

Comparative Analysis of the Economic Performance of Pigs and Broiler Production in Delta State, Nigeria

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Abstract: The study examined the “Comparative Analysis of Broiler Production and Fattening Pigs in Delta Central Agricultural Zone of Delta State, Nigeria. A total of 160 respondents were randomly selected and they comprise 80 broiler producers and 80 farmers fattening pigs. Data were collected using a well-structured questionnaire and were analyzed by means of descriptive statistics, the Gross Margin analysis and farm performance ratios such as Benefit Cost Ratio (BCR) and Return on investment. A multiple regression analysis was also carried out to determine the factors that have statistical significant influence on revenue from both enterprises.

The results of the analysis showed that gross margin (₦ per Kilogramme) in piggery production was higher than broiler production by 16.1% and the difference was statistically significant at 5%. The net return per kilogramme (in naira) was also statistically significantly higher in piggery than broiler production at 5%. Both enterprises had benefit-cost ratios above one, indicating that they are profitable ventures. But fattening pigs was more profitable, with a Benefit-Cost Ratio of 3.85 compared to 2.48 for broiler production and the mean difference was statistically significant at 1%. Fattening pigs also produced a higher return on investment of 2.85 as against 1.48 for broiler production, with a statistically significant mean difference at 1%. The results of the regression analysis found three variables (educational level, years of experience in poultry production and type of poultry house) to have had positive significant influence on output and revenue in broiler production. On the other hand, sex, educational level and experience as well as type of housing had positive statistically significant influence on revenue from the fattening of pigs at 1% and 5% respectively.

Keywords: *Fattening Pigs, Broiler Production, comparative analysis, Nigeria*

I. INTRODUCTION

The concept of protein deficiency in the dietary requirements of growing children and adults alike has taken center stage in the policies of most developing countries of the world. In recent times, this has been reflected in the agenda of most international agencies (United Nations International Children’s Emergency Fund, UNICEF, Food and Agriculture Organisation, FAO) charged with the responsibilities of fighting the scourge of nutrient deficiency in diets. In Nigeria, we also have bodies like the Nutritional Society of Nigeria, Federal Ministry of Health across the country leading the fight against protein deficiency in diets.

Protein deficiency can be defined as the lack or insufficiency of the necessary amounts or kind of protein needed by an individual and usually provided by animals and fishes (Olomu, 1995). The concept has two aspects: (a) Provision of protein which determines the capacity for adequate and regular

production of animals required to provide the necessary amount of protein. (b) Economic analysis of cost and benefit of animal production by farmers.

The sustainable provision and production of these protein sources lies largely on the benefits of production economics which the farmers will experience (Nyike et al, 1995). Animal protein in most cases is superior to plant protein primarily due to the presence of some essential amino acids which are lacking in plant protein. Food and Agricultural Organization (1998) opined that proteins from animal sources are usually more expensive when compared to protein from plant sources. To this end, its consumption is also affected as only few people can afford it.

To make the consumption of protein readily available and affordable to the teeming populace from poor countries, there is need to assess the economics of the different sources of the animal protein; pigs and broiler birds being some sources. This is likely to ensure their production at a cheaper rate thereby contributing effectively to animal protein value chain. In addition, sustainable production and supply of these animals may only be possible if all the economic indices of production such as cost of production and the return on investment are properly studied (Udoh, 2005). This view is supported by the work of Kater et al (2000) which indicated that protein supply for the teeming population of any country could be achieved only if real comparative factors that necessitated the production of various types of animals are analyzed to encourage and sustain production.

Nigeria, like other developing nations, experiences rising population necessitating increasing demand for food especially protein for the largest segment of the population which is the “growing children”. Increase in supply could be achieved by addressing the factors influencing the production of protein-rich and easy to rear animals (Maazu and Abdulmumin, 2012).

The significance of this discussion is derived from the perspective that the costs of fattening pigs and production of broilers have serious implication for protein sufficiency which will in turn affect the overall socio-economic welfare of farmers involved in the production. It is in view of this that this work seeks to analyze the economics of fattening pigs in comparison with production of broiler birds in Delta State, Nigeria with a view to looking at the profitability to farmers thereby making protein available to the masses at affordable prices.

The general objective of this study is the comparative study of Economic performance of fattening pigs and broiler birds’ production in Delta State, Nigeria. The specific objectives are to:

- (i) identify the socio economic characteristics of piggery and broiler birds’ farmers.

- (ii) determine the cost and return in piggery in comparison with broiler birds production, and
- (iii) determine factors that affect the production of broiler birds and fattening pigs in the study area.

II. MATERIALS AND METHODS

Study Area:The area covered in this study are the eight local government areas of Delta Central Agricultural Zone which include Ethiope West, Ethiope East, Ughelli North, UghelliSouth, Uvwie, Udu, Sapele and Okpe. The major occupation of the people in the area is agricultural production, of which piggery and broiler farming are significant because of the high rate of consumption of both pork and chicken in rural as well as urban areas.

Sampling Procedure

Data for the study were collected using a well-structured questionnaire. A two-stage sampling technique was applied in the selection of respondents for the study. Two communities (villages/towns) each in the eight local government areas in the zone where poultry and pig production are practised were purposively selected for the study. These include: Amukpe and Okireg were in Sapele Local Government; Jesse and Oghara in Ethiope West Local Government; Agbarho and Agbarha-Otor in Ughelli North Local Government; Otor-Jeremi and Oginibo in Ughelli South Local Government Area; Uvwian and Aladja in Udu Local Government; Ororokpe and Oko-Kuoko in Okpe Local Government, while Eku and Abraka were selected from Ethiope East Local Government. Stage two involved the selection of five piggery and five poultry farmers (producing broilers) from each of the chosen communities.

Data Analysis

Descriptive and inferential statistics were used to analyze the data collected. Descriptive statistics used include percentages, means and frequency counts. The Gross Margin (GM) analysis was used for the quantitative analysis and was obtained by subtracting Total Variable Cost (TRC) from Total Revenue (TR) as used by Olukosi and Erhabor (2005) and Alufohai and Ahmadu (2012). Project viability was also estimated using the Benefit Cost Ratio (BCR) as indicated by Gittinger (1972) and applied by Reddy et al (2005).

The Gross Margin Analysis is given as:

$$\text{Gross Margin (GM)} = \text{Total Revenue (TR)} - \text{Total Variable cost (TR)} \text{ ----- (1)}$$

$$\text{Total Variable Cost (TV)} = \text{Total Cost (TC)} - \text{Total Fixed Cost} \text{ ----- (2)}$$

$$\text{Net Revenue/Profit (NR)} = \text{Gross Margin (GM)} - \text{Total Fixed Cost (TF)} \text{ -----(3)}$$

$$\text{Return on Investment (ROI)} = \frac{\text{Net Revenue (NR)}}{\text{Total Cost (TC)}} \text{ ----- (4)}$$

Performance and economic worth of the enterprise was also determined using the profitability ratios:

$$1. \text{ Benefit Cost Ratio (BCR)} = \frac{\text{Present Value of total benefit}}{\text{Present Value of Total Cost}}$$

$$\text{BCR} = \text{TR/TC}$$

An enterprise is profitable and sustainable if $\text{BCR} > 1$; it is not sustainable if $\text{BCR} < 1$; and it operates at Break-even point if BCR equals 1.

The GM and other ratios were calculated for each enterprise and compared using t-test for difference between two means.

Multiple regression analysis was used to examine the effect of socio-economic characteristics on production. The production function postulated for the two enterprises (piggery and broiler birds) is given as:

$$Q = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8 \dots U_i)$$

Where :

Q = Total Revenue of the enterprise to be compared

X₁ = Sex of the respondent

X₂ = Age of the respondent

X₃ = Level of education of the respondent

X₄ = Household size

X₅ = Experience in livestock farming

X₆ = Type of facility for rearing the animals (modern or traditional)

The Ordinary Least Square method was evaluated using the linear, semilog and Cobb Douglas Production functions and the linear function was chosen as the lead equation.

III. RESULTS AND DISCUSSION

Socio Economic Characteristics of Respondents

The analysis in Table 1 shows that majority (69% and 79%) of the pigs and broiler farmers respectively were males and fall within the age bracket of 40-60 years in both enterprises. A high number of the respondents in both enterprises had some form of tertiary education, 60% for pig farmers and 65% for broiler farmers. The high level of education might be due to the metropolitan nature of the study area with proximity to higher institutions. The analysis also shows that majority (75%) of the piggery farmers and 82% of broiler farmers made use of modern housing and associated facilities common to modern livestock practice and most of them had household size between 5 and 10 persons, with a mean of 8.

Table 1 Socio-economic characteristics of fattening pigs and Broiler Birds' Farmers

Socio-economic Variables	Pigs Farmers (No = 80)	Frequency %	Broiler Farmers (No = 80)	Frequency %
Sex				
Male	55	69	63	79
Female	25	31	17	21
Age				
20-30 years	10	13	6	8
31-40 years	18	23	20	25
41-50 years	20	25	16	20
51-60 years	23	29	25	31
>60 years	9	11	13	16
Mean	45.7		47.84	
Level of Education				
Primary	14	18	12	15
Secondary	18	22	16	20
Tertiary	48	60	52	65
Household Size				
0-5	36	45	27	34
05-Oct	38	47	40	50
>10	6	7	13	16

Mean	5.63	6.63		
Years of Experience				
1-5 years	12	15	15	19
6-10 years	46	58	50	63
Above 10 years	22	28	15	19
Mean	8.49	7.91		
Type of Housing				
Modern	60	75	66	82
Traditional	20	25	14	18

Source: Data Analysis, 2018.

Gross Margin Analysis of Piggery and Broiler Farmers

Table 2 presents the results of the gross margin analysis of fattening pigs and broiler production in the study area. The total revenue per kilogramme was found to be ₦1,003.13 for the fattening of pigs and ₦996.88 for broiler production and the difference was not statistically significant. The variable cost (in naira) per kilogramme was significantly higher statistically by 47.7% in broiler production than piggery production. This is possibly due to the omnivorous nature of pigs that tends to make the cost of feeding them to be lower. Fixed cost per kg(in naira) was also higher in broiler production. However, gross margin(₦ per Kg) in piggery production was higher than broiler production by 16.1% and the difference was statistically significant at 5%. The net return per kilogramme(in naira) was equally statistically significantly higher in piggery than broiler production at 5%. Both enterprises had benefit-cost ratios above one, indicating that they are profitable ventures. But fattening pigs was more profitable, with a Benefit-Cost Ratio of 3.85 compared to 2.48 for broiler production and the mean difference was statistically significant at 1%. Fattening pigs also produced a higher return on investment of 2.85 as against 1.48 for broiler production, with a statistically significant mean difference at 1%.

Table 2: Gross Margin and Net Returns Analysis of Fattening Pigs and Broiler Production

	Piggery	Broiler	Mean Difference	T-value
Total Revenue (TR)₦/Kg	1003.13 (151.42)	996.88 (119.10)	6.63 (68.11)	0.097
Total Variable Cost(TVC)	144.88 (12.24)	276.88 (61.76)	-132.00 (22.26)	5.930**
Gross Margin (GM)	858.63 (147.49)	720.00 (102.75)	138.63 (63.55)	2.181*
Fixed Cost(FC)	117.31 (31.44)	132.50 (38.91)	-15.19 (17.67)	0.859
Net Return (NR)	741.31 (139.09)	587.50 (130.17)	153.81 (67.35)	2.284*
Return on Investment (ROI)	2.85 (0.57)	1.48 (0.45)	1.36 (0.26)	5.277**
Benefit-Cost Ratio(BCR)	3.85 (0.57)	2.48 (0.45)	1.37 (0.26)	5.277**

Source: Field Survey, 2018; Figures in parenthesis are standard deviations/ standard error of the mean

*Statistically significant at 5%

**statistically significant at 1%.

Factors Affecting the Production of Broilers in the Study Area

The results of the linear regression analysis of the factors affecting the production of broilers in the study area are presented on Table 3. The Coefficient of Multiple Determination (R^2) was found to be 0.691. This shows that about 69% of the total variation in the revenue from broiler production was influenced by the regressors included in the analysis. Three variables (educational level, years of experience in poultry production and type of poultry house) had positive significant influence on output and revenue. The three other variables (sex, age and household size) had negative influence, but not statistically significant.

Table 3: Regression results on factors affecting the production of broilers

Variable	Coefficient	SE	T-value
Constant	14.096	3.559	3.961**
Sex	-0.026	0.100	-0.261
Age	-0.029	2.003	1.021
Education Level	0.141	0.069	2.041*
Household Size	-0.068	0.094	0.720
Experience	0.136	0.069	1.961*
Type of Housing	0.081	0.034	2.361**

Source: Authors' calculations from field Survey, 2018; $R^2 = 0.691$, $F = 19.126$

* Statistically significant at 5%

**statistically significant at 1%.

Factors Affecting the Fattening of Pigs in the Study Area

Table 4 shows the regression results of the factors influencing the revenue from the fattening of pigs in the study area. The Coefficient of Multiple Determination (R^2) was 0.820. This implies that about 80% of the variation in total revenue from fattening of pigs in the study area was due to the influence of the explanatory variables.

The results also indicate that sex, educational level and experience as well as type of housing had positive statistically significant influence on revenue from the fattening of pigs at 1% and 5% respectively. Age and household size had negative effect, but not statistically significant.

Table 4: Regression results on factors affecting the fattening of pigs

	Coefficient	SE	T-value
Constant	16.001	2.461	6.502**
Sex	0.301	0.121	2.486**
Age	-0.082	-2.011	0.041
Educational Level	1.104	0.161	6.840**
Household Size	-0.161	1.104	0.146
Experience	0.113	0.018	6.277**
Type of Housing	0.316	0.16	1.971*

Source: Authors' calculations from field Survey, 2018; $R^2 = 0.820$, $F = 19.141$

*Statistically significant at 5%

**Statistically significant at 1%.

The implication of the results of the regression analysis is that total revenue from broiler production and fattening of pigs could be improved upon by increasing any or a combination of

the factors that were found to have statistically significant influence.

CONCLUSION AND RECOMMENDATIONS

Conclusively, results from the analysis indicate that both enterprises are highly profitable, but fattening pigs had higher Benefit-Cost ratio and higher returns on investment than broiler production. It was also found that socio-economic characteristic such as educational level, years of experience, type of housing affected production and invariably had positively statistically significant influence on revenue from broiler production. Furthermore, revenue from pig fattening was positively and significantly affected by factors such as sex, educational level and having a cognate experience in the business as well as the sex of the respondent. It is recommended that farmers in the study area should leverage on the identified significant factors influencing both enterprises, especially the need to invest on modern facilities, in order to increase their productivity and profitability. Since fattening pigs was found more profitable, the government should encourage more farmers to investment in piggery business and farmers already in broiler production should also undertake combination of fattening of pigs into their farming business to enhance their overall profitability.

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