart from supplying protein, poultry is also a good source of lipids and vitamins of high zoological value to man (Bamiro *et al.,* 2006).

Available information shows that Nigeria hosts more than 45% of the poultry in the West African sub region and its poultry population is estimated at 140-160 million comprising of 72.4 million chicken, 11.8 million ducks, 4.7million guinea fowl, 15.2 million pigeons and 0.2 million turkeys (WHO 2006). Poultry is the fourth among sources of animal proteins for the populace, representing about 27% of the national meat production in the country (FAO, 2010). The chicken production is estimated at 150.682 million of which 25% are commercially farmed, 15% semi-commercially, and 60% in backyards (Ebukiba and Anthony, 2019). In spite of this, the gap between animal protein supply and consumption is very wide, demand is greater than supply. To this end, Federal Government of Nigeria placed a ban on importation of poultry products to encourage local production (ATA, 2012). Effort is also currently being made through the presidential initiative to improve local poultry production in Nigeria by encouraging commercial large scale poultry farmers. Poultry production has therefore, becomes a full time job for many and is considered to be a commercially viable enterprise (Yusuf *et al.,* 2016).

The demand for poultry products is progressively increasing in the country as meat consumers' preference for white meat rises. But this is presently, being undermined by high cost of production necessitated by escalating cost of major and essential ingredients required for feeds production (Mamman *et al.,* 2016). For Nigerian to be able to solve this issue of demand-supply gap; poultry production must be technically efficient and profitable. According to Emokaro and Erhabor (2014); Mamman *et al.,* (2016); Ebukiba and Anthony (2019), high cost and poor quality of feeds, inadequate finance, poor access to credit facilities, high rate of disease infestations, high cost of drugs and vaccines are some of the constraints to growth and profitability of poultry enterprises in the country. Therefore, this study seeks to evaluate the profitability of poultry production in Lagos State, Nigeria. Specifically, it sought to describe the socio-economic characteristics of poultry farmers, estimate the cost and returns to poultry production and determine the socio-economic and production factors influencing profitability of poultry production in the study area.

2. METHODOLOGY

Study area

The study was carried out in Lagos State, South-Western geopolitical zone of Nigeria. The state was created on 27th May, 1967. The capital is Ikeja. The state is geographically located between latitudes $6^035'N$ and 6.58^0N; longitude $3^0 45'E$ and $3.75^0 E$. It has an estimated population of 17,555,940 (LASG, 2012), a land mass of 3,577 square kilometers with a marine shoreline of about 180 km extending inland to a maximum distance of about 32km. The state has a humid tropical climate characterized by distinct dry and wet seasons with moderate mean annual rainfall which varies between 1381.7 mm and 2733.4 mm. Lagos State, being Nigeria's most industrialized state accounts for over 60% of the federation's total industrial investment. Primary agricultural production typifies the rural economy of Lagos State with industrial activities.

Sampling techniques

A two-stage sampling procedure was used for this study. The first stage involved the purposive selection of Epe, Ikorodu and Ojo Local Government Areas due to the predominance of poultry production in the LGAs. The last stage involved the selection of 25, 45 and 50 poultry farmers from Epe, Ikorodu and Ojo Local Government Areas respectively, using snowballing sampling technique. The total respondents used for the study was 120 poultry farmers.

Data collection

Primary data collected through the administration of structured questionnaires was used for the study. Data were collected on socio-economic characteristics of the farmers as well as costs and returns to poultry production in the study area.

Analytical technique

The following techniques were used to analyse the data collected:

Descriptive statistics: Descriptive statistics such as frequencies, percentages, means and standard deviation was adopted to describe information on the socio-economic characteristics of the poultry farmers in the study area.

Farm budgetary techniques: The cost and returns associated with poultry production was carried out to determine the profitability of poultry production in the study area. According to Olukosi and Sonaiya, (2003), farm budgeting is a detailed physical and financial plan for operation of a farm for a certain period. The gross margin analysis involves evaluating the efficiency of an individual enterprise (or farm plan) so that comparison can be made between enterprises or different farm plans (Olorunwa, 2018).This approach was used to estimate the net farm income of poultry production in the study area.

The model for estimating farm budgeting is outlined thus:
Gross margin (GM) is the difference between the Gross Return (GR) and the total variable cost (TVC), that is:

GM =GR– TVC   (1)
GR = price (P) x quantity sold (Q)   (2)
NFI = GM – TFC   (3)

Where:
GM = Gross Margin, GR = Gross Revenue, TVC = Total Variable Cost, TFC = Total Fixed Cost, NFI = Net Farm Income.

Other profitability ratio that was determined from the study includes:

1. Return per naira spent in poultry production
 Net farm Income ÷ Total cost   (4)
2. Total cost = TVC + TFC   (5)
3. Gross Ratio = Total Expenses ÷ Gross Revenue   (6)
4. Fixed Ratio = Total Fixed Cost ÷ Gross Revenue   (7)
5. Operating Ratio = Total Variable Cost ÷ Gross Revenue   (8)

Multiple Regression Analysis: This was employed to determine the factors influencing the profitability of poultry production in the study area.
The model is specified as:
$$Y = â_0 + â_1X_1 + â_2X_2 + â_3X_3 + â_4X_4 + â_5X_5 + â_6X_6 + â_7X_7 + â_8X_8 + â_9X_9 + U_i \qquad (9)$$

Where,
Y = Total profit (including broilers, layers, and cockerel in naira). X_1 = Age of farmer (years), X_2 = Sex of farmer (Dummy), X_3 = Educational status (years), X_4 = Experience of farmer (years), X_5= Household size (years), X_6 = Flock size (number), X_7 = Operating expenses (cost of labour, drugs, and transportation in naira), X_8 = Cost of feed (in naira),
X_9 = Membership of cooperative society (dummy), Ui = Error term.

3. RESULTS AND DISCUSSION

Socio-economic characteristics of the poultry farmers

Results on the socio-economic characteristics of the poultry farmers are presented in Table 1. The results reveal that majority (51.7%) of the respondents were within 41-50 years' age group, 32.5% were between 31 and 40 years while 15.8% were more than 50 years. The mean age of 43 years implies that the poultry farmers were within their economically productive age group. This result agrees with the findings of Olorunwa (2018) that broiler farmers in Lagos State were physically strong and mentally alert to face challenges which poultry farming requires. Male poultry farmers accounts for69.2% of the respondents. This implies that poultry farming is male dominated in the study area. This result corroborates the findings of Yusuf *et al.,* (2016) that male dominance is consistent with gender role pattern of the society where male plays role of household head and also provides for the family. They therefore engage more in poultry production to supply household foods and other basic needs. Distribution by education reveals that all the sampled farmers had one form of education or the other, with majority (72.5%) having tertiary education. This implies that, the poultry farmers were literates. This is in line with Ebukiba and Anthony (2019) that high literacy enhances adoption of innovation and also a necessary tool for successful implementation of innovation for profitability. Majority (59.2%) of the respondents were married with an average of 5 persons in their household. This indicates that married respondents were more involved in poultry farming because they are responsible for the well- beings of their house, some members of the family are also usually available as family labour. Majority (54.2%holds) of the respondents had poultry farming experience that spans between 6 and 10 years. The mean year of experience of about 11 years implies that, the poultry farmers were well groomed and experienced in their business. This is in tandem with the findings of Bamiro *et al.,* (2013) that higher experience is expected to translate to high level of productivity as the farmers bring their experience to bear on the job. In terms of type of poultry business engaged in by the farmers, majority (50.8%) were broiler producers. This reason adduced to this was that broiler birds matured earlier and give high turnover than other types of poultry business. About 38% were producers of layers, this according to the farmers earns double income, that is eggs and the layer birds. This corroborates the findings of Oladunni and Fatuase (2014) that, the layer farmers start the rearing earlier so that they can get enough eggs before the end of the year when they will sell them for meat purpose during the festive periods. Only 11.7% of the respondents engaged in cockerel production, this was due to low demand for cockerel in the study area. About 53% of the poultry farmers had flock size of 500 birds or less in the study area. Based on the classification of 50-500 birds as small poultry farms, 501-1000 birds as medium-scale farms and above 1000 birds as large-scale poultry farms by Ajibefun and Daramola (2000), the mean flock size of 335 birds is an indication that the poultry farming is a small scale enterprise in the study area. This could be attributed to problems of inadequate capital to scale up their business as majority (67.5%) of the farmers did not have access to bank loan.

Table 1: Socio-economic Characteristics of Poultry Farmers *N= 120*

Description	Frequency	Percentage	Mean	Std. dev.
Age				
31-40	39	32.5	43.10	9.299
41-50	62	51.7		
Above 50	19	15.8		
Sex				
Male	83	69.2		
Female	37	30.8		
Educational Status				
Primary	6	5.0		
Secondary	19	15.8		
Adult/vocational	8	6.7		
Tertiary	87	72.5		
Marital Status				
Single	36	30.0		
Married	71	59.2		
Widowed	14	10.8		
Household Size				
≤ 5	86	71.7	5	2.606
6-10	34	28.3		
Experience				

≤5	39	32.5	11.33	4.587
6-10	65	54.2		
>10	16	13.3		
Poultry Type				
Broiler	61	50.8		
Layer	45	37.5		
Cockerel	14	11.7		
Flock Size				
≤500	63	52.5	335	127.875
501-1,000	42	35.0		
>1,000	15	12.5		
Credit Access				
No	81	67.5		
Yes	39	32.5		
Cooperative Society				
No	48	40.0		
Yes	72	60.0		
Extension Services				
No	91	75.8		
Yes	29	24.2		

Source: Field Survey Data, 2019

Cost and returns to poultry production in the study area

The result of the costs and returns to poultry production is presented in Table 2. The result shows that, an average total cost of ₦730,575.23, ₦742,455.31 and ₦391,802.32 were invested in the production of broiler, layers and cockerel respectively by the farmers per production cycle in the study area. The variable costs accounted for72% (broiler), 67.6% (layers) and 57% (cockerel) of the total cost of production in the study area. This implies that variable costs constituted larger share of the cost of poultry production in the study area. This result is in consonance with the reports of Emokaro and Erhabor (2014) that variable inputs account for most of the cost incurred in farming. The cost composition indicates that feed consumed the lion share of the total cost of production of all the poultry enterprise representing 35.4%, 38.3% and 32.5% for broiler, layers and cockerel production respectively. This clearly shows that large amount of money is spent on the purchase of feed in the study area. This is in congruence with the findings of Yusuf *et al.,* (2016) and Olurunwa (2018) that feed cost is the major important single cost item associated with poultry production due to the increasing costs of poultry feed ingredients. The cost of purchasing chicks was next after feed cost accounting for 27.1%, 18.3% and 16.9% of the total cost of production for broiler, layers and cockerel respectively. This conforms to the findings of Adejoro (2000) and Yusuf *et al.,* (2016) that, the cost of flock is the second most important cost in poultry production and that efforts should be made to reduce the mortality rate and ensure high productivity of the birds by sourcing for chicks from disease free hatcheries or from reliable distributors. The mean gross revenue that accrued from the sales of matured birds in the study area were ₦1,131,101.25 forbroiler,₦1,106,120.55 for layers and ₦602,643.88 for cockerels thereby returning a gross margin and net farm income of ₦604,933.61 and ₦400,526.02 for broilers; ₦602,210.55 and ₦363,665.24 for layers; ₦379,243.58 and ₦210,841.54 for cockerel. The results of the profitability ratios reveal that, the returns per naira invested were 0.55, 0.49 and 0.54 for broiler, layers and cockerels respectively. This means that, for every ₦1 invested, 55K would be realised from broiler production, 45K from layer production and 54K from cockerel production by the farmers in the study area. This result shows that poultry production is a profitable business in the study area. Furthermore, the gross ratio that measures the overall success of the poultry enterprise shows that the total cost of production was 65% for both broiler and cockerel while it was 67% for layers. The value of the fixed ratio indicates that 18%, 22% and 29% of the gross revenue were spent to procure the fixed input while 47%, 45% and 37% of the gross revenue accounted for the operating costs of broiler, layer and cockerel production in the study area. It should be noted however that, this result is not a comparison of these poultry enterprises as the sample size and flock size differ.

Factors Influencing profitability of Poultry Production in the Study Area

Results of the multiple regression analysis used to determine the factors influencing profitability of poultry production in the study area is presented in Table 3. Three functional forms of the model, linear, double log and semi log were analysed. Linear model was

chosen as the lead equation for broiler production while semi-log model was the lead equation for both layers and cockerel production. This was because the models had the highest values of coefficient of determination (R^2), highest F value and highest Number of significant variables conforming to the *a priori* expectations. The R^2 value of 0.813 implies that about 81% of the variation in the profit made from broiler production was accounted for, by the socio-economic variables included in the model. In the same vein, R^2 value of 0.772 and 0.794 for layers and cockerel indicate that about 72% and 79% of the variation in the profit made from layers and cockerel production were explained by the socio-economic variables included in the model. The F value of 12.317, 22.234 and 21.183 for broiler, layers and cockerel respectively were significant at 1% alpha level suggesting that the model fits the data well.

Table 2: Average Cost and Returns to Poultry Production in the Study Area

Cost item	Broiler	Layer	Cockerel
Variable cost			
Cost of chicks	181,971 (24.9%)	122,855.1 (16.5%)	66,318.84 (16.9%)
Cost of feed	258,915.4 (35.4%)	284,479 (38.3%)	127,289.57 (32.5%)
Cost of labour	57,217.39 (7.8%)	77,173.91 (10.4%)	12,869.57 (3.2%)
Cost of medication	15,375.36 (2.1%)	8,951.97(1.2%)	8,463.77 (2.1%)
Cost of transportation	1,688.19 (0.2%)	978.26 (0.1%)	992.75(0.3%)
Cost of fuel	8,565.81(1.2%)	5,150.01 (0.7%)	6,058.19 (1.6%)
Cost of electricity	1,253.52 (0.2%)	1,688.41 (0.2%)	872.83 (0.2%)
Miscellaneous	1,181.59 (0.2%)	633.34 (0.1%)	534.78 (0.1%)
Total Variable Cost	526,167.64 (72%)	501,910 (67.6%)	223,400.3 (57%)
Fixed cost (depreciated)			
Poultry house/cage	75,000	67,000	62,000
Feeders & drinkers	8,592.14	8,545.65	5,345.22
Costsof other equipment	120,815.45	164,999.66	101,056.82
Total Fixed Cost	204,407.59 (28%)	240,545.31 (32.4%)	168,402.04 (43%)
Total cost (TVC + TFC)	730,575.23	742,455.31	391,802.34
Returns			
Gross revenue (PQ)	1,131,101.25	1,106,120.55	602,643.88
Gross margin (GR - TVC)	604,933.61	604,210.55	379,243.58
NFI (GM - TFC)	400,526.02	363,665.24	210,841.54
Returns/₦spent (NFI/TC)	0.55	0.49	0.54
Gross ratio (TC/GR)	0.65	0.67	0.65
Fixed ratio (TFC/GR)	0.18	0.22	0.29
Operating ratio (TVC/GR)	0.47	0.45	0.37

Source: Field Survey Data, 2019   Figures in parentheses are % of total cost

The result reveals that age of the respondents had a negative significant influence on broiler farmers and a positive significant influence on layers' farmers at 5% level of probability respectively. This implies that profit made from broiler production decreases with age of the farmers suggesting that younger farmers made more profit from broiler production than the older farmers and vice versa. The direct relationship of age with layers' production implies that profit realized from layers' production increases with age. This is in line with the findings of Yusuf *et al.,* (2016) that age have direct relationship with farm output in poultry production. Profit made from cockerel production decreases with sex of the farmers as it was negative and significant at 5% alpha level. This implies that female cockerel farmers made more profit than their male counterpart in the study area. Educational status (p<0.01) of the cockerel farmers also had direct relationship with profit accrued from the enterprise. This implies that the level of education attained by the cockerel farmers enhance their productivity and profitability in the study area. This result agrees with the findings of Oladunni and Fatuase (2014) that advancement in the level of education would definitely increase and boost revenue from poultry production. Years of experience was found to have a positive significant influence on profit accrued from broiler production at 5% level of probability, which implies that farmers with more years of experience tend to make more profit in broiler production than new entrants. This affirms the findings of Olorunwa (2018) that continuous practice of an occupation for a long period presumably makes a person more experienced andmore productive in practice. The coefficient of household size had significant inverse relationship

with layers and cockerel production at 5% and 1% alpha levels respectively. This implies that profit accrued from these enterprises decrease with household size. This corroborates the findings of Yusuf *et al.,* (2016) that large households consume more thereby reducing farm output. Flock size is positively signed and highly significant at 1% level of probability for all the poultry enterprises in the study area. This implies that as the flock size increases, the profit accrued from these enterprises increases in the study area. This result is in agreement with Nurudeen (2012) that farm revenue increases with number of flocks.

Table 3: Lead Equations of Factors Influencing profitability of Poultry Production in the Study Area

Parameters	Broiler	Layers	Cockerel
Constant	0.884***	-0.496*	0.636**
	(2.631)	(-1.896)	(2.361)
Age (Years)	-0.024**	0.030**	-0.009
	(-2.186)	(2.490)	(-0.945)
Sex (Dummy)	0.190	0.056	-0.222**
	(1.258)	(0.395)	(-2.054)
Educations (Years)	0.053	0.038	0.064***
	(0.992)	(0.752)	(2.666)
Experience (Years)	0.027**	-0.028	0.014
	(2.398)	(-1.522)	(0.097)
Household size (Number)	0.006	-0.123**	-0.137***
	(0.099)	(-2.030)	(-2.987)
Flock size (Number)	0.022**	0.008***	0.089**
	(2.042)	(3.108)	(2.351)
Operating expenses (₦)	-1.065***	0.135	-0.117**
	(-3.021)	(1.614)	(-2.241)
Cost of feed(₦)	-11.051**	-1.151***	-0.128
	(-2.155)	(-2.517)	(-1.575)
Cooperative society	-0.892	0.137**	-0.080
	(-1.354)	(2.168)	(-0.766)
R^2	0.813	0.772	0.794
Adjusted R^2	0.718	0.682	0.656
F-Value	12.317***	22.234***	21.183***

Source: Computed from field survey, 2019 ***, ** and * indicate significance at 1%, 5% and 10% levels respectively. Figures in parentheses are t-values

However, operating expenses (cost of labour, medication, transportation, fuel, electricity and miscellaneous)and cost of feed were negative and significant at 1% and 5% alpha levels respectively implying that profit from the poultry enterprises decrease with increase in these costs and vice versa in the study area. This concurs with the findings of Oladunni and Fatuase (2014) that any increase in the value of these costs will reduce output and that they must be minimized in order to maximize output in the course of poultry production. Finally, membership of cooperative society (p<0.05) had positive significant relationship with layer production in the study area. This implies that, farmers who are members of cooperative society made more profit from layer production than non-members in the study area.

4. CONCLUSION AND RECOMMENDATIONS
It can be deduced from the findings of this study that; first, poultry production in Lagos State is dominated by highly educated, young and active men. Secondly, feed consumed the lion share of the total cost of production of all the poultry enterprise. Thirdly, going by the estimates of the return to investment value of 0.55 for broiler, 0.49 for layers and 0.54 for cockerels in a production cycle, poultry production can be said to be a profitable venture capable of providing a decent livelihood for the farmers in the study area. Lastly, profits accrued to the farmers were grossly reduced by household size, feed cost and other operating expenses in the study area. Therefore, policies aimed at reducing the cost of poultry production through subsidy and other palliative measures should be formulated and implemented by the government. Poultry farmers should be encouraged to join viable cooperative societies in order to enjoy economies of scale through input procurement and low interest loan that could help them expand their

scale for higher profit, as members of cooperative societies were found to make more profit than non-members in the study area. Also, extension agents should be well equipped to train and provide technical assistance to the farmers especially in the area of feed formulation for their birds and marketing in the study area

Funding:

This study has not received any external funding.

Conflict of Interest:

The authors declare that there are no conflicts of interests.

Peer-review:

External peer-review was done through double-blind method.

Data and materials availability:

All data associated with this study are present in the paper.

REFERENCE

1. Adejoro, S. O. (2000): A Handbook for Poultry Practitioners and Consultants (Layers). SOAVET Nig. Ltd and Centre for Livestock Management and Training Courses, Ibadan, pp 3-10.

2. Ajibefun, I. A. and Daramola, A.G. (2000). Measurement and sources of technical inefficiency in poultry egg production in Ondo State, Nigeria. *Journal of Rural Economics, 10:* 85-93.

3. Agricultural Transformation Agenda (2012). Federal Government of Nigeria. http://www.emrc.be/documents/document/20121205120841-agri2012-special_session-tony_bello-min_agric_nigeria.pdf

4. Bamiro, O. M., Phillip, D. O. A. and Momoh, S. (2006). Vertical Integration and Technical Efficiency in Poultry (Egg) Industry in Ogun and Oyo State, Nigeria" International *Journal of Poultry Science* 5 (12): 1154-1171.

5. Bamiro, O.M., Otunaiya, A.O. and Adejumo, I. (2013). Profit Efficiency in Poultry Production in Peri-Urban Lagos, Nigeria. *International Journal of Applied Agricultural and Apicultural Research,* 9 (1&2): 120-130.

6. Ebukiba, S.E and Anthony, L. (2016). Economic Analysis of Broiler Production in Karu Local Government Area, Nasarawa State, Nigeria. *IOSR Journal of Agriculture and Veterinary Science,* 3(1): 49-56

7. Ekunwe, P. A. and Soniregun, O. O. (2007). Profitability and Constraints of Median Scale Battery Cage System of Poultry Egg Production in Edo State, Nigeria. *Int. J. Poult. Sci. 6(2):* 118-121.

8. Emokaro, C.O. and Erhabor, P.P. (2014). Comparative Analysis of Profitability of Layers Production in Esan North East and Ovia North East Local Government Areas of Edo State, Nigeria. *J. Appl. Sci. Environ. Manage.,*18 (1): 121-126

9. FAO (2010). Chicken genetic resources used in smallholder production systems and opportunities for their development. P. Sørensen. FAO Smallholder Poultry

Production Paper, No. 5. FAO, Rome. Available at: www.fao.org/docrep/013/al675e/al675e00.pdf

10. LASG (2012). Population-Lagos State Government. Retrieved 21 February, 2016.

11. Mamman, B.D., Anzaku, T.A.K. and Umar, H.S. (2016). Profitability Evaluation of Broiler Production among Small-Scale Commercial Poultry Farmers in Nassarawa - Eggon Local Government Area of Nasarawa, State, Nigeria. *International Journal of Agriculture and Earth Science,* 2(1): 52-57

12. Nurudeen, A.J. (2012). Economics and social characteristics of registered poultry egg producers in Ilorin, Kwara State. *Russian J. Agric. Socio-Econ. Sci.* 11:11.

13. Oladunni, M.E. and Fatuase, A.I. (2014). Economic Analysis of Backyard Poultry Farming in Akoko North West Local Government Area of Ondo State, Nigeria. *Global Journal of Biology, agriculture & Health Science,* 3(1): 141-147

14. Olorunwa, O.J. (2018). Economic Analysis of Broiler Production in Lagos State Poultry Estate, Nigeria. *Journal of Investment and Management,*7(1): 35-44

15. Olukosi, O.A. and Sonaiya, E.B. (2003). Determination of the quantity of scavenge-able feed for Producers in Oyo State of Nigeria. *Int. J. Poult. Sci.* 7(12):1227-1231.

16. WHO (2006) Global Health Observatory [Internet]. Geneva: World Health Organization; 2006. Available from: http://www.who.int/gho/en/ [cited 2013Nov 3].

17. Yusuf, T.M., Tiamiyu, S.A. and Aliu, R.O. (2016). Financial analysis of poultry production in Kwara State, Nigeria. *African Journal of Agricultural Research,* 11(8): 718-723

18. Yusuf, M. Bello, M. B., Ahungwa, G. T., Gama, E. N. and Oke, F. O. (2016). Profitability of Medium Scale Layer Production in Kumbotso and Nassarawa Council Areas, Kano State, Nigeria. *PAT,*12 (2): 23-32