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Economics of Swine Production in Jama'a Local Government Area of Kaduna State, Nigeria

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Target Audience: Swine Producers, Researchers, Agricultural Extension Workers, Policy Makers

Abstract

The paper examines the economics of swine production in Jama'a Local Government Area of Kaduna State, Nigeria. A sample of 125 swine producers was purposively selected in the study area. Data were collected from the respondents through the use of structured questionnaire. The data collected were analysed using descriptive statistics and farm budgeting technique. The results show the influence of some socio-economic variables on swine production. The costs and returns analysis shows that feeds, piglets and labour accounted for over 87% of the total variable costs incurred in swine production. Swine production was highly profitable as indicated by the net farm income. However, swine producers were confronted with the problems of high cost of feeds, diseases, high cost of drugs and veterinary services, poor housing, theft, lack of fund, high costs of transportation and inadequate numbers of improved breeds. The need and means of improving swine production through the eradication of identified problems are highlighted.

Keywords: Swine, Production, Profitability, Constraints, Nigeria

Description of Problem

There is no doubt that there is animal protein shortage in Nigeria. There is also no doubt that the solution to this problem rests on the promotion and more efficient production of all classes of meat animals including swine.

Pig (Sus scrofa) is one of the sources of animal protein in Nigeria. Pig production is in the hands of government institutions and private individuals. It represents the fastest way of increasing animal protein since pigs grow at a faster rate and are highly more prolific than cattle, sheep and goats (1,2).

Among the major species of domestic livestock in Nigeria, the pig is one of the least well known. Compared with the extensive bibliography for cattle, sheep and goats, there are relatively few descriptions of smallholder pig production systems. This situation poorly reflects current economic reality, since pigs are spreading into new areas even in a period of economic recession.

Pigs also have a rather peculiar status in that they are forbidden by Islam. In spite of religious and cultural taboos that discredit the pig, its widespread domestication and increase in population has continued, thereby providing evidence of its contribution to the nutrition of man (3).

Pigs are traditionally a scavenger, having been raised as a means of utilizing human food wastes in early domestication. However, current

production involves the use of foodstuff or waste product of human food as feeds. In Nigeria, as in most other African countries, swine plays a minor role in meat production compared to the other classes of livestock. However, Nigeria has the second highest population of pigs in Africa and it accounts for about 4.45% of total meat supply of the country (4).

In Kaduna State, most pig farmers raised their pigs on small family farms while the rest are in institutional or large intensive production units (5). The major source of animal protein in southern Kaduna has been through the conventional livestock such as cattle, goats and pigs. Pigs excel other red meat animals, such as cattle, sheep and goats in converting feed to flesh (6).

The production of indigenous pigs in recent years has been recommended as an alternative source of cheap, high quality dietary protein for the escalating human population (7). This is due to the relatively low cost of pig production and fast growth rate (2,3); short generation interval and high production potentials; prolific fecundity (1,2,3); highly efficient carcass yield (8); and easy adaptation to environmental conditions (9). Besides, pig meat (pork) has good meat to bone ratio (6,10).

A high turnover rate/profit is associated with pig production. Apart from the poultry industry, pig farming has the highest quick returns on investment and profit margins are high with judicious utilization of resources, especially feeds (3). This again is due to its high fecundity and growth rate. It was based on these numerous advantages of pigs that research on pig production is necessary. In fact, pigs have contributed immensely to the livelihood of many people in the study area and other parts of Nigeria either directly or indirectly. The ripple effects of increased pig production on the nutritional and economic well-being of Nigerians need not be over emphasized. It is in appreciation of this potential of pig industry that this research work is undertaken.

This study is an attempt to (i) determine the costs and returns of pig production in the study area; (ii) identify the constraints militating against pig production and (iii) suggest control measures.

Materials and Methods

Data Collection

The survey was conducted in Jama'a Local Government Area of Kaduna State by means of structured questionnaire administered to a total of 125 farmers selected out of 1804 farm families rearing pigs' (11). Regular visits were paid to the 125 farmers who were randomly selected. The data for the study were collected between April 2000 and June 2001. Data were collected on socioeconomic variables such as family size, educational level, age and years of experience. Data collected on production and marketing variables include fixed inputs such as farm equipment and tools, land size (ha), repairs and maintenance cost. Information on variable inputs included number of piglets, drugs, feeds, labour, veterinary cost and breeding cost. Data were also collected on the constraints militating against pig production as perceived by the respondents.

Analytical Techniques

The analytical technique employed in this study was the farm budgeting. This is mainly an operation leading to the estimation of the total costs and revenue for the same period. The farm budget model is commonly used for analyzing the profitability of farm production practices. The equation for obtaining net farm income can be stated in the following manner:

$$NFI = TR - (TVC + TFC)$$

where

NFI = Net farm income for the farm in Naira
TR = Total return or revenue in Naira
TVC = Total variable costs in Naira
TFC = Total fixed costs in Naira

Net farm income signifies the difference between total returns in Naira for the farm and total expenses of production of the enterprise, in Naira.

The total revenue is defined as the total money value of all pigs produced whether sold, consumed or in stock. Total fixed costs are those incurred

which do not vary when output changes and therefore have no influence on production decisions. Total variable cost is the cost of variable inputs such as feed, labour and drugs used in production. They change directly with the level of production.

The socio-economic aspects of the information gathered were analysed using descriptive statistics such as percentages, means and standard deviation. Possible constraint areas were listed on a Likert-type scale with values 5, 4, 3, 2 and 1. A mean value of 3.00 was obtained by adding the values and dividing by 5. The respondents' mean scores were obtained for each constraint area and any mean response higher or equal to 3.00 was regarded as a major constraint.

Results and Discussion

Socio-economic Characteristics of Swine Farmers

The results in Table 1 revealed that age affects production of pigs since the lowest age group of 21-30 years has a mean of swine herd size of 3.00, while the group above 60 years has 2.58. This is corroborated by the fact that there is a significant difference in herd size across age groups.

From the analysis it can be adduced that the number of swine farmers of 35 within age bracket of 21-30 years is almost three times those in the age bracket of 60 and above with a frequency of 12. The reason for this could be because the farmers within age bracket (21-30) are young and can easily bear the risk of accepting new innovations aimed at improving swine production. The fact that they are young shows they can still face the challenges of swine rearing given the demand of integrating both crop and livestock enterprises especially for labour (see Table 5).

Household size includes members from the age of seven years in a family that were engaged in productive activities. Table 2 shows that 35.2% of the respondents fell within the range of 1-5 members per household, while 41.6, 16, and 7.2% fell within the range of 6-10, 11-15 and 16-20 members respectively. The result shows that the larger the household size, the more the herd size of pigs up to 11-15 household size.

Table 1. Age distribution of swine farmers by mean herd size.

Age bracket (years)	Frequency of respondents	Percent of respondents	Mean herd size
21-30	35	28.0	3.00
31-40	32	25.6	2.94
41-50	25	20.0	2.83
51-50	21	16.8	2.86
Above 60	12	9.6	2.58
Total	125	100.0	

Analysis revealed that majority of the respondents (54.4%) had less than four adult pigs while 29.6% had between 4 and 6 pigs (Table 3). The mean adult herd size was 2.9 ± 1.6.

Table 2. Distribution of the swine producers in Jama'a LGA, Kaduna State by household size and herd size.

Household size	Frequency of respondents	Percent of respondents	Mean herd size
1-5	44	35.2	2.83
6-10	52	41.6	2.84
11-15	20	16.0	4.10
16-20	9	7.2	3.36
Total	125	100.0	

Table 3. Distribution of swine farmers by herd size.

Herd size	Number of respondents	Percent of respondents
1-3	68	54.4
4-6	37	29.6
7-9	20	16.0
Total	125	100.0

Results show that all the respondents were small-scale farmers. This conforms with an earlier report (5) that pig farming in Southern Zaria (now Southern Kaduna) is primarily a small holder concern.

The overall educational level of the respondents as presented in Table 4 shows that a large number of the swine farmers are literate. They could read in Hausa or English Language. There was significant difference between the mean herd size of 2.79 for the illiterate farmers and 3.5 for those farmers who attended tertiary institutions. Respondents with more education had larger herd size. This finding on the relationship between level of education and herd size agrees with previous findings on innovation adoption in Nigeria (12,13). The better educated farmers tend to be more receptive to superior management practices as they tend to readily appreciate the usefulness as well as the benefits of such practices.

Table 4. Distribution of pig farmers by level of education and mean herd size in Jama'a LGA, Kaduna State.

Level of education	Number of respondents	Percent of Respondents	Mean herd size
Never gone to school	10	8.0	2.79
Adult education	48	38.4	2.75
Primary school	41	32.8	3.00
Secondary school	20	16.0	3.20
Tertiary school	6	4.8	3.50
Total	125	100.0	

Besides swine production which is on part time, analyses revealed that other sources of income by the respondents included mainly crop production (81.6%), while 11.2% respondents combined both civil service and crop farming and the remaining (7.2%) are both traders and crop farmers (Table 5). The implication of the employment distribution is that a programme of swine improvement be construed as an improvement endeavour within the farming structures. In other words, swine improvement should be designed to incorporate the farming systems thereby making it an integrated programme of crop and animal production.

Land Requirement

Table 6 shows the two major sources of land tenure in the study area. Analysis revealed that almost all respondents (81.6%) surveyed operated under relatively secure tenurial arrangement as most respondents owned their land, except for a few (18.4%) respondents who acquired land through leasing. The land for pig production among these small-scale farmers is small and within or near their houses. Data analysis revealed that the average size of land used for pig production was 0.124 hectares. This is consistent with results of similar study (14).

Table 5. Distribution of farmers according to their other sources of income.

Type of employment	Number of respondents	Percent of respondents
Crop farming	102	81.6
Civil service and crop farming	14	11.2
Trading/crop farming	9	7.2
Total	125	100.0

Labour Requirement

Data analyses further revealed that the type of labour mainly used on swine farms was family labour. The average labour time spent on the farms in the study area was 4 hours per day at the rate of ₦50 each day. The effective working hours was converted by using the conversion ratio of 0.5, 0.75 and 1 for the children, female and male adult respectively as adopted by (15). The children engaged in swine production were between ages

Table 6. Distribution of swine farmers according to sources of land.

Sources	Number of respondents	Percent of respondents
Inheritance	102	81.6
Leasing	23	18.4
Total	125	100.0

7 - 14 years while male and female adults were between ages 15 - 64 years. Table 7 shows that male adult contributed more average labour of 196.6 hours (46.59%) followed by female adult with 135.22 hours (32.04%) and children 90.18 hours (21.37%). Provision of feeds to the pigs required knowledge of the amount that they require each feeding period so as not to waste the resources, and has to be done timely as not to subject the pigs to unnecessary hunger. The clearing of pens and daily observation of the performance of the swine is also done by the adults. Perhaps the above reasons explain why children spent less labour in swine production because they are only involved in provision of feeds for swine.

Feed Requirement

On the mode of feeding, feeds consisted mainly of bran of grain crops cultivated in the study area. The bran called "dusa" in Hausa Language is commonly derived from sorghum, maize, millet, rice and soyabeans. About 94% of the respondents fed their pigs with sorghum bran and the rest fed maize bran. Besides the major sources (sorghum bran and maize bran), other sources of "dusa" as indicated by the respondents were rice, millet and soyabean.

During the study period, the bran cost ₦4.50 per mudu or ₦450 per bag which weighed 56kg on the average. The cost of the bran per kilogramme was ₦8.00. Other minor sources of feeds include waste peels from root crops such as cassava, cocoyam, yam, etc. The cost of these other sources of feeds was difficult to estimate because they are hardly sold in the market and are seasonal.

Pig keeping experience

Responses on pig keeping experience were grouped into three categories. One, new comers to pig keeping (less than 10 years); two, those who have been keeping pigs for some time (10-19 years); three, those who have been keeping pigs for a long time (20 years and over). The results in Table 8 show that majority of the respondents (62.4%) have been keeping pigs for a long period (20 years or more). Pig keeping experience ranged between 2 and 27 years. All farmers with over 20 years experience were regarded as being highly experienced, those between 10-19 years moderately experienced and those with less than 10 years experience as being relatively inexperienced. Hence the majority of the farmers in the study area are highly experienced in pig production.

Table 7. Distribution of labour in swine production by gender and age in Jama'a LGA, Kaduna State.

Labour class	Age range (years)	Number of labour force	% of labour force	Average man-day	% of total man-day
Adult male	(15-64)	220	57.6	196.60	46.59
Adult female	(15-64)	116	30.4	135.22	32.04
Children	(7-14)	46	12.0	90.18	21.37
Total		382	100	422.00	100.00

Costs and Returns Analysis of Swine Production

The cost structure is given in Table 9. For an average producer, analysis of the total cost (TC) of production indicates that feeds rank highest with a cost of ₦346,875; representing 34.11% of TC, followed by purchase of piglets (₦284,750) and labour (₦257,250) representing 28% and 25.3% of TC, respectively. The analysis revealed that the costs of feeds, piglets and labour remain the major constraints in swine production in the study area. This agrees with the report by (3) that feed cost constitutes the highest cost of the total cost of

Table 8. Respondents distribution by years of pig keeping experience

Categories	Number of respondents	Percent of respondents
Less than 10 years	16	12.8
10-19 years	31	24.8
20 years and above	78	62.4
Total	125	100.0

Mean pig keeping experience is 22 years.

producing edible pork. This high cost of feeds has been reported to be occasioned by the highly exorbitant prices of feed grains (10).

Gross Revenue Accruing to Swine Farmers

Table 10 shows that the gross revenue accruing to the swine farmers was made up of all proceeds realized from the sale of swine. The mean of the total revenue were found to be N20,800.82 per farmer over a period of six months.

Net Farm Income of Swine Farmers

This aspect of the study gives a summary of the costs and returns for swine production and consequently the net farm income. The net farm income was obtained by subtracting both the total variable costs and the total fixed costs from the total revenue. The net farm income gives a measure of farm profit obtained from swine production.

The average net farm income of sampled farmers obtained from swine production was ₦12,665.01 over a period of 6 months. Table 10 shows the return to naira invested as 64 kobo (0.64), implying that swine production is highly profitable.

Problems of Swine Production

Swine production in the study area is bedeviled by so many problems, ranging from diseases, inavailability of improved stocks, high

Table 9. Items of costs in swine production and percentages of total cost of all sampled farmers.

Item	Total cost (₦)	%
Feeds	346,875	34.11
Purchase of piglets	284,750	28.00
Labour	257,250	25.30
Drugs and veterinary services	53,000	5.21
Swine death	25,576	2.51
Depreciation on building	22,125	2.18
Hiring of boar for mating	9,063	0.89
Castration	8,500	0.84
Depreciation on tools	7,175	0.70
Maintenance and repairs	2,662	0.26
Total	**1,016,976**	**100.00**

cost and scarcity of nutritionally adequate feeds capable of supporting good pig growth. Table 11 shows the basic problems confronting swine farmers in the study area. The most important identified production constraints by the respondents were diseases ($\overline{X}s=4$) , high cost of drugs/veterinary ($\overline{X}s = 3.5$) and high cost of feeds. Although cost of drugs and veterinary services is only ₦424 as revealed in Table 10. The reason for this may be due to the fact that although diseases and cost of drugs/veterinary services may pose major problems to swine farmers, they seldom purchase drugs and employ services of veterinarians. The observation that disease is the most prevalent constraint to swine production in the study area calls for an urgent need to develop

Table 10. Average revenue and cost of swine production in Naira.

Item	Mean (₦)	Standard deviation
Revenue		
Piglets	8,189.81	2,987.88
Adult pigs	12,611.01	9,351.87
Total revenue	20,800.82	10,901.95
Cost of Production		
Feeds	2775	2,186.75
Labour	2058	1,012.78
Drugs and veterinary services	424	384.80
Hired mating boar	72.50	41.51
Castration	68	33.90
Repairs and maintenance	21.30	10.62
Swine death	204.61	99.87
Depreciation on building	177	128.83
Depreciation on tools	57.4	36.61
Purchase of piglets	2278	1662.19
Total cost of production	8135.81	5025.93
Net income	12,665.01	38,710.4
Net income per pig	35.10	818.76
Net income per man hour	30.01	45.57
Net income per naira	0.642	0.83

effective methods or packages of disease control in the area for large-scale production of swine as another source of protein judging from the prolific fecundity (1) and good meat to bone ratio of swine (6,10). This when done will go a long way to boost the acute shortage of dietary animal protein supply and increase the average daily protein intake.

Table 11. Major constraints associated with swine production in Jama'a LGA, Kaduna State.

Constraints	Mean scores ($\bar{X}s$)	Ranking
Diseases	4*	1st
High cost of drugs/veterinary services	3.5*	2nd
High cost of feeds	3.1*	3rd
Poor housing	2	4th
Lack of capital	1.7	5th
High cost of transportation	1.2	6th
Lack of improved breed	0.8	7th
Theft	0.5	8th
Accident	0.3	9th

*Major constraints.

Conclusions and Application

The study concludes as follows:

1. Most swine farmers in the study area can be regarded as small-scale, part-time producers with average herd size of 2.9 ± 1.6 adult pigs.
2. Feed costs are clearly the most important component of production cost in the study area. There is the need therefore to reduce the cost of production using alternative feed sources such as agro-industrial by-products. There is also the need to evolve cheap rations that will support a viable production enterprise using locally available raw materials. This will lead to increased animal protein production in the country.
3. Incidence of diseases and high cost of inputs are the most pressing problems of the farmers.
4. Farmers education on feeding methods using available non-conventional feeds and simple disease control programmes are possible short-term methods to improve pig production in the study area.
5. Pig production will ease pressure on beef and other animal types resulting in increase in protein source and probably a decrease in prices of meat.
6. Pig farming is primarily a small holder concern in the study area and there is no doubt that it will continue to be so for a long time. In this situation, it is therefore advocated that technical know-how for improving production should be made available to farmers through extension service. Thus the extension workers have a major role to play in improving pig production.

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