

Comparative Analysis on Profitability of Broiler and Turkey Production in Anambra State, Nigeria

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Abstract: *The study compared the profits from broiler and turkey productions in Anambra State, Nigeria. This was as a result of the deficit discovered in the supply of animal protein in the State. The data used in the study were obtained from a cross-sectional survey of broiler and turkey farmers in the State. Purposive and simple random sampling procedures were used to select 321 farmers for the study. The data collected were analysed using descriptive statistics, budgetary method and Z-statistic. The result showed the mean ages of 43.1 and 43.9 years for broiler and turkey farmers respectively. Majority of the farmers were educated up to the secondary level, and had average poultry farming experience of 12.1 years for the broiler and 11.5 years for the turkey farmers. The budgetary estimation showed a net return of ₦760.88 in broiler farming, while it was ₦1,498.27 in turkey farming (per bird). The profitability ratios showed the Return on Investment (RoI) of 1.53, Net return on Investment (NRoI) of 0.53, and Gross ratio of 0.66 in broiler production as against RoI (1.57), NRoI (0.57) and Gross ratio (0.64) in turkey production. Although both productions were found profitable, turkey farmers recorded more profit. Therefore, farmers and investors should invest more in turkey production as a strategy to bridging the animal protein supply deficit.*

Keywords: Comparative analysis, profit, return on investment, broiler and turkey production

1. Introduction

The livestock industry has been an important agricultural subsector of the Nigerian economy considering its contribution to the Gross Domestic Product (GDP) and the importance of animal protein in the diet of the people. The significance of animal protein which is a major constituent of balanced diet in the meal of the people cannot be overemphasised. Olorunwa (2018) asserted that animal protein supplies man with high quality nourishment which aid growth, development and tissue replacement. It decides the level of nourishment of the populace and the health of the labour forces, which, thus, decides the advancement of a country and its economy. On the other hand, Food and Agriculture Organization (FAO) (2015) reported that the repercussions of animal protein deficiency to the lives of the people particularly children under the ages of five years old and pregnant women in rural areas of sub-Saharan Africa is of major concern to policy makers, researchers and government. And that the low intake of protein is capable of predisposing mostly these vulnerable to weight loss, weakness, fatigue, poor appetite and anaemia.

The major sources of animal protein in Nigeria include Cattle, sheep, goat, swine, fish and poultry (Olorunwa, 2018). However, Ume, Ezeano and Obiekwe, (2018) opined that in the livestock industry, poultry birds are most capable in providing dietary protein intake in most developing countries due to their intrinsic features. These, according to Ezeano, Ume, Okeke, and Gbughemobi (2017) include that they have fast growth rate, high feed conversion efficiency, low production cost per unit relative to other types of livestock, ability to be marketed at different ages, has tender meat, are commonly used in ceremonies, and have short production cycle. More so, FAO (2015) stated that the meat is palatable and generally acceptable across nearly all cultural and religion boundaries.

Poultry meat is rich in proteins and is a good source of phosphorus and other minerals, and of B-complex vitamins. Poultry meat contains less fat than most cuts of beef and pork. Poultry liver is especially rich in vitamin A. It has a higher proportion of unsaturated fatty acids than saturated fatty acids. This fatty acid ratio suggests that poultry may be a healthier alternative to red meat (FAO, 2010). These intrinsic features of poultry birds endeared them as veritable sources of animal protein in the people's diet.

In Anambra State, Nigeria, poultry production is spread round every part as a result of its economic viability and potentials in wealth creation and provision of employment especially for the rural dwellers. Therefore, the potentials of poultry production, if properly harnessed, will not only increase farmers' income, it will also boost the animal protein supply in the area, thereby closing the deficit.

2. Statement of the Problem

It is common knowledge that cattle, sheep, goat, pig and poultry are the most common primary sources of animal protein in Nigeria. However, in year 2004, Ajala and Balogun reported that the supply of meat in Nigeria fell short of demand, and that most Nigerians were poorly fed and suffered from malnutrition due to lack of adequate protein of animal source. In recent times, Ume, Ezeano, Dauda and Okeke (2016) reported that the animal protein supply in the Nigerian diet especially in the rural areas have remained inadequate. Therefore, what is needed is a strategy that could be adopted to solving this problem, and poultry production stands a better option. This is because, it has been adjudged the most capable in bridging the animal protein supply gap in developing countries due to its intrinsic features, and according to FAO (2015), broilers and turkeys are the most common poultry species. Therefore, the problem for which solution is sought is that of balancing the deficit in the supply of animal protein using poultry species production.

However, poultry production in Nigeria is not without problems. These, according to Ezeano, *et al.*(2017) include lack of skills and equipment to produce, high cost of feed, high cost of day old chicks, fluctuation in market prices, poor breeds of day old chicks, high cost of building materials, high cost of labour and access to credit. Also, FAO (2014) reported that small-scale commercial poultry producers often produced with lower efficiency and constraints to securing quality inputs – chicks and feed, among others. It is in lieu of these that this study was carried out to examine and compare the profit levels of farmers in broiler and turkey enterprises in order to identify the enterprise that would be more suitable in reducing, if not completely bridging, the animal protein supply deficit in the area.

Objectives of the Study

The main objective of the study was to compare the profit realised from broiler and turkey productions in Anambra state. The specific objectives were to:

- 1) Describe the socio-economic characteristics of the respondents,
- 2) Estimate the profits from broiler and turkey productions,
- 3) Compare the profits from the two enterprises,

Hypothesis

H₀₁: there is no significant difference between profit realised by the broiler and turkey producers.

3. Methodology

3.1 Area of the Study

The study was carried out in Anambra State, Nigeria. Anambra State is one of the five states located in the South-eastern region of Nigeria, made up of twenty one (21) LGAs with its capital in Awka. It shares common boundaries with the States of Imo and Rivers in the South, Enugu in the East, Delta in the West and Kogi in the North (Anambra portal, 2019). The state is located at Latitude 6°20'N and Longitude 7°00'E with a total land area of four thousand, eight hundred and forty-four square kilometres (4,844 km²), and a population density of about eight hundred and sixty persons per square kilometres (860/Km²). It has an altitude of 300m above sea level with an annual mean rainfall of 1,220 mm and a mean temperature of 27°C to 30°C between June and December, but rises from 32°C to 34°C between January and April, with the last few months of the dry season marked with intense heat (Wikipedia, 2018).

According to the National Population Commission (NPC, 2017), Anambra state has an estimated population of about (5.5million) people who are 98% and 2% of Igbo and Igala ethnicities respectively (Anambra portal, 2019). The major economic activities in the state are farming (crops and livestock) and trading.

3.2 Sampling techniques and Sample size

Multi-stage with the combination of purposive and random sampling procedures were used for the study. The first stage was the purposive selection of the four agricultural zones in the state since poultry production was spread round the four

agricultural zones as revealed by the ADP data (2018). One Local Government Area with the highest number of registered poultry farmers in each of the four zones in the state was selected purposively in the second stage to arrive at four (4) LGAs. The third stage involved the random selection of a total of seventeen (17) communities/towns from across the four selected LGAs in a proportionate manner. Lastly, simple random technique was then applied in the selection of two hundred and thirty-one (231) broiler farmers and eighty-three turkey farmers from the selected communities also in a proportionate manner.

3.3 Methods of Data Analysis

The study utilised descriptive statistical techniques of frequency distribution, percentage and mean to achieve objectives 1 and 3.

Objective 2 was achieved using budgetary method which is stated as follows:

1) Net Revenue Analysis: the net revenue of the farmers was computed as

Net Revenue = Total Revenue – Total Cost

Where: Total revenue (₦) = value of the outputs (mature broiler and turkey birds and the manure generated)

Total cost (₦) = Total variable cost (costs of the inputs used) + Total fixed cost (depreciation of fixed assets).

Profitability Ratios:

- a) Net Return on Investment (NRoI) = Net Profit ÷ Total cost
- b) Return on Investment (RoI) = Total Revenue ÷ Total cost
- c) Gross ratio = Total cost ÷ Total revenue

Hypothesis 1 was tested using the Z-statistic expressed as:

$$Z = \frac{\frac{X_1}{n_1} - \frac{X_2}{n_2}}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}}$$

Where:

Z = Computed z-value for judging the significance of the mean difference

X₁ = Profit in turkey, X₂ = Profit in broiler,

σ₁² = Variance for turkey profit, σ₂² = Variance for broiler profit,

n₁ = Sample size in turkey, n₂ = Sample size in broiler

4. Results and Discussion

4.1 Socio-economic Characteristics of the Respondents

The socio-economic characteristics of the respondents were determined. They include age, sex, marital status, household size, educational level, years of experience in broiler and turkey productions and stock size as shown in table 1.

Table 1: Socio-economic characteristics of the farmers

Broiler farmers (n=221)			Turkey farmers (n=71)			
Freq.	%	Mean	Freq.	%	Mean	
Age						
21 – 30	31	14	43.1	7	9.9	43.9
31 – 40	58	26.2		22	31	
41 – 50	74	33.5		23	32.4	
51 – 60	48	21.7		15	21.1	
61 – 70	10	4.6		4	5.6	
Sex						
Males	127	59	39	54.9		
Females	94	41	32	45.1		
Household size						
1 – 5	100	45.2	6	32	45.1	6
6 – 10	97	43.9		29	40.8	
11 – 15	24	10.9		10	14.1	
Education						
Primary	50	25.7	18	25.4		
Secondary	116	50.5	33	46.5		
Tertiary	55	23.8	20	28.2		
Experience						
1 – 10	113	51.1	12.1	31	43.7	11.5
11 – 20	85	38.5		27	38	
> 20	23	10.4		13	18.3	
Type of labour						
Family labour	164	74.2	55	77.5		
Hired labour	57	25.8	16	22.5		
Stock size						
0 – 200	56	25.3	321.0	51	71.8	172
201 – 400	127	57.5		20	28.2	
>401	38	17.2		0	0	

Source: Field survey, 2019

The respondents between the ages of 41 and 50 years (33.5%) dominated broiler production in the study area with the mean age of 43.1 years. In turkey production, a larger proportion (32.4%) of the farmers also belonged to the age bracket of 41 to 50 years with the mean age of 43.9 years. This result implies that the farmers belonged to the economically active population category who were still vibrant and can adopt new approaches in production which can increase their level of profit. This, however, disagreed with the findings of Maikasuwa *et al.*, (2014) which stated that majority of the poultry farmers, were between the ages of 31 and 40 years.

The table also showed that both the broiler and turkey farming was dominated by males with 59% and 54.91% respectively. This could be because most females in the study area were saddled with domestic responsibilities. This finding is in line with those of various authors that reported male dominance in broiler and turkey production (Ukwuaba and Inoni, 2012; and Maikasuwa, *et al.*, 2014). The study showed that majority (45.2% and 45.1%) of the broiler and turkey farmers had household sizes of between 1 and 5 with the mean household size of 6 persons in both. This, therefore, explains why majority (74.2% and 77.5%) of the broiler and turkey farmers, respectively, utilised family labour.

The table also showed that majority (50.5% and 46.5%) of the broiler and turkey respondents respectively had secondary education as their highest level of education. This is also in conformity with Emokaro and Eweka (2015) and Adesiyani (2014) who opined that majority of poultry

farmers had secondary education as the highest level of education. This implies that poultry farmers have the potentials to adopt new technologies and innovations. Among the broiler respondents, although the mean years of production experience was 12.1, majority (51.1%) of them had years of experience of between 1 and 10 years. This was almost the same among the turkey farmer respondents whose greater proportion (43.7%) also had production experience of between 1 and 10 years with the mean years of 11.4 years. This showed that the farmers were vast in the knowledge of poultry farming and can easily and readily adopt new technologies that can better their profit levels.

Majority (74.2% and 77.5%) of both the broiler and turkey farmers respectively, as shown in the table, employed the use of family labour. This positively correlated with the household size of the farmers which was reasonably high. The average stock size, as shown in Table 4.1 was 321 birds for the broiler farmers and, 172 birds for the turkey farmers respectively. This result agreed with Mgbakor and Nzeadachie (2013) who reported that majority of the broiler farmers in Orumba South LGA of Anambra State reared less than 500 birds. This could have positive relationship with profit due to the fact that, as the farmer increases his stock size, the unit cost of his product decreases, while returns to scale increases.

Budgetary Analysis on Costs and Returns of Broiler and Turkey Productions

Table 2 showed the average costs and returns from producing and selling a unit of broiler and turkey birds in Anambra State. Broiler farmers spent an average total cost of ₦1, 450.69 with a total variable cost of ₦1, 445.17 out of which the feed input got the highest share of ₦963.07 (66.39% of the total cost) (per bird). This is similar to the finding of Olorunwa (2018), that feeding poultry birds accounted for over 50% of the total cost of production in Lagos State, Nigeria, and that of Gillespie and Flanders (2010), which reported that the feed input could account for up to 70% of the total cost of poultry production. The average revenue realised from the sale of a broiler bird and its droppings was ₦2, 211.57 and this yielded a net profit of ₦760.88.

In turkey production, the average total cost of producing a turkey bird was ₦2, 643.70 with a total variable cost of ₦2, 623.95 out of which ₦1, 721.14 was spent on feeding which accounted for about 65.10% of the total cost. This is also in line with the finding of Maikasuwa *et al.* (2014) that feeding accounts for more than 50% of the total cost incurred in rearing turkey birds in Kebbistate, Nigeria. The average revenue recorded was ₦ 4, 141.97, while ₦1, 498.27 was realised as the net profit.

Table 2: Average costs and returns for broiler and turkey productions (per bird)

Category	Broiler		Turkey	
	Value (₦)	% of TC	Value (₦)	% of TC
Revenue from sale of bird(s)	2,186.57	-	4,101.97	
Revenue from sale of droppings	25	-	40	
Total revenue	2,211.57	-	4,141.97	
Variable cost				

Day old chicks/poult	280	19.3	583	22.05
Brooding	26	1.79	39.61	1.5
Vaccination	36.1	2.49	55	2.08
Drugs	56	3.86	68	2.57
Feeding and additives	963.07	66.39	1,721.14	65.1
Water	7	0.48	9.2	0.35
Litter materials	2	0.14	3	0.11
Labour	75	5.17	145	5.49
Total variable cost	1,445.17	99.62	2,623.95	99.25
Fixed cost (depreciation)				
Poultry house	3.57	0.25	14.38	0.54
Drinkers	0.35	0.02	0.84	0.03
Feeders	0.56	0.04	1.61	0.06
Lamps and stoves	0.26	0.02	0.77	0.03
Jerrycans, Buckets and basins	0.34	0.02	0.91	0.04
Spades and shovels	0.11	0.01	0.31	0.01
Wheel barrow and head pans	0.33	0.02	0.93	0.04
Total fixed cost	5.52	0.38	19.75	0.75
Total cost (TC)	1,450.69	100	2,643.70	100
Profit		760.88	1,498.27	

Source: Computed from field survey, 2019

Note: “***” indicates statistical significance at 1% probability level.

Profitability ratios for broiler production

$$1. \text{ Return on Investment (RoI)} = \frac{\text{Total revenue}}{\text{Total cost}} = \frac{709,913.97}{465,671.49} = 1.53$$

This ratio implies that every ₦1 invested in broiler production yielded a cash flow of ₦1.53kobo.

$$2. \text{ Net Return on investment (NROI)} = \frac{\text{Net Profit}}{\text{Total Cost}} = \frac{244,242.48}{465,671.49} = 0.53$$

This shows that, for a naira invested in the production of broiler birds, about 53kobo returned to the farmer as reward for management.

$$3. \text{ Gross ratio} = \frac{\text{Total cost}}{\text{Total revenue}} = \frac{465,671.49}{709,913.97} = 0.66$$

The implication of this is that 66% of the total revenue generated from the sales of the outputs in broiler production was used to pay off all the costs incurred in the production. The above results showed that broiler production in the study area was profitable, and had similarities with the reports of Olorunwa (2018) and Emokaro and Eweka (2015)

Table 4: Profits in broiler and turkey production (per bird)

Category	per cycle (N)	per annum (N)	Cal. Z-value	Tab. Z-value	Decision
Turkey	1498.27	2,996.54 (X ₁)	9.27	1.96	Reject
Broiler	760.88	2,282.75 (X ₂)			
Difference (X ₁ - X ₂)			713.79		

Source: Computed from field survey, 2019

The profits per annum from the two enterprises were compared using the Z-statistic:

$$Z \text{ cal.} = \frac{\frac{X_1}{n_1} - \frac{X_2}{n_2}}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}} = \frac{\frac{2,996.54}{71} - \frac{2,282.75}{221}}{\sqrt{\frac{594.22^2}{71} + \frac{460.69^2}{221}}}$$

$$= \frac{713.79}{\sqrt{5,933.54}} = 9.27$$

that broiler production was profitable in Lagos State and in Esan and Ovia North-East Local Government Areas of Edo State, Nigeria.

Profitability ratios for turkey production

$$1. \text{ Return on investment (RoI)} = \frac{\text{Total revenue}}{\text{Total Cost}} = \frac{257,702.44}{454,716.40} = 1.57$$

This ratio implies that every naira invested in turkey production yielded a cash flow of ₦1.57kobo.

$$2. \text{ Net Return on Investment (NROI)} = \frac{\text{Net profit}}{\text{Total cost}} = \frac{257,702.44}{454,716.40} = 0.57$$

The above ratio indicates that for every naira invested in the production of turkey birds, about 57kobo returned to the farmer as reward for management.

$$3. \text{ Gross ratio} = \frac{\text{Total cost}}{\text{Total revenue}} = \frac{454,716.40}{712,418.84} = 0.64$$

This implies that 64% of the total revenue generated from the sales of the outputs was used to pay off the entire costs incurred in the production. The above results equally showed that turkey production in the area was also profitable and viable. These results are also consistent with the finding of Maikasuwa et al., (2014) that the profitability rate of turkey production was above 0.30, and was profitable.

Comparative analysis of the Annual Profits in Broiler and Turkey Productions

Table 3 shows the statistics of the annual profits from sales of a unit of broiler and turkey birds, while table 4 described the number of production cycles carried out by farmers in the two enterprises.

Table 3: Descriptive statistics on number of production cycles per annum

No. of cycles	Broiler		Turkey			
	Freq.	%	Mean	Freq.	%	Mean
1	20	9.1	3	23	42.4	2
2	77	34.8		48	57.6	
3	99	44.8		0	0	
4	25	11.3		0	0	

Source: Field survey, 2019

showed that turkey production recorded a higher net profit/annum than broiler production with a difference of ₦713.79 per annum.

Hypothesis 1: The profits from broiler and turkey production were not significantly different.

5. Decision

The test of significant difference in the annual profits in broiler and turkey productions yielded a Z-value of 9.27 as calculated above. Therefore, the null hypothesis which stated that there is no significant difference between the profits from broiler and turkey enterprises in Anambra State was rejected (calculated $Z > 1.96$), while the alternative was accepted. This implies that the profit from turkey enterprise was significantly higher than from broiler enterprise.

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