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Factors Associated with the Choice of Pig Farming Enterprise among Smallholder Farmers in Ekiti State, Nigeria

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Abstract: Pig production has been advocated as a short term measure towards alleviating animal protein and calorie deficit, especially where there are no religious edicts preventing its production and consumption. The study examined the factors associated with the choice of pig farming enterprise among smallholder farmers in Ekiti State. Specifically, the study described the socio-economic characteristics of the respondents, perception of the respondents, cost and returns of pig farming, constraints to pig farming and the factors influencing the choice of pig farming among the respondents. A multi-stage sampling procedure was employed to elicit information from 80 pig farmers with the use of a well-structured questionnaire. The data collected were analyzed using descriptive statistics such as frequency counts, percentages and mean, a 3-point Likert scale, Gross Margin Analysis and linear regression analysis. Findings revealed that majority (82.5%) of the respondents were male with mean age 64 years and household size of 4 persons. Farming was the main source of livelihood of the respondents and they have about 25.3 years of farming experience. Most (68.8%) of the respondents were literate and 63.75 percent of them uses hired labour while the average farm size of the respondents was 93 pigs. Majority (92.2%) of the respondents have favourable perception on pig farming. The cost and return analysis shows that, the total cost incurred in one production year was ₦1,092,500.00 and the total revenue was ₦3,605,550.00. The Net profit was ₦2,513,050.00 and the Gross return was 0.30, while the rate of returns was 2.30. The Benefit Cost Ratio was 3.30 and this implies that pig farming is a profitable enterprise. The linear regression analysis shows that marital status (t=2.813), educational background (t=5.04), farm size (t=-1.81), revenue (t=4.83) and variable cost (t=-7.33) were the factors associated with the choice of pig farming enterprise in the study area. Difficulties in securing loan, lack of extension advisory services, high cost of feed and feed ingredients, unregulated market price and high cost of transportation were the constraints to pig farming in the study area. It is therefore recommended that policies should be made to encourage and educate female and youths on the enormous potentials of pig farming as well as subsidized feed ingredients to reduce the cost of feeds.

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1. Introduction

The increasing population in Nigeria has significantly affect demand for animal protein and this led to low supply of meat. This dearth of animal protein intake is partly due to the high cost of conventional sources of meat like cattle, goat, sheep and poultry (Ironkwe and Amefule, 2008). It is expedient to search for a low-cost source of meat to meet the ever increasing demand for animal protein. This quest can only be met by short-cycled animals such as rabbits, poultry and pigs. Pigs have been described as one of the most prolific and fast growing livestock that can convert food waste to valuable products, it has a tender meat, good alternative source of cheap, high quality animal nutritive protein and vitamin B that suits escalating human population and adapt easily to environmental conditions (Bamiyi, 2013). Pig surpass other red meat animals such as cattle, sheep and goat in converting feed to flesh and the annual growth rate (3.8%) is higher than that of the human population (2.3 – 2.8%) (Ajala and Osuhor, 2004). Hence, pig production has high potentials to contribute to the economy of the nation and it has been advocated as a short term measure towards

lessening the animal protein and calorie deficit, especially where there are no religious edicts inhibiting its production and consumption (Uddin and Osasogie, 2016).

In spite of the potentials of pig farming in Nigeria, it is yet to be developed like ruminants and poultry farming. The laxity in growth of pig farming could be attributed to acceptability and management challenges, such as disease outbreak, feed inefficiency, high cost of feed and feed ingredients, inadequate handling knowledge and skills, inadequate veterinary services, high level of inbreeding and marketing. The hitches from these are poor animal production, limited supplies and low intake of animal protein and thus malnutrition. Onwumere (2008) affirmed that educational background, high cost of production in terms feed and feed ingredients and lack of extension services delivery are some of the major challenges of pig farming. Enhancement in quantity and quality of pig will go a long way in meeting the nutritional requirement of Nigerians and it will also reduce the colossal bill, resulting from the importation of animals and animal products. Such improvement will bridge the gap between animal protein production and consumption with resultant benefits to improve rural employment and income. In light of the aforementioned, this study proffered answers to the following research questions. What are the socio-economic characteristics of the respondents? What is the perception of the pig farmers on pig farming? What are the cost and returns of pig farming? What are the constraints to pig farming among the farmers?

2. Material and Methods

Study Area

This study was carried out in Ekiti State. The State lies within the tropics between longitude $4°45^1$ and $6°45^1$ East of Greenwich meridian and latitude $6°15^1$ and $8°5^1$ North of equator. The State experiences a typical tropical climate with two different seasons, raining season between April-October while dry season is between November-March. The State shares boundary in the South with Kwara and Kogi States, in the east with Ondo State and in the west with Osun State. The State has a population of about 2,384,212 which represent about 1.7% of the nation's total population with covered land area of 6,353 km^2 (NBS, 2008; NPC, 2006). The average annual rainfall ranges between 2000 mm - 2400 mm, the average annual temperature range from 20^0C - 27^0C and 60% relative humidity. There are sixteen (16) Local Government Areas in the State. Ekiti State was purposively chosen for the study due to increase in population and demand for animal protein.

Sampling Procedure and Sample Size

A total of 80 pig farmers from four (4) Local Government Areas were selected using a multi-stage sampling procedure, and a well-structured interview schedule was used to elicit information for this study. Data were collected on socio-economic characteristics of respondents such as age, marital status, educational level, households' size, membership of social association, primary occupation, farm size and annual income. Information was also collected on the perception of the respondents, cost and returns of pig farming, constraints to pig farming and the factors associated with the choice of pig farming enterprise.

Methods of data analysis

Data were analyzed with the use of descriptive statistics such as frequency count, percentages and mean to describe the socio-economic characteristic and constraints to pig farming. A 3-points Likert scale was use to ascertain the perception of the respondents on pig farming. Gross Margin analysis was used to determine the cost and returns of pig farming in the study area. Linear regression analysis was used to analyze the factors associated with the choice of pig farming enterprise in the study area.

A 3-points Likert Scale: In analyzing the perception of the respondents on pig farming in the study area, a 3 points Likert scale was developed and ranked. The extent of their perception was expressed by using a 3 points Likert scale and are accorded 3, 2, and 1 for Agree, undecided and disagree respectively.

$LS = (N_1X_3 + N_2X_2 + N_3X_1) / (N)$

Where:

LS = Likert Scale

N = Total number of respondents.

N_1 = Number of pig farmers who agree to the statement.

N_2 = Number of pig farmers who did not decide on the statement.

N_3 = Number of pig farmers who disagree with the statement

Regression modeling was used to examine the factors associated with the choice of pig farming enterprise in the study area and the estimation was done.

The implicit and explicit form of the regression model (Greene, 2003) employed is of the form:

$Y = f(X1, X2, X3, X4, ----------, X10, ei)$

$Y = a_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + b_{10}X_{10} + e_i$

Where,

Y = Profitability

X_1 = Age of Respondents (Years)

X_2 = Marital Status of Respondents (Married = 1, Single = 0)
X_3 = Household Size (Number)
X_4 = Educational Background
X_5 = Farm Size (Ha.)
X_6 = Access to Extension Advisory Services (Yes = 1, No = 0)
X_7 = Access to Credit Facilities (Yes = 1, No = 0)
X_8 = Farming Experience (Years)
X_9 = Revenue (Naira)
X_{10} = Variable Cost (Naira)
ei = Error term

Partial Budgeting Analysis
TC = Total Fixed Cost (TFC) + Total Variable Cost (TVC)
Net Profit = TR – TC
ROR = Net Profit/TC
GR = TC/RC
BCR = TR/TC
TC = Total Cost
TR = Total Revenue
ROR = Rate of Returns
BCR = Benefit Cost Ratio

3. Results and Discussion

The result in Table 1 shows the socio-economic characteristics of the respondents. Most (82.5%) of the farmers were male while 17.5 percent of them were female. It was opined that pig farming is mostly carried out by male as a result of the laborious nature of the business. It does not mean that female was not engaged in pig farming but most of them were usually workers while others partner with their spouse. This affirmed the assertion of Osondu, Ijioma, Anyiro and Obike (2014) that pig farming is mostly carried out by male probably because of the stressful nature of the enterprise, it does not mean that female were not involved in pig production but usually involved as suppliers of labour in light farm operations.

Less than half (43.7%) of the respondents were between the age range of 61 – 80 years while 21.25 percent of them between the age range of 41 – 60 years and the mean age was 64 years. This indicated that most of the pig farmers in the study area were aged people.

About 88.7 percent of the respondents were married while 11.3 percent of them were single and this is in accordance with the findings of Osondu *et al* (2014) and Oguniyi and Omoteso (2011) that the married classes were more involved in pig production than the single ones due to usefulness of family labour for light farm operations.

Most (61.3%) of the respondents have between 1 and 4 persons in their households while 31.2 percent of them have between 5 and 8 persons in their households and 7.5 percent of them have more than 8 persons in their households with average household size of 4 persons. It was opined that most of the respondents have moderate household size.

About 68.8 percent of the respondents had tertiary education while 18.8 percent of them had secondary education and 8.8 percent of them had non-formal education. It was affirmed that majority of the respondents in the study area were literate and this could help them in pig management to ensure sustainable productivity.

Less than half (42.5%) of the respondents indicated that farming is their primary occupation while 33.8 percent of them were civil servant and 23.8 percent of them were retiree.

About 63.8 percent of the respondents use hired labour on their farm while 28.8 percent of them use both hired and family labour and only 7.5 percent of them use family labour. This implies that a good number of the pig farmers in the study area use hired labour on their farm.

Less than half (41.2%) of the respondents have between 51 and 100 pigs in their farm, 22.5 percent of them have between 101 and 150 pigs in their farm, 20.0 percent of them have between 151 and 200 pigs on their farm while 13.7 percent of them have less than 51 pigs on their farm and 2.5 percent of them have more than 200 pigs on their farm. The average farm size of the respondents was 93 pigs.

More than half (57.5%) of the respondents have between 21 and 30 years of farming experience, 22.5 percent of them have between 11 and 20 years of farming experience, while 13.7 percent of them have between 1 and 10 years of farming experience and only 6.25 percent of them have more than 30 years of farming experience. The average years of farming experience of the respondents in the study area was 25.3 years.

Socio-economic Characteristics of the Respondents

Variables	Freq.	%	Mean
Sex			
Male	66	82.5	
Female	14	17.5	
Age (Years)			
Less than 20			
21 – 40	13	16.3	
41 – 60	17	21.3	
61 – 80	35	43.8	**64**
Above 80	15	18.8	
Marital Status			
Single	9	11.3	
Married	71	88.7	
Household size			
1 – 4	49	61.3	**4**
5 – 8	25	31.2	
Above 8	6	7.5	
Level of Education			
Non-formal Education	7	8.7	
Primary Education	3	3.7	
Secondary Education	15	18.8	
Tertiary Education	55	68.8	
Primary Occupation			
Farming	34	42.5	
Civil service	27	33.8	
Retiree	19	23.7	
Farm Size (Held size)			
Less than 51	11	13.7	
51 – 100	33	41.3	**93**
101 – 150	18	22.5	
151 – 200	16	20.0	
Above 200	2	2.5	
Type of Labour Use			
Family Labour	6	7.5	
Hired Labour	51	63.7	
Both Family and Hired Labour	23	28.8	
Years of Farming Experience			
1 – 10	11	13.7	
11 – 20	18	22.5	
21 – 30	46	57.5	**25.3**
Above 30	5	6.3	

Source: Field survey, 2019.

Perception of the Respondents on Pig Farming in the Study Area

The result in table 2 shows the perception of the respondents on pig farming in the study area. Thus, perception of the respondents were subjected into eleven variables and efforts were made to ascertain the perception levels. It is important to note that the mean score of the variables was 2 points and this was used as the benchmark. The mean score of any variable or statements found to be lesser than 2 points refers to as low perception while the ones found to be greater than 2 points were regarded as high perception. Also, the variables were ranked according to the level of perception using the mean score point. Thus the variable with the highest mean score was accorded the first position while the variable with least mean score was accorded the eleventh position.

The respondents perceived that pig meat is a tender meat with mean score point of 2.84 and was accorded the first position. Followed by, its easy adaptability to environmental conditions ($\bar{x}$=2.73), it is a good alternative source of cheap and high nutritive protein and vitamin ($\bar{x}$=2.69), its meat is relatively cheap than other animal meats ($\bar{x}$=2.63), it is highly prolific and has short life span ($\bar{x}$=63), it convert waste food to valuable meat products ($\bar{x}$=2.61), it's a fast growing livestock ($\bar{x}$=2.50), it serves as source of income during off season and festive period ($\bar{x}$=2.48), there is high customer demand ($\bar{x}$=2.44), it is relatively cheap to manage ($\bar{x}$=2.43) and it assist in settling contingencies ($\bar{x}$=2.33). They were accorded second to eleventh positions respectively. Hence, majority (92.22%) of the respondents have a favourable perception on pig farming in the study area.

Table 2. Perception of the respondents on pig farming in the study area

Perception Statement	Agree	Undecided	Disagree	Total	Mean	Rank
It is relatively cheap to manage	162	12	20	194	2.43	10th
It is highly prolific and has short life span	186	12	12	210	2.63	4th
There is high customers' demand for pork	135	50	10	195	2.44	9th
The meat is relatively cheaper than other animal meats	183	16	11	210	2.63	4th
It is a fast growing livestock	150	40	10	200	2.50	7th
It can convert food waste to valuable meat products	177	22	10	209	2.61	6th
It has a tender meat	213	10	4	227	2.84	1st
The meat is a good alternative source of cheap and high nutritive protein and vitamin	195	10	10	215	2.69	3rd
It can adapt easily to environmental conditions	204	4	10	218	2.73	2nd
It serves as source of income during off season and festive period	162	20	16	198	2.48	8th
It assists in settling contingencies	129	40	17	186	2.33	11th

Source: Field survey, 2019.

Cost and Returns of Pig Farming

The results in Table 3 shows the estimate of cost and return analysis made from pig farming in Ekiti State using the average cost (fixed cost and variable cost) and the income generated by each of the respondents per month. The total cost incurred on pig production in the study area was ₦1,092,500.00 and the total revenue was ₦3,605,550.00. The Net profit for pig farming was ₦2,513,050.00, which depicts the difference between the total revenue and total cost. The Gross return for pig farming was 0.30, while the rate of returns was 2.30 which indicate that for every ₦1.00 invested in pig farming, ₦2.30 is been gained. The benefit cost ratio for pig farming was 3.30 and this implies that pig farming is a profitable enterprise. This corroborate the rule of thumb, any benefit cost ratio greater than one, equal to one or less than one indicate profit, break-even or loss, respectively. Since, the benefit cost ratio of this is greater than 1.0 and it shows that it is profitable even with little capital investment. This affirmed the assertion of Osondu *et al* (2014) and Olorinde, *et al.,* (2003) that piggery generates better profit margins.

Table 3. Cost and Returns of Pig Farming per Annum

Variables	₦
Fixed Cost	
Construction of building or pen	185,000.00
Digging of well and installation of water	72,000.00
Purchase of pigs	45,000.00
Purchase of bowl	3,500.00
Total Fixed Cost	**305,500.00**
Variable Cost	
Feeding	460,750.00
Labour	192,000.00
Transportation	65,000.00
Medication	50,000.00
Maintenance	20,000.00
Total Variable Cost	**787,000.00**
Revenue	
Sales of weaned piglets	430,000.00
Sales of fattened piglets	2,505,050.00
Sales of culled sows	670,500.00
Total Revenue	**3,605,550.00**
Total Cost (FC + VC)	**1,092,500.00**
Net Profit (TR - TC)	**2,513,050.00**
Gross Return (TC/TR)	**0.30**
Benefit Cost Ratio (TR/TC)	**3.30**
Rate of Returns (Net profit/TC)	**2.30**

Source: Field survey, 2019.

Factors Associated with the Choice of Pig Farming Enterprise in the Study Area.

The result in Table 4 shows that linear function was chosen as the lead equation because it exhibited better diagnostic statistics than other models. The coefficient of determination (R^2) is 0.934, this implies that the explanatory variables accounted for about 93.4% of the factors influencing the choice of pig farming among the smallholder farmers in Ekiti State. This indicates that there are more variables that explained the dependents variable. The overall significance of the model was measured using F-test, which has a value of 54.717 which is significant at 1.0% risk level.

Specifically, the coefficient of their marital status (-0.838) was negative and statistically significant at 1.0% alpha level. The sign is in accordance with a priori expectation. This implies that the marital status of the respondents have significant effects on their choice of involvement in pig farming. That is household obligations could determine their choice of involvement in pig farming. The coefficient of educational background (1108.85) was positive and statistically significant at 1.0% level of probability. This implies that as the literacy level of pig farmers increases, there will be proper management of pig farms which will result in large production and in turn result in high income which is in line with the assertion of Onyebinama (2004).

The coefficient of farm size (-0.09) was negative and statistically significant at 10.0% level of probability. This indicates that the farm size have negative influence on pig production in the study area. It is at variance with a prior expectation though it may suggest need for efficiency in the use of land rather than expansion of land areas as a necessary requisite that could increase chances of increasing net return.

The coefficient of the revenue (78.49) was positive and statistically significant at 1.0% level of probability. It was opined that the revenue arising from the sales of pig would increase as the price of the product increases. This

result is in agreement with the findings of Osondu *et al.* (2014) that the pig production in Abia State was profitable since the net farm income was positive.

The coefficient of the variable cost (-5.37) was negative and statistically significant at 1.0% level of probability which is in accordance with a prior expectation. This indicates that the higher the variable cost the lower the use of inputs in order to maximize farm returns. This corroborates the findings of Osondu *et al* (2014) and Nwaru and Ekumankama (2002) that as the input prices increases the inputs used for pig production are also reduces. Hence, marital status, educational background, farm size, revenue and variable cost are the factors associated with the choice of pig farming enterprise in the study area.

Table 4. Estimate of the Factors Associated with the Choice of Pig Farming Enterprise

Independent Variables	Coefficient	T-ratio
Constant	-76166.52	-3.38
Age	-436.23	-0.49
Marital Status	-0.838***	2.813
Household size	1347.95	0.85
Educational Background	1108.85***	5.04
Farm Size	-0.09*	-1.81
Access to Extension Advisory services	138.56	0.191
Access to credit facilities	-548.39	0.78
Farming Experience	0.231	0.99
Revenue	78.49***	4.83
Variable Cost	-5.37***	-7.33
R Square	0.923	
Adjusted R^2	0.906	
F-ratio	54.717***	

Source: Field survey data, 2019.

Constraints to Pig Farming in the Study Area

The result in Table 5 shows the constraints to pig farming in the study area. About 78.8 percent of the respondents indicated that difficulties in securing loan were one of the constraints to pig farming in the study area. It was followed by, lack of extension advisory services has indicated by 76.3 percent of the respondents. Also, 72.5 percent of the respondents indicated that high cost of feed and feed ingredients was one of the constraints encountered in pig farming. About 70.0 percent of the respondents indicated that unregulated market price was one of the constraints to pig farming in the study area. High cost of transportation was another constraint to pig farming in the study area as indicated by 67.5 percent of the respondents. It was opined that most of the pig farmers in the study area encountered one or more constraints in pig farming operations.

Table 5. Constraints to Pig Farming in the Study Area

Constraints	Freq.	%
Lack of extension advisory services	61	76.3
Unregulated market price	56	70.0
High cost of feed and feed ingredients	58	72.5
Difficulties in securing loan	63	78.8
High cost of transportation	54	67.5

Source: Field survey, 2019.

4. Conclusion and Recommendations

The study concluded that most of the pig farmers in the study area were male, married, aged, with moderate household size. The farmers perceived that pig farming is a veritable enterprise and the cost and returns analysis revealed that pig farming is a profitable enterprise with little capital investment. The linear regression analysis shows that marital status, educational background, farm size, revenue and variable cost were the factors associated with the choice of pig farming enterprise in the study area. Difficulties in securing loan, lack of extension advisory services, high cost of feed and feed ingredients, unregulated market price and high cost of transportation are the constraints to pig farming in the study area. Based on the findings of this study, it was recommended that policies should be made to encourage and educate female and youths on the enormous potentials of pig farming. There should be provision of adequate extension advisory services to enhance the knowledge and practical skills of pig farming. Government needs to invigorate pig production industries by bringing out appropriate polices to guide and regulate the marketing system in order to ensure effectiveness and efficiency.

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