PROFITABILITY OF SWINE PRODUCTION IN AKWA IBOM STATE, NIGERIA

BY

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A THESIS SUBMITTED TO THE SCHOOL OF POSTGRADUATE STUDIES, AHMADU BELLO UNIVERSITY, ZARIA IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF SCIENCE DEGREE IN AGRICULTURAL EDUCATION, DEPARTMENT OF VOCATIONAL AND TECHNICAL EDUCATION, AHMADU BELLO UNIVERSITY, ZARIA

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DECLARATION

I, Imaikop David EKPE hereby declare that this dissertation entitled "Profitability of Swine Production in Akwa Ibom State, Nigeria" has been carried out by me in the Department of Vocational and Technical Education, Ahmadu Bello University Zaria. The information derived from the literature has been duly acknowledged in the text and a list of references provided. No part of this dissertation was previously presented for another degree or diploma at this or any other institution.

_____ _____

Imaikop David Ekpe **Date**

CERTIFICATION

This dissertation entitled "Profitability of Swine Production in Akwa Ibom State, Nigeria" by Imaikop David Ekpe, meets the regulations governing the award of the Degree of Master of Science in Agricultural Education of the Ahmadu Bello University, Zaria and is approved for its contribution to knowledge and literary presentation.

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DEDICATION

This research work is dedicated to my darling husband Mr. Edirin E. Ogigirigi.

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ABSTRACT

This study assessed the profitability of swine production in Akwa Ibom State, Nigeria. Three specific objectives, three research questions and two null hypotheses were stated for the study. The population for the study consisted of 4,003 registered swine farmers in Akwa Ibom State (Uyo branch). Descriptive survey research design was used and structured questionnaire was drafted for data collection. Data were analyzed using descriptive statistics, profitability ratio and Pearson product moment correlation. The two null hypotheses were tested at 0.05 level of significance using profitability ratio for null hypothesis one (1) and Pearson product moment correlation was used to test null hypothesis two (2). Major findings revealed that 52% of the respondents were 40 years of age, 42% had secondary school education, 68% engaged in business as their major occupation, 61% used semi-intensive management system and 50% of the respondents had 10 years farming experience. The findings further indicated that an annual production variable cost was ₦365,200, fixed cost was ₦94,760 and total cost was ₦459,960 and sales of output was valued at ₦1,239,000 (TR) while the net revenue was ₦779,040. The profitability ratio was 3.39. The profitability ratio showed that there was a significant relationship between costs and benefit of swine production while Pearson product moment correlation showed that there was a significant relationship between constraints faced by farmers and swine production. Based on the findings, it is recommended that the government of Akwa Ibom State. Agricultural development programme should increase veterinary service by supplying necessary vaccine at lower cost by establishing new veterinary care centres. This will help to increase profitability.

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GLOSSARY

AKWASFDP	-	Akwa Ibom State Association of Swine Farmers Development Programme
GDP	-	Gross Domestic Product
CBA	-	Cost Benefit Analysis
FAO	-	Food and Agricultural Organization
TC	-	Total Cost
TVC	-	Total Variable Cost
TFC	-	Total Fixed Cost
TR	-	Total Revenue
NR	-	Net Revenue
GM	-	Gross Margin
AKADEP	-	Akwa Ibom Agricultural Development Programme
FAX	-	Facsimile Automated Xerox
OND	-	Ordinary National Diploma
MTN	-	Mobile Telecommunication Network
ICT	-	Information and Communication Technology
A.B.U.	-	Ahmadu Bello University
L.G.A.	-	Local Government Area
PPMC	-	Pearson Product Moment Coefficient
HND	-	Higher National Diploma
NCE	-	National Certificate in Education
NDE	-	National Directorate of Employment

NPM	-	Net Profit Margin
GPM	-	Gross Profit Margin

OPERATIONAL DEFINITION OF TERMS

Production: Production in this study is the process of rearing swine from farrowing to finishing stages as well as transporting and marketing of live swine, pork and swine products and by-products.

Cost: Amount of money put in production of swine.

Benefit: The profitability or cost return of swine production.

Analysis: Process of calculating cost and benefits in swine production.

Gestation period: The period or duration of pregnancy.

Hoof: The top of a toe of swine feet

Litter size: Numbers of swine offspring

Piglet: Unwanted young swine or immature swine

Pork: Swine meat

Farrowing: Process of giving birth in swine

Snout: The long projecting nose, mouth and jaw of swine.

Sow: Breeding female or female swine.

Prolificacy: Highly fertile with high numbers of litters.

Omnivorous: Swine is animal that eats both herbs and flesh.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

One of the major challenges facing Nigeria is satisfaction of the ever-increasing demand for protein. Most Nigerian diets are deficient in animal protein. FAO (2010) recommends that the minimum intake of protein by an average person should be 65g per day; of this, 36g (that is, 40%) should come from animal sources. However, Nigeria is presently unable to meet this requirement. At present, the animal protein consumption in Nigeria is 15g per person per day which is a far cry from the FAO recommendation. Consequently, widespread hunger, poor and stunted growth as well as increase in spread of diseases are evident in the country (Tijjani, Tijani, Tijjani and Sadiq, 2012).

This shortage of animal protein consumption is partly due to the high cost of conventional sources of meat like cattle, swine, goat, sheep and poultry (Tewe, 1999). It is therefore necessary to search for cheaper alternative 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 swine. Swine have been described as one of the most prolific and fast growing livestock that can convert food waste to valuable products. They excel above other read met animals such as cattle, sheep and goat in converting feed to flesh.

Ekarius (2008) defines swine as a farm animal with hoofed feet, short prickly hair and along snout used for digging and is the oldest domesticated animal. It is omnivores and is a highly social and intelligent animal. It has the potential to be highly prolific, because it is capable of producing many litters after a relatively short gestation period.

The productivity in terms of yield of meat per tone of live weight of breeding females per year is in the region of six times that of cattle. Domesticated swine is raised commercially for meat (generally called pork, ham, gammon or bacon) as well as for leather. A sow stays pregnant for an average of 114 days (three months, three weeks and three days). A growing swine of improved breeds that is managed and well fed from weaning to slaughter can reach a weight of 90kg in 150 days with good life weight growth pattern (Ekarius 2008). The profitability of swine production is vital to the national economy in the case of generating employment opportunity, additional income for households and improving the nutritional level of the people. MOF (2012) report show that about 2.58 percent of GDP in Nigeria came from animal farming during 2010/11 financial year. In addition, swine is an excellent source of protein and nutrients which are essential for health and growth of the human body.

In addition, the profitability of swine production include: swine have high fecundity, high feed conversion efficiency early maturity, short generation interval (gestation period 114 days) and relatively small space requirement, they are multipurpose animals providing about 40% of meat in the world market, cooking fats and bristles (Babatunde and Fetuga, 2000). Also, swine have higher survival rate especially under the scarcity of inputs. Swine is equally important for agro-based industries like feed mills for provision of bone and blood meal respectively, which are a good source of calcium in animal nutrition. In addition, swine manure is an excellent fertilizer for enriching poor soils for crop production. Its skin is also useful for light leather production. It is produced under a variety of production systems ranging from simple backyard piggery,

swine living on garbage belt`s to family operated farms or large scale integrated swine industries with sophisticated bio-safety measures (Babatunde and Fetuga, 2000).

Swine production have been recommended as a good alternative source of cheap, high quality animal protein that suits escalating human population. They have relatively low cost of production and their growth rate is fast (Osaro, 2005). They also have high production potential and high carcass yield. They adapt easily to environmental conditions. Swine production has therefore been advocated as a short term measure towards alleviating the animal protein and caloric deficit, especially where there are no religious edicts preventing their production and consumption.

Swine production is unique in that it offers the highest turnover rate and the quickest returns to investment outlay in livestock enterprises (Sanni and Ogundipe, 2005). Funds invested in swine production is the highest when compared with ruminants and other monogastric animals (Braenkaert, Gavirial, Jallade & Seiders, 2000) but the cheapest, commonest and the best source of animal protein.

1.2 Statement of Problem

Akwa Ibom State is densely populated and malnutrition and hunger are serious problems facing the state (Ebong and Akpabio, 2008). Fifty percent (50%) of the new born babies especially in the rural areas have low birth weight while more than 90 percent of the children (aged <5years), suffer from mild to severe forms of malnutrition (Ojo, 2002). The cheapest, commonest and the best source of animal protein in the area is swine meat. But little or no research work has been done on swine production. Few researchers like Ironkwe and Amefale (2008) carried out a research work on swine

production and Osondu, Ijoema, Anyiro and Obike (2014) did work on swine production around the neighbouring state of Akwa Ibom, but they fail to address the profitability of swine production. For this reason this work was initiated to address the profitability of swine production in Akwa Ibom State.

1.3 Objectives of the Study

The overall objective of this study was to determine the profitability of swine production in Akwa Ibom State.

The specific objectives of the study were to:

1. identify the major socio-economic characteristics of swine farmers in Akwa Ibom State;
2. determine the cost return and profitability ratio of swine production in Akwa Ibom State; and
3. identify the major constraints faced by swine farmers in Akwa Ibom State.

1.4 Research Questions

The following research questions were stated and answered, which was in line with specific objectives.

1. What are the major socio-economic characteristics of swine farmers in Akwa Ibom State?
2. What are the cost return and profitability ratio of swine production in Akwa Ibom State?
3. What are the major constraints faced by swine farmers in Akwa Ibom State?

1.5 Research Hypotheses

The following null hypotheses were formulated and tested at 0.05 level of significance.

Ho1: There is no significant difference in the mean responses between cost and profitability ratio of swine production.

Ho2: There is no significant relationship between the constraints faced by swine farmers and swine production.

1.6 Significance of the Study

The findings of this research study will benefit the following group of people: Unemployed youth; swine farmers; agricultural Extension agents; agricultural education students and teachers; Ministry of Agriculture and Ministry of Education; agricultural economic analysts; researchers and research institutes; universities and other institutions of learning; curriculum planners and National Directorate of Employment and general public.

The findings of this research will be useful to unemployed youth, as it will create awareness on the benefits of swine production which can serve as a means of livelihood for youth for the immense profitability in swine production and as career occupation.

It will also provide blueprint for extension agents to disseminate information to the livestock farmers on profitability of swine farming which will arouse their interest in swine production. Agricultural economic analysts will also benefit from the study as a literature source to plan their paper presentation and conferences and effectively teach animal scientists and farmers. Curriculum planners also will benefit from the findings of

this research work as they plan activities that will serve as total learning experiences for students and teachers. The information obtained can be made available to swine farmers and others through workshops, seminars, conferences, publications and training manuals for proper utilization.

The findings of this study will provide a guide for other farmers and investors who will love to invest on production of swine for proper establishment and profitability. The results of this study on cost benefit profitability will provide information and a guide which will help other swine farmers and investors to apply improved swine production management in their various farms with the assistance of agricultural extension agents. The information obtained by agricultural extension agents from the findings of this study on the constraints of swine production technologies, swine productivity constraints and strategies for improving physical productivity and profitability of swine farms will help them map out improvement strategies, design extension training packages and guidelines for training and retraining of other swine farmers and prospective investors on how to embark on profitable swine production.

The findings of this study on swine production and constraints will also provide useful information for State Ministry of Agriculture, and Akwa Ibom State Agricultural Development Programme (AKADEP), to integrate the findings into training packages.

The findings of this study on social and natural, technical, economic and profitability of swine will help the National Directorate of Employment (NDE) to organize seminars, workshops and conferences on profitable swine production for sustainability. The National Directorate of Employment (NDE) will also use the findings as strategies for improving productivity and profitability of swine production in the

training of other farmers and prospective investors. This will enable them to acquire relevant skills on the production especially during training scheme. The data on swine profitability will guide the swine farmers on the choice of more productive breeds for stocking and the required input costs and corresponding output (revenue) in swine business. This will also show the livestock farmers and investors how viable swine business is in the state.

The general public will also benefit from the findings of this study because the appropriate use of the entire findings by swine farmers, agricultural extension agents, nutritionists, institutions, governments and non-governmental organizations will lead to more investments in swine production resulting to increased pork production, and reduction in malnutrition of animal protein.

1.7 Basic Assumptions of the Study

The following assumptions were made in this study.

1. It is assumed that difference exist in the socio-economic characteristics of swine farmers in Akwa Ibom State.
2. It is assumed that there are cost and profitability ratio on swine production in Akwa Ibom State.
3. It is assumed that swine farmers are faced with social, economic and technical constraints in Akwa Ibom State.

1.8 Delimitation of the Study

Based on swine production, the study was delimited to profitability of swine production in Akwa Ibom State. The study was also delimited to registered Swine Farmers in Akwa Ibom Agricultural Development Programme (AKADEP). The reason was that they were the main respondents that gave relevant data needed for the study. The research work was further delimited to sixteen Local Government Areas in Akwa Ibom State. The reason why the researcher delimited the research work to these areas was that there are high concentration of swine farming in the area. The study was further delimited to only one year of swine production cycle.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

This chapter reviews relevant literatures related to cost analysis and benefits of swine production among other domestic livestock farmers under the following sub-headings.

2.1 Theoretical Framework

2.2 Marketing of Swine and Swine Products

2.3 Swine Production under Different Management Practices

2.4 Techniques and Care in Swine Production

2.5 Housing Management in Swine Production

2.6 Feeding Technique in Swine Production

2.7 Profitability in Diseases Management in Swine Production

2.8 Record Keeping in Swine Farms

2.9 Cost of Swine Production

2.10 Farm Physical Productivity and Profitability

2.11 Constraints to Swine Production

2.12 Empirical Studies

2.13 Summary of the Reviewed Literature

2.1 Theoretical Framework

The theoretical background adopted for this study was based upon cost benefit analysis theory. The cost benefit analysis theory, sometimes called Benefit Cost Analysis (BCA) was viewed by Weimer (2005) as a systematic approach to estimating the

strengths and weaknesses of alternatives that satisfy transactions, activities or functional requirement for a business. It is a technique that is used to determine options that provide the best approach for adoption and practice in terms of benefits in labour, home and cost saving. The CBA is also defined as systematic process for calculating and comparing benefits and costs of a project (production). Weimer (2005) further postulates that this theory is broadly grouped into two proposals:-

1. To determine if it is a sound investment/decision (justification/feasibility)
2. To provide a basis for comparing projects. It involves comparing the total expected benefits to see whether the benefits outweigh the cost, and by how much.

CBA is related to, but distinct from cost effectiveness analysis. In CBA benefits and cost are expressed in monetary terms, and are adjusted for the time value of money, so that all flows benefits and flows of project cost over time (which tend to occur at different points in time) are expressed on a common basis in terms of their net present values. Closely related, but slightly different, formal techniques include cost effectiveness analysis, risk-benefit analysis, economic impact analysis, fiscal impact analysis, and social return on investment analysis.

Boardman (2006) reports that cost benefit analysis is often used by governments and other organizations, such as private sector businesses, to appraise the desirability of a given policy. It is an analysis of the expected balance of benefits and costs, including an account of foregone alternatives and the status quo. CBA helps predict whether the benefits of a policy outweigh its cost, and by how much relative to other alternatives (i.e one can rank alternate policies in terms of the cost benefit ratio). Generally, accurate cost-

benefit analysis identifies choices that increase welfare from a utilitarian perspective. Assuming an accurate CBA, changing the status quo by implementing the alternative with the lowest cost-benefit ratio can improve efficiency. An analyst using CBA should recognize that perfect appraisal of all present and future costs and benefits is difficult, and while CBA can offer a well-educated estimate of the best alternative, perfection in terms of economic efficiency and social welfare are not guaranteed.

Using the theory, Dunn (2009) postulates the process of CBA as a list of steps that comprise generic cost benefit analysis as follows:

1. List alternative projects/programs.
2. List stake holders
3. Select measurements and measure all cost/benefit elements.
4. Predict outcome of cost and benefits over relevant time period.
5. Convert all costs and benefits in a common currency.
6. Apply discount rate.
7. Calculate net present value of project options.
8. Perform sensitivity analysis.
9. Adopt recommended choice.

Cost benefit analysis theory is adopted for this study since it is based on predicting outcome of cost and benefits over relevant period of time. It is the analysis of the expected balance of benefits and costs, including an account of foregone alternatives and status quo. Cost benefit analysis helps predict whether the benefits of production outweigh its cost. Hence, this study revolves around analyzing the cost of swine production from piglet to market size and the benefits derived from swine production

following Dunn (2009) who postulated the process of cost benefit analysis who predicted outcome of cost and benefit in swine production.

2.2 Marketing of Swine and Swine Products

Production is incomplete until the goods and services produced reach the hands of the final consumers (Nweze, 2002). The farm products have to be delivered through different marketing channels or systems to the consumers. An agricultural market exists where there is selling and buying of farm products. Nigerian swine farmers produce swine and sell them and their end products including effluent or wastes to the consumers either on-farm or in the market (Ajala, Adesehinwa and Mohammed, 2007).

The marketing of swine and swine products in Nigeria is not as organized as in developed countries like China, Brazil, Spain, America and Britain. Nigerian swine farmers usually sell their live swine direct to wholesalers, retailers, local butchers or consumers at on-farm-gate or in local markets. The wholesalers or middlemen transport them from areas of abundance to areas of scarcity and distribute to retailers or butchers who eventually sell the pork, lard, sausages or bacon in small pieces to consumers and hoteliers (Nwobodo, 2007). Swine can also be sold in the form of live swine, fresh meat or pork cured products sausages, pies, luncheon meat, and meat pastes, lard (swine fat), swine skin, bristles, intestines, offals, blood, hoofs, slaughter house by-products and swine manure (Holness, 2007). All these attract appreciable prices in the market and add to the farmers' profit.

In a study conducted by Nwobodo (2007), it was revealed that in Enugu State, swine and pork are found mainly in rural markets than in urban markets. Nwobodo

(2007) further maintained that in urban markets, pork is highly demanded but is always in short supply. Marketing includes all of business activities involved in moving the agricultural products from the producers to the consumers. It includes buying, processing and selling of raw materials and consumer goods. Marketing also extends to transportation, advertising and promotion of products (Burton, 2004). The market efficiency of swine farms is an indication of their capacity to get a good price for their inputs and outputs.

Wharton (2005) suggested that efficiency in communication, agricultural education and extension services improve the market efficiency of farmers. The major aim of improving market efficiency is to obtain the highest net sale price for the outputs and obtain the lowest net purchase price for the inputs. Effective systems of communication and information devices in agriculture have been developed for disseminating improved and proven information. To this end, telephone, internet, radio, teletype, FAX, E-mail and television communication play important roles in providing agricultural marketing information to producers, middlemen and consumers (Burton, 2004). Recently, modern Information and Communication Technology (ICT) through computer internet, websites and electronic banking services are doing nice jobs in providing adequate agricultural marketing strategies (Phillippe, 2004).

Publications like newspapers are widely distributed to provide agricultural market information. The major systems for marketing swine include: private sales, public sales, direct sales to an abattoir or butcher and contract sales (Serres, 2009). Private sales is a method where one or more swine are sold to the local consumers, middlemen, other producers and butchers. This is common in Nigeria among small scale swine farmers. In

it, the live swine are sold at a negotiable price equilibrium. This system has the advantage of being simple but in rural areas, the swine farmers are usually cheated by the swine traders and speculators. In view of this problem, marketing co-operatives and swine farmers association of Nigeria have been formed to ensure adequate and stable prices for their products. In public sales, the swine are taken to urban or local markets where the live swine are sold by auction to the highest bidder. In some markets in Nigeria, veterinary fees per swine are usually collected from the swine sellers by the market masters as part of government revenue.

In Kaduna State, there is popular Kafanchan swine market while in the South Eastern Nigeria, the notable markets include Eke, Oye, Afor and Nkwo where swine are usually sold. Swine are also sold in other Christian areas of Lagos, Ondo, Benue, Plateau and Taraba States. Some markets operate on daily basis while others operate on the basis of native weeks. Some swine farmers during festivals like Christmas, Easter, New year celebration and some local festivals kill their swine and sell the pork in the market to the consumers on expectation of higher prices. In some places, swine dealers or traders and butchers do not allow this practice of selling pork in the market by the producers rather they monopolise the sale of pork. Direct sales to an abattoir or butcher is where the large scale swine producers sell their animals direct to the butchers who keep them in lairage waiting to be slaughtered in abattoir or slaughter house. In this system, there is price fluctuation because prices rise when swine are in short supply and producers are motivated to produce more. Consequently, more swine are supplied to the market and the price falls.

The instability of market price for swine in Nigeria and lack of reasonable net profit are the major reasons why swine producers go in and out of swine production (Ajala and Sanni, 2002). The method does not give room for proper negotiation of prices due to the monopolistic tendency of butchers. Contract sales is a system whereby there is contract agreement between a swine producer and a butcher having an abattoir on the ground that the producer will supply a specific number of swine to the butcher within a specific period of time at stipulated prices. There is a clear term 54 of agreement with respect to the size, number and price of the swine to be supplied. There is price stabilization here and the producer is able to plan ahead for his enterprises. Contract sales is always favourable to the producer but it is a rare opportunity. The most recent innovative selling technologies or marketing approaches include: forward contracting, options trading or trading in options, futures trading, video merchandising or video marketing and telemarketing (Burton, 2004).

Forward contracting allows the buyer and the seller or producer to know the selling price of a product before it is ready for sale. With the cost of production in mind, the producer determines the selling price of the item being produced. The risk of the producers selling below the cost of production is highly reduced in forward contracting system. Under the contract agreement, the description of the product and quantity to be supplied must be clearly specified. Options trading is a form of marketing in which a producer buys an option giving him/her the right to purchase a future contract for a swine at a specific price by a specific future date. A favourable option period will enable the farmer to exercise the option to buy or sell.

Future trading is a marketing technology in which contracts for farm products like boars, hogs, piglets, sow, and other farm products are bought and sold for delivery at a future date. When the farm products are available for sale, they are sold on cash market and a future contract is bought immediately. The contract to sell is cancelled by a contract to buy and no obligation exists to deliver the products. Video merchandising or marketing is an innovative approach to sell livestock that allows buyers in distant places to view the sale offering without actually visiting the farm or ranch. The video tape is recorded in such a way that the animals or other products meant for sale are clearly shown to the buyers on the screen for proper inspection and purchases. Telemarketing is a type of auction sale conducted over the telephone. The farm products meant for sale are properly arranged, weighed, graded for quality and size. In it, prospective 55 buyers are invited for a telephone conference call before the sales proper. The farm products are sold by auction over the telephone to the highest bidder for immediate delivery.

In the year 2010, e-presence technology was developed by Mobile Telecommunication Network (MTN) for business transaction. This e-presence is an innovative marketing strategy where businessmen and women or marketers in different locations can come together within few seconds and see each other face to face on the screen to discuss matters concerning their business transaction. This service is provided by Telecommunication companies like MTN. The practicing of some of these approaches depends on the farmers' mastery of Agricultural education and extension and the availability of social amenities and modern Information and Communication Technology (ICT) facilities in the rural areas. In marketing, swine are distributed with the help of motor vehicles like trucks and pickup, motor cycles, bicycles and wheel barrows

(Whetham, 2008). Adequate care should be taken to avoid any injury to the swine on transit (Serres, 2009). In addition, proper ventilation and cool environment should be provided within the truck or vehicle to avoid asphyxiation and heat stress (Holness, 2007). The relationship is that in the present study, the marketing technologies applied by swine farms will be determined. This will help to ascertain whether the swine farmers are applying appropriate modern marketing technologies in swine production or not.

Prospects of Swine Production Animal husbandry have developed over the years to become a highly profitable industry in Nigeria (Oni and Yusuf, 2009). In spite of the fact that there are many constraints in livestock production in Nigeria, there is still hope in the industry. The prevailing climatic condition in Nigeria is conducive for livestock production. Furthermore, there is availability of necessary factors of production including both human and material resources. The positive contributions of livestock industry include: Provision of income (money); Source of food (meat and milk) supply; Provision of foreign exchange earnings; Source of manure; Provision of raw materials for industries; Used for research and scientific investigation· Provision of means of transportation and source of farm power used for different farm operations. Swine production will go a long way to supplying large quantity of nutritious pork (meat) so as to fill the animal protein gap in the diet of Nigerian citizens.

Some animal products like hides and skins (leather) are exported to other countries to earn us foreign exchange thereby increasing Nigeria's capital base and gross domestic product. Farm animals provide good source of manure (waste products) which help to increase the fertility of the soil. It has been reported by Rogerio and Laura (2006) that in some developed countries like Brazil, China, Britain and United States of

America, swine effluents and faeces (waste) have been recycled through bio-digesters to generate energy (gas) used for both domestic and industrial activities. This is a source of net income as well as solution to environmental problem in piggeries.

The prospects of swine production enumerated by Holness (2007) include swine produce white meat without contributing to the deterioration of the natural grazing lands as is the case in ruminant production. Nowadays, white meat is more preferred to red meat in the world market, because of its low content of cholesterol. Similarly, they convert concentrated feeds to meat twice as efficiently as ruminants. Again, swine possess the potential to be highly productive because they are capable of producing large litter size after a relatively short gestation period. Their output in terms of yield of meat per tonne of live weight of breeding female per year is in this region of six times that of cattle. If confined, maximum use can be made of their manure (faeces and effluent).

Swine are relatively small size when compared with cattle provides for flexibility in marketing and consumption. They have quicker rate of turnover on investment compared with cattle; The swine meat (pork) is particularly suitable for processing and some of the processed products have a longer shelf life than fresh meat. Owing to these huge benefits derived from swine production, Nigeria needs to encourage and motivate farmers to go into intensive swine production which is gradually being abandoned especially in Enugu State of Nigeria. The potential for increased pork production is enormous and should be pursued vigorously in all its ramifications.

2.3 Swine Production under Different Management Practices in Nigeria

Swine production in Nigeria is carried out under different management practices, broadly classified as extensive, semi intensive and intensive (Okojie, 2003). According to Okojie (2003) the extensive system can also be called outdoor, unrestricted, the free range system, where the animals roam and look for food. It is unspecialized and traditional system which is most predominant among small scale farmers.

The system of swine production chosen by a farmer will depend on many factors which include: the choice of the farmer, the prevailing weather condition, financial capability, availability of swine feeds and the type of breeding stock. Some farmers embark on small scale swine farming, others on medium scale or large scale swine farming. Peasant farmers usually due to shortage of capital and inadequate vocational skills and basic knowledge keep swine under small scale. On the other hand, commercial swine farmers who have enough financial backing and huge capital, adopt large scale system of swine farming.

Extensive system is the traditional method of rearing swine in many parts of Nigeria. It is the most simplest and cheapest system of swine keeping (Piot – Lepetit, Le Moing and Ulve, 2004). Here, the swine are allowed to move freely without any restriction to search for feeds and cool spots for relaxation. They may move out and roam about from morning till evening without hindrances. Although swine here live as scavengers but the farmers usually supply extra feeds or supplementary feeds in form of grains, kitchen wastes, roots and tubers and industrial by-products (Holness, 2007). Sometimes, shades and wallows are provided for them for farrowing and to reduce heat stress and sun burn (Michael, 2003).

The indigenous breeds of swine which are adapted to the local environment are usually kept under this extensive system. The number of swine kept in this system is always small and hardly satisfies the consumers' demand in the market (Adesehinwa, Aribido, Oyediji and Obiniyi, 2003). The extensive system of swine rearing is only suitable where there is vast area of land which is not under cultivation. The major disadvantages of extensive system include: low productivity, low quality feeds, poor growth rate, high mortality rate, heavy parasite and disease infestation, exposure to inclement weather condition and predators (Holness, 2007). However, rural subsistent farmers can increase their farm income through the extensive system of raising swine at minimum production costs (Mendola, 2007).

Morgan (2008) viewed that swine reared under extensive system thrived better because of their adaptive to different feeds that may not be consumed by other domestic animals. The author explained more that predators like snakes, rodents and kites that may be dangerous to cattle, sheep and goats were used as source of feed to swine except scorpions.

Mbanasor and Sampson (2004) opined that swine in extensive management system required small area of land. Morrison (2001) stated that the ultimate performance measure in livestock business is the amount of profit which is made and the level of profit made depends on management practices. Hans (2000) stated that profitability is not a function of investment only but management practices and husbandry play very important roles.

The semi intensive system of management whereby animals are partially confined especially during the dry season and totally during the wet season. In semi-intensive

system, swine spend part of their time in the field searching for feeds, foraging and exercising themselves and the other parts of their time in confinement (Serres, 1999). There is provision for such facilities like buildings, pens, mud wallows, creep feeds mainly made of very simple cheap local materials (Holness, 2007). Extra feeds are provided by the farmers and animals are properly taken care of while in confinement. In addition, detection of diseases and parasites of swine and the subsequent veterinary services are easily practiced in semi-intensive method than in extensive method (Ezeibe, 2010).

With good management, swine reared under this semi-intensive system tend to perform higher than the same swine reared under extensive system (Scott and Edwards, 2005). In addition semi-intensive system is more costly to embark on but has better net profit margin than extensive method (John, 2003). This system is useful in producing breeding stock in addition to preventing over fattening through proper exercises and producing strong, muscular and healthy swine (Peter, Owen and Sheona, 2001). The size of the herds are higher and swine are sold in the market when the need arises to solve financial problem. This system has combined the advantages of both extensive and intensive systems of swine keeping. The practice of semi-intensive system has contributed to low production cost especially in the area of feeds and housing when compared with intensive rearing (Odupelu, 1992).

The semi intensive management practices allow for good control of feeding. Harvested grasses are fed with household wastes such as peal of yams, potatoes, cocoyam, boiled cassava, beans and cereal grains like maize etc. This management has advantage over the free range (extensive system). Admosun (2006) explained that swine

production under semi intensive system are commonly used by small scale producers and are characterized by having one or more pens in which the swine can forage on natural vegetation and insects to supplement the feed supplied. It is desirable to provide at least two runs for alternating use to avoid build-up of disease and parasites. Each run should allow at least 10 to 15m^2 per swine and be fenced, but a free-range allowing 40 to 80m^2 per swine will be required where the swine are expected to obtain a substantial part of their diet by foraging. A small, simple house, which allows 0.3 to 0.4m^2 per swine and which has a thatched roof a littered earth floor and slatted or swine wire walls on at least three sides will provide protection from inclement weather, from predators at night and offer shade in the daytime. The shelter should be large enough to enter to collect piglet and be equipped with next boxes, feeders, drinkers and perches. For convenience the house should be situated so that access to each of the runs can be provided with small outlet doors or 'popholes'. Swine stood a better chance of utilizing the supplemented feeder like kitchen wastes, agro industrial by products waste because of their simple stomach which make them adapted to almost all types of feeds. The intensive production system provides total confinement of swine in a particular housing system. Hence, the system enables them to express fully their genetic potentials since adequate nutrients are provided to satisfy requirement for efficient feed conversion and growth (Devandra and Fuller, 2003).

Intensive system of swine production has a lot of advantages over the extensive and semi intensive system, in terms of diseases and breeding control as well as adoption of improved technology in swine production. Intensive system of swine rearing is associated with large scale swine production in Nigeria. It is capital-intensive. In this

system, there is total confinement of the swine from birth to finishing stage (Holness, 2007; Serres, 1999). This system is adopted mainly by commercial swine farmers with huge capital investment. The system of housing will be more sophisticated and will generally comprise a concrete or hard floor, adequate shelter, pen space, appropriate feed and watering facilities (Holness, 2007). In it, there is intensive care of the swine coupled with improved management practices to optimize output and increase profitability of the swine farms. Under intensive system, the number of swine reared per individual farm are many ranging from about 40 to 2000 swine or more depending on the viability and financial stand of the farm. The swine are usually separated into units on the basis of age and purpose for which they are kept. For instance, there may be units for gilts, in-swine (sows), sows, boars, farrowing swine, weaners, growers, breeding stock, fatteners and ready for slaughter swine (Akinyosoye, 1999).

In intensive swine production, the swine reared are mainly the high-yielding types, higher performance, improved exotic swine or hybrids between exotic and local breeds of swine (Holness, 2007). The houses used in intensive production of swine are cost-effective, properly ventilated and spaced, have the ability to control heat stress and excessive sunlight, accessible to free movement and effective disposal of effluent (Gekara, Garner and Dunbar, 2009). It is also beneficial to feed the animals with high quality commercial feeds coupled with home-grown feeds, household and kitchen wastes and agro-industrial by-products.

In order to reduce the incidence of diseases and parasites in intensive swine farm, there is need for adequate maintenance of high level hygiene and bio-security

awareness in the farm (Jason, 2005). The veterinary officers are available to detect, diagnose and treat sick swine to avoid loss in the piggery. Infected swine are usually culled or isolated from the rest of the animals to avoid rapid spread of the diseases within the herd (Holness, 2007).

The sale of live swine, swine products and swine manure help to fetch the intensive swine farmers huge amount of money as their farm income. Intensive swine production can be established in both rural and urban areas. Intensive system of swine rearing is the choice of most swine farmers in Nigeria if the required resources are provided.

Swine management includes the provision of adequate housing, feeding, handling and care for boars, sows, pregnant sows, gilts, weaners, growers and the fattening herds (Akinyososye, 1999). Swine care services contribute in no small measure to the success or failure of swine enterprise. For adequate care of swine of all types and ages, all factors of production such as land, labour, capital and stockmanship (manager) must be available (Peter, Owen and Sheona, 2001).

The farm manager co-ordinates the activities of all other factors of production. The pillars of swine production enterprise include: management, genetics, nutrition, housing, health, teamwork and stockmanship as the corner stone (Peter, Owen and Sheona, 2001). A good swine farm manager should have good character, love for swine and must have acquired effective farmer education on complex needs of the swine, how best to meet these needs and on full range of skills required (Peter, Owen and Sheona, 2001). Swine are better taken care of in accordance with their age, type and purpose of rearing them.

In addition, the system also avoids destructions of growing crops and swine becoming nuisance on the street. In connection with this explanation, Karool and Krider (2001) stressed that free ranging (extensive system) of swine is considered as one of the risk factors for porcine cysticerosis. Therefore, it is imperative to find ways to keep swine enclosed. Economic studies have shown that traditional production system is wasteful and unprofitable due to poor feed conversion, high mortality rates, low productive rates and final products (Verhulst, 2009). Dick (2004), described the structure of swine house under intensive system to be simple by saying that the house can be constructed with solid tree trunks with simple roofing. The author points out the principles of constructing swine housing during hot climate to be an open type that will facilitate good ventilation and should be expensive (Ensminger, 2003 and Julian, 2011).

2.4 Techniques and Care in Swine Production

Care of Boars: Boars are male swine which are used for meat and for mating or breeding. They need to be housed in a separate unit or pen and when they reach about 8 months of age, then they need to be introduced to sows and gilts for servicing. It is generally accepted that the ratio of boar to sow is 1:20, that is one boar to 20 sows. Black (2000), reports that it is better to introduce boars to sows when the sows are on heat period to enable them willingly accept the boars without resistance. This will encourage the boar to have successful sexual experience devoid of frustration in the first encounter. Serres (1999) suggested that young boar should not be introduced to a group of many sows to avoid bullying and subsequent libido reduction. Serres (1999) further stated that the boar should not be over-worked and

a minimum of two services per week is recommended. Boars should also be protected from high temperature to avoid reduced libido and spermatogenesis, heat stress and sunburn. Shades or proper houses, wallows and water sprays should be provided.

Mating is encouraged in the morning or evening when the weather is expected to be cool. Mature boar can carry out five to six services per week and still maintain good fertility levels. The boar should not be over worked otherwise there is decline in the quantity and quality of sperm produced resulting to small litters and increased number of sows returning to service (Holness, 2007). Any boar which fails to perform for one reason or the other should be culled and sold in the market. The boar that is meant to be used primarily for meat should not be used in mating. In some farms, such boars are usually castrated (removal of testes) to encourage rapid growth and fattening. The castrated boar is known as hog, barrow or stag. This practice must be carried out by skilled personnel. In actual fact, boars should not be kept for more than four years in the piggery to avoid being too heavy and ill-tempered. Lameness also reduces productivity in boars. Scott and Edwards (2005) suggested that lameness has to be prevented by ensuring that the floors are not rough and dirty and anything that causes injury to the legs of the swine should be avoided.

Care of Sows: Sows are mature female swine while gilts are young female swine. The gilts are sexually active at the age of 8 months but recently, it is observed that gilts can be served at the age of 7 months without any problem (Akinyosoye, 1999). It is a well known fact that boar odour otherwise called pheromones help in

stimulating the gilt to be sexually active especially when they are on heat period (Serres, 1999).

The signs of sows on heat include restlessness, swollen and reddish vulva, mucous discharge from vagina, mounting on top of other sows, abnormal noise making or serious grunting and finally deep acceptance of boars during mating (Osaro, 1995). The gilts which show reluctance to come on heat for the first time should be mixed with strange gilts, moved into new accommodation or taken around in a motor vehicle like trailer or truck for more stimulation of ovulation (Serres, 1999). The animals should be well cared for, fed on balanced diet and through the adlib feeding method. The major phases in the breeding cycle of a sow are mating, pregnancy, farrowing, lactation and weaning.

Farrowing is the act of giving birth to the young ones (piglets) by sows. This stage is very critical in the life of pregnant sows, therefore the stockman should take proper care of the pregnant sows and detect the various requirements of the sow during farrowing (Peter, Owen and Sheona, 2001). Few weeks to the farrowing, the sows should be properly fed, dewormed and moved into the farrowing pen or quarters a week before the actual farrowing. When the sow is under labour, there is increased restlessness, noise making and perhaps milk flow from the udder 12 hours prior to the onset of farrowing (Holness, 2007). The sow should be assisted by the farmer to reduce injury to the piglets and other problems that may arise from farrowing which lasts between 2 to 8 hours (Serres, 1999).

Immediately after birth, strong piglets struggle to reach for the mother's udder and teat to suck some milk. Lactation is the practice of feeding the piglets with the breast

milk by their mothers immediately after birth. It is advisable to provide farrowing crates to reduce the incidence of crushing the piglets by sows (Serres, 1999). It is important that each piglet must share from the first milk (Coloestrum) produced by the sow within the first 4 days to provide high degree of immunity or antibody (Falusi and Adeleye, 1999). The peak period of milk production in sow is between 20 to 25 days after farrowing (Holness, 2007). The sows must be checked for possible disease infection at this stage such as MMA syndrome which may affect lactation and sucking of breast milk. When milk production reduces at about 3 weeks after farrowing, it is necessary to supply solid feeds in form of creep feed. In creep feeding, the feeds are supplied in the piglets' creep or nest where they are not within the reach of the sows. Creep feeding helps the piglets to depend less on sow's breast milk, improves the digestive system of piglets, enhances growth and enables the piglets to be detached or stay away from the sow temporarily.

Care of Weaners: Pre-weaning diet must contain at least 20 percent crude protein based upon ingredients with a good balance of amino acids such as milk and fish meal (John, 2007). Weaning is the practice of separating the piglets from their mother (sow) so that they can feed on their own. As soon as the piglets are weaned, the stockman should look after them properly by providing optimum temperature and continuation of creep feeds for at least two weeks after weaning (Peter, Owen and Sheona, 2001).

Weaned piglets may be faced with social stress of mixing with swine from other litters, psychological trauma of separation from their mother, environmental

stress, nutritional stress and loss of antibodies which provide immune protection from the sow's milk (Serres, 1999). Piglets should be weaned at about the age of seven to eight weeks or when they have attained an average live weight of 11kg (Akinyosoye, 1999). This is gradually achieved by removing the sows from the farrowing pen leaving only the piglets. The piglets are provided with conducive environmental conditions and ad libitum feeding of creep feeds coupled with fresh water (Holness, 2007). Split weaning allows the bigger piglets to be weaned first and lighter ones left with the sow and weaned later when they have added weight to enable successful weaning (Williams, 2004).

Care of Growing and Finishing Swine (Fatteners): Growing and finishing swine otherwise known as fatteners are the swine found within the period from weaning to slaughter (Holness, 2007). At the age of eight or nine weeks, the growing swine have crossed the delicate period of various stresses and have well developed digestive systems to consume a variety of feeds (Serres, 1999). In large piggeries, the growers are separated into porkers which are slaughtered at the live weight of about 65kg, baconers which are slaughtered at the live weight of about 70 to 90kg and heavy hogs which are slaughtered at the live weight of about 90 to 140kg. At times, they are separated into light weights and heavy weights or males and females in different pens. In small scale peasant swine farming, there is no separation. Holness (2007) pointed out that some 80 percent of the feeds used in a swine unit is consumed by the growing and finishing swine, therefore the efficiency of feed utilization during this phase is a crucial factor affecting profitability of swine farms. The feeding

system may take the form of a combination of both adlib and restricted feeding at different stages of growth and to yield the most desirable results (Williams, 2004). A good example is where the fatteners are fed adlib up to 50kg body weight and then restricted feeding until slaughter.

Appropriate feeding troughs and other equipment must be applied while feeding the growing swine to avoid or reduce feed wastage through soiling and contamination with urine and dung. In Nigeria most piggeries feed growing swine with a view to producing large quantity of lean meat (pork) which is mostly demanded by the consumers in this part of the world. In his own contribution, Jason (2005) opined that efficient veterinary services must be rendered to minimize disease and parasite infestation among the growing swine. Furthermore, the stockman should maintain high level hygiene and on-farm bio-security.

Fighting and cannibalism can break out among the swine resulting to injuries to weaker swine and perhaps death. Tail biting, ear biting, bruises and bone fractures predispose the swine to other infections (Holness, 2007; Serres, 1999). If these conditions are mismanaged, it may lead to low productivity and profitability of the swine enterprise. These problems can be solved through proper separation of swine into units, provision of adequate space, bedding, proper ventilation and addition of adequate quantity of salt to feeds.

2.5 Housing Management in Swine Production

The choice of housing for swine is usually not based on greater profitability or improved animal performance but on operator is preference. Swine

like other domestic farm animals require proper housing for optimum performance and improved productive efficiency. The housing for swine is usually based on the principle of swine productivity and comfort (Holness, 2007). The most productive swine are those that are likely to be contained in a thermally neutral environment. This is when the environmental temperature around the swine is consistently between the swine Lower Critical Temperature (LCT) and Upper Critical Temperature (UCT). This is when the swine's heat production for metabolic activities is at minimum and it is neither using feed energy to keep warm nor reducing feed intake to keep cool (Holness, 2007).

In intensive swine production, proper housing is unavoidable due to the following reasons:

- Swine need to be protected from inclement weather condition.
- Protection of animals from thieves.
- Protection of swine from wild animals and predators.
- Provision of sufficient space and proper ventilation.
- Easy management of swine, encouragement of proper feeds and drinking without wastage.
- Protection of swine from infectious diseases from other herds, proper identification and treatment of sick farm animals.
- Facilitation of effective and controlled disposal of swine wastes (faeces and effluent).

In Nigeria, some climatic features such as dry season, rainy season, South- West trade wind and North-East trade wind must be put into consideration in constructing

appropriate swine house. The swine house is always sited east-west direction on slightly sloppy area. This encourages proper ventilation and prevents entrance of sunlight into the house. The source of good water supply is another factor which should be considered in siting a swine house. The general considerations for the building of a house for swine: include: site, walls, floors, roofs, space (size) and provision of pens for dry sows, boars, farrowing swine, fatteners or growing swine, weaners or breeding stock together with structures like wallows, gates, feeders and watering equipment (Holness, 2007; Serres, 1999).

Permanent buildings and temporary or make-shift buildings are used in intensive swine production. Permanent buildings are usually made of modern and improved building materials such as cement, corrugated iron and aluminium roofing sheets, wire mesh and netting, rods, asbestos, gravel, river sand, tiles, paints, hard wood, plastic and iron pipes. The temporary or make-shift buildings are made of simple low-cost local materials like, mud, stone, straw, sticks, grasses, palm leaves, palm fronds, raffia palm leaves and many others. Permanent buildings are more costly and last longer than the temporary buildings (John, 2003).

In view of the fact that over crowding leads to reduced performance of swine of various categories, there should be proper spacing for different types of swine at different stages of growth (Osaro, 1995). Collective pens must allow 1m2 per swine between 20kg and 50kg, 2m2 between 50kg and 100kg and 2.5m2 for dry sows, therefore a pen with dimensions 4m x 5m may house 20 piglets, 10 fattening swine, 8 sows, 1 boar while 1 lactating sow and litter must have at least

10m2. The swine buildings are subject to constant maintenance and repair when the need arises to avoid excessive dilapidation and collapse.

The provision of environmental enrichment for swine is in vogue in many countries of the world especially in Europe. The swine is naturally an exploratory animal, having evolved in semi-wood land areas where it had to forage in the ground for food (Scott and Edwards, 2005). Despite many years of genetic selection, the swine still displays an inherent motivation to explore its environment. In intensive swine production within barren environments typified by concrete flooring and lack of rooting materials, Scott and Edwards (2005) stressed that swine still display a natural tendency for exploration. However, in such cases, the behaviour is directed at the limited number of objects available especially pen mates resulting to ear and tail biting. Scott and Edwards (2005) added that this problem is solved by using straw-bedding, hanging "toys" (sticks and plastic piping) suspended at swine head level and rootable materials like sugar beet pulp. These environmental enrichment materials are suitable to be provided in part or fully slatted floor of the swine house in order to keep the swine comfortable and avoid vice habits or cannibalism. High yielding swine breeds coupled with proper housing and good management practices will obviously lead to the success of swine farms in Nigeria.

2.6 Feeding Management Technique in Swine Production

The performance improvements of the past 20 years are associated with changes in feeding systems. This was realized through better understanding of the

nutritional physiology of the swine which has allowed more precise definition of its nutritional needs (Williams, 2004).

Feed inputs are the most important determinant of the price of swine and swine meat hence feeding must receive considerable and constant attention. The feed classes required by swine include: Basal (energy) feeds, feed concentrates, feed supplements and roughages or forages. Basal (energy) feeds provide high energy-yielding ingredients to enable the animals do some work and carry out other physical activities. They mainly provide carbohydrates and fats and oil. Feed concentrates are the feeds that contain all the required primary feed nutrients. On the other hand, feed supplements are given to animals in order to supply deficient nutrients. They can be fed in conjunction with other feeds or separately e.g. amino acids, vitamins, minerals, antibodies and growth hormones. Roughages or forages are feeds with high fibre content which can be given either dry, in the form of hay, silage, straw, seed hulls, maize stems or wet green pasture (Succulent feed).

Swine being monogastric animals do not benefit very well from roughages because they cannot digest cellulose materials easily (Sundrum, Butfering, Henning and Hoppenbrock, 2007). Ruminant animals have greater advantage over other animals with respect to forages because their digestive systems utilize forages very well. Recently, in organic swine production, forages are playing important role in swine industry. Swine require feeds for the production of energy, growth, performance of body functions and general body repairs. The major nutrients contained in animal feeds which are required by swine for normal growth and development include: carbohydrates, proteins, fats and oil, minerals, vitamins and

water . Feeds currently account for 60 – 70 percent of total swine production costs (Honeyman and Weber, 1996).

Swine are relatively fed on cheap sources of feeds which include cereals, roots and tubers, legume seeds, tree legumes, fruits and their by-products, agro-industrial by-products, products of animal origin and kitchen wastes (Holness, 2007). Roots and tubers, agro-industrial by-products and wastes in addition to kitchen wastes form the major bulk of swine feeds in Nigeria. They are usually purchased at cheaper cost thereby reducing the cost of production and increasing the profitability of swine farms especially those situated very close to these industries or factories. There are proliferation of brewing and food processing industries in Nigeria with their by-products and wastes as swine feeds. These feeds include brewers' spent grain, molasses, pulp from citrus and pineapple, rice bran, maize bran and wheat bran.

Kitchen wastes in most cases have high nutritive value. They are fed to swine to provide feed nutrients at little or no cost but they must be supplemented with crude protein, minerals and vitamins or conventional feeds if their potential is to be realized and satisfactory performance achieved (Anukwu and Ebong, 2011). Discussing on the issue of swine nutrition, Black (2000) strongly maintained that feeds formulated appropriately from legume help to improve both growth and productive performance of swine.

The methods of feeding swine varies from place to place and from farmer to farmer. Swine feeding is said to be the pivot of swine enterprise. An effective feeding plan will focus on the consumption of cheap and small quantity of nutritious feeds to achieve maximum productive performance and high profitability

without feed wastage. Feeds are required by swine for maintenance, production and weaning. A swine feed may be found to be nutritious but the method of feeding them at various stages of growth may affect them adversely (Williams, 2004).

Generally, swine are good converters of feeds and must always be placed on balanced diet or ration coupled with effective feeding systems to avoid malnutrition. Maintenance ration is the ration which supplies enough nutrients to maintain the supplies of energy and protein for all metabolic activities such as respiration, blood circulation, digestion, locomotion, maintenance of body temperature and repair of worn-out tissues (Serres, 1999). On the other hand, production ration is supplied in excess of maintenance requirements needed for the production or reproduction of animals e.g. production of meat, milk, wool, leather, eggs, fats or lards, giving birth to young ones and perhaps carrying out some farm operations including the transportation of goods from place to place. Weaning ration is given to the piglets that are about to be separated from their mothers and immediately after separating them from their mothers to enable them stand and feed on their own e.g. creep feeding.

Swine feeding in the tropics is influenced by a number of specific factors such as low technical expertise of farmers, poorly organized markets for both animals and feeds, almost complete absence of feed industries, wide variability in carcass quality required and high cost of all imported materials (Serres, 1999). Nutrients in feed have a direct impact on swine' growth and thereby on feed consumption (Monica, 2003). Holness (2007) identified three means of feedings namely: scavenging, ad libitum feeding and restricted feeding. In scavenging which is mainly used in extensive swine production, the swine are allowed to move about in search of

feeds in addition to the supplementary feeds given to the swine by the farmers. Ad libitum feeding is where the animals have free and continuous access to feeds. There is continuous feeding of animals so as to satisfy them fully without any limit or restriction.

Feeds of high dietary energy value when fed ad libitum tend to promote synthesis of body fat which is inefficient in terms of feed conversion (Williams, 2004). Nowadays, lean meat is preferred to high carcass fat in the market although some still go for it in form of lard or bacon (John, 2007). Where excessive weight gain is not required, ad lib feeding should not be recommended. Experience has shown that during fattening in intensive piggeries, ad libitum distribution of feeds through hoppers has never been associated with excessive fat carcasses (Serres, 1999).

In swine nutrition, over feeding and underfeeding are two extremes that should be avoided throughout the production process. In as much as wastage of feed by the swine is minimized, ad libitum feeding should be highly encouraged in swine production. Restricted feeding is the system of feeding whereby the animals are fed with known feed requirements and specific quantity of feed is provided for the animals in groups or individually in three or two divided meals per day. This method reduces wastage of swine feeds especially in intensive system of swine rearing.

Phase feeding in swine production is described by Monica (2003) as the adjustment of protein content of feeds as swine grow. Phase I involves constant protein ratios fed to swine during the entire production period while phase II and III imply a higher protein.

In feeding the swine, farmers should be guided by the following principles as recommended by Serres (1999):

- Use of simple diets
- Use of locally available feeds
- Review the possibilities of storage of swine feeds
- Use of available feed additives or supplements judiciously.

These principles if followed will reduce cost of production and the additives will help increase nutrient availability, digestibility, palatability, feed utilization, nutrient release, reduced excretion of unutilized nutrients, higher body immunity, higher yield and excellent profitability (Koeleman, 2005).

2.7 Profitability in Diseases Management in Swine Production

Diseases cause abnormal condition of the body of animals and lead to ill-health, reduced productivity and profitability (Serres, 1999). Diseases have adverse effect on swine of all ages. A vast knowledge of swine diseases is a must for any swine farmer to enable him be able to identify specific diseases and map out strategies for preventing and controlling them to avoid high swine mortality in the swine farms (Ezeibe, 2010). Once a disease affects a swine herd, the impact on the economics of swine production in terms of the cost of control and decreased productivity can be enormous (Holness, 2007).

Swine diseases are caused by many pathogens such as viruses, bacteria, fungi, protozoa and parasitic organisms. There are also malnutrition or deficiency diseases which can easily be controlled by supplying the deficient nutrients. Disease infection

results in poor growth, poor feed utilization, poor yield of products and even death of the animals (Akinyosoye, 1999). Many swine diseases abound in literature. They include: African swine fever, foot and mouth disease, Anthrax, Rabbies, Trypanosomiasis, Brucellosis, Coccidiosis, Enzootic Pneumonia, Erysipela, Greasy swine disease (exudative epidermitis), Mastitis- Metritis-Agalactia (MMA syndrome), Hog Cholera, Porcine babesiosis (red water), Salmonellosis, SMEDI (still birth, Mummification, Embryo Death and Infertility) swine dysentery, swine influenza, swine pox, Trangmissible gastroenteritis (TGE), Abscesses, Gastric ulcers, Intestinal haemorrhage syndrome (Red gut) and some minor injuries sustained through cannibalism (Holness, 2007; Serres, 1999).

Koeleman (2005) noted that the major problems of swine production was diseases and parasites. Nwobodo (1997) observed that the swine had a bad reputation right from the Babylonian days when it was openly condemned by the laws of Hamurabbi, to the time of Jesus Christ when Our Lord Jesus Christ considered the swine the only suitable animal to carry demons cast out from a demoniac. Since then, the swine had been known to carry a disproportionate amount of diseases.

There are frequent reports of disease out-break in piggeries all over the country. This has led to the closure of many swine farms with its attendant losses in terms of capital, labour and output. Diseases also reduce both the quality and quantity of swine products. Generally, animals are born free of diseases or parasites but usually acquire these maladies either through contact with diseased animals or improper sanitation, feeding, care and management except congenital diseases (Emedo, Maduka and Oranekwulu, 1995). In his own contribution, Holness (2007) prepared easy

diagnostic chart for easy identification of swine diseases as follows shown in chart 1.

Chart 1
Diagnostic Chart for Identification of Swine Diseases

Symptoms	**Possible diseases or condition**
Abortion	Brucellosis, Red water, Any disease causing a high body temperature.
Agalactia	MMA, Ergot in feed
Anaemia	Round worms, Red water, Iron deficiency, Trypanosomiasis.
Loss of Appetite	African swine fever, Hog cholera, Red water, ulcers, swine fever, swine influenza.
Distressed, rapid breathing	African swine fever, swine influenza
Constipation	Red water
Coughing	Round worms, Lung worms, Enzootic pneumonia, swine influenza.
Dehydration	Coccidiosis, Enteric colibacillosis
Diarrhoea (scours)	Round worms, Coccidiosis, Enteric colibacillosis, Hog cholera, swine dysentery, salmonellosis, Gastro enteritis
Discharges	
Anus	Anthrax, Intestinal haemorrhage syndrome
Eyes	Hog cholera
Vulva	Mastitis, metritis, Agalactia.
Emaciation	Round worms, ulcers, coccidiosis, Tapeworm, salmonellosis

Infertility	Brucellosis, SMEDI
Nervous signs	African swine fever, Hog cholera, Rabies.
Salivation	Foot and mouth disease, Rabies
Skin conditions	Mange, lice, ticks, fleas, erysipelas, swine pox, Greasy swine disease, African swine fever.
Sudden death	Anthrax, Acute Trypanosomiasis, Acute erypsipelas, Intestine heamorrhage syndrome.

Swellings/blisters

Face	Foot and mouth disease, Abscesses.
Body	Abscesses, Anthrax, Gut Oedema.
Feet	Foot and mouth disease.
Udder	Matitis-Metritis (MMA)
Temperature elevated	All bacterial, viral and protozoan diseases.
Coloured urine	Cystitis, Red water.

Sick swine should be examined and tested thoroughly to aid proper diagnosis and subsequent treatment. Under serious case, veterinary officers should be invited into the farm to take care of the sick animals appropriately. Bacterial infections are treated with antibiotics while viral infections are treated with anti viral drugs and dieting to boost the immunity of the infected animal. Worms are usually treated with antihelminthic drugs or dewormers.

However, losses due to disease infections can be prevented by vaccination, quarantine, isolation or separation and treatment of the disease, culling, pen resting, disinfection, burial of dead animals, treatment of animals with veterinary drugs and good management practices (Ezeibe, 2010). With the high swine density in most modern hog farms, proper bio-security is essential to protect swine against the transmission of diseases between or among herds (Jason, 2005). Bio-security decisions should be based on facts from practical scientific data rather than relying on speculations. Swine producers should devise means of reducing the risk of exposure to diseases to the barest minimum. Jason (2005) further stressed that further considerations should include ways of minimizing the risk of exposure to disease transmission by biological vectors, mechanical vectors and area spread. Jason (2005) went on to explain that any living organism that can carry a pathogen and allows it to replicate is said to be a biological vector while mechanical vector carries only the pathogens and does not replicate. Area spread may include wind current as well as unknown biological and mechanical vectors.

Many swine farms make use of boot bath containing disinfectant solution. Recent research works have shown that improper use of boot baths are a waste of time and money. It is established that bacterial contamination is not reduced by stepping through a pan of disinfectant solution when boots are soiled with manure. This is because manure and other organic materials prevent decontamination by encasing and protecting pathogens from disinfectant exposure in addition to inactivating the active ingredients contained in most disinfectants (Jason, 2005).

In order to solve this problem associated with boot bathing, all manure and organic materials should be removed manually prior to contact with disinfectants. The use of animal dips, crushes and chemical sprays also help in reducing the transmission of infectious diseases in various swine farms (William, 1995). It is also recommended that high level hygiene should be maintained by the stockman in different practices like teeth clipping, tail docking, castration, artificial insemination, nose ringing, ear notching and during farrowing (Holness, 2007). Serious health problems in piggeries should be referred to qualified veterinary officers or doctors. Some sick animals may even be admitted and treated in veterinary clinics or veterinary Teaching Hospitals.

The parasites of swine are those living organisms which live on or inside the body of the swine and derive nourishment from their hosts (Holness, 2007). Some parasites are pathogenic while others are not but the host does not derive any benefit from the association. The parasites that live on the body of the animals are called ecto-parasites and they include ticks, mange-mites, lice, fleas and flies (Sharma, Leung and Zaleski, 1997). Mites damage the skin of the swine and cause irritation and itching. Sarcoptes scabiei is the most common species which causes sarcoptic mange leading to a crusty, dry-looking skin around the eyes, ears and snout. Ticks infest swine and cause damage to the skin, suck blood and cause irritation and discomfort. They also transmit serious swine disease called babesiosis or red water disease. Lice, fleas and flies also attack swine especially in dirty and unhygienic environment. They may also suck blood, cause irritation, bite and feed on fresh wounds on the animals (Holness, 2007).

All these ectoparasites reduce the performance of swine, quantity and quality of swine products and generally bring about loss in swine business if not check-mated and controlled effectively (Serres, 1999). Ecotparasites are controlled by spraying with insecticides or acaricides, dipping the swine in disinfectant solution, using baits or attractants which are poisonous to them. Ecto-parasites are also controlled physically by handpicking and maintaining high level hygiene among the herds and within swine pens. Effective control of swine parasites will go a long way to increasing the productivity and profitability of swine farms (Akinyosoye, 1999).

The parasites that live inside the body of the animals are referred to as endo-parasites. Some endo parasites include: round worms (Ascaris lumbricoides), Tape worms (Taenia solum), Trypanosome (Trypanosoma simiae). The damage caused by these endo-parasites on the host include: anaemia, weakness, loss of weight, liver and lung tissue damage, cause wounds for secondary infections, obstruction of the gut, malnutrition, reduced immunity, increased appetite, oedema, abdominal pains and discomfort and in severe cases, death may occur (Holness, 2007).

These will adversely affect productive performance and profitability of swine farms if they remain unabated. However, the endo-parasites can be controlled by clearing the breeding places of vectors like in trypanosome, deworming, proper sanitation and good hygiene, proper cooking of meat, treatment of infected animals with antihelminthic drugs, rotational grazing, adequate feeding, preventing the parasites from infecting the secondary and intermediate hosts so as to terminate their life cycle (Serres, 1999). In this direction, Oladele (2002) in his study, identified effective

control of mange and ecto-parasites, vaccination and deworming as very important production technologies applied by swine farmers in Kwara State for keeping the swine healthy. With improvement in the system of swine rearing, nutrition and health care delivery, many swine farms especially under intensive system do not experience much parasite infestation (Jason, 2005). This has led to improvement in the production performance of swine farms.

2.8 Record Keeping in Swine Farms

Record keeping is indispensable in piggeries. It is absolutely essential to keep some basic records in order to monitor both the technical and economic efficiency of a swine enterprise (Serres. 1999). Farm records should cover all aspects of swine enterprise, so that evaluations can be made of boar performance, sow productivity, weaner growth and grower/finisher efficiency (Holness, 2007). The nature of the business demands that there should be proper record of all phases of production to ascertain their strengths and weaknesses and help in mapping out strategies for improvement. There should be day-to-day recording of various activities in the farm including the record of inputs and outputs, income and expenditure, balance sheet and records of profit and loss (Ebirim, 2002).

The farm records could be used in compiling individual swine and herd performance sheets for assessment or evaluation. The important records kept in the farm include boar performance record, sow service record, health record, culling and sales records and the entire herd performance record (John, 2003).

The overall performance of swine farms and their profitability level are usually determined through appropriate record keeping. The information on this may be obtained from government advisory staff or other advisory agencies like ministry of Agriculture, Agricultural Extension Departments and Research Institutes. This will enable the swine farmers in an area to compare the performance of their swine with the performance of other swine within the same area.

Falusi and Adeleye (1999) enumerated the advantages of keeping accurate farm records as follows:

- They give an account of what has happened on the farm for the period during which they are kept;
- They are used to keep a close check on whether or not things are going according to plan on the farm;
- Making plans to modify farm needs;
- Knowing what yields to expect from livestock and what costs and receipts the farmer is likely to get;
- Telling the farmers how much they are earning as their farm income;
- Giving information to farmers on whether they are making profit or loss;
- Serving as a guide for tax assessment of farmers;
- Ascertaining the value or worth of the farm so as to help in obtaining loan as well as sale of the farm.

Record keeping is based on the principle that all records, to be useful, must be accurate, neat and filled as soon as possible after the operation (Ebirim, 2002). The

keeping of accurate records in swine farms comprising of both financial and non-financial records is a must for all modern swine farmers.

2.9 Cost of Swine Production

Costs are the total amount of funds used for the production. Cost can be categorized as variable and fixed cost. (1) **Variable costs:** These are the costs incurred directly to the enterprise being budgeted, such as feed, fuel, and hired labored. These costs vary with the level of output. Generally, variable cost increase at a constant rate relative to labour and capital. Variable cost may include: wages, utilities, materials used in production such as concentrates, grass and hay, mineral/supplements, grain, water, medicine/vaccines, breeding fees, supplies, transportation. In accounting they also often refer to mixed cost. These are simply costs that are part fixed and part variable. An example could be electricity, usage may increase with level of production but if nothing is produced a factory may still require a certain amount of power just to maintain itself. (Ahmed, 2003). The author went further to explain (2) **fixed costs** are costs that are independent of output. These remain constant throughout the relevant range (not relevant to output decision). It includes rent, building and machinery.

Variable cost that relate to the production of swine include all expense items create an obligation, usually specific as to time. In other words, farmers and pastoralists know when they will need cash to meet those obligations. They also should know when they will have cash available based on when they have swine to sell. A most certainly, the two flows of cash (the inflows and outflows) will not match. However if they estimate the cash flows fairly accurately, they can plan for the deficit periods.

Solomon, Gatechew, Solomon & Coppock (2003) stress that a cash flow statement, just like the budget, is also a look into the future. It takes the individual income and expense items and separate them by period, usually by month, but sometimes by quarter. The cash flow statement need not to be complicated and is usually fairly subjective. Looking first at income, when will the piglets be ready for market? The sale of breeding stock can also be planned. When will they likely be sold? Cull sows probably will be disposed of after weaning. These items can be calculated for each month. The author stresses that moving on to expense, and beginning with the first item on the list of budget expenditures, when will concentrates be fed? What about hay? The same reasoning can be applied to animal health and labour. Utilities (like telephone service) might reasonably be divided equally throughout the year.

Once farmers and pastoralists know what the expected income and expense totals are on monthly basis, they can use this information to keep track of their budget, item by item. As they proceed through the year, they may find that their original budget needs adjustment. At other items, they receive a warning that they are letting certain get out of hand (Solomon *et al.,* 2003).

Farmers and pastoralists should know the prices of inputs and outputs in order to complete cost and ventures. Solomon *et al.* (2003) stressed that while analyzing the cost of swine production, cost that should be considered most are: cost of piglets and successful raising them to reach market size, cost of housing structure, cost of vaccination, cost of feed materials, cost of labour, transportation cost, and general management cost. Farmers and pastoralists should use the farm gate price for inputs as well as outputs. Farm gate price is the monetary value of the items at the production

point. For example, the cost of concentrate purchase with transportation cost at the farm gate. Moreover, they stressed that, the minimum price or the lower price accepted by farmers or pastoralists is the price level which cover the entire cost of production until the animals are ready for sell. A selling price that is lower than the cost of production means a loss for farmers (Solomon *et al*., 2003).

2.10 Farm Physical Productivity and Profitability

Production in this study is the process of rearing swine from farrowing to finishing stages as well as transporting and marketing of live swine, pork and other swine products and by-products. Farm productivity is expressed in terms of yield per unit of input (factors of production) (Robert and Ben, 2009). Productivity shows the amount of output realized per unit of input achieved by a firm, industry or a country (Arene, 2008). Productivity is the rate of output in relation to the work, time and money needed to produce them. Productivity per worker can be increased by longer hours, more effort, improved technology or better management (John, 2003). Arene (2008) in his own view maintains that productivity in economic term is used to describe how well or how efficient an economy's resources are used in the process of production.

Physical products in animal production include live animals, meat, milk, wool, hides and skin, eggs, horns, hooves, bristles and manure. In swine production, physical products include live piglets, adult swine, pork, bacon, lard, bristles, swine skin, manure and hooves (Holness, 2007). Physical products in a swine farm are measured in terms of the number of piglets produced by a sow per litter per year, number of piglets born alive, weight gain per month, number of piglets weaned and average adult body weight

(Michael, 2003). The quantity of live swine, pork and swine products and by-products produced in a piggery per year are clear indication of physical productivity of that swine farm. The physical productivity of a swine farm can be affected by stockmanship, capital investment, swine production technologies adopted, feeds and feeding system, housing, diseases and parasites, type of swine breeds used and management practices used in the farm. These factors can affect physical productivity either positively or negatively in the production process. The sale of physical products will lead to the monetary or financial aspect of productivity which will go a long way in measuring the profitability of swine farms.

Profitability is an indication of the amount of money gained from business. It is otherwise known as the degree of benefit enjoyed by the farmer in his farm. It is the difference between these sales (income or returns) and the input costs or expenditure that gives either profit or loss in the business. Profitability is the degree to which business or activity is profitable. Profit itself is the money gained from a business transaction or selling things after all costs have been deducted or paid completely. Profit is an excess of the receipts over the expenditure of a business at given period (John, 2003). If the receipts or sales become less than expenditure, the business records loss. Loss is an excess of spending over receipts. Profit exists when the total revenue (TR) is greater than the total cost (TC) of production. There are two types of profit which include gross profit and net profit. Gross profit is obtained by subtracting total cost from total revenue before tax payment. Net profit on the other hand is obtained by subtracting the amount paid as tax from the gross profit.

The profitability of any business enterprise can be determined by the gross profit margin analysis, benefit- cost ratio, net profit margin analysis, net return or net revenue (Arene, 2008). Profitability is an indicator of the amount of gain made by an enterprise. Ngwu (2000), reports that profitability is the net result of a large number of policies and decisions. The ultimate goal of any swine farm is to identify cost-effective production strategies and the best credible alternatives to reduce costs and increase profits in swine farms (Gekara, Garner and Dunbar, 2009).

Profitability is measured by analysing the various costs of production and returns from production (Gekara, Garner & Dunber 2009). The amount of profits made by swine farms in an area determines to a large extent the shrinkage (closure) or continuity (sustainability) of the swine enterprise in that particular area. The profitability of a swine farm shows how viable the swine business is and how successful the farmer is. Profitability is directly proportional to the physical productivity of farms.

The major aim of any farming enterprise is to make profit (Ngwu, 2000). There can be increased production performance without reasonable profit especially if the cost of production is outrageous or very high. Ezeibe (2010) points out that the ultimate performance measure in livestock business is the amount of profit made which depends on management practices adopted.

Swine production cannot be sustained unless it increases revenue through whatever means to those who practice it, hence there must be a profit (Serres, 1999). In order to find out whether there is profit or loss, total production costs including tax must be determined as well as the total revenue or receipts. The difference between the two gives the answer. For instance, if the production cost is greater than revenue, there is loss

but if the total revenue, is greater than total production cost, then there is profit or gain. Arene (2008) argues that for agricultural based firms and other firms, it is important to project and analyse financial statements to judge efficiency, incentive, credit worthiness and liquidity and to determine the costs and benefits that are to be included in the overall project. Production costs in swine farms include, fixed costs which are independent of the number of swine kept and variable costs dependent on swine reared. Fixed costs include: staff salary, cost of building and swine house maintenance, equipment purchases and miscellaneous costs which may include management charges, insurance, taxes and financial charges, if applicable, such as interest on loan (Peter, Owen and Sheona, 2001).

Depreciation is the amount of money set aside for tear and wear of equipment and buildings (Ijiomah, 2002). It is the loss in value of a depreciable asset due to tear and wear, old age or obsolescence (Ebirim, 2002). Depreciable items in piggeries include: land, farm machinery and tools, farm buildings and structures. There are several methods of calculating depreciation namely: straight-line method, reducing balance method, sum of the years digits method, machine hour method, annual revaluation method, sinking fund method and the annuity method (Ebirim, 2002). The straight line method is calculated by subtracting the estimated salvage value of the asset from the original cost of the asset divided by the useful life of the asset. For most farm machines and tools, the useful life is calculated at 10 years. Depreciation is calculated as 5 percentage of the value of farm buildings which are considered to last for 20 years if they are strong, 3 years for straw and thatched roofs and 10 years for wooden buildings (Serres, 1999). It is worthy of note that these facilities may also appreciate in value. Straight line method will be used in this study to calculate depreciation of assets in swine farms.

Variable costs in swine production include cost of feeds, fuel, water, electricity, amount spent for part-time workers and miscellaneous costs (Serres, 1999). The sum of the fixed costs and variable costs will give the total production costs (costs of inputs). The products (output) will be sold and revenue obtained and the difference between them will give either profit or loss.

The economics of swine production deals with the complex subject of spending money wisely in terms of spending the right amount on the right areas at the right time to make meaningful profit in swine business (John, 2003). The performance terms in swine production include litter size, daily weight gain, feed conversion ratio, weaning weight, slaughter weight carcass quality and quantity (Holness, 2007). The only major method used by swine farmers to find out total revenue or farm income is by sale of live swine, meat (pork) and swine products.

Business enterprises can determine their profit or loss by working out the balance sheet at the end of the year preferably at 31st day of December. Balance sheet refers to the statement of account showing various costs and revenue (expenditure and income) so as to ascertain whether the business is recording gain or loss (Serres, 1999). Balance sheet helps in determining the profitability of a farm business at the end of production cycle or accounting period (Arene, 2008).

The financial ratio analysis indices are used to evaluate the financial position, level of profitability and performance of a farm enterprise (Ngwu, 2000). The financial Ratio Analysis indices include profitability Ratio, Gross profit margin (GPM) Ratio and Net Profit Margin (NPM) ratio. The profitability ratio is calculated to measure the operating efficiency of the enterprise or firm (Arene, 2008). The two major types of

profitability ratios are calculated in terms of profitability in relation to sales and in terms of profitability in relation to investment (Umebali, 2002). Profitability depends on the development of productivity and income distribution (Saari, 2006). The gross profit margin ratio is calculated by dividing the gross profit by sales while net profit margin ratio is measured by dividing net profit after tax by sales (Arene, 2008). The ratio is an indication of the efficiency of the farm enterprise and it establishes a relationship between net profit and sales.

The viability or profitability of any enterprise can be determined by the gross profit margin analysis, benefit-cost ratio and net return (Ezeibe, 2010). Gross margin/profit analysis has been found to be a veritable and effective tool in determining the performance as well as profitability of agricultural business (Upton, 1996). It is a measure of the contributions of all farm inputs in determining total farm profit or loss. The productivity and profitability analytical tools such as net return or net farm income and gross profit analysis are more suitable for use in this study, hence they are used as the tool for the analysis of production performance of swine farms in Akwa Ibom State, Nigeria.

2.11 Constraints to Swine Production

Swine production in Nigeria is constrained by many factors. Adesehinwa, Aribido, Oyediji and Obiniyi (2003) identify some problems facing livestock production which include weather fluctuation, poor vegetation growth, diseases and parasites, religious beliefs, illiteracy leading to poor skills, poverty and shortage of animal feeds. Holness (2007) on the other hand enumerate the constraints in swine production as

commonly religious and social constraints because Moslems and believers in Jewish faith are forbidden from producing and eating swine meat (pork). Others include being simple-stomached animals and therefore may compete with human beings for food. Swine are not used as draught animals.

Their faeces and effluents cause environmental pollution if not properly handled. · As co-hosts of man to a number of parasites, swine not confined can spread these parasites to man. These hindrances have contributed to low productivity of livestock in Nigeria, resulting to little or no farm income for livestock farmers in most cases. Farm animals require optimum temperature and clement weather condition coupled with good management, in order to attain the highest productive capacity. In line with this, any condition below this results to low profitability.

Ezeibe (2010) laments that diseases and parasites increase production costs and reduce the quantity and quality of animal products. True Moslems, in accordance with their religion, believe that rearing swine, eating or handling pork or any swine product is an abomination against Allah (God). This is the main reason why in Moslem communities, little or no swine farming is practiced. Illiteracy has led to poor basic knowledge, attitude and practical skills in livestock production. The skilled staff or labourers employed either on part-time or full-time basis are heavily paid and this increases production costs and reduces farmers' income and profit. Poverty or insufficient capital is a great hindrance to swine production in Nigeria. Ezeibe (2010) stresses that most livestock production in Nigeria due to poverty, are carried out under extensive, peasant, nomadic, traditional, small-scale and unimproved form. Capital is an

indispensable factor of production and is greatly required for the procurement of many agricultural facilities, tools, equipment and other inputs needed in the production process.

For instance, swine are highly sensitive to temperature changes especially during hot weather condition due to heavy fat deposit in their body tissues. Generally, swine require cool weather condition and this is the main reason why they are usually provided with wallow during hot weather condition to buffer the effect of hot environment on swine (Serres, 2009). Insufficient nutritious feeds is a great problem in animal production especially in piggeries. Feeds are needed from both organic and inorganic sources (Sundrum, Butfering, Henning and Hoppenbrock 2007). The production performance of swine depends on sufficient right type of feeds, increase in nutrient digestibility and feed conversion efficiency (John, 2011). Ruminants benefit more from vegetation than non-ruminants. However, recently in organic swine production, foraging is now receiving great attention due to its high nutritive value (Sundrum, Butfering, Henning and Hoppenbrock, 2007). In terms of conventional feeds, swine feeds account for the greater percentage of the total swine production costs (Holness, 2007). There is scarcity of vegetation during dry season and abundance of it during rainy season.

Swine production constraints vary from place to place and from farmer to farmer. Constraints negatively affect production performance and profitability of swine farms. It is therefore necessary to identify specific swine production constraints affecting swine farmers in Enugu State and map out strategies for solving these problems. This will help to increase productivity and profitability in swine industry.

2.12 Empirical Studies

Ogunniyi and Omoteso (2011) carried out a study on the Economic Analysis of swine production in Nigeria: A case study of Ibadan Zone of Oyo State. The main objectives were to: (i) examine the factors influencing swine production in Ibadan metropolis; (ii) calculate the costs and returns in pig production; (iii) determine the elasticity of production and return to scale and (iv) examine the problems faced by pig farmers. There were five research questions. Survey research design was used. The sample of the study was 80 pig farmers out of a population of 100 registered pig farmers in the 10 Local Government Areas in Ibadan Zone. A survey research design was used in the study. Structured questionnaire was used to collect data and analysed using frequency count, mean percentages, profitability Ratio, Gross margin Analysis, Benefit-cost Ratio and Cobb Douglas production function.

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 N15, 187. 80k while 85 percent of the respondents financed their business from their personal savings. The findings further showed that variable costs represented 93.5 percent while fixed costs accounted for 6.5 percent of the total cost of production; the average net farm income per respondent was N81,470.81k while the average net income per pig was N1,198.10k. The rate of return on investment was 57 percent. Benefit-Cost Ratio was 1:1.53 showing that

swine production was profitable in the area. Gross margin ratio was 2.87. The mean fixed cost per farm was N9996.47 while the mean variable cost per farm was N142,518.59. Total mean cost of production per farm was N152,515.36 while the mean Gross margin per farm was N91,467.28. The mean Net Farm Income per farm was N81,470.81. The mean Revenue or Returns per farm was N233, 986.17.

The result of this study showed that pig enterprise was viable in Ibadan metropolis of Oyo State. The study shares similar characteristics with this current study on the Analysis of Production Performance and Profitability of Pig Farms in Enugu State. They are related in terms of title, scope, research design, objectives, method of data collection and data analysis. The difference is that the study in Ibadan, Oyo State failed to analyse the physical productivity of pig farms. It had also ignored pig manure as source of income in pig farms. The mean Total Revenue or Returns Per farm was obtained only from the sales of pork and live pigs and no sales from pig manure which is now an important income-generating aspect of pig production. The application of pig production technologies was not also analysed in the study thereby leaving an important aspect of modern pig production practices hence the need for this present study.

Hubbard, Mullaney and Dunkin (2006) conducted a research work on survey of Reproductive Performance of sows in pig farms (Herds) in Victoria. In the study, the breeding records of sows from seven pig farms (farms either commercial or used for teaching and research purposes) were analysed to determine levels of reproductive performance. A survey research design was used. Data were collected from seven pig farms for a period of 4 years. The available farm records were used

by the three researchers. Although factors such as breeds of sows, parity structure and methods of mating undoubtedly affected performance of each herd, there was considerable variation in herd performance. Total sow productivity (pigs weaned per sow per year) varied from 12.4 to 21.8. The major causes of variation were litter size at birth, lactation length, and average age of gilts at first mating. The purpose of the study was to analyse the breeding records of sows in a number of herds to determine levels of performance of components of reproductive rate and to assess the relative importance of these to overall level of sow productivity.

In the seven farms studied, average number of pigs born, weaned and number of litters per sow per year were obtained. The pigs born alive per sow per year varied from 15.8 to 23.45. This showed high productivity or reproductive performance of the pig farms studied. The result showed sow productivity, in terms of the number of pigs produced per sow per year which is one of the main determinants of profitability in raising pigs. The study is similar to the present study in terms of topic, objectives, research design and analysis. The study analysed the physical productivity of pig farms in Victoria but failed to analyse the financial productivity (profitability) of pig farms. The present study seeks to analyse both the physical and financial aspects of productivity as well as other variables of interest.

In a research study conducted by Chabo, Malope and Babusi (2000) titled "Pig Productivity: A Case Study for Southern Botswana", there was evaluation of the pig enterprise at the Botswana College of Agriculture (BCA) farm using sow productivity and gross margin analysis. The objective of the study was to determine pig

productivity using the college farm as a model. The physical performance as well as the financial performance of the pig enterprise were also determined. The Botswana College of Agriculture (BCA), pig unit was used as experimental site. An interview was carried out with the farm management staff to document pig management practices and verify the records kept. The data were collected from January 1997 to December 1999 from production records of Duroc Jersey and Land Race breeds. Litter size at birth influenced litter size at weaning and both traits decreased with an increase in parities. A positive correlation of 0.70 was observed between litter size at birth and litter size at weaning. A negative gross margin was realized due to the high feed costs and low market price of pigs which did not cover production costs. Land Race and Duroc Jersey breeds were compared in terms of average physical productivity. With respect to litter size at birth, Land 70Race had 11.4 while Duroc Jersey had 10.2. In terms of litter weight at birth in (kg), Duroc Jersey had 13.8 while Land Race had 12.8. In terms of number of litters per sow per year, Duroc Jersey had 2 while landrace also had 2. The weaning age (in weeks) for both breeds was 4 weeks respectively. The litter size at weaning was 6.5 for Duroc Jersey and for landrace it was 7.6 while the litter weight (kg) at weaning was 62.4 for Duroc Jersey while landrace was 78.8. With respect to the financial productivity of the pig farm, gross margin analysis showed an income of 33,191 Botswana pula (BWP)#, total income per sow was 3319 (BWP)#, total gross income (Revenue) was 28691 (BWP)#, total gross income per sow was 2869 (BWP)#. The total variable costs were 29437 (BWP)#, Gross margin was – 746 (BWP)# while average gross margin per sow was – 74 (BWP)#. The negative gross margin at Botswana

College of Agriculture (BCA) for a 10 – sow unit with 2 litters per year and 8 piglets per sow, was mainly due to low market price of pigs and high feed costs.

It is worthy of note that the average currency exchange rate during the study was 1.00 U. S dollar to 4.30 Botswana Pula. The study is highly related to this present study in terms of topic, objectives, research designs and analysis. In the study, both the physical and financial productivity or performance were analysed in the pig farm just like the present study. The difference lies on location and the fact that pig manure was ignored in the study in Botswana during the analysis of gross margin for the financial performance of the farm. In addition, pig production technologies applied in the farm were not analysed in Botswana College of Agriculture farm as was analysed in this present study in Enugu State.

A research study was conducted by Anukwu and Ebong (2011) on Analysis of the Performance of Piggery Loan Beneficiaries in the Integrated Farmers scheme of Akwa Ibom State: A case of Uyo Agricultural Zone. The objectives of the study were to: (i) determine the profitability of the enterprise; (ii) examine both the credit providers' lending risk in the piggery enterprise and the piggery owners' financial risk; (iii) and analyse the factors influencing pig production. It was a survey research design used with structured questionnaire as data collection instrument. sixty respondents were sampled for the study and the data analysed using budgetary analysis, gross margin analysis, Return on capital employed and production function analysis. Pig production on the average was found to be profitable.

The result of analysis of costs and returns of the piggery farms in the study area revealed an average total cost of production to be N533,894.00 per farm

comprising average variable costs of N307,026.00 per farm and average fixed costs of N226,868.00 per farm constituting about 76% was the highest of the average variable cost component amounting to N900,542.00 per farm, it gives an average profit margin of N366,648.00 per farm thus making the piggery enterprise worthwhile venture.

The study in Akwa Ibom State is similar to this current study in Akwa Ibom State in terms of the objectives of the study and research design. The method of data collection and analytical tools used in both studies are also highly related. The difference lies on the fact that the study formerly conducted in Akwa Ibom State failed to analyse the profitability of swine production. Pig manure was also not considered in the study as a source of farm income as it did not appear in the list of sales that gave average total farm revenue or returns. The pig production technologies adopted by farmers were not discussed or examined in the study. There was therefore the need to carry out a study on profitability of swine production in Akwa Ibom State.

Adesehinwa, Aribido, Oyediji and Obiniyi (2003) carried out a study on production strategies for coping with the demand and supply of pork in some peri-urban areas of South western Nigeria. The primary objective of the study was to identify production strategies employed by pig farmers in some peri-urban areas of South Western Nigeria (Lagos and its environs) to cope with production constraints and soaring demand for pork. The survey research design was used. The population for the study comprised of all pig farmers in the area out of which 60 were randomly selected. Responses were elicited from the farmers with the aid of structured questionnaire. Frequency and percentages were used for data analysis.

The results showed that herd size of the majority (70 percent) of farms was below 100 heads of pigs. 26.7 percent of the farms had more than 100 heads of pigs while 3.3 percent of the pig farms was not classified in terms of herd size according to the respondents. Large white was the most common breed of pigs found in Lagos since 53 percent of the respondents showed preference for Large White over Duroc Jersey and Land Race. Weaning weight ranged from 6 – 10kg for most farms as reported by more than 70 percent of the respondents. Mean weaning weight and average daily weight gain have been reported to be significantly influenced by litter size, maturity, maternal parity, sex and period of birth. Only the frequency and percentages were used in data analysis without any tool for inferential statistics such as t-test statistic, ANOVA and Chi-square. The study focused on pig production constraints and coping strategies without analyzing the financial productivity or performance of pig farms. In coping strategies, there were no pig production technologies discussed. This present study however, sought to fill all these gaps by determining the financial production performance and profitability of swine. The similarities are based on topic, objectives, research design, method of data collection and analysis. The production constraints and profitability were determined in this present study.

In a research study titled "Appraisal of Pig Production in Songhai Redemption Farm, Nekede, Imo State, Nigeria", Emenyonu, Odii, Chilaka, Onyemauwa and Anaeto (2006) evaluated the productivity of Songhai Redemption Farm with a view to determining its profitability. The objectives of the study were to estimate the costs and revenue of pig production in the enterprise and isolate

the factors militating against enhanced production performance of the pig enterprise. The survey research design was used in the study. The data were collected through well structured questionnaire and personal interview on the piggery units, costs and revenue items in the farm. The data were analysed using percentages, t-test statistic, Gross margin analysis and Net farm income.

The results showed that piggery production in the study area was a profitable venture. Feeding cost accounted for the largest proportion of the total variable cost incurred in this enterprise. The findings also revealed that such variables like number of pigs in stock, labour cost, medication cost and depreciated value of capital implements were positively related to output and statistically significant. The study is related to the present study in terms of topic, objectives, research design, method of data collection and analysis. The study failed to analyse the constraint in production performance but only focused attention on the financial aspect of production performance.

Lewis (2007) carried out a research work on financial performance of specialist pig farms in England. The objectives of the study were to: (i) examine the influence of size on financial performance of specialist pig farms. (ii) determine mean costs and returns in specialist pig farms (iii) determine the average amount of profits realized by specialist farms. 54 specialist pig farms were selected as sample for the study. Direct farm observation, interviews and structured questionnaire were used to collect data which were analysed using gross margin and profit analysis, Net Farm Income (NFI), Management and Investment Income (MII) and Farm Business Income (FBI). The results showed that mean total output

amounted to £294,268, total variable costs were £156,124, farm gross margin was £138,143, total fixed costs were £131,460, Management and Investment Income was £6683, Net Farm Income was £24,974 and Farm Business Income was £24706 per farm. The average number of pigs per sow per year was 19.1 in specialist farms. Although the research focused on financial performance, it also briefly treated an aspect of physical performance relating to number of pigs per sow per year which is one of the major indications of pig farm profitability. The study is related to the present study in terms of objectives, method of data collection and findings. The difference is that the study did not determine anything about profitability in cost and return of swine production and constraints faced in the production of swine.

Gekara, Garner and Dunbar (2009) carried out a study on Evaluating Production Techniques to Improve Efficiency and Profitability of Hog Farms in South East Arkansas. The aim of the project was to address constraints related to hog production strategies to improve profits through improved management and feeding. The specific objectives included: (i) surveying and evaluating the current hog production practices for small, limited – resource farmers in Southeast Arkansas (ii) identifying and evaluating feeds used by hog farmers in Southeast Arkansas (iii) identifying and evaluating locally produced energy and protein feed ingredients for use by hog farmers. A descriptive research method was used to assess the feeding/management practices, financial burden/profitability and market arrangements. Enterprise budgets that fitted the small farm situation were developed and used to compute cost of production, breakeven price and yield while measurements of body weights and feed were used to calculate average daily body gain, average

daily feed intake and feed efficiency. The results showed that pigs fed brewers grade rice had faster gains (0.96 vs 0.79 kg/d), had greater feed efficiency 0.33 vs 0.25 kg gain per kg feed) and had lower cost per kg gain ($ 1.21 vs 1.58) compared with pigs fed conventional feeds (use of corn and/or Milo as energy sources). This helped hog farmers to stay in business as a result of reduced feed cost and greater profitability in the study area. The study is related to the present study in Akwa Ibom State with respect to research title, methodology and expected results. The study in Southeast Arkansas was not well detailed as in the present study in productivity and financial performance.

Unang (2003) conducted a research work on Profitability and Efficiency of the Broiler Industry in Tasikmalaya. The objectives of the research were to evaluate whether the existing production systems are profitable and economically efficient. The primary and secondary data collected were both qualitative or quantitative. Survey research design was used. Data were collected by directly recording inputs, costs and revenue for one production cycle/period during July, August, and September 2002. The data analysis tool used was Policy Analysis Matrix (PAM) introduced by Monke and Pearson in 1989.

The result of the study showed that both autonomous and partnership broiler enterprises, and both large and small production systems were profitable and economically efficient. An autonomous broiler industry which was rearing less than 2000 birds incurred total cost of production of Rp 8, 925, 614, total revenue of Rp 10, 049, 684 and made a profit of Rp 1, 124, 070. Another autonomous broiler enterprise keeping more than 2000 birds had the cost of inputs as Rp 8,878, 435, output was Rp 10175020

while the profit was Rp 1,296,585. In the same research another broiler farm which was a partnership enterprise keeping less than 2000 birds, spent Rp 9268370 on inputs and Rp 1050 9103 realized as revenue with a profit of Rp 1240 733. Unang also reported that in another broiler partnership farm raising more than 2000 birds, the inputs took Rp 9,286,093, output was Rp 10,811,968 and the profit made was Rp 1,525,875. All these results from the study showed that broiler industries in Tasikmalaya were profitable and needed to be sustained. The study failed to analyse the cost and return of the broiler farms and constraint that affect broiler production in the study area. The analytical tool used in the study is different from the analytical tool employed in the present study in Akwa Ibom State. The similarity lies on the research topic, objectives and financial results of the study. The present study in Akwa Ibom State definitely filled the missing gap although in pig production and not in broiler production.

Baruwa (2013) carried out a research on "Empirical analysis of cost and returns to goat production under tropical conditions". The main objective of the study was to examine the cost and returns to goat in Osun State, Nigeria. Six specific and six null hypotheses were formulated. A total number of sixty (60) respondents were selected from the target population using multi-stage techniques. Instrument for data collection was structured questionnaire. The data collected were analysed using descriptive statistics and budgetary technique. Budgetary analysis revealed that gross margin was N324,668 and net profit was N315,818, indicating that goat production was profitable. Major production constraints were lack of access to credit facilities, diseases outbreak, mortality and poor foundation stock.

The present study is similar with the past study looking at the topic; the past study was to analyse the cost of goat production and the present analysed the cost of swine production. The past researcher used structured questionnaire as instrument for data collection. The present researcher also made use of the same instrument to collect relevant data from the respondents. However, the past study differs from the present study in that past researcher formulate six objectives and six null hypotheses while the present researcher formulated four objectives and four null hypotheses.

Osondu, Ijeoma, Anyiro & Obike (2014) carried out research work on "Economic Analysis of Pig Production in Abia State Nigeria". The population for the study was 120 swine farmers. Multi stage random sampling technique was used for the study. Four specific objectives and four null hypotheses were formulated and tested at 0.05% level of significance. Data were collected through a structured questionnaire. Data collected was analyzed with descriptive and inferential statistics such as mean, frequency and percentages, net return and regression analysis. The result of the multiple regression using the linear function as the lead equation revealed that age, farming experience, farm size, educational level, and access to credit were positive factors that influenced the production swine.

The present study is similar with the past study on the topic titled "Economic Analysis of Swine Production". The past study used swine farmers as population for the study and the present study also used swine farmers as population for the study. The past study used questionnaire as instrument for data collection, the present study also used questionnaire to collect data from the targeted respondents. However, the past study differed from the present in that the study was carried out in Abia State with four

researchers while the present study was carried out in Akwa Ibom State with only one researcher.

2.13 Summary of Reviewed Literature

The chapter reviewed literature under profitability of swine production in Akwa Ibom, Nigeria. The review dealt on profitability of swine production, production of swine under different management practices, feeding, housing, diseases management, record keeping as well as market of swine and swine products. The review further observed profitability of swine production. From the ten (10) empirical studies, study by Ogunniyi (2009), the result indicates that pig producers were confronted with major production constraints such as diseases incidence, high cost of feed, high cost of conventional drugs and poor housing structures. Also, study by Ogunniyi and Omoteso (2011) in Osun State, Nigeria, the result indicated that swine production was profitable.

However, though swine production is profitable according to the result of finding of empirical studies, the major constraints faced by farmers is parasite and disease outbreak which leads to high mortality rate and is caused by use of poor foundation stock. Finally, the researcher reviewed ten (10) empirical studies. Based on the literature review the researcher observed none stressed on profitability of swine production being the major gap this study has filled.

CHAPTER THREE

RESEARCH METHODOLOGY

This chapter described the methodology used for conducting this research study described under the following sub-headings:

3.1 Research Design

3.2 Population for the Study

3.3 Sample Size and Sampling Procedure

3.4 Instrument for Data Collection

3.4.1 Validation of the Instrument

3.4.2 Pilot Study

3.4.3 Reliability of the Instrument

3.5 Procedure for Data Collection

3.6 Procedure for Data Analysis

3.1 Research Design

The study was conducted in Akwa Ibom State, specifically in sixteen Local Government Areas (LGAs). The state is located in the South-South geopolitical Zone of Nigeria. Akwa Ibom covers an area of 8421 square kilometers, has a population of 3920203 people. It is located in the tropical rainforest belt, with mean annual rainfall of 2400mm, mean relative humidity of 75% and mean annual temperature of 30^0 (Ebong, Akpabio & Anukwu, 2008). Agricultural production in the area included food and cash crops, livestock, aquaculture and fishing activities which constitute the major occupations

of the people in the state. Other occupations include commerce, civil/public service and transportation business.

The study adopted descriptive survey research design. It was a valuable tool for assessing opinions and trends as it reflects the views of genuine cross-section of the population (Shuttleworth 2008). The descriptive survey method was ideal for this study as data were generated from a large number of respondents at one point in time.

The depreciating values of variable and fixed cost such as cost of piglets, feed cost, cassava, cost of labour, cost of drugs and vaccine, electricity, veterinary expenses, transport, housing cost, tools and equipment, interest on land and value, salaries, maintenance and depreciation were calculated using straight line method.

3.2 Population for the Study

The population for the study comprised of all registered swine farmers in the study area. The population comprised of 4,003 swine farmers who are registered with the Association of Swine Farmers of Nigeria, and identified as being eligible for inclusion in this study. Akwa Ibom State has 31 LGAs. The registration of members was done according to their LGAs under the various departments of agriculture in the areas.

3.3 Sample Size and Sampling Procedure

From the study population of 4,003, a sample size of 399 was drawn using systematic random sampling technique which according to Alamu and Olukosi (2010) ensures selecting sample in the population at uniform interval and the selection of one sample is dependent on the selection of a previous one. Therefore, 10% of population in

each sampled LGA was selected as suggested by Afolabi (2014). To select the sample size, each respondent was selected after the interval of six from the register provided by the Akwa-Ibom Agricultural Development Programme (AKADEP) office. In locating the selected respondents according to the LG they belong, systematic random sampling was used to select the 16 LGAs out of 31 LGAs in Akwa Ibom State. The respondents were then selected from the 16 LGAs using their registers. The sample size from the study population is represented in Table 1.

Table 1: Population and Sample Size

S/N	L.G.A.	Population of Swine Farmers	Sampled Swine Farmers (10%)
1	Abak	203	20
2	Etim Ekpo	244	24
3	Ika	201	20
4	Ini	192	19
5	Uruk Anam	410	41
6	Etinan	273	27
7	Ibiono Ibom	207	21
8	Nsit Atain	220	22
9	Nsit Ubium	202	20
10	Uyo	294	29
11	Eastern Obolo	156	16
12	Esit Eket	342	34
13	Ikot Abasi	255	26
14	Okobo	300	30
15	Udung Uko	240	24
16	Urue Offiong/Oruku	264	26
	Total	**4003**	**399**

Source: Field Survey Data, 2017

3.4 Instrument for Data Collection

Structured questionnaire was used for data collection and was developed by the researcher. The questionnaire was divided into three sections 'A', 'B' and 'C'. Section 'A' sought for status of the respondents, while Section 'B' contained 37 questions designed to elicit information on the issues identified in the specific objectives. Section C responses were structured on a four point likert scale.

Strongly Agree - SA

Agree - A

Disagree - D

Strongly Disagree - SD

3.4.1 Validation of the Instrument

In order to ensure the validation of the instrument, the researcher gave the unstructured questionnaire to five experts in the Department of Vocational and Technical Education, A.B.U., Zaria to confirm its accuracy and correctness. The validation was to determine the internal consistency of the instrument. After vetting the instrument, their corrections and suggestions were incorporated in the final copy of the instrument for the study.

3.4.2 Pilot Study

In order to establish reliability of the instrument, pilot study was conducted in Kagoro in Kaura LGA (Southern Kaduna), Kaduna State. The reasons for selecting Kagoro LGA in Kaduna State were based on the fact that the respondents have similar

characteristics with those in the study area. Also, the area has similar climatic characteristics with Akwa Ibom State. Kagoro in Kaura L.G.A. is known to be swine producing area. Forty (40) copies of the questionnaire were distributed to the swine farmers by the researcher. All copies of the questionnaire were filled and returned to the researcher. The data collected from the pilot study were used to determine the reliability coefficient of the instrument.

3.4.3 Reliability of the Instrument

The data collected from the pilot study were statistically analyzed to determine the reliability co-efficient of 0.71 was obtained. This reliability co-efficient was considered adequate for the internal consistencies of the instruments. This was a confirmation of test of reliability by Spiegel (1992) and Stevens (1986) who hold the view that an instrument was considered reliable if its reliability co-efficient lies between 0 and 1 and that the closer the calculated reliability coefficient is zero, the instrument and the closer the calculated reliability coefficient is to 1, the more reliable less reliable is the instrument. Therefore this data collection instrument was considered highly reliable for the study.

3.5 Procedure for Data Collection

Data collection was effected using the structured questionnaire. The researcher obtained a letter of introduction from the Head, Department of Vocational and Technical Education in the Faculty of Education to the Chairman of Akwa Ibom swine farmers Association Development Programme (Uyo branch) (see Appendix A). The researcher

visited the chairman's office, the researcher was given a date of the general meeting of the association.

The researcher went to their meeting and engaged the assistance of 3 executives of the association. Each of them was trained on how to complete the questionnaire. A total number of 399 selected swine farmers were served with the structured questionnaires designed in line with the objectives of the study during one of their general meetings early in the year 2017. All the questionnaires were filled and returned to the researcher with complete number constituting a 100% return of the questionnaire for further analysis.

3.6 Procedure for Data Analysis

Data analysis were accomplished using mean and standard deviation for answering the research questions, while profitability ratio (gross margin ratio and benefit cost ratio) to test null hypothesis 1 (one) and Pearson Products Moment Correlation was used to test null hypothesis 2 at 0.05 level of significance. In Section C, decision rule for the mean response receiving a mean score rating of 2.50 and above as agreed while any mean score rating below 2.50 was regarded as disagreed. For the profitability test, when calculated BCR is greater than 1 (one) the null hypothesis would be accepted and if otherwise, it would be rejected. For PPMC test, when the calculated r is less than the critical r-, the null hypothesis would be accepted, and if otherwise, it would be rejected.

To obtain the worth of each of the fixed cost items, the straight line method of depreciation was used and was assumed that the salvage value of the fixed items used in

the business is not zero. The formula for depreciation using straight line method is given as:

$$\text{Depreciation} = \frac{Total\ Revenue}{Total\ Variable\ Cost}$$

CHAPTER FOUR

PRESENTATION AND ANALYSIS OF DATA

In this chapter, the data collected for the study were analysed and done in two (2) stages. Research questions were analysed using descriptive statistics (mean, percentage and standard deviation) and profitability ratio. While, the null hypotheses one and two were tested using profitability ratio and PPMC respectively. The null hypotheses were tested at 0.05 levels of significance.

4.1 Answers to Research Questions

Answers to research questions were presented on Table 3.

Research Question One: What are the socio-economic characteristics of swine farmers in Akwa Ibom State?

Table 3 showed the socio-economic characteristics of swine farmers in Akwa Ibom State. The result based on age revealed that 43 (11%) of the respondents were in the age bracket of 20 – 29, 149 (37%) were between the ages of 30 – 39, while those between the ages of 40 and above were 207 (52%). This indicated that majority of the swine farmers were between the ages of 40 and above. The result of educational level disclosed that 44 representing 11% of the respondents had primary school education, 169 representing 42% had secondary school education, 86 constituting 22% had NCE, 58 constituting 14% had OND, 32 representing 8% had HND. Yet, 8 constituting 2% of them had first degree while others were 2 representing 1% of the respondents. This implies that swine farmers with secondary school level were the highest respondents. Also, the result of major occupation revealed that 272 constituting 68% of the respondents were business people, civil servants were 120 representing 30% of the

respondents, and only 7 representing 2% of the respondents were other categories. This indicated that the respondents who had business as their major occupation were the highest respondents.

The result of management system of rearing swine by the farmers showed that 62 constituting 15% of the respondents used extensive management system, while those using semi intensive were 242 representing 61% and those using intensive management system were 95 representing 24% of the respondents. This revealed that those using semi intensive management system were the highest. Also, the result on family size revealed that those having family size between 1 – 3 were 58 representing 15% of the respondents, those with family size between 4 – 5 were 93 representing 23% of the respondents. Again, 189 representing 47% of the respondents belong to the family size of 6 – 7, 41 representing 10% of the respondents fall between the family size of 8 – 9, while 18 representing 5% fall between the family size of 10 and above. The result showed that those that belong to the family sizes of 6 – 7 persons had the highest responses.

The result on years of experience revealed that 88 representing 22% of the respondents had < 5years experience, 112 constituting 28% had 5 – 10years experience, and 199 representing 50% of the respondents had more than 10years experience. This indicated that those respondents that had more than 10 years of experience were the highest respondents. The result of herd size showed that 40 representing 10% of the respondents had 1 – 4 herd sizes, those that had 5 – 10 herd size were 81 representing 20% of the respondents, and majority of them (176) representing 44% of the respondents had 10 – 15 herd sizes. Yet, 57 out of 399 representing 14% of the respondents had 15 – 20 herd sizes, those that had 20 – 30 herd size were 35 representing 9% of the

respondents, whereas those that had 30 and above herd sizes were 10 constituting 3% of the respondents. The results indicated that those respondents that had 10 – 15 herd sizes constitute the majority.

The result of litter sizes indicates that 205 representing 51% of the respondents had 1 – 8 litter sizes per sow, 10 – 12 litter size were 103 representing 26% of the respondents and 12 and above were 91 representing 23% of them. The result implies that farmers who had 1 – 8 litter size per sow were the majority in the study area.

Table 4: Socio-economic characteristics of swine farmers in Akwa Ibom State

Variable	Frequency	Percentage
Age		
20 – 29	43	11
30 – 39	149	37
40 and above	207	52
Educational level		
Primary	44	11
Secondary	169	42
NCE	86	22
OND	58	14
HND/BSC	32	8
Degree	8	2
Others	2	1
Major Occupation (beside swine production)		
Business	272	68
Civil Servant	120	30
Others	7	2
No of Time are Weaned Per Year		
1 Time	57	16
2 Time	342	84
3 Time	-	-
Management System		
Extensive	62	15
Semi intensive	242	61
Intensive	95	24
Family Size		
1 – 3	58	15
4 – 5	93	23
6 – 7	189	47
8 – 9	41	10
10 and above	18	5
Years of Experience		
< 5 years	88	22
5 – 10 years	112	28
Above 10 years	199	50
Herd Size		
1 – 4	40	10
5 – 10	81	20
10 – 15	176	44
15 – 20	57	14
20 – 30	35	9
30 and above	10	3
Litter Size		
1 – 8	205	57
10 – 12	103	26
12 and above	91	23

Source: Field Survey Data, 2017

* Multiple Responses by the Respondent

Research Question Two: What are the cost return and profitability of swine production in Akwa Ibom State?

Table 5 showed the analysis of cost and benefit of swine production in Akwa Ibom State. The breeding sows were fifteen (15) comprising 12breeding sows and three breeding boars. The average inputs used in the production as listed in Table 4 was based on variable cost and fixed cost respectively.

The cost of 15 piglets was ₦150,000 at ₦10,000 each, feed cost incurred was ₦62,500 for 25 bags at ₦2,500 each; cassava of ₦57,000 was expended. The cost of labour and cost of drugs & vaccine were incurred at ₦55,000 and ₦10,000, respectively. Regular supply of electricity was ensured at the cost of ₦8,700, veterinary expenses stood at ₦12,000 while transport was maintained at ₦10,000.The total variable cost was ₦365,200.The cost of housing was ₦15,830. Tools and equipment were purchased at the cost of ₦21,500. Interest on land and value stood at ₦4,000. Also, salaries, maintenance and depreciation stood at ₦27,910, ₦3,000 and ₦22,520 respectively. The total fixed cost expended was ₦94,760.

During the survey year, each sow produced twice with average litter of 8 piglets. The total piglets produced were 50 on the average. Eight (8) swine were slaughtered and the pork was sold at ₦45,000 each amounting to ₦360,000. A total of ₦420,000 was realised from the sales of 35 weaned piglets at the cost of ₦12,000 each. The sales of 7 matured swine amounted to ₦350,000 as each one costs ₦50,000. Yet, 175 bags of manure obtained from the farm was sold at the cost ₦600 per bag and a total of ₦105,000 was realised for all the bags. Fifty (50) empty bags were sold at the cost of ₦80 each which amounted to a total of ₦4,000. The result shows that under one production year, the Total Cost was ₦459,960, the Gross Margin was ₦873,800, whereas Net Revenue

was ₦779,040. The Benefit Cost Ratio (BCR) was 3.39 which showed that the enterprise is profitable since the BCR is greater than 1.

Total Fixed Cost (TFC): These are depreciation expenses on land, equipment, houses, salaries and maintenance depreciation.

Profitability Ratio: The viability (profitability) of swine enterprise was determined using the Benefit-Cost Ratio (BCR), which is the division of total revenue by total cost. The BCR measures the ability of the business production to upset its financial obligations and still remain standing.

Table 5: One Year Average Cost returns and profitability of swine production in Akwa Ibom State

	Input and their values		
SN	**Variable cost**	**Unit cost (₦)**	**Amount**
1	Cost of piglets (15)	10,000	150,000
2	Feed cost (25 bags)	2,500	62,500
3	Cassava		57,000
4	Cost of labour		55,000
5	Cost of drugs & vaccine		10,000
6	Electricity		8,700
7	Veterinary expenses		12,000
8	Transport		10,000
	Sub-Total		**365,200**
	Fixed Cost		
9	Housing cost		15,830
10	Tools and equipment		21,500
11	Interest on land & value		4,000
12	Salaries		27,910
13	Maintenance		3,000
14	Depreciation		22,520
	Sub-Total		**94,760**
	Output and Values		
15	Sale of pork (Slaughtered) 8	45,000	360,000
16	Sale of weaned piglets (35 piglets)	12,000	420,000
17	Sales of matured swine (7)	50,000	350,000
18	Sales of manure (175 bags)	600	105,000
19	Sales of empty bags (25)	80	4,000
	Sub-Total		**1,239,000**

Source: Field Survey Data, 2017

* Multiple responses by the respondents

Profitability of swine production

Total Cost (TC) = Total Variable Cost (TVC) + Total Fixed Cost (TFC) (i.e.TC = TVC+TFC) = ₦365,200 + ₦94,760 = **₦459,960**

Total Revenue (TR) = **₦1, 239,000**

Net Revenue (NR) = Total Revenue (TR) – Total Cost (TC) = ₦1, 239,000 – ₦459,960

NR = **₦779,040**

Gross Margin (GM) = TR – TVC = ₦1,239,000 - ₦365, 200

GM = **₦873,800**

Benefit Cost Ratio (BCR) = TR/TVC = ₦1, 239,000 /₦365,200

BCR = 3.39

Research Question Three: What are the constraints faced by swine farmers in Akwa Ibom State?

Table 6: Constraints faced by swine farmers in Akwa Ibom State

SN	Item	Mean	SD	Decision
	Economic Constraints			
1	Inadequate finance	2.6	0.86	Agreed
2	High cost of piglets	2.5	0.94	Agreed
3	High cost of feed	2.5	0.88	Agreed
4	Uncertainty of profit	2.4	0.78	Disagree
5	Inadequate credit facilities	2.6	0.75	Agreed
	Marketing Constraints			
6	Fluctuation in the prices	2.4	0.94	Disagreed
7	Delayed payment	2.4	0.98	Disagreed
8	Inadequate swine market	2.6	0.77	Agreed
	Technical Constraints			
9	Poor growth of swine	2.4	0.87	Disagreed
10	Electricity constraints	1.9	0.94	Disagreed
11	High charges by veterinary doctors	2.6	0.86	Agreed
12	Poor extension service	2.7	0.73	Agreed
13	Unavailability of improved breed	2.7	0.76	Agreed
	Social and Natural Constraints			
14	Problem of theft	2.4	0.96	Disagreed
15	Outbreak of parasites and diseases	2.6	0.75	Agreed
16	Pollution of the environment	2.3	0.98	Disagree

Source: Field Survey Data, 2017
Multiple Responses by Respondents

The analysis of results in Table 6 showed the breakdown of constraints faced by swine farmers in Akwa Ibom State to include economic, marketing, technical and social constraints. The respondents agreed with the items that said inadequate finance, high cost of piglets, high cost of feed, and inadequate credit facilities as the economic constraints but disagreed with the item that said uncertainty of profit is part of the economic constraint of swine farmers in the state. Out of all the items constituting marketing constraints, the respondents only agreed with inadequate pig market as marketing constraint while disagreeing with fluctuation in the prices and delayed payment as part of

marketing constraints. Technical constraints facing swine farmers in Akwa Ibom State included high charges by veterinary doctors, inadequate extension service and unavailability of improved breed but disagreed with poor growth of swine and electricity as technical constraints. The respondents are of the opinion that problem of theft and pollution of the environment do not form the basis of social and natural constraints faced by swine farmers but only agreed with outbreak of parasites and diseases as the only social constraint faced by swine farmers in the state.

4.2 Test of Null Hypotheses

Null Hypothesis One: There is no significant difference in the cost return and profitability of swine production

Table 7: Profitability analysis of the difference in the cost and benefit of swine production

TC	TR	NR	GM	BCR	Sig.	Decision
459,960	1,239,000	779,040	873,800	3.39	3.39> 1	Rejected

TC= Total Cost, **TR**= Total Revenue, **NR**= Net Revenue, **GM**= Gross Margin

BCR= Benefit Cost Ratio

Table 7 showed the difference in the cost and benefit of swine production. The results revealed calculated TC value of ₦459,960, TR value of ₦1,239,000, NR value of ₦779,040, GM value of ₦873,800 and BCR of 3.39. This shows that swine production is profitable since the significance ratio is > 1, therefore, there was significant difference in

the cost and benefit of swine production in Akwa Ibom state hence, the hypothesis was rejected.

Null Hypothesis Two: There is no significant relationship between constraints faced by farmers and swine production practices.

Table 8: Relationship between constraints faced by farmers and swine production

Variables	Mean	Std.	N	Df	r-cal	r-crit	Sig_(2-tailed	Decision
Constraints	2.4	0.82						
			399	397	0.672	0.195	.007	Rejected
Swine production	2.7	0.78						

The results of Table 8 show the significant relationship between constraints faced by farmers and swine production. The results of the analyses revealed that r-calculated value was .672, r-critical value of .195 significant at 0.007 at df 397. Since the calculated r-calculated value of 0.672 is greater than r-critical value of 0.195 it implied that there is significant relationship between constraints faced by farmers and swine production in Akwa Ibom State. This means that economic, marketing, technical, social and natural constraints affect swine production in Akwa Ibom State hence, the null hypothesis is rejected.

4.3 Summary of Major Findings

From the analysis presented, the study revealed that:

1. Majority of swine farmers engaged in swine production were between the age of 40 years and above.
2. The finding showed that 42% of swine farmers had secondary school education.
3. The result indicates that most swine farmers had business as their major occupation
4. Swine has the ability to wean twice a year.
5. The finding revealed that swine farmers practiced semi intensive management system in their production.
6. The result indicates that most of swine farmers had large family members (6 – 7 members).
7. The result showed that swine farmers had farming experience of 10 years and above in the production of swine.
8. The result of the findings showed that the highest numbers of swine kept by farmers varies from 10 – 15 per pen.
9. From the finding it showed that swine produce large litter size at a time.

The finding showed that under one production year, the Total Cost (TC) was ₦459,960, Total Revenue (TR) was ₦1,239,00 and Net Revenue (NR) was ₦779,040, while Gross Margin (GM) was ₦873,800 and Benefit Cost Ratio (BCR) was 3.39. Thus BCR = 3.29 implies that every one naira (₦1.00) swine farmers put into production yields return of Three Naira Thirty Nine Kobo (₦3.39k). This indicates that swine enterprise is profitable since BCR is greater than 1.

Table 5 indicates economic marketing, technical and social constraints. The breakdown of the analysis indicated that:

Economic Constraints:

The findings showed that under economic constraints inadequate finance, high cost of piglets, high cost of feed and inadequate credit facilities were the constraints faced by swine farmers.

Marketing Constraints:

The finding also indicates that the marketing constraints included inadequate swine markets were constraints confronted by swine farmers.

Technical Constraints:

The result revealed that high charges by veterinary doctors, inadequate extension service and unavailability of improved breed were the constraints faced by swine farmers.

Social and Natural Constraints:

The finding indicates that outbreak of diseases and parasites were the social and natural constraints faced by swine farmers in Akwa Ibom State.

4.4 Discussion of Major Findings

The findings revealed that majority of the swine farmers were those who are 40 and above years of age. The implication of this is that older people engage more in swine

production. Age distribution of swine farm owners is very important in maintaining profitability operation of swine production. The findings identified that education plays an important role for a swine farm owner and helps a farmer to have day to day information about the existing modern techniques together with changes in various management practices. This finding agrees with the opinion of Karrol and Krider (2001) who observed that pig production which is both in the hand of government institutes and private individuals represents a fast way of increasing animal protein since swine grow at a faster rate and reproduce sooner with larger litter size.

The result revealed that swine has the ability to multiply in a relative short period of time. Ekarius (2008) agrees with this finding that swine does produce many litters in a relatively short gestation period. The findings also showed that swine farmers practice semi intensive management system. This finding agrees with that of Morrison (2001) who stated that the ultimate performance measures in livestock business, amount of profit which is made and the level of profit depends on management practices. The findings further showed that cost and benefit of swine production under one year production was as follows: total cost incurred at ₦459,960, Total Revenue Value at ₦1,239,000, Net Revenue Value at ₦779,040, Gross Margin Value at ₦873,800 and Calculated Benefit Cost Ratio were 3.39. The cost benefit ratio showed significant difference in the production. This showed that swine farming business is very profitable and this is in agreement with the findings of various researchers (Olaloku, 2000: Lufedeju, 2002; Lois, 2005; Jacob and Patricia 2009) in different states of the federation who concluded that swine production was highly profitable.

The findings showed that there is significant relationship between constraints faced by farmers and swine production. The survey result indicated that economic constraints include inadequate finance, high cost of piglets, high cost of feed, and inadequate credit facilities. This study agrees with Ajala and Osuhor (2004) 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.

Table 3 shows the result of socio-economic characteristics of farmers, for instance, swine farmers keep between 20 – 30 or more swine in one house. Heins (2000) stated that profitability is not a function of investment only, but management and husbandry play very important roles.

Under technical constraints the findings identified high charges by veterinary doctors, unavailability of improved breed and inadequate extension services. While in social and natural constraints the result identified outbreak of diseases and parasite. This finding agrees with that of Ojo (2002) who reported that proper healthcare reduces risk of severe economic losses.

Under marketing constraints the result showed inadequacy of market for swine meat and products discourages some youth from going into production, they rather engaged older men to run or manage their swine farms. These findings all agree with FAO (2006). Solomon *et al* (2003) agrees with this finding who stressed that while analyzing the cost of swine production, cost that should be considered most are cost of piglets, cost of vaccination, cost of feed material and general management cost should be taken into consideration.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

This chapter contains the summary, conclusion and recommendations for the study.

5.1 Summary

The main objective of the study was to determine profitability of swine production in Akwa Ibom State. The study had three specific objectives among which were to: (i) describe the socio-economic characteristics of swine farmers (ii) determine the cost-return and profitability of swine production in Akwa Ibom State.

Review of related literature was carried out and theoretical framework was based on Cost-Benefit Analysis Theory which emphasized on predicting outcome of cost and benefit over a period of time, also to determine whether benefits outweigh the cost, and by how much. The study adopted descriptive survey research design and the population for the study was 4,003 comprising of only registered swine farmers. A simple size of 399 was drawn using systematic random sampling technique. A structured questionnaire was used for data collection. Three research questions and two null hypotheses were formulated for the study. Data were analysed using Descriptive Statistics, Profitability Ratio and Pearson Product Moment Correlation. In answering research questions, mean, percentage and standard deviation was used. A mean of 2.5 and above was considered as agreed while a mean less than 2.5 was considered as disagreed for research question three.

Hypothesis one (1) was tested using profitability ratio while null hypothesis two (2) was tested using Pearson Product Moment Correlation (PPMC) and decision was made at 0.05 level of significance. In answering research questions, all the suggested cost and benefits outlined to ascertain no significance difference in the cost and benefit of swine production were rejected. The findings showed that 52% of the respondents were 40 years and above, 42% had secondary school education, 68% engaged in business as their major occupation, 61% used semi intensive management system, and 50% of the respondents had experience of 10 years and above. The findings showed further that under one year production period, variable cost was ₦365,200, fixed cost was ₦94,760 and total cost incurred was ₦459,960 and sales of output value at ₦1,239,000 (TR) and the net revenue was ₦779,040, while benefit cost ratio was 3.39. Thus, the swine production is a profitability venture in the study area. The findings further showed that swine farmers were confronted with economic, marketing, technical and social constraints such as inadequate finance, high cost of piglets, high cost of feed, inadequate credit facilities, inadequate swine market, high charges by veterinary doctors, inadequate extension services, unavailability of improved breed and outbreak of diseases and parasites.

5.2 Contribution to Knowledge

This study contributes to knowledge and literature in the following ways:

1. This study identified the socio economic characteristic of swine farmers in Akwa Ibom State as majority were 40 and above years of age, 42% had secondary education and 50% of them had 10 and above years of farming experience.

2. Swine production significantly differs in cost and benefits (3.39>1).
3. The constraints to profitable swine production had significant relationship with swine production ($p = 0.007$).

5.3 Conclusion

The findings of this study showed that age, educational level, regular weaning, system of keeping swine, family size, years of experience in business and number of litters from in-pigs are factors that significantly affected profit margins of swine farmers.

The cost and returns analysis showed that swine enterprise is a profitable enterprise that should be encouraged and invested in. Constraints such as inadequate finance, high cost of piglets, high cost of feeds, inadequate credit facilities, inadequate swine market, high veterinary cost, poor extension service, unavailability of improved breeds and diseases and parasite were major constraints to profitable swine production in the study area.

5.4 Recommendations

1. To inculcate production and profitability in swine enterprise, it is recommended that field cost should be reduced, the process of substituting feed with locally available by-products like banana, maize residues, sugarcane residues, cassava peals, fish waste, overripe fruits etc. Such diet may be supplemented with small quantities of protein concentrates.
2. Most swine producers in the study area have no access to credit facilities. Since swine production is capital intensive, intending swine farmers and other farmers

still active in some business should form cooperatives to access credit facilities and pull their financial resources together for bulk purchase. This will reduce cost considerably and increase the profit margin realized. Better marketing channels should be utilized like local established supermarkets with facilities, transportation and personnel for marketing pork swine meat and products.

3. Akwa Ibom Agricultural Development Programme (AKADEP) should increase veterinary service by supplying necessary vaccine at lower cost by establishing new veterinary care centres as this will help to check some parasites and diseases.

5.5 Suggestions for Further Studies

The following are suggestions for further studies:

1. Comparison on Cost-Benefit Analysis of Poultry Production in Akwa Ibom State, Nigeria.
2. Analysis of the Performance of Swine Loan Beneficiaries in the Livestock Scheme of Akwa Ibom State: A Case Study of Uyo.

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APPENDIX I

QUESTIONNAIRE

Agricultural Education Section,
Department of Vocational and Technical Education,
Faculty of Education,
Ahmadu Bello University, Zaria.

Dear Respondent(s),

REQUEST TO COMPLETE QUESTIONNAIRE

I am an MSc candidate in the named Department above, conducting an academic research on the topic **"Profitability of Swine Production in Akwa Ibom State, Nigeria".**

I solicit your co-operation to respond to the questionnaire. It is mainly for research purpose and as such, all your responses will be treated as confidential.

Thanks for your cooperation.

Yours faithfully,

Ekpe Imaikop David
M.SC/EDUC/515/2011-2012
(P16EDVE8158)

SECTION A

What are the socio-economic characteristics of swine farmers in Akwa Ibom State?

Instruction: Please tick (√) on the appropriate box provided.

1. Age of the respondents

20 – 29 [ ]

30 – 39 [ ]

40 and above [ ]

2. Educational level of swine farmers

Primary school [ ]

Secondary school [ ]

N.C.E. [ ]

OND [ ]

HND [ ]

Graduate [ ]

Others, specify _____

3. Major occupation of swine farmers

Business [ ]

Civil servant [ ]

Others, specify _____

4. Management system practiced by swine farmers

Extensive system [ ]

Semi intensive system [ ]

Intensive system [ ]

5. Family size of the respondents

1 – 3 [ ]

4 – 5 [ ]

6 – 7 [ ]

8 – 9 [ ]

10 and above [ ]

6. Years of farming experience

<5 years [ ]

5 – 10 years [ ]

Above 10 years [ ]

7. Herd Size of the respondents

1-4 [ ]

5-10 [ ]

10-15 [ ]

15-20 [ ]

20-30 [ ]

30 & above [ ]

8. Litter Size per sow

1-8 piglets [ ]

10-12 piglets [ ]

12 and above [ ]

9. No of time weaned per year

1 time [ ]

2 times [ ]

3 times [ ]

SECTION B

Instruction: Please write the unit price in the column provided based on the cost item.

2. What are the cost analyses of swine production?

	Cost Item	**Unit Price**
A	**Variable Cost**	
10	Cost of piglets	
11	Feed cost	
12	Cost of labour	
13	Cost of drugs, disinfectants and vaccine	
14	Electricity cost	
15	Veterinary expenses	
16	Transportation cost	

B	**Fixed Cost**	
17	Housing cost	
18	Tools and equipment cost	
19	Interest on land value	
20	Salaries	
21	Maintenance	
22	Depreciation	

2b. What are the benefits of swine production?

S/N	Item	Unit Price
23	Sales of pork (slaughtered)	
24	Sales of weaned piglets	
25	Sales of matured swine	
26	Sales of manure (in bags)	
27	Sales of empty bags	

SECTION C

4. What are the major social, economic and technical constraints faced by swine farmers?

Instruction: Please tick (√) on the appropriate box provided.

Rating Key

SA = Strongly Agreed

A = Agreed

SA = Strongly Disagreed

D = Disagreed

S/N	Constraints	SA	A	SD	D
A	**Economic Constraints**				
28	Inadequate finance				
29	High cost of piglets				
30	High cost of feed				
31	Uncertainty of profit				
32	Inadequate credit facilities				
B	**Marketing constraints**				
33	Fluctuation in the prices				
34	Delayed payment				
35	Inadequate pig market				
C	**Technical constraints**				
36	Poor growth of swine				
37	Electricity constraints				
38	High charges by veterinary doctors				
39	Inadequate extension service				
40	Unavailability of improved breed				
D	**Social and natural constraints**				
41	Problem of theft				
42	Outbreak of parasite and diseases				
43	Pollution of environment				

Correlations

[DataSet1] C:\Users\Hp\Documents\ALL IN ONE.sav

Descriptive Statistics

	Mean	Std. Deviation	N
CONSTRAINTS	2.4352	0.89415	399
SWINE. PRODUCTION	2.7403	.73879	399

Correlations

		CONSTRAINTS	SWINE PRODUCTION
CONSTRAINTS	Pearson Correlation	1	.672
	Sig. (2-tailed)		.007
	N	399	399
SWINE. PRODUCTION	Pearson Correlation	.672	1
	Sig. (2-tailed)	.007	
	N	399	399