

Economic Analysis of Swine Production in Nigeria: A Case Study of Ibadan Zone of Oyo State

L. T. Ogunniyi* and O. A. Omoteso**

**Department of Agricultural Economics and Extension, Ladoko Akintola University of
Technology, Ogbomoso, Oyo State, Nigeria*

***Department of Agricultural Economics and Farm management, University of Ilorin, Ilorin,
Kwara State, Nigeria*

KEYWORDS Gross Margin. Profitability. Elasticity. Cobb Douglas Production Function

ABSTRACT This study analyzed the economics of swine production in Ibadan Metropolis of Oyo State. Data were collected through interview schedule administered to eighty swine farmers in that area. The findings of the study revealed that 68.8 percent of the respondents were between 31 to 50 years of age with a mean age of 41.4 years, less than 10 percent of the respondents had no formal education, 80 percent were married, more than 70 percent had more than 5 years experience in pig farming, 98.8 percent were Christians, the average capital invested was #15,187.80K while 85 percent of the respondents financed their business from their personal savings. The findings showed further that variable costs represent 93.5% while fixed costs accounted for 6.5% of the total cost of production; the average net farm income (NFI) per respondents was #81,470.81K while the average net farm income per pig was #1,198.10K. The rate of return on investment was 57 percent. The Cobb-Douglas production function showed that there is a significant relationship between quantity of pork produced in Kg and labour employed in man days, quantity of feed in kilogram and cost of drugs, disinfectants and vaccines while there are no significant relationship between total output and years of experience and level of establishment. Based on the findings, it is recommended that the government should formulate and implement policies that would increase the level of productivity in swine industry. These policies should include the enforcement of effective feed quality control legislation, subsidizing major input supplies like feeds, weaners and other equipment used in swine production.

INTRODUCTION

There is no doubt that human food supply must be improved both in quantity and quality and better shared within countries. However, studies by Lufadeju (1996) reveal that the correct proportion of animal or livestock products in an equilibrated intake is a matter of discussion, when one considers physiological requirement, land use, production costs, sociological or religious habits, not to speak of public campaigns against meat and fat in developed countries

The swine is omnivorous and in some respect competes with man for food, but is also a very useful utilizer of the by-products and waste from human feeding. Thus pigs are usually numerous where human food is cheap or where there are large quantities of by-products or offal's available. The size of the pig population of any given region also, of course, depends upon other factors, for example the climate - only a small number of pigs being found in the arid areas of the world - and the social and religious beliefs of the indigenous people, there being few pigs in countries with a predominantly Muslim population.

The swine has some unique advantages over

all other animals, which make them a good species of animals to multiply extensively to combat protein shortages. Among these advantages are their fast growth rate which is only slightly exceeded by the best, carefully managed broilers, their prolificacy which is unsurpassed by that of any other animals species except the birds, their very good efficiency of feed utilization which brings better returns per units of inputs than most other animals and the quality of their meat which is both tender and more nutritive in terms of the contents of protein and the B-vitamins than those of other animals.

As a result of the state of the economy as a whole, studies by Olaloku (1987) reveal that animal protein has become a luxury instead of a dietary necessity since only a certain class of citizen finds it convenient to buy. The deficiency of protein in the diet produces such disease as kwashiorkor and miasma, which affects children, thus, affecting adversely the future labour force. In adults, it results in weight loss, weakness, fatigue, poor appetite and anaemia.

A study by Agada (1991) reveals that the neglect or slow growth of the swine industry can be attributed to reasons which include religion, acceptability and above all management prob-

lems. The management problems include problem of disease outbreak, feed efficiency and high cost of feedstuffs, which stems from lack of swine production knowledge, skill and often, the Nigerian Stockman is ignorant of new techniques. The complications from these are cleared, low ratios of stock keeping to humans, poor animal productivity, limited supplies and low intake of animal protein and thus malnutrition.

Therefore, to reverse this situation in the Nigerian economy, there is the need to study the economics of swine production in Nigeria. This study therefore determines the profitability of swine production, and examines the factors affecting swine production in the study area.

This has led to research on an animal that can serve as protein source apart from the traditional cattle, sheep and goat meat. It is then not surprising that pigs which have not played a significant role in meat supply in the country due to religious, cultural and social constraints is now being consumed by an increasing number of people (Tewe 1988). But attempts by individuals and business group to increase commercial swine production in Nigeria has been met with several problems, such as lack of adequate supply of genetically sound breeders, high cost of feed, poor infrastructure facilities, the fear of inadequate market for piggery products and the absence of pig product processing industry in Nigeria.

All these related problems directly affect the swine farmer through increase production costs coupled with limited revenue.

In view of the foregoing, the study set out to answer the following questions in relation to the area of study:

- What factors influence swine production?
- What are the costs and returns to swine production?
- What is the elasticity of production and return to scale?
- What are the problems faced by swine farmers?

Objectives of the Study: The main objective of this study is an economic analysis of Swine production in Ibadan metropolis of Oyo State. The specific objectives are to:

- examine the factors influencing swine production in Ibadan metropolis;
- calculate the costs and returns in pig production;
- determine the elasticity of production and return to scale and

- examine the problems faced by pig farmers

MATERIAL AND METHODS

The study was carried out in Ibadan metropolis of Oyo State. Ibadan is the capital of Oyo State and the biggest in Africa South of Sahara. There are ten local government areas (L.G.As) in Ibadan zone, out of which five (LGA's) was purposively selected due to high concentration of pig farmers in the area.

The population for this study comprises of all swine farmers in the study area. Simple random sampling techniques were used in selecting the respondents. The sampling frame was obtained from the Pig Farmers Association of Nigeria (Ibadan branch). The sampling had 100 pig farmers registered with the association out of which a sample of 80 farmers was selected at random.

The data used were obtained mainly from primary source, through the use of structured questionnaires. The data collected covered socio-economic characteristics, management practice, land availability and use, labour use and availability, capital, output and the problems encountered by swine farmers.

Data obtained were analyzed using descriptive statistics such as frequency count, mean, percentages, budgetary techniques, profitability ratio and Cobb Douglas production function. The empirical specification of the model is:

$$Y = \beta_0 X_i^{\beta_i} \epsilon_i$$

Where

Y = quantity of pork produced in kilogram

B = intercept of the function

X_i = explanatory variables ($i=1, \dots, 5$)

ϵ_i = Error term

In Logarithms, the equation is:

$$\log Y = \log \beta_0 + \sum_{i=1}^5 \beta_i \log X_i + \log \epsilon_i$$

Where

X_1 = quantity of feed consumed in kilogram

X_2 = labour employed in Mandays

X_3 = Cost of drugs, disinfectants and vaccines

D_4 = Dummy variable for years of experience in swine production which takes the value of 1 for those with more than 10 years experience and 0 otherwise.

D_5 = Dummy variable for level of establishment which takes the value of 1 for fully equipped establishment and 0 otherwise

The regression coefficients are all expected

to have positive signs *a priori*. A study by Timmer (1970) reveal that there are some problems in using Cobb- Douglas in production function estimation such as constant elasticity of substitution and separability of each factor of production. However, its primary characteristics such as ease of handling, suitability for direct estimation of production elasticities and provision of good fit have informed its usage in this study.

RESULTS AND DISCUSSION

The result of selected personal factors of the respondents is presented in Table 1. If old farmers are defined as those who are above 50 years of age, 18-75% of pig farmers can be said to be old. From Table 1, the mean age of farmers was 41.38 years and 47.5% of farmers are below this age. The implication of this is that young people engage more in pig farming business than older people and hence represent a high percentage of pig farmers in the area.

Table 1 also shows that more than three quarters of the respondents were males. Although this result shows that pig farming is mostly carried out by males probably because of the stressful nature of rearing it, it does not mean that females were not highly involved in pig production in the study area. Females in this study area were usually involved as helpers or suppliers of labour in light farm operations such as serving of feed, water or cleaning of the piggery.

It is also indicated in Table 1 that 18.75% of the respondents were single, 80% were married while 1.25% were widowed. The high percentages of married respondents conform to Jibowo's (1992) study that majority of the adult population of a society consists of married people. The implication of this is that housewives were still predominantly used as family labour for light farm operations. The literacy level of the respondents is very high, less than 10% of the respondents had no formal education; others had formal education ranging from primary to tertiary. This probably implies that pig farming requires certain level of education in terms of management to ensure productivity.

Furthermore, nearly all the pig farmers (98.75%) were Christians. This conforms to *a priori* expectation in which Muslims are forbidden from eating pork. Table 1 shows that more than 70% of the respondents have more than 5 years of experience. This implies that the sample

of respondents was well established in their pig production activities.

Finally, none of the respondent borrowed money from banks during the study period due to lack of collateral security and high interest rates. From Table 1, 85% of the respondents finance their business from their personal savings, 16.2% source their capital from relatives and friends and from Cooperative society. This study agrees with Adekunle and Ajani (1999) who found that the source of capital of livestock farmers was either from friends and relatives or from their personal savings, which mostly comprised of retained profits made from previous earnings. The average capital invested is #15,187.80K. The smallness of average capital invested shows that they finance their business from their personal savings.

Table 2 shows that the average total cost of production incurred by the respondents were #152,515.36K. The total cost comprises of the

Table 1: Selected personal factors of respondents n = 80

Personal factors	Frequency	Percentage
<i>Age (years)</i>		
21-30	10	12.50
31-40	28	35.00
41-50	27	33.75
51-60	15	18.75
<i>Gender</i>		
Male	66	82.5
Female	14	17.5
<i>Marital Status</i>		
Single	15	18.75
Married	64	80.00
Widowed	1	1.25
<i>Educational Level</i>		
No formal education	7	8.75
Primary education	19	23.75
Secondary education	41	51.25
Tertiary education	13	16.25
<i>Religion</i>		
Christianity	79	98.75
Islam	-	-
Traditional	1	1.25
<i>Years of Experience</i>		
Less than 5 years	19	23.75
5-9 years	32	40.00
10-15 years	23	28.75
15-19 years	4	5.00
Above 19 years	2	2.50
<i>Source of Capital*</i>		
Personal saving	68	85.00
Relatives and friends	13	16.25
Cooperative society	13	16.25
Money lender	1	1.25

Source: Personal Survey, 2003

* - Total observation > 100% due to multiple responses.

variable and fixed costs. From the table, variable cost represent 93.45% while fixed costs accounted for 6.55% of the total cost of production. Additionally, feed cost represent 55.54%, labour cost 29.98% while the cost of drugs, disinfectants and vaccines represent 7.93% of the total cost of production.

The average gross revenue was #233,986.27 K per respondent. The average gross margin per respondent was #91,467.28K. The average Net Farm Income per respondent was #81,470.81K. Therefore the average Net Farm Income per pig

was #1,198.10K. This show that pig production is a profitable venture.

The rate of return on investment in the study area was 57%. This means that for every #1.00 invested, 57K is gained in the business. Also the opportunity cost of capital (interest rate) is 25%, that is for every #1.00 saved in the bank, 25K is gained as interest. This shows that it is better to invest in pig production than to save in the bank.

Benefit-cost ratio (BCR) shows that pig production is a profitable business since it is greater than 1. The same thing applied to GMR. The ESR results also indicate that pig production has good financial strength.

Conclusively, the various profitability ratio techniques employed indicates that the business is profitable. Thus it is profitable to produce pig in the study area.

The coefficient of multiple determination (R^2) imply that 96.5% of total variation in the quantity of pork produced in kilogram is explained by the explanatory variable while the remaining 3.5% not explained is attributed to other variables not included in the model. All the independent variables (X_1 , X_2 , X_3 , D_4 , and D_5) have positive signs. The positive signs indicate that the variables were positively related to the quantity of pork produce in kilogram.

The result shows that labour employed in Mandays was statistically significant at 5% level of significance (X_2) while quantity of feed in kilogram (X_1) and cost of drugs, disinfectants and vaccines (X_3) are significant at 10% level of significance. The result implies that an increase in quantity of feed consumed in kilogram, labour employed in Mandays and costs of drugs etc will likely bring about an increase in quantity of pork produced in kilogram. The positive relationship among X_1 , X_2 , and X_3 can be said to conform to *a priori* expectation.

The regression coefficients constitute the respective elasticities of production in Cobb-Douglas production function. The total sum of regression coefficients is 1.0782 (Table 3). This was found to be greater than unity, indicating increasing return to scale. Hence, the farmers can be said to operate in stage 1 (irrational stage) of production. The implication of this is that the enterprises in the study area are not yet operating at optimum scale of production. Hence, there is need for improvement such as better equipment and using more variable inputs to boost production.

Table 2: Gross margin analysis

	Mean revenue/ Cost per farm	Mean number of pigs per farm	Peren- tages contri- bution
A. Returns			
Sales of Pork	58,496.54	17	25
Sales of live pigs	175,489.63	51	75
Total	233,986.17	68	100
B. Variable Cost			
Cost of feed	84,708.14	55.54	
Cost of labour	45,722.40	29.98	
Cost of drugs, disinfectants and vaccines	12,088.35	7.93	
Total		142,518.59	93.45
C. Fixed Cost			
Depreciation of building	6,518.90	4.27	
Depreciation of equipment and Machinery	3,477.57	2.28	
Total		9,996.47	6.55
D. Grand Total			
B + C	152,515.36	100	
E. Gross Margin			
A - B	91,467.28		
F. Net farm Income			
E - C	81,470.81		
Rate of return of investment	57%		
Opportunity cost of capital	25%		
Benefit - Cost ratio	1.53		
Expense structure ratio	0.066		
Gross margin ratio	2.87		
Cobb-Douglas Production Function			
$\log Y = 1.0078 + 0.0693 \log X_1 + 0.9577 \log X_2 + 0.0363 \log X_3 + 0.01310D_4 + 0.0018D_5$			
	(7.228)	(1.782)*	(17.174)**
	(1.836)*	(0.888)	(0.076)
$R^2 = 0.965$	S.E = 0.059779		

** - Significant at 5% level

*- Significant at 10% level

The figures in Parentheses are the t- values

Table 3: Production elasticity and return to scale

Variable	Regression coefficient	t-value
Constant	1.0078	7.228
X ₁	0.0093	1.782**
X ₂	0.9577	17.174*
X ₃	0.0363	1.836*
D ₁	0.0131	0.888
D ₅	0.0018	0.076
Return to scale	1.0782	

Source: Personal Survey, 2003

The result of the study also reveals the problem encountered by the respondents. Necessary knowledge as regards to pig husbandry which will facilitate efficient utilization of available resources such as feed is grossly lacking in the study area except for cases where feeds were compounded locally, 48.75% of the respondents reported that feeds were difficult to procure and their cost is high (Table 4). About 56.25% of the sampled farmers have no access to formal credit facilities. Lack of financial assistance is a huge problem hindering large-scale production of pigs in the study area.

Similarly, from Table 4, 36.25% of the pig farmers had equipment problem. These problem ranges from rising cost of equipment to lack of access to modern equipment. 45% of the respondents had drugs problems. The major constraints in the use of these drugs is the high cost, limited availability and apparent difficulty in getting these health care commodities to the farmers at the right time. In conclusion, 47.5% of the respondents are faced with the problem of disease and high infant mortality. The disease includes mastitis, agalactia, brucellosis, swine fever, dysentery and coccidiosis.

Table 4: Problems encountered by pig farmers

Problems encountered	Frequency	Percentage
None	7	8.75
Feeding	39	48.75
Lack of capital	45	56.25
Inadequate equipment	29	36.25
Lack of drugs	36	45.00
Health	38	47.50

Source: Personal Survey, 2003

Total observation > 100% due to multiple responses.

CONCLUSION

It may be concluded that (i) majority of the farmers were male, (ii) the mean age of the far-

mers was 41.4 years of age, (iii) the level of education is high as less than 10% of the farmers had no formal education, (iv) the main source of capital to the farmers is their personal savings, (v) average gross margin per respondent was #91,467.28k, (vi) the rate of return on investment in the study area was 57%, (vii) there is increasing return to scale to input used, (viii) the problem encountered by the farmers are lack of capital, high cost of feed, incidence of diseases, lack of drugs and high cost of equipment.

RECOMMENDATIONS

To boost pig production in the study, there is need to provide a production incentive package for the swine farmers at all production levels. Credits could be extended to them in form of purchase inputs such as drugs and feed rather than in cash as this will encourage the use of the credit facilities or the intended purpose rather than their use on social satisfaction like marriage and burial ceremonies. Also, the schemes that will directly reduce costs and increase output should be adopted. The farmers should endeavor to re-invest a greater percentage of their profit into activities that will lead to the expansion of their farm size. Research work should be geared towards discovering the least cost combination of feed that will yield the same nutrients equivalent to the pigs' conventional diet. The quantity of pork produced in kilogram could be increased by increasing the quantity of feed consumed, employing more labour, employing more drugs, disinfectants and vaccines and using better equipment.

REFERENCES

- Adekunle OA, Ajani OI 1990. Economic of beef marketing in Bodija market in Ibadan North Local Government Area of Oyo State. *Tropical Journal of Animal Science*, 1(1): 93-100 (1999).
- Agada ES 1991. *Economic of Swine Production: A Study of Two Local Government Area in Kaduna State, Nigeria*. B.Sc Project, Unpublished. Department of Agricultural Economics and Farm Management, University of Ilorin, Ilorin, Kwara State, Nigeria.
- Jibowo AA 1992. *Essentials of Rural Sociology*. Abeokuta: Gbemi Sodipo Press Ltd.
- Lufadeju EA 1996. The Role of Livestock on Farm Adaptive Research (OFAR) in Animal Production. *Journal of Nigeria Society of Animal Production*, 15(12): 1-3.

- Olaloku EA 1987. The Nigerian livestock industry: A perspective extension manpower development. *Paper Presented in the Livestock Extension Training Workshop at Ogere Conference Centre*, October, pp. 19-24.
- Tewe OO 1988. *Feasibility of Piggery Enterprise*. B.Sc. Project, Unpublished. Ibadan: University of Ibadan.
- Timer CP 1970. On measuring technical efficiency. *Food Research Institute Studies*, 9(2): 100-171.