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ECONOMIC ANALYSIS OF LOCAL SWINE PRODUCTION AMONG SMALL SCALE FARMERS IN KABBA/BUNU LOCAL GOVERNMENT AREA OF KOGI STATE, NIGERIA

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Abstract

This study investigated the economic analysis of swine production in Kabba-Bunu Local Government Area of Kogi State. Specifically, the study described the socio-economic characteristics of swine farmers, determined the effect of some selected socio-economic variables on the farm income of swine producers, estimated the cost and return of swine production, and identified the problems faced by swine farmers in the study area. A total of 50 swine farmers were purposively selected from; Iyah, Otu, Kakun, Ogbagba, Ayegunle Igun, Odo ape, and Okebukun. Data collected through structured questionnaire were analyzed using descriptive statistics, multiple regression analysis, gross margin analysis and mean score. The results showed that swine production in the study area was generally practiced by farmers in their active labour age of 48 years and an average swine farming experience of 10 years. Access to extension services was low. The regression analysis showed that education and stock size were directly related to income of swine farmers and significant at 5% and 1% respectively. Swine production in the area was profitable with a positive gross margin of ₦44, 171 and a benefit cost ratio of ₦2.49k. The major problems affecting swine production in the area are: high cost of feed (M=2.84), high cost of veterinary drugs (M=2.82), parasitic infection (M =2.70), inadequate capital (M=2.42) and inadequate extension services (M=2.4). It was recommended that adult education be provided to swine farmers. Also, veterinary and extension services should be provided to expand the scale of business and for swine farmers to take advantage of economies of scale in their production activities.

Keywords: Income, Local, Pork, Protein, Swine, Turnover

INTRODUCTION

The demand for protein products to measure up with the geometric rate of population growth in Nigeria has been on the increase in recent time. Deficiency of protein in diet produces such diseases as kwashiorkor and miasma (Ogunniyi and Omoteso, 2011). Swine meat (pork) is a very important source of animal protein in human diets. Many Nigerians feed on carbohydrate, because the average man cannot afford the cost of animal protein which is richer in amino acid (Ezeibe, 2009). According to Ajala (2007), animal protein in Nigeria includes beef, milk, pork, poultry, sheep, goats and game animals. Of these sources,

pork represents one of the fastest ways of increasing animal protein. Food and Agricultural Organization (FAO) recommended that the minimum daily protein intake by an average person should be 65 grammes. However, the animal protein consumption in Nigeria is less than 8 grammes per person per day, which is far below the recommended rate (Niang and Jubrin, 2001).

Swine production has quick turnover on investment with a gestation period of only one hundred and fourteen days, an average litter size at birth above seven, pre-weaning age of six weeks, and a high growth rate. It is one of the most productive livestock species. Swine output (yield of meat/tone of live weight of breeding females per year) is about six times that of cattle (Mpofu and Makuza, 2003). Swine production could be regarded as the 'magic bullet' to protein inadequacy due to certain attributes which are not easily found in other domestic livestock. About 40% of the world meat protein consumption is derived from pork and pork products (FAO, 2001). However, its production has little prominence among rural farmers in some parts of Nigeria due to religious belief, low capital, technical know-how, and disease outbreak.

Empirical evidence on the economic implications of swine production in Nigeria abounds (Ajala *et al.,* 2007; Adetunji and Adeyemo, 2011; Ajala, 2007; Ajala *et al.*, 2007; Ezeibe, 2009; Ironkwe and Amefule, 2008; Ogunniyi and Omoteso, 2011). Such evidence, however, are scanty in Kogi state. Farmers in Kogi state and particularly, the study area are no exemption with regards to low swine rearing. Perhaps, as a result of low economic value attached to its production. Indicatively, swine production in the state and the study area could be increased with empirical evidence on its economic value vis-à-vis the level of turnover.

The study principally focused on economic analysis of swine production in Kabba/Bunu Local Government Area of Kogi State, Nigeria. The specific objectives are to: describe the socioeconomic characteristics of swine producers, determine the effect of selected socioeconomic variables on farm income of swine producers, estimate the costs and return in swine production, and identified the major problems faced by swine producers in the study area.

MATERIALS AND METHOD

The study area

The study was carried out in Kabba/Bunu Local Government Area (LGA) of Kogi State, Nigeria. It is located in the western senatorial district of Kogi State. The local government was created in 1991 with its headquarters at Kabba. It has 16 wards: Okekoko, Odolu, Asuta, Egbeda, Oke-Bukun, Aiyewa, Aiyetoro, Akutupa-kiri, Iluke, Olle-Okeoffin, Aiyeteju, Kajola, Okedayo, Otu, Bolorunduro, and Odo-Akete. The local government has common boundary with Ijumu, Lokoja, Adavi, Okehi, and Mopa/muro local government areas. The people speak Okun as their major dialect. The Local Government Area has a land mass of 2,748km^2 and a population of 145,446 (National Population Commission, 2006). Kabba-Bunu local government area lies within latitude 7^0N and 31^0N and longitude $5^0$41'E and 6^0E. The area is in the guinea savanna zone with thick forest and experience the wet and dry season. The wet

season begins from April and ends in October while the dry season is between November and March. The annual temperature varies between 27^0C and 37^0C with relative humidity between 30% and 40% in January and rising between 70% and 80% in July to August. The soil in the study area is predominantly sandy loam in texture. The major crops cultivated in the area are maize, cassava, yam, pawpaw, citrus, oil palm, coffee and guava. Major livestock reared are swine, sheep and goat, cattle, turkey and poultry. The people of this area are also involved in economic activities like trading and food processing. Small-scale industries such as garri processing, cloth weaving and soap making are on the increase in the area.

Population and Sampling Procedure

The target population for the study includes swine producers in Kabba-Bunu local government area of Kogi state, Nigeria. The LGA has three districts: Kabba Township, Bunu, and Ikowa Opa. Seven (7) villages were purposively selected from the districts. These villages were selected due to their greater involvement in swine production. The selected villages are; Iyah, Otu, Kakun, Ogbagba, Ayegunle- gun, Odo-Ape, and Oke-Bukun. A sample size of fifty (50) swine farmers were randomly selected for the study.

DATA COLLECTION AND ANALYSIS

Primary data used for the study were obtained through structured questionnaire. Data obtained were analysed using descriptive statistics, Ordinary Least Square (OLS) multiple regression analysis, gross margin analysis, and mean score from Likert type of scale.

Model Specification

(a) OLS multiple regression analysis

Three functional forms: linear, semi-log and double log were tried and the lead equation chosen based on econometric criteria such as number of significant variables, F-value, value of the coefficient of determination (R^2) and conformity with *apriori* expectation. The OLS model used is specified below:

$Y=f\ (Xs)$

$Y= f(X_1, X_2, X_3, X_4, X_5, e_i)$

Linear form

$Y = \alpha + \beta_1X_1+\beta_2X_2+ \beta_3X_3+ \beta_4X_4+ \beta_5X_5+\mu$

Semi-logarithm form

$Y = \alpha + ln\beta_1X_1+ln\beta_2X_2+ ln\beta_3X_3+ ln\beta_4X_4+ ln\beta_5X_5+\mu$

Double-logarithm form

$lnY= \alpha + ln\beta_1X_1+ln\beta_2X_2+ ln\beta_3X_3+ ln\beta_4X_4+ ln\beta_5X_5+\mu$

Where:

Y= Income from swine production (naira)

X_1 = Household size (number)

X_2 = Age (years)

X_3 = Number of swine

X_4 = Years spent schooling (years)

X_5 = Farming experience (years)

μ = error term

α = intercept and β represents the coefficient of the explanatory variables.

(b) Gross margin analysis

Gross margin is the excess of sales revenue over purchase. The purpose of gross margin is to determine the value of incremental sales, and to guide pricing and promotion decision (Arene, 2003). Gross margin is specified as follows;

GM = TR – TVC

Where GM = Gross Margin
TR = Total Revenue
TVC = Total Variable Cost
NR=TR- TC
Where NR =Net revenue, TR =Total revenue, TC = Total cost
TC =TVC +TFC
Where TC = Total cost, TVC = Total variable cost. TFC = Total fixed cost
BCR = TR/TC
Where BCR = Benefit cost ratio, TR = Total revenue, TC =Total cost
It is believed that if a business can recover its variable cost, then it is capable of continuing in the short run.

(c) Mean score

Likert scale was developed by Rensis Likert in the 1930s to measure the mean scores of variables. The mean scores were obtained after respondents' responses are gathered using the three point Likert type of scale. Likert type of scale was used to identify the major constraints faced by swine farmers as specified below:

Opinion	Point
Very Serious (VS)	3
Serious (S)	2
Not Serious (NS)	1

The mean response to each item was calculated using the following formula:

$$\bar{X} = \frac{\sum FX}{N}$$

Where: $\bar{X}$ = means response, $\sum$ = summation, F = number of respondents choosing a particular scale point, X = numerical value of the scale point and N = total number of respondents to the item

Decision Rule: the mean of these weights is 2 [(3 + 2 + 1) ÷ 3 = 2]. A mean score of 2 or more implied a serious constraint.

RESULTS AND DISCUSSION

Socioeconomic characteristics of swine producers

The socioeconomic characteristics of swine farmers in the study area are presented in Table 1. Results in Table 1 shows a productive mean age of 48 years among swine farmers. This age is an indication that most of the respondents still possess the necessary energy required for swine management for optimum output. This finding agrees with the suggestion of Mischra and Goodwin (2005) that younger people are more adventurous with more productivity than older farmers. Furthermore, 82% of the respondents were married with an average household size of 7 members. Marriage could be seenas an evidence for responsibility and readiness to settle for a particular profession. Family members could serve as source of labour for increased production. Another important indicator among the respondents is religion. Results in Table 1 shows that 100% of the respondents were of the Christian believe. This finding is not surprising sequel to religious believe that relatively prohibit the Muslim faithful from swine consumption. However, it will not be out of place for Muslim farmers to be involved in swine production in as much as they may probably not consume the products. Perhaps, it could be reared for commercial purpose.

The mean number of years spent in school was 4 years which is less than the required number of years required for the completion

of primary education (First School Leaving Certificate). It is obvious that the educational standard of the respondents are generally low. However, Oladele, (2005) reported that farmers who were exposed to formal education and information have high propensity towards improvement of swine production than those with less exposure. Table 1 further show that swine farmers in the area were involved in swine production over an average of 10 years. Experience increases technical know-how necessary for increased production. Experience is also an indicator of a profitable venture as it is a common knowledge that no one will remain in an unprofitable enterprise for a longer period of time.

Effect of selected socioeconomic characteristics on the farm income of swine farmers

The OLS estimated regression result on the effect of selected socioeconomic variables on the farm income of swine producers are presented in Table 2. Output of the double-log functional form was chosen as the lead equation. Hence, explanation is based on the result of double-log model. The coefficient of determination (R^2) was 0.699, implying that about 70% of the variation in the income of swine farmers was explained by the independent variables. The remaining 30% could be attributed to error term. The F-value shows the significance of the entire mode.

Number of years spent schooling shows a direct relationship with swine farmers' income. The relationship was significant at 5%. This implies that the higher the number of years spent schooling, the higher the income of farmers from swine production. As farmers get advanced in their educational qualification, there is every possibility for an increase in the acceptance and adoption of agricultural innovations which are primarily aimed at profit maximization and cost minimization. This confirms the report of Oladele, (2005) that farmers who were exposed to formal education and information have high propensity towards improvement of swine production than those with less exposure. Furthermore, number of swine reared by farmers showed a positive relationship with farmers' income. The relationship was significant at 1%. The direct relationship implies that the higher the number of swine reared the higher the income from swine production. This is in line with the *apriori* expectation.

Costs and return in swine production

Gross margin analysis of swine production in the area is presented in Table 3. The variable costis made up of cost of; piglet stock, labour, drug/ veterinary services, feed, dipping, processing, and transportation. The average total variable cost was ₦16, 339.40k. The fixed cost of production was obtained from the depreciation of fixed assets used in production- equipment, land, farrowing crates, and pen. The assets were depreciated using the straight-line method and the average total fixed cost amounted to ₦ 7,914. Total cost was₦ 24,253. The gross margin was ₦ 44,171 with a net profit of ₦ 36,257. A positive gross margin is an indication that swine production in the study area is profitable, since it is believed that if a business can recover its variables cost, then, it is capable of continuing in the short run. Benefit cost ratio of 2.49 implies that every

₦1 invested in swine production generate revenue of ₦2.49k. This is an indication that swine production in the study area is economically viable.

Constraints in Swine Production

Table 4 seeks to find the opinion of swine farmers on the major constraints encountered in swine production in the area. The result shows that the major constraints encountered by swine producers and their corresponding mean score include: high cost of feed (2.84), high cost of veterinary drugs (2.82), parasitic infection (2.7), inadequate capital (2.42), inadequate extension services (2.4), inadequate processing facilities (2.4), poor record keeping (2.38), disease/infection (2.32), and inadequate veterinary services (2.2).

Finding on feed cost confirms the earlier feed cost recorded in the costs and return analysis were feed accounted for about 36% of the total variable costs. Due to high feed cost, swine producers are forced to use alternative feed source such as bran spent grains. This practice results in poor growth rate and subsequently lower economic returns. This agrees with Chabo *et al.* (2000) who reported feed cost as a major constraint encountered by swine farmers and accounted for approximately 80% of the total cost of production. Swine farmers in the area further agreed to inadequate capital as a major constraint. This could be attributed to their inability in accessing credit facilities from financial institutions. Perhaps, they were not able to provide collateral securities and other requirements. The effect of parasitic infection coupled with inadequate veterinary services and the associated high cost of veterinary drugs resulted in loss of swine. This will invariably reduce the income from swine production. Finding on veterinary services agrees with a report by Presidential Committee on Livestock (PCOL, 2003) which pointed out that livestock diseases in Nigeria accounted for about 40% loss in productivity as a result of poor veterinary services.

Extension service delivery was also said to be inadequate with respect to swine production. Moreki (2009) attributed inadequate extension service delivery to inadequacy of transport and personnel. Extension personnel in the area are not adequately equipped to provide quality service to swine farmers as they have not received specialized training in swine production. However, farmers in the area unequivocally asserted to quality service delivery in other areas such as crop production and other livestock rearing. Moreki and Mphinyane (2011) attributed inadequate extension service delivery to market liberalization and globalization.

CONCLUSION AND RECOMMENDATIONS

The study analysed the socioeconomic factors of swine production in Kabba-Bunu local government area of Kogi state, Nigeria. It can be concluded from the findings that swine production is a profitable and viable enterprise that could enhance the living standard of households. This is evident in a positive gross margin and a benefit cost ratio of 2.49. Indicatively, number of years spent schooling and the number of livestock reared directly influenced the income of swine farmers. However, swine farmers were constrained

with high cost of feed and veterinary drugs/services, parasitic infection, inadequate capital and inadequate extension services.

Based on the findings, the following recommendations are made:

1. Taking into cognizance the effect of education on income and low educational status recorded among the respondents, adult education classes should be established in rural areas by government. This is geared towards increasing their educational status with its multiplier effect on increased income generation.
2. Relaying the viability of swine production, small scale farmers should be encouraged to increase their scale of production. Also, non swine farmers should venture into the enterprise as it requires little capital to start-up.
3. Government at local level should 'activate' their veterinary unit to meet up with the demand of farmers. Additionally, veterinary drugs should be provided to farmers ata subsidized rate.
4. Adequate extension delivery services through public-private partnership should be encouraged by relevant agency. Quality service delivery will enhance swine farmers' knowledge and skills required for efficient production. It will also avail swine farmers the technical know-how on various diseases associated with swine production and how they could be managed.

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Table 1: Socioeconomic Statistics of Swine Farmers

Socioeconomic Variables	**Frequency**	**Percentage**	**Mean**
Age Category (years)			
20 – 40	15	30	
41 – 60	25	50	48 years
Above 60	10	20	
Total	50	100	
Sex			
Male	28	56	
Female	22	44	
Total	50	100	
Marital Status			
Single	2	4	
Married	41	82	
Widow	5	10	
Widower	2	4	
Total	50	100	
Religion			
Christianity	50	100	
Islam	0	0	
Total	50	100	
Family size			
Less than 4	7	14	
4-9	37	74	7 members
10 – 15	6	12	
Total	50	100	
Educational status			
No primary education (0 years)	29	58	
Primary education (1 – 6 years)	3	6	4.4 years
Secondary education (6 – 12 years)	9	18	
Tertiary education (above 12 years)	9	18	
Total	50	100	
Experience (years)			
1 – 5	4	8	
6 – 10	22	44	10 years
11 – 15	17	34	
Above 15	7	14	
Total	50		
Major occupation			
Farming	30	60	
Civil service	9	18	
Trading	11	22	
Total	50	100	
Number of swine reared			
1 – 10	9	18	
11 – 20	35	70	15 swine

Above 20	6	12
Total	50	100
Labour force		
Family labour	19	38
Hired labour	28	56
Both family and hired labour	3	6
Total	50	100
Access to extension service		
Yes	05	10
No	45	90
Total	50	100

Source: Field Survey, 2015

Table 2: Ordinary Least Square (OLS) Estimates on the Effects of Selected Socioeconomic Characteristics on Swine Farmers' Income

Variables	**Linear**	**Semi-log**	**Double-log**
Age (years)	-24.893	-31655.144	-0.315
	(-0.032)	(-1.057)	(-0.634)
Family size (number)	-1772.294	17690.359	0.315
	(-0.718)	(1.345)	(1.444)
Education (years)	1512.621	7648.397	0.145
	(1.65)*	(2.247)**	(2.564)**
Experience (years)	1306.724	-15371.260	0.067
	(0.962)	(-1.50)	(0.395)
Number reared	2119.543	51717.830	0.649
	(4.736)***	(6.187)***	(4.677)***
Constant	17082.583	42949.527	9.507
	(0.474)	(0.418)	(5.572)***
R^2	0.572	0.699	0.699
F-value	11.739***	19.499***	19.537***

Source: Computed from Field Survey, 2015. Note: figures in parenthesis are t- values.
*,**and*** = coefficient significant at 10%, 5% and 1% respectively**.**

Table 3: Average Costs and Returns in Swine Production

Items	**Amount (₦)**
A. Returns	
Adult boar	31, 580
Adult sow	1, 200
Young boar	10, 180
Young sow	360
Piglet	15, 580
Waste	1, 610
Total Revenue (TR)	60, 510
B. Variable Cost	
Piglet	4,280

Labour	3,320
Drugs/veterinary services	2,112
Feed	5,908
Dipping	113
Processing	200
Transportation	406
Total Variable Cost (TVC)	16, 339
C. Fixed Cost	
Depreciation on:	
Equipment	2,422
Land	3,445
Farrowing crate	1,180
Pen	867
Total Fixed Cost (TFC)	7, 914.00
D. Total Cost (TC) = TVC + TFC	24, 253.00
E. Gross Margin = TR – TVC	44, 171.00
F. Net Revenue = TR – TC	36, 257.00
G. Benefit Cost Ratio = TR/TC	2.49

Source: Computed from Field Survey, 2015

Table 4: Opinion distribution on constraints affecting swine farmers

Constraints	**Frequency**			**Mean Score**
	VS	S	NS	
Disease/infection	20	26	04	2.32*
Parasitic infection	36	13	1	2.70*
High cost of feed	44	4	2	2.84*
Inadequate processing facilities	35	0	15	2.40*
High mortality rate	2	14	34	1.36
Inadequate extension services	24	22	04	2.40*
Inadequate veterinary services	12	36	02	2.20*
Poor record keeping	26	17	07	2.38*
High cost of veterinary drugs	42	07	01	2.82*
Inadequate capital	29	13	08	2.42*
Seasonality of market	01	07	42	1.18
High cost of labour	06	07	37	1.38

Source: Computed from Field Survey, 2015 * = serious constraints