

## ANALYSIS OF PROFITABILITY OF PIG PRODUCTION IN EDO SOUTH AGRO-ECOLOGICAL ZONE OF EDO STATE, NIGERIA.

**Okojie O.E, Ajayi, T.D and Okoror, O.T**

Department of Agricultural Economics and Extension Services, Faculty of Agriculture, University of Benin,  
Benin City, Edo State, Nigeria.

### ABSTRACT

This study analyzed profitability of pig production in Edo South agro-ecological Zone of Edo State, Nigeria. The study described the socio-economic characteristics of pig farmers in the study area; determined the cost, returns and profitability of pig production in the study area; ascertained the determinants of profit in pig production in the study area; and identified the constraints faced by pig farmers in the study area. Simple random sampling technique was used in selecting 120 pig farmers. The analytical techniques used were descriptive statistics, budgetary techniques, and multiple regression model. Result showed that the mean age of the pig farmers was 44years, and 84.1% of the farmers were males. Also, the study showed that pig production was profitable in the study area with a net profit of ₦ 323, 902.99 per farmer per production cycle, while the return on investment was 1.24. Significant determinants of profit were age (0.556), feed cost (-0.370) and fixed cost (-0.371) all at 5% level of significance. High feed costs, high costs of breeding stock, labour unavailability, inadequate finance, lack of government aid, and poor sewage system were identified as the most serious constraints faced by the pig farmers in the study area.

**Keywords: Pig Production, Budgetary Techniques, Multiple Regression Model, Edo State,**

### INTRODUCTION

One of the greatest problems confronting Nigeria today is lack of adequate protein to feed the nation's ever-growing population. Research has shown that while the population of Nigeria increases at about 3.3% annually, livestock population increases at a rate of 2%, invariably reducing the quantity of animal protein consumed by the people (Osondu, *et al.* 2014). This is seen in the FAO (2006) report that the average Nigerian eats about 45g or less of protein per person per day which is far below the standard set by World Health Organization (WHO, 2007) of 85g of protein per person per day. This lack or insufficient supply of animal protein resulting in protein malnutrition is a major problem in Nigeria (Osondu, *et al.*,2014). Nigerian governments have implemented programs and policies at national, state and community levels to curb this problem of protein malnutrition by boosting the mass production of livestock (Pro-Con, 2012). Amongst the livestock reared in Nigeria are goat, chicken, cow and pig. Pigs are important domestic animals in Nigeria (Ugbomoiko, *et al.*, 2008). Pigs are the major important non-ruminant animals reared in the derived

savannah and rain forest zones of Nigeria (Rahman, *et al.*, 2008). Pigs have fast growth rate, high feed efficiency and higher rate of returns as compared to livestock such as goat and sheep (Ogunniyi and Omoteso, 2011). Furthermore, their unique adaptive characteristics to survive in whatever areas they are found give them an edge over other animals (Ajala, *et al.*, 2007). Their unique advantage to multiply extensively makes them a good species of animals to combat protein shortages (Oguniye, 2011). Also the quality of their meat is tender and more nutritive in protein and the B-vitamins than those of other animals (Oguniye, 2011). Despite these unique characteristics they make up to only four percent of the total domestic animals in Nigeria (Ajala, *et al.*, 2007). Their low contribution to total domestic animals in Nigeria could be attributed to several constraints such as high cost of feed, high cost of labour, scarcity of skilled labour, inadequate production capital (Anukwu and obong 2011; Duniya, *et al.*, 2013), poor acceptability of swine products, management problems in production (Agada, 1991) and religious beliefs that do not promote the consumption of pig (Umeh, *et al.*,2015). Other factors that have militated against pig production in Nigeria include disease outbreak, inadequate technical assistance in the form of extension services, inaccessibility of pig farmers to credit facilities, lack of adequate supply of genetically improved breeders, poor infrastructural facilities, and fear of inadequate market for piggery products. These constraints to pig production in Nigeria could affect the profitability of the business or result in losses. This study therefore analysed the cost, returns and profit of pig production in the study area.

### MATERIALS AND METHODS

Edo state is one of the 36 states in Nigeria. It is located between longitude 05<sup>o</sup> 04' East and latitudes 05<sup>o</sup> 44' North and 07<sup>o</sup> 34' North of the Greenwich. It is bounded to the North by Kogi, to the South by Delta, West by Ondo and East by Anambra State. It is made up of 18 local government areas, divided into 3 senatorial districts which include Edo Central, Edo South and Edo North. It has a total area of 17,820km<sup>2</sup> and population estimate of 3,218,332 made up of 1,640,461 males and 1,577,871 females (National Population Census, 2006).

The study was carried out in Edo South agro-ecological Zone of Edo State, Nigeria. Edo South agro-ecological Zone is made of Egor, Ovia North

East, Ovia South West, Uhumwonde, Orhionmwon, Oredo, and Ikpoba-okha local government areas.

A multi-stage sampling technique was used to select the pig farmers for the study. Firstly, Egor, Oredo, Ovia North East and Ikopa-okha were purposively selected from the study area out of the seven local government areas due to the prevalence of pig production activities in these areas. Secondly, five communities each were selected from the selected local government areas using the simple random sampling technique to give a total of 20 communities. Thirdly, Snow balling technique was used to obtain a list of the pig farmers in the various local government areas after which simple random sampling technique was used to select 6 pig farmers from each community to give a total sample size of 120 pig farmers. The pig farmers practiced intensive system of pig production.

#### Data Analysis

Descriptive statistics such as means, percentages and frequencies were used to analyse the socio-economic characteristics of pig farmers.

#### Budgetary Analysis

Budgetary tools such as gross margin, net farm income and returns on investment were used to analyze the cost, return and profitability of pig production in the study area.

#### The Gross profit Margin (GM):

$$GM = TR - TVC$$

#### Net farm income:

$$\text{Profit/Net farm income (NFI)} = TR - TC$$

TR = Total Revenue, TC = Total Cost, TVC = Total Variable Cost

$$TC = TVC + TFC$$

TFC = Depreciated Total Fixed Cost. The annual depreciation was calculated using the straight line method.

#### Returns on Investment (ROI):

$$ROI = TR/TC$$

Where

TR = Price × Quantity (Output); Output = adult pigs

#### Determinants of Profit

A multiple regression model using the double log form was used to ascertain the determinants of profit in pig production in the study area. The double log regression function is given as;

$$\ln Y = \beta_0 + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + \beta_4 \ln X_4 + \beta_5 \ln X_5 + \beta_6 \ln X_6 + \beta_7 \ln X_7 + \beta_8 \ln X_8 + \beta_9 \ln X_9 + e$$

Where Y is the dependent variable = Profit (₦)

X<sub>1</sub>, X<sub>2</sub>, X<sub>3</sub>,....., X<sub>9</sub> are the independent variables:

β<sub>0</sub> = intercept; β<sub>1</sub> –β<sub>9</sub> = estimated coefficients; e = error term

X<sub>1</sub> = Feed Cost (₦), X<sub>2</sub> = Age, X<sub>3</sub> = Household Size, X<sub>4</sub> = Farming Experience, X<sub>5</sub> = Labour Cost (₦), X<sub>6</sub> = Educational Level, X<sub>7</sub> = Sex, X<sub>8</sub> = Medication Cost (₦), X<sub>9</sub> = Fixed Cost (₦).

#### Constraints Faced by the Pig Farmers

The information from a 5-point likert-type scale was used to analyse the constraints faced by the pig

farmers. The responses were grouped into 5; Very serious (VS) = 5; Serious (S) = 4; Moderately Serious (MS) = 3; Least Serious (LS) = 2; Not Serious (NS) = 1

## RESULTS AND DISCUSSION

### Socio-economic characteristics of pig farmers in the study area

The result in Table 1 shows that 82.2% of the pig farmers were within the active young age of 30 to 49 years as Uddin and Osasogie, (2016) reported that farmers above 50 years of age are referred to as older farmers. The mean age of the pig farmers was 44 years. This indicates that farmers in the study area were still within their economically active age and as such were able to cope with the drudgery nature of pig production. The finding of this study is in consonance with the findings of Aminu and Akhigbe-Ahonkha, (2017) in a study carried out in Ekiti State where majority of pig farmers were in their active age.

The result in Table 1 shows that about 84.0% of the pig farmers were males, while only 15.9% were females. This result indicates that pig farming was mostly carried out by men probably because of the labour intensive nature of the enterprise. Women in the study area were involved in helping or supplying lighter farm labour such as serving of feed, water, and cleaning of the piggery amongst others. The finding of this study corroborates with the finding of Uddin and Osasogie (2016) in a study carried out in Edo State and of Abiodun, *et al.*, (2017) as they reported that majority (81.7%) of pig farmers in Ogun state were males.

The result in Table 1 also shows that 58.9% of pig farmers were married. The findings of the study are in consonance with the report of Osondu, *et al.*, (2014) in Abia State where majority of pig farmers were married. The result on household size shows that 77.5% of the pig farmers had five and above five persons in their homes. This indicates the possible use of family labour for production activities. The finding of this study agrees with the findings of Aminu and Ekiomoado, (2017) in Ekiti State where majority of the pig farmers had household sizes of above 5 persons.

The religion distribution of the pig farmers shows that 80.4% of pig farmers practiced the Christian religion, while only 19.6% of pig farmers practiced the African traditional religion. None of the pig farmers were of Islamic religion. This indicates that more Christians are into the production of pigs. The (0%) of pig farmers practicing Islamic religion may be attributed to the religious beliefs of the Muslims, which discourages them from pig consumption. The mean farming experience of the farmers was 8 years, while 43.0% had above 10 years of farming experience. This indicates that a good number of the pig farmers were relatively experienced in their pig production activities and would possibly possess the

necessary knowledge and skills required to manage their farms efficiently. The finding of this study agrees with that of Abiodun, *et al.*, (2017) in Ogun State that reported that a good number of the farmers were relatively experienced in their pig production having a mean pig farming experience of 6.7 years.

Most (95.3%) of the pig farmers had formal education ranging from primary to tertiary, which implies that the pig farmers had one form of education, and this could have positive consequences on their capacity to exploit latent opportunities in the pig production and also support them in the adoption of improved technologies.

**Table 1: Socio-Economic Characteristics of Pig Farmers**

Socio-Economic Characteristics		Frequency	Percentage (%)	Mean
Age	30 – 39	28	26.1	43.5
	40 – 49	60	56.1	
	50 -59	16	15.0	
	60+	3	2.8	
Sex	Male	90	84.1	
	Female	17	15.9	
Marital Status	Single	19	17.8	
	Married	63	58.9	
	Divorced	14	13.1	
	Widowed	1	0.9	
	Widower	10	9.3	
Religion	Christianity	86	80.4	
	Traditional	21	19.6	
	Islamic religion	0	0.0	
Farming Experience	1 – 4	13	12.1	8
	5 – 9	48	44.9	
	10+	46	43.0	
Household Size	1 – 4	24	22.4	5
	5 – 7	79	73.8	
	8+	4	3.7	
Educational Level	Non Formal	5	4.7	
	Primary	17	15.9	
	Secondary	54	50.5	
	Tertiary	31	29.0	
Frequency of Visits	Frequently	48	44.9	
	Rarely	27	25.2	
	Never	32	29.9	
Source of Stock	Research Farm	10	9.3	
	Personal	13	12.1	
	Breeding Stock	84	78.5	
	Other Farms			
Type of Feed Stuff	Local Feed	1	0.9	
	Formulated Feed	4	3.7	
	Both	102	95.3	

**Source: Field Survey, 2018.**

#### **Average Costs, Returns and Profitability of Pig Production per Farmer per Production Cycle**

The result on Table 2 shows that the average number of Boars kept per farmer per production cycle of five

months were five boars and average number of Sows kept per farmer per production cycle of five months were also five. The average price per boar of an average weight of 95.50kg, was ₦61,607.48; while

the average price per sow of an average weight of 90.0kg was ₦55,248.59. The revenue generated from boar was ₦308,037.38, while from the sow was ₦276,242.99 giving a total revenue of ₦584,280.33 per pig farmer per production cycle. The result in Table 2 also shows that the total variable cost used to produce 5 Boars and 5 Sows was ₦234,420.09 accounting for 90.03% of the total cost of production. The labour cost (₦58,850.47) and feed cost (₦106,485.98) accounted for a larger percentage of the total variable cost of production accounting for 22.6% and 40.9% respectively. The Piglets stocked by the farmers which were 4weeks old on average,

cost ₦41,635.51 per farmer per production cycle and accounted for about 16.0% of the total variable cost of production. The total fixed cost of ₦25,957.29 accounted for 9.97% of the total cost of production. Therefore, the total cost of pig production per farmer per production cycle was ₦260,377.38. The Gross margin and net profit were ₦349,860.28 and ₦323,902.99 respectively indicating that the enterprise was a profitable venture in the study area. The return on investment was 1.24. This indicates for every one naira invested, 124 kobo is received, indicating the enterprise is profitable.

**Table 2: Average Costs, Returns and Profitability of Pig Production per Production Cycle (an average of 5 months) per Farmer in the Study Area**

Items	Average Value Per Farmer (₦)	Percentage
<b>Revenue</b>		
Average No of Boar	5	
Average No of Sow	5	
Average Price Per Boar	61,607.48	
Average Price Per Sow	55,248.59	
Total Revenue of Boar	308,037.38	52.72
Total Revenue of sow	276,242.95	47.28
Total Revenue of Pigs	<b>584,280.37</b>	<b>100</b>
<b>Variable Cost</b>		
Labour Cost	58,850.47	22.60
Feed Cost	106,485.98	40.9
Water Cost	10,210.28	3.92
Medication Cost	5,039.25	1.94
Transportation Cost	4,305.61	1.65
Fuel Cost	1,352.80	0.52
Light Bill Cost	4,471.03	1.72
Disinfectant Cost	2,069.16	0.79
Piglet Stock Cost	41,635.51	15.99
<b>Total Variable Cost</b>	<b>234,420.09</b>	<b>90.03</b>
<b>Fixed Cost</b>		
<b>Total Fixed Cost</b>	<b>25,957.29</b>	<b>9.97</b>
<b>Total Cost</b>	<b>260,377.38</b>	<b>100</b>
Net Farm Income	<b>323,902.99</b>	
Gross Margin	<b>349,860.28</b>	
Return on Investment	<b>1.24</b>	

Source: Field Survey, 2018.

#### **Determinants of Profit among Pig Farmers in the Study Area**

The result in Table 3 shows that the significant determinants of profit in the study area were age (0.556), feed cost (-0.370) and fixed cost (-0.371). The result shows that age had positive and significant effect on profit at 5% level of significance, while feed cost and fixed cost had negative and significant effect on profit at 5% level of significance. This implies that one percent increase in age of the farmer will increase profit by 0.556 percent. This was as expected as the older the farmer, the more experienced he is likely to be in his pig enterprise,

which could lead to increased profit. Also, a one percent increase in feed cost will decrease profit by 0.370 percent, and a one percent increase in fixed cost of production will decrease profit by 0.371 percent. These were both as expected as the lower the cost of production the higher the returns. The results of this research are in consonance with the results obtained by Igwe, *et al.*, (2013) where feed cost was a significant determinant of profit in pig production enterprise, but it disagrees with results obtained by Abiodun, *et al.*, (2017) and Uddin and Osasogie (2016) where age was an insignificant determinant of profit.

**Table 3: Determinants of profit**

	<b>Coefficients</b>	<b>Standard error</b>	<b>t Stat</b>	<b>P-value</b>
Intercept	2.44736	2.1887	1.1182	0.2662
Feed cost	-0.3701	0.1699	2.1778	0.0318**
Age	0.5559	0.2387	2.3294	0.0219**
Household size	-0.0477	0.1086	-0.4394	0.6614
Experience	0.0877	0.077	-1.1245	0.2635
Labour cost	-0.0884	0.1361	-0.6494	0.5176
Educational level	0.0852	0.1734	-0.4909	0.6246
Sex	0.0533	0.1520	0.3508	0.7264
Medication	0.1575	0.1184	1.3304	0.1865
Fixed cost	-0.3711	0.1592	2.3314	0.0218**

**Source: Field survey, 2018**

**R Square = 0.26; Adjusted R Square = 0.20; F statistics = 3.87**

**(\*\*) Significant at 5% Level of Significance**

#### **Constraints faced by pig farmers in the study area**

The result in Table 4 shows the constraints encountered by the pig farmers in the study area. High cost of feeds (X = 4.79), high cost of improved breeding stock (X = 4.23), land unavailability (X= 3.51), lack of government aid (X= 4.23), inadequate finance (X= 4.20), poor sewage systems (X = 4.04) and inadequate labour (X= 4.88) were identified as the most serious constraints affecting pig farmers in

the study area as their means were greater than the benchmark of three.

The findings of this study agree with the findings Ajieh and Okwuolu (2015) in Delta State who reported that high feed cost, high cost of improved breeding stock and high cost of labour were the significant constraints of the pig farmers in the study area.

**Table 4: Constraints Faced by Pig Farmers in the Study Area**

<b>Constraints</b>	<b>Mean</b>
Outbreak of Diseases	1.69
High cost of feeds	4.79*
Water scarcity	1.95
Inadequate labour	4.88*
High mortality rate	2.75
Inadequate finance	4.20*
Unavailability of land	3.51*
High cost of transportation	1.87
Lack of government aid	4.23*
Poor housing	1.95
Lack of market products	1.67
High cost of improved piglet stock	4.23*
Poor extension services	1.74
Inadequate sewage system	4.04*

**Decision Rule: \*Serious (Mean > 3)**

**Source: Field Survey, 2018.**

#### **CONCLUSION**

This study analysed the Profitability of Pig Production in Edo South Agro-ecological Zone of Edo State, Nigeria. It was concluded that pig production in the study area was dominated by male farmers and majority of farmers were within the active age. The study showed that pig production was a profitable venture in the study area. The significant

determinants of profit in the study area were age, cost of feed and fixed cost. The significant constraints to pig production were high cost of feeds, high cost of improved breeding stock, land unavailability, lack of government aid, inadequate finance, poor sewage systems and inadequate labour. The study recommends that the farmers form co-operatives, so they can pool resources to finance their

businesses due to the high cost of feed and other variable inputs used in production. Policies that would ease land acquisition by pig farmers should be enacted by the government. This is because the findings of this research show that land unavailability was a serious constraint faced by pig farmers in the study area.

## REFERENCES

- Abiodun E.O, Omotoso O.O, and Olusegun K.S (2017). Economic Analysis and the Determinants of Pig Production in Ogun State, Nigeria: *Journal of Agricultura Tropica Et Subtropica*, 50/2, 61–70, 2017
- Agada .E.S(1991). Economic analysis of swine production. A study of two local government areas in Kaduna State, Nigeria (B.Sc. Thesis). Department of Agricultural Economics and Farm Management, University of Ilorin, Ilorin, Kwara State, Nigeria:
- Ajala M. K. (2007). Analysis of factors affecting the management of pigs in Kaduna State. Nigeria. *Agricultural Journal* 2(2): 343 – 347.
- Ajieh, P. C. and Okwuolu, U. (2015). Constraints and Strategies for Enhancing Pig Production in Delta State, Nigeria. *Global Journal of Science Frontier Research*. Volume 15, Issue 8, Version 1: p46 - p51
- Anukwu, M. I., and Ebong, V. O. (2011). Analysis of the Performance of Piggery Loan Beneficiaries in the Integrated Farmers Scheme of Akwalbom State: A Case of Uyo Agricultural Zone: *Nigerian Journal of Agriculture, Food and Environment*. 7(3):73-79.
- Aminu F. O., and Akhigbe-Ahonkha C. E. (2011). Profitability and Technical Efficiency of Pig Production in Nigeria: the Case of Ekiti State Department of Agricultural Technology, Yaba College of Technology, P. M. B. 2011, Yaba, Lagos State, Nigeria, *Agricultura Tropica Et Subtropica* Vol. 50 (1) 2017.
- Duniya, K.P., Akpoko, J.G., Oyakhilomen, O., and Nandi J.A. (2013). Measurement of Pig Production Profitability in ZangonKataf and Jema'a Local Government Areas of Kaduna State, Nigeria: *British Journal of Applied Science & Technology*. 3(4): 1455-1463.
- Food and Agricultural Organization (F.A.O.) (2006). Animal production and consumption indices in Africa. Rome, Italy. PP. 50-68.
- Igwe, K., Ifekaonwu, A., Amao, S. and Igwe, C. (2013). Determinants of Output among Pig Farmers in Abia State, Nigeria: *Journal of Biology, Agriculture and Healthcare*, Vol.3, No.17.
- Oguniyi L. T., and Omotoso O. A. (2011). Economic analysis of swine production in Nigeria: A case study of Ibadan zone of Oyo State. *Journal of Human Ecology*, 35(2): 137-142.
- Osondu C. K., Ijioma, J.C., Anyiro, C. O., and Obike K. (2014). Economic analysis of pig production in Abia State, Nigeria: *International Journal of Applied Research and Technology* 3: 3–10.
- ProCon (2012). Per capita meat consumption of 177 countries in 2007. Accessed on April, 4, 2016 from <http://vegetarian.procon.org/view.resource>.
- Rahman S., Barthakur S., and Kalita G. (2008). Pig production and management system in Aizawl district of Mizoram, India: *Healthcare* 95, 5 p.
- Uddin, I. O. and Osasogie, D. I. (2016). Constraints of Pig Production in Nigeria: A Case Study of Edo Central Agricultural Zone of Edo State. *Asian Research Journal of Agriculture*, 2(4): 1-7, 2016.
- Ugbomoiko, U. S., Ariza L., Heukelbach J. (2008). “Pigs are the most important animal reservoir of Tunga penetrans (jigger flea) in a rural Nigeria”: *Tropical Doctor* 38(4): 226 – 227.
- Umeh J. C., Ogbanje C., and Adejo M. A. (2015). Technical efficiency analysis of pig production: A sustainable animal protein augmentation for Nigerians. *Journal of Advanced Agricultural Technologies* 2: 19–24.
- World Health Organization (W. H. O.) (2007), Protein and amino acid requirements in human nutrition: report of a joint FAO/WHO/UNU expert consultation, World Health Organisation, technical report series, no.935. [http://apps.who.int/iris/bitstream/10665/43411/1/WHO\\_TRS\\_935\\_eng.pdf?ua=1](http://apps.who.int/iris/bitstream/10665/43411/1/WHO_TRS_935_eng.pdf?ua=1)