



Economic Analysis of Swine Production in Osun State, Nigeria

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Abstract

Pork plays a very important role in bridging the protein gap in Nigeria by increasing the potential of protein intake in households. This study aimed to determine the socio-economic characteristics, costs, returns and the constraints affecting swine production in Osun State, Nigeria. Primary data were collected with the aid of well-structured questionnaires from 100 respondents using multistage sampling techniques. Data were analysed using descriptive statistics and budgetary analysis. The results showed that most (82 %) of the respondents were male, married (84 %), had tertiary education (68 %), have family size 4-6 (72 %), had more than 5 years' experience (70 %), kept 50-150 (62 %), had no access to formal credit (58 %), were not visited by extension agents (62 %) and 86 per cent got their replacement stock from on-farm birth. Budgetary analysis revealed that average revenue per farmer was ₦ 2,134,575.00; Gross margin was ₦ 693,238.00 and Net Farm Income was ₦ 641,094.00. The major constraints facing swine production are feeding cost, cost of medication, lack of fund. It was concluded that swine production is a profitable business.

Keywords: Budgetary, Economics, Osun, Production, Swine

Introduction

Agriculture is considered a major sector of Nigeria's economy. It is a source of employment and accounts for more than one-third of the total Gross Domestic Product (GDP) and labour force (FAO, 2003). As a result of the ever increasing human population in Nigeria and virtually static agricultural productivity, the animal protein consumption among Nigerians has worsened in the past few years (Okpor, 2009). The FAO (2003) recommended that on the average basis, a man's daily protein intake should be between 65-75g and 53 % should be animal-based. However, the average daily intake in Nigeria has been found to be below this level. Ajala *et al.* (2007) observed that only 8.4g of the recommended 53.8g of protein consumption levels of Nigerians is derived from animal sources which means there is

less than 16% contribution of animal products to protein consumption of Nigerians. Studies by Ogunniyi and Omoteso (2011) revealed that animal protein has become a luxury instead of a dietary necessity since only a certain class of citizens find it convenient to buy. Ugwu (2006) observed that animal protein, apart from its palatability, is essential for normal physical and mental development of man. In view of this, there is a need to increase the production of domestic animals which are conventional sources of animal protein. Pigs have some desirable characteristics (especially its prolificacy) which make it a good species of animals to multiply extensively to supply animal protein shortages.

A study by Ogunniyi and Omoteso (2011) showed that the neglect or slow growth of the swine industry can be attributed to reasons which include religion, acceptability and above all, management

problems. Social factors that could influence pig production in Nigeria include a general preference for ruminant meat and lack of incentives for investing in large scale pig production due to economic and political factors. There's also a popular belief that pigs are filthy and pose hazard to health because some people are of the belief that pork has too much fat. This is untrue for pigs that are produced under modern intensive husbandry production techniques as pigs can be very clean animals (Ajala *et al.*, 2007) and when fed properly, can have low back fat content. Another important reason is the presence of a large population of Muslims in Nigeria especially in the northern part where eating of pork is a religious taboo.

Nevertheless, swine production has contributed to the socio-economic development of Nigerians through improved income, employment, improved nutrition and wellbeing of the farmers. Pig is an omnivore which in some respect competes with man for food but is also efficient utiliser of by-products and waste from human feeding. One of the major advantages of pigs is their ability to convert different kinds of feed including kitchen waste to meat (Rahman *et al.*, 2008). Another noticeable advantage pig has over other livestock species is good feed-to-meat conversion. Considering general feed conversion, pig is the most efficient farm animal in the conversion of feed energy to body energy (Umeh *et al.*, 2015). This gives them a rapid growth rate and leads to early maturity. The high rate of productivity is another major advantage of pigs. They are highly prolific, polyestrous and capable of producing up to 2-2.5 litters per year (Litter per sow is 9.96) which is as a result of their short gestation period that is between 3-

4months (Okoli, 2006). They have higher carcass weight compared to other red meats producing animals. MSUE (2011) revealed that the pig is a more efficient carcass yielder than cattle, sheep or goat and has an average dressing percentage of about 70 % compared to 62 % for cattle and 50 % for sheep and goat. In addition to this, pig carcasses have a smaller proportion of bones and higher proportion of edible meat. Pig manure is a valuable fertiliser and can be aerobically digested to produce cooking gas. It also stimulates the growth of micro-organisms for feeding fresh water fish and ducks (Okoli, 2006).

In view of the above, the study examined the socio-economic characteristics of pig farmers, evaluated the cost benefit ratio and identified the constraints of swine production among farmers in the study area. Understanding the profitability and constraints associated with swine farming can help improve productivity and gains in swine production. An increase in output will help to meet the present demand for animal protein in Nigeria and in turn increase the profit of farmers. This would make financial institutions willing to give loan to swine farmers with the assurance of getting their money back with interest in due time.

Materials and Methods

The study was conducted in Osun State, Nigeria. The state is located in south west Nigeria and lies within Latitude 7.0° and 9.0° and Longitude 2.8° and 6.8°. Osun State is one of the six states that make up the south west geo-political zone in Nigeria. It has interstate boundaries with Ondo State to the south east, Kwara State to the North, Ekiti State to the north east, Oyo State to the West and Ogun State to the south west.

Osun State has a landmass of 9,251 km². The state has a considerable number of highly urban settlements with a population of about 3,423,535 inhabitants, representing 2.45% of Nigeria's total population. In the rural areas, majority of the inhabitants are farmers cultivating both food and cash crops and rearing livestock while in the urban areas, they are mostly traders, artisans and civil servants.

A multi-stage random sampling procedure was used to collect data from the farmers. The first stage was a purposive selection of Osun East Senatorial district because of the intensity of livestock rearing in the area. The second was the selection of two Local Government Areas (LGAs): Ife Central and Ilesa East Local Government Areas using simple random sampling. The third involved the random selection of five villages from each of the two LGAs. The fourth and final stage was the selection of ten farmers from each of the villages using simple random sampling. This gave a total of 50 respondents from each of the selected LGAs and a sum total of 100 respondents in all.

The primary data were collected using well-structured questionnaires on socio-economic characteristics of the respondents, physical quantities and prices of inputs and output in the area during 2016/17 production season. Data collected were analysed using descriptive statistics and budgetary analysis. Budgetary analysis involves estimation of gross revenue and total cost of production period. The difference between the two estimates gives a measure of net income (Kainga and Seiyabo, 2012). The budgetary model enables the analyst to assess the profitability or otherwise of an agricultural production system. The model delineates

the cost and revenue structure of a production system with a view to estimating its income-generating potential or profitability.

A total farm budget approach was adopted to estimate cost and returns accruing to each of the farmer. A budget can be defined as the quantitative expression of total farm plan, summarising the income, cost and profit. Also the Gross Margin (GM) which is the difference between Total Revenue (TR) and Total Variable Costs (TVC) was calculated. Total Cost (TC) which is the sum of the Total Variable Cost (TVC) and the Total Fixed Cost (TFC) was also evaluated.

$$TC = TVC + TFC \dots\dots\dots (1)$$

$$TR = P \times Q \dots\dots\dots (2)$$

$$GM = TR - TVC \dots\dots\dots (3)$$

$$\text{Profit } (\pi) = TR - TC \dots\dots\dots (4)$$

Total Variable Cost which is also referred to as the operating cost, is the cost incurred in the purchase of inputs like fertiliser, pesticides, wages paid to labour for different farm operations and the cost incurred in the purchase of farm implements. Total revenue is the sum of all income generated from the sale of all farm output.

Results and Discussion

Social-economic characteristics of the respondents

As indicated in Table 1 only 54 % of the respondents were below 50 years of age and 46 % were above 50. The mean age was 42.6±29.08. This implies that majority of the pig farmers were in their active years. These findings agree with that of Ogunniyi and Omoteso (2011) and Osondu *et al.* (2014) who both reported an average age of 41.38 and 44.38 respectively for swine

farmers. It was observed that majority (82 %) of the respondents were males while only a few (18 %) were females. This is in consonance with Osondu *et al.* (2014) who reported 81.66 % (male) and 18.34 % (female). The reason for a larger number of males compared to that of females in swine farming may be due to the rigours involved in swine farming. Also it is believed that females are more involved in the sales aspect rather than the production aspect. Majority (84 %) of the respondents were married, 12 % were single while the divorced and widowed constituted 2 % each. This agrees with the findings of Umeh *et al.* (2015) who reported 83.3 % married, 10 % single and 6.7 % widowed or divorced among pig farmers. This result implies that majority of the respondents in the study area were married and therefore had the opportunity of getting assistance from their spouses. This is also a reflection of the strong moral values attached to the marriage institution in the study area.

Majority (68 %) of the respondents had tertiary education while 14 % had secondary education. The remaining (12 and 6 %) had just primary and non-formal education respectively (Table 1). This implies that majority of the respondents are well educated and this assists them to take informed decisions on their farming activities for higher productivity. This agrees with findings of Oni (2014) who indicated that high literacy is evident among swine farmers. The average household size was 5.1 ± 1.77 . This result indicates a relatively high household size and this will enhance the availability of family labour for swine farming. The mean years of experience of swine farmers in the study area was 11.5 ± 9.66 suggesting that swine farmers in the area are not new to the

enterprise and are more likely to make better decisions to enhance productivity and profit. This finding conforms to that of Umeh *et al.* (2015) who reported an average number of years of swine farmers' experience to be 11.08 years.

The mean size of production was 96.1 ± 77.14 implying that swine farming is dominated by medium scale farmers. More than half (58 %) of the respondents had no access to formal credit. This implies that policy makers need to sensitise formal institutions on the profitability of swine farming. This agrees with the findings of Osondu *et al.* (2014) who reported that majority of swine farmers had no access to formal credits. The study revealed that majority (86 %) of the farmers got their replacement stock by on-farm births while 14 % got theirs from both birth and purchase. This finding implies that farmers prefer a cheaper way of restocking and have trust in the offspring of their old stock implying that research institutes were not patronized for replacement stock.

Cost and returns (?) in swine farming

The estimated total cost of production was ₦ 1,493,480.00 and total return was ₦ 2,134,575.00 to individual swine farmers in the enterprise (Table 2). The variable inputs were breeding stock, feed, drugs/vaccines and medications, electricity, fuel and transportation, labour, repairs and other costs. Feed constituted the highest percentage (76.62 %) of the total cost. This is in line with reports by Ogunniyi and Omoteso (2011) that feeding constitutes the largest percentage of variable cost in swine production. This was followed by labour (6.40%), fuel and transportation (5.32 %), medication (3.21 %) repairs and other costs (2.9 %), breeding stock (2.0 %) while

Table 1: Socio-economic characteristics of swine farmers in Osun State, Nigeria

Parameter	Frequency	Percentage	Mean
Age range (Years)			
< 30	8	8.0	
30 - 39	14	14.0	42.6
40 - 49	32	32.0	
50 – 59	36	36.0	
>60	10	10.0	
Gender			
Male	82	82.0	
Female	18	18.0	
Marital status			
Married	84	84.0	5.1
Single	12	12.0	
Divorced	2	2.0	
Widowed	2	2.0	
Size of household			
1 - 3	12	12.0	
4 - 6	72	72.0	11.5
7 - 9	16	16.0	
Level of education			
No formal education	6	6.0	96.1
Primary education	12	12.0	
Secondary education	14	14.0	
Tertiary education	68	68.0	
Farming experience			
1-5	30	30.0	
6-10	34	34.0	
11-15	10	10.0	
>15	26	26.0	
Scale of swine production			
<50			
50 – 150	18	18.0	
>150	62	62.0	
Access to formal credits	20	20.0	
Yes			
No	42	42.0	
Source of replacement stock	58	58.0	
Birth	86	86.0	
Purchase	0	0	
Inheritance	0	0	
Gift	0	0	
Birth and Purchase	14	14	

Source: Field Survey, 2017

electricity constituted the least cost (0.1 %). Sharma *et al* (1997), Adetunji and Adeyemo (2012) reported that labour is a key factor in profitability of pig business in Haiti and Nigeria respectively. The Net Farm Income (NFI) per farm was ₦ 641,094.00 while Gross Margin was ₦ 693,238.00. The Profitability Index was 0.30 while Rate of Return on Investment (RRI) was 42.9. This implies that for every Naira invested in the swine farming enterprise, there was a return

of ₦ 42.9 to the enterprise. Operating Expenses Ratio (OER) was 67.52. This indicates that 67.52 % of revenue was used to cover operating expenses and the remaining 32.48 % was the farmer's equity. The Capital Turnover Value (CTV) was 3.08. This implies that for every Naira invested in swine production, ₦ 3.08 was returned as farm revenue. These measures of performance show that swine production enterprise is viable. This corroborated the

Table 2: Average costs and returns (₦ per farmer) of swine farmers in Osun State, Nigeria

S/N	Item	Mean amount(₦)	Percentage of Revenue/Costs
1	REVENUE		
I	4743.5kg of live pigs at ₦450 per kg	2,134,575	
A	Total Revenue (TR)	2,134,575	
2	VARIABLE COST		
I	Breeding stock	29,178	1.95
Ii	Feeds	1,144,356	76.62
Iii	Medication	47,882	3.21
Iv	Electricity	1,504	0.10
V	Fuel/Transportation	79,656	5.33
Vi	Labour	95,560	6.40
Vii	Repairs and other costs	43200	2.89
B	Total Variable Cost (TVC)	1,441,336	96.51
C	Gross margin (GM) = (TR – TVC)	693,238	
3	FIXED COST		
I	Depreciation on building	38,544	2.58
Ii	Depreciation on reservoir	600	0.04
Iii	Opportunity cost of land	13,000	0.87
D	Total Fixed Cost (TFC)	52,144	3.49
E	Total Cost (TC) = (TFC + TVC)	1,493,480	
F	Net Farm Income (NFI) = (TR – TC)	641,094	
G	Rate of Return on Investment (ROI) = F/E * 100		42.93
H	Operating Expenses Ratio (OER) = B/A * 100		67.52
I	Capital Turnover (CTO) = A/C		3.08
J	Profitability Index (PI) = F/A		0.30

Source: Field Survey, 2017

Constraints in Swine Production

Farmers were faced with many problems in the study area. Nine of these problems were analysed and ranked in order of importance (Table 3). They were; poor quality of breeding stock, high cost of feeding, inadequacy of fund, susceptibility to diseases and sensitivity to environmental factors, high cost of drugs and vaccines, loss of swine to theft, disease outbreak, injuries and weather conditions. Similar production constraints were reported by Muhanguzi *et al* (2012) in Uganda; by Petrus *et al* (2011) in Namibia; by Kagira *et al* (2010) in western Kenya. The constraints were on a scale of 1 to 5 in order of importance to individual farmers: Very important problem (1), important problem

(2), less important problem (3), not important problem (4) and not a problem at all (5). This is in line with the study of Nabikyu and Kugonza (2016) who researched on profitability analysis of selected piggery businesses in peri-urban communities of Kampala Uganda.

High cost of feeding ranked first with a mean value of 1.18. This agrees with the earlier findings of Khem *et al* (1997) and Babovic *et al* (2011) who reported increase in feed costs as one of the major challenges in the pig enterprises, which in turn leads to reduction in profits. The assertion is corroborated by Hofstrand (2009) who reported that higher feed prices can quickly convert profits into losses. High cost of drugs and vaccines with a mean value of

Table 3: Constraints in swine production

Variables	Very important problem	Important problem	Less important problem	Not important problem	Not a problem at all	Mean	Rank
Poor quality of breeding stock	4(4.0)	56(56.0)	28(28.0)	12(12.0)	0(0.0)	2.48	4th
High cost of feeding	86(86.0)	12(0.0)	2(0.0)	0(0.0)	0(0.0)	1.18	1st
Inadequate fund	42(42.0)	40(40.0)	18(0.0)	0(0.0)	0(0.0)	1.76	3rd
Susceptibility to disease & env.	0(0.0)	0(0.0)	8(8.0)	92(92.0)	0(0.0)	3.92	6th
High cost of drugs & vaccines	86(86.0)	12(0.0)	2(0.0)	0(0.0)	0(0.0)	1.20	2nd
Loss of swine to theft	0(0.0)	0(0.0)	0(0.0)	8(8.0)	92(92.0)	4.92	9th
Disease outbreak	8(8.0)	0(0.0)	2(2.0)	50(50.0)	40(40.0)	4.14	7th
Injuries	0(0.0)	6(6.0)	30(30.0)	62(62.0)	2(2.0)	3.60	5th
Weather condition	0(0.0)	0(0.0)	8(8.0)	10(10.0)	90(90.0)	4.90	8th

Source: Field survey, 2017

1.20 ranked second. Inadequacy of fund ranked third with a mean value of 1.76. Poor quality of breeding stock ranked fourth with a mean value of 2.48. Injuries ranked fifth with a mean value of 3.60. Susceptibility to diseases and sensitivity to environmental factors ranked sixth with a mean value of 3.92. Disease outbreak ranked seventh with a mean value of 4.14 while weather conditions and theft ranked eighth and ninth respectively with mean values of 4.90 and 4.92 respectively.

Strategies to combat swine production constraints

With the information obtained from the farmers, various strategies have been developed to solve the constraints faced. The problem of high feeding cost was managed by giving animal locally available feedstuff, crop residues and household wastes. High cost of drugs and vaccines though difficult to avoid was reduced through sanitation and cleanliness in the swine house and its surroundings. When in need of capital, funds can be borrowed from friends and family or mature pigs can be sold since there is usually market for them to raise the younger ones. Breeding stock should be sourced from reputable farms with trusted stock if the ones on the farm are not performing to standard. Injuries should be treated as quickly as possible to avoid infection thereby increasing cost of production as medication will need to be administered. Susceptibility to diseases and environmental factors can also be reduced through proper sanitation. Disease outbreak can be controlled by separating sick animals from the rest of the herd immediately it is noticed. A diagnosis of the disease should be carried out

promptly and when the disease is untreatable the animal should be culled.

Weather conditions are not really a problem for pigs but they can be given more feed in cold weather because some of their feed are used to generate heat. Water pits should be provided in their pens where they can cool off when the weather is hot or the animals can be sprayed with water by the farmer in the absence of that. The problem of theft can be controlled by fencing the pens but almost all the farmers claimed their pigs never get stolen.

Conclusion

Based on the findings from the study, it was concluded that majority of the pig farmers were males below 50 years of age, married, had household size above 5, and had tertiary education. The largest proportion of swine production was on medium scale. Most had no access to formal credits facilities, were not visited by extension agents and got their replacement stock through on-farm births. It was also revealed through the budgetary analysis that swine production is a profitable enterprise. The main problems facing swine production in order of importance were high cost of feeding, high cost of drugs and vaccines, inadequacy of fund, poor quality of breeding stock, injuries, susceptibility to diseases and sensitivity to environmental factors, disease outbreak, weather conditions and theft.

Recommendations

Based on the findings from this study, the following recommendations were made in order to improve the profitability of swine production in Osun State, Nigeria. Government should establish feed mills to help in the production of swine feeds so as to reduce scarcity and hence help bring down

the cost of feeds which is the major constraint in swine production.

Extension workers should be adequately equipped so that they can make regular visits to swine farms. This will increase their level of productivity through the information given to farmers for improvement in their profits.

Breeding stock should be got from reliable source to ensure the production of good and viable offspring. Research institutes can be contacted for good stock.

Credit facilities should be made available with low interest rate so that fund will be readily available to swine farmers to expand their enterprise or for a start-up.

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