

Using Stakeholders View to Develop Strategy for Pork Supply Chain In Imo State- Nigeria.



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Masters in Agricultural Production Chain Management
Specialization in Livestock Production Chain

By

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**Wageningen University
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DEDICATION

This Research work is dedicated to God the Father, the Son and the Holy Spirit and my Late father Mr. A.N. Uhuegbu.

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LIST OF ABBREVIATIONS

Abbreviation	Full meaning
A.S.T	Department of Animal Science & Technology
A.D.P	Agricultural Development Project
E.A	Extension Agents
F.U.T.O	Federal University of Technology Owerri
L.G.A	Local Government Area (Municipalities)
I.T	Information Technology
NAFDAC	National Agency for Food and Drug Administration and Control
S.M.S	Subject Matter Specialist
S.A.A.T	School of Agric & Agric Technology

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ABSTRACT

Pig sector in Imo state although, has considerable increase in number, still poorly organized, with no cluster orientation among sector members. There are poor management and inefficiencies along the chain with weak producer's organisation, and little business orientation that creates uncertainties in pork supply chain in the state.

The study uses stakeholders view from all segment of pork supply chain in Imo state, on strategies to develop pork chain in the state. The investigation was carried out in Imo state Nigeria, three zones in Imo state was used as clusters.

The investigation was carried out between, July 21st to August 15th 2008. Three methods were used for the study, Thus Include, Desk study, which was the first method the researcher used to gather background information for the study before setting off for fieldwork.

Case study and survey was used to gather information from respondents in the field.

In case study, since an in-depth analysis on stakeholders view is required, experts who have representative ideas about the internal situation of pork chain in Imo state were approached. 12 Stakeholders were interviewed. These include 9 primary actor, 5 Chain Supporters and 1 regulatory group member. The interview questions involved the current situation of pork chain, support structures and strategies to develop pork chain in Imo state.

The third method the researcher used was survey; structured questionnaire was designed for pork retailers, three zones in Imo state was used as clusters. 45 pork retailers were interviewed with structured questionnaire; respondents were randomly selected with equal sample population based on number of pork retailer identified in each zone. Reason for selecting pork retailer for survey is that they are in position to inform the researcher about the marketing channel of pork, quality of pork produced cost and selling price, constraints to pork consumption and consumer preference.

Datanalysis????

CHAPTER ONE INTRODUCTION

1.0 Introduction

The aim of this thesis is to develop strategies for Pork Supply Chain in Imo State. The study will benefit all actors in Pork chain especially the smallholder's pig farmers. The Thesis is divided into five chapters, Chapter one is introduction, chapter two is research methodology, chapter three talks about Pork Supply chain, chapter four is result and discursions, chapter five includes strategies for development , conclusion and recommendation.

1.1 Background information

Topic, using stakeholders view to develop strategy for pork supply chain in Imo State is assigned to me by the Department of Animal Science and Technology of Federal University of Technology Owerri Imo State Nigeria.

Reason for this research is because Department of Animal Science wants to embark on developmental project on Pork Supply Chain as a means of encouraging small scale pig farmers and other actors in pork supply chain in Imo state.

In other to make the project a success, the department decided to involve stakeholders who are directly involve in the chain, to enable them identify where the problem is, in the chain, and suggest strategies for its development.

The idea of involving stakeholders is because, it is observe that most developmental project carried out by some organizations, turned out to be a failure, because the project is imposed on farmers/stakeholders without seeking their opinion.

Federal University of Technology Owerri is the project owner, but Department of Animal Science and Technology will coordinate the project.

1.1.1 Mission of Animal science department

The mission is to impact scientific and technological Knowledge and skills necessary for improved livestock production and also produce graduate, who will be well equipped to go into private farming and industry, or teach agriculture in secondary or tertiary institutions.

1.1.2 Vision of Department of Animal Science

The vision is to train high-level manpower in Agriculture (Animal Science and Technology) to solve the problems of food in sufficiency and graduate unemployment in the country.

1.1.3 Goal of Department of Animal science

The goal of the department is to combine academic distinction with a technological bias, character and high dose of self-development

1.1.4 Objective of Department of Animal Science

To produce private farmers

1. To develop improve livestock breeds, practices and technology
2. To produce qualified graduate who will assist in National agricultural planning, policy formulation and implementation, and increase livestock production.
3. To provide adequate training for those interested in career as agricultural Teachers in secondary schools and Tertiary institutions

1.2 Livestock Production in Imo State

Livestock production in tropics is the same as in the temperate region to convert cultivated or harvested Product into meat, meat Product or raw materials for agro industrial processes by using animal as converter.(source)

Livestock industry is an important component of Agriculture in Imo state, it is primarily a good source of protein, which is required for a balance diet. Emenyeonu et al, (2007) reported that an average of 20-gram of animal protein is required per day as recommended by FAO (Food and Agricultural Organization) for developing countries.

Livestock provides source of employment and income for a large proportion of the rural population, as well as an important source of protein in the local diet.

Livestock plays a very important role in the economy of Imo state; it has consistently contributed over 5% of the Gross Domestic Products (GDP) and about 20% of total Agricultural GDP (Akinwumi and Ikpi 2000).

Livestock farming in Imo State includes poultry, goats, sheep, and rabbit keeping, but mainly on subsistence level. Choice on the type of livestock to raise depends on interest of the farmers in the area.

1.2.1 Pig Industry in Imo state

Pig industry can be a very reliable one, due to cretin attributes of pig and the production system. Pigs have a high survival rate and have the ability to utilize most Agro Industrial by - Products, and crop residues.

Pig has the ability under efficient and balanced nutrition to reach a slaughter weight of 80 to 90 kilogram, between 7 to 8 months, which makes it one of the most efficient feed converters. The production of pig as compared to other livestock is economically viable, therefore calls for proper development in the state. Okoli (2003)

Pork production remains the main purpose of keeping pig, different breeds of pigs are recognized in Imo State, which include local and exotic breed. The commercial pigs are crossbred with middle-sized large white pig that is well adapted to the environment and corresponding to market demands. In small-scale farming, mainly local breeds of pig are identified. (Adesehina, 2003)

Ibeawuchi ,2007 reported that pig production is gaining recognition in Imo State since 10 years ago, however, marketing of pig is domestic oriented, 95% of pigs raised in the state are sold at farm gate to the middlemen who supply the live fatteners to the neighbouring state where they are slaughtered and sold to the consumers. The remaining 5% are sold to traders, who slaughter and sell in the local market or to people that have restaurants or confectionary shops.

Three types of pig farmers are recognized in the state, small-scale farmers, medium scale farmers and large-scale farmers. The size of their flocks ranges from 5-20, 21-80, 81 and above. 85% of pig farmers are small scale, 10% are medium scale, and 5% are the large-scale farmers (Amadi, 2007). Pork chain in Imo state is described in fig 1

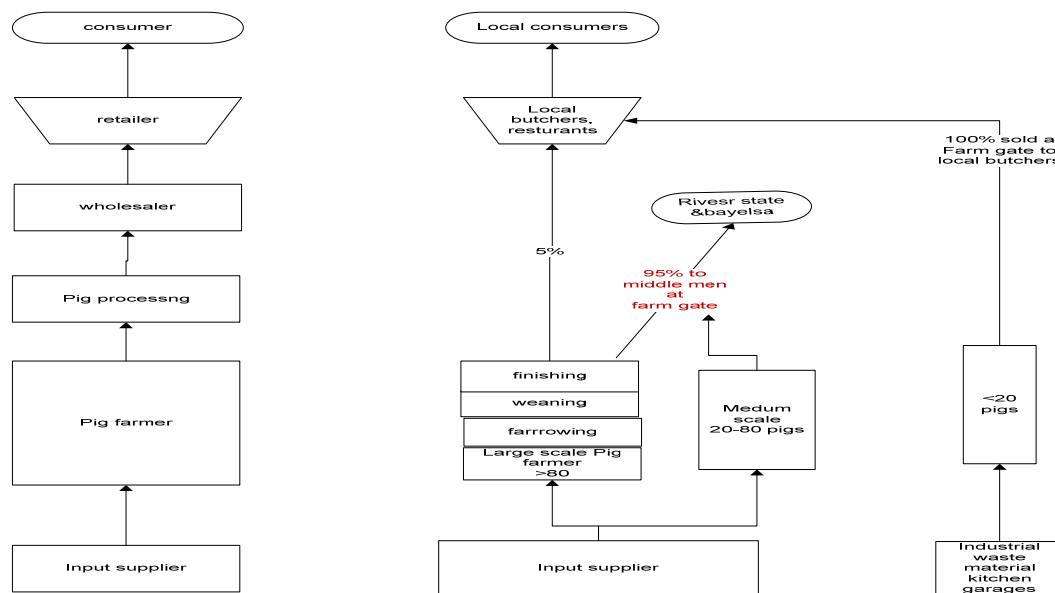


Figure 1 Pork chain in Imo state

Large and medium scale farmers feed their pigs with concentrates and industrial waste material example breweries spent grain, palm kernel cakes, heat bran , etc while the small scale farmers formulate their own feed with farm waste materials, kitchen garbage etc (Amadi, 2007).

Pig farming in Imo State recently has shown a noticeable increase, from 5 thousand registered farmers, in 1984, to 15 thousand farmers in 2007. Smallholder pig farmers own most of these farms. Demand for pork is continually on the rise because most families are now including pork in their daily meals unlike before whereby they are only interested in beef, chicken and goat meat (Ibeawuchi, 2007).

Despite the increase in the number of pig farmers in Imo state, pig population data are difficult to obtain. Livestock and veterinary services are only in possession of data of the registered pig-farms, which represent a small part of all the pig-farms (Ibeawuchi, 2007). Recognized pig farmers in three zones of Imo state is in Annex 1.

Pig sector in Imo state although, has considerable increase in number, still poorly organized, with little or no cluster orientation among sector members, poor information flow among actors, poor management and inefficiencies along pork supply chain, weak producer's organisation with little business orientation which creates uncertainties in supply chain in the state (Adesehina ,2003).

1.2.2 Research problem

The rate of expansion of pig industry in Imo State is on the increase, as Ibeawuchi, 2007 reported that pig farmers have increased from 5 thousand farmers in 1984, to 15 thousand registered farmers in the year 2007.

Pig sector in Imo state although, has considerable increase in number, still poorly organized, with little or no cluster orientation among sector members, poor information flow among actors, poor management and inefficiencies along pork supply chain, weak producer's organisation with little business orientation which creates uncertainties in supply chain in the state (Adesehina ,2003).

In addition, it is observed that the expansion is only on farm level. There is no formal market, no processing plant or Abattoir for pig; fatteners are sold at the farm gate to middlemen who sell them, to the processing plant in other state (Adesehina, 2007).

The present situation of pork supply chain in Imo state, attracted Department of Animal Science and Technology of Federal University of Technology, Owerri to spot out where the bottle necks is in the supply chain, and develop strategies for its development. For this to be achieved, analysis of the present situation, strategies for development will be very relevant, which may serve as a reference for the department to develop pork supply chain in the state.

1.2.3 Research Justification

The result of this study will provide useful information to the Department of Animal Science and Technology on the present situation of pork chain; bottlenecks identified in the chain by the stakeholders and suggested strategies will serve as a guide for the department on how to develop pork supply chain in the state.

Also, Since most actors in the chain are small scale pig farmers that still adopt traditional way in their cluster practices, developing of pork supply chain will be a way to encourage them to adopt new technology that will lead to increase in productivity.

Development of pork supply chain in Imo state will also help to promote pork consumption which will lead to diversification of more value addition to pork product ,that will lead to greater income to different levels of the chain.

1.2.4 Objective of the research

The purpose of this research is to develop strategies for Pork supply Chain development in Imo State Nigeria

1.2.5 Research Questions

Main questions

- What is the current situation of Pork supply chain in Imo state?
- What support structures are in place for actor in pork supply chain?

Sub-questions

- 1.1 Who are the actors in pork supply chain?
- 1.2 What is the relationship between actors in the chain?
- 1.3 What quality control measures are applied by actors in the chain?
- 1.4 What are the barriers to pork consumption in Imo state?

- 2.1 Who are the supporters of pork supply chain?
- 2.2 What infrastructural facilities are available for actors in pork chain?

1.2.6 Conceptual frame work

To have direction on how to conduct this research, a conceptual framework was designed to define different steps necessary in the process of completion of the research. The research will base on the concept of supply chain development. This objective will be achieved is by analyzing the existing pork chain, the support structures available and strategies to develop ideal pork chain in Imo state. Conceptual framework is in Fig 2 .

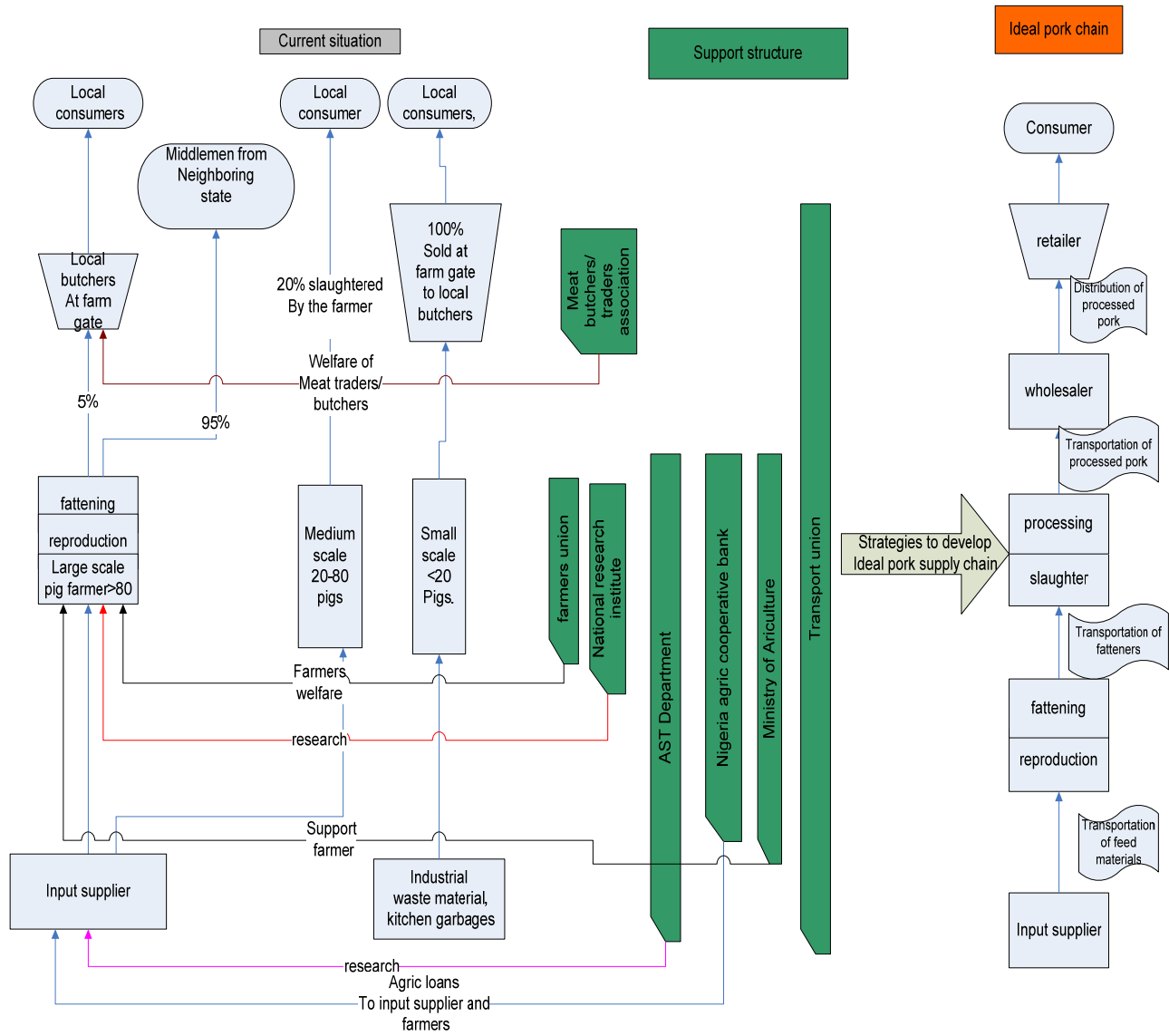


Figure 2 Conceptual Frame Work

CHAPTER TWO RESEARCH METHODOLOGY

2.1 Methodology

This research has a quantitative and qualitative approach, which based on empirical data and desk study. Three methods were used in data collection, which include; Desk study, Case study and survey.

2.1.1 Study Area

This study was carried out in Imo State, Imo state is among the 36 states in Nigeria and it is located in the south-eastern region of Nigeria. Neighbouring states of Imo state is indicated in map of Nigeria attached in Annex 2.

Imo is divided into 27 Local Government Areas (LGA) for administrative purposes. These LGA's are further grouped into three senatorial districts namely; Owerri (East), Okigwe (North), and Orlu (West). Human population estimate according to census 2005 is 4 million. (National Bureau of Statistics 2005).

Imo State Agricultural Development Project (ADP) first quarter annual report 2008 reported that major Livestock enterprises of economic importance in Imo state include poultry, sheep, goat, cattle, beekeeping and pig rearing. Study area is shown in figure 3.

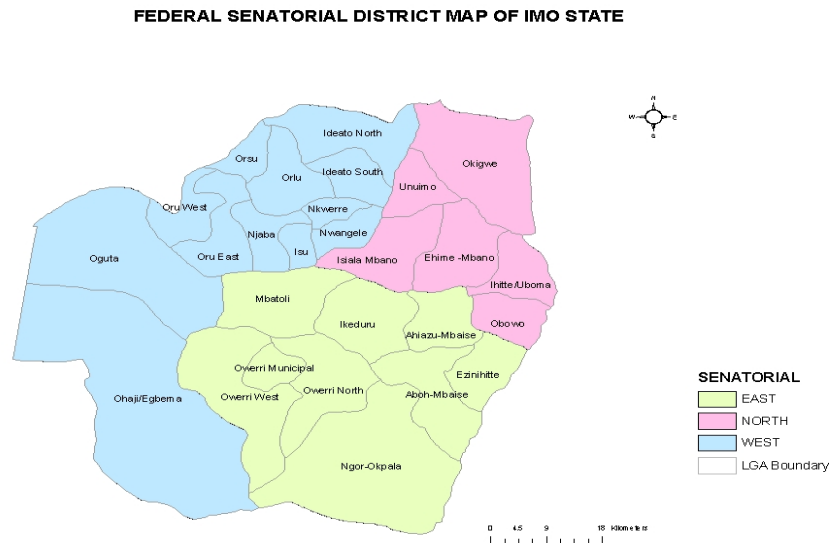


Figure 3 study map of Imo State

Source : (<http://www.nigerianstat.gov.ng/mapdet.php?recordID=16>)

2.1.2 Research design

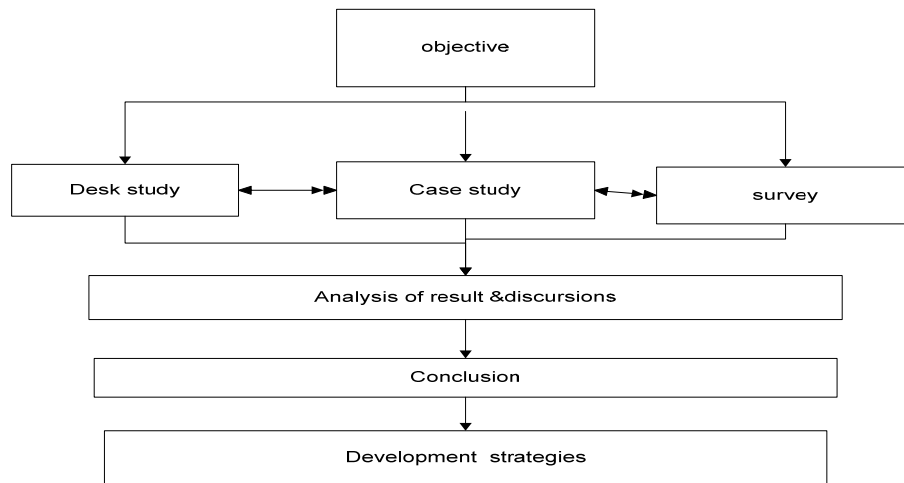


Figure 4 Research design

a) Desk study

The first method that was used to generate data from existing literature is the desk study; it was used to prepare background information of this research before setting off for field study. Sources of information from desk study include Text book, PhD thesis, scientific Journals and publication. Internet was also used.

b) Case Study

The second method used in this study is Case study, it was used because an in-depth of stakeholders view . In case study, experts that have representative ideas about internal situation of pork chain, level to be developed first in pork chain, and strategies to develop the identified problem were approached with semi structured interview. See check list in annex C.

11 Stakeholders were interviewed. These include 7 primary actor, 5 Chain Supporters and 1 regulatory group member. Discursion with the stakeholders includes their role in pork chain, identification of problem in the chain and strategies to develop the problems.

Consumers were interviewed because they are the only group that can answer question on constraints to pork consumption. In other to capture their views, a group discussion was made with colleagues who are specialist in animal production, nutrition and meat quality. Also some consumers met in restaurant and meat shops were also interviewed. Case study is used to answer sub- questions 1.1, 1.4, 2.1 and 2.2 (see sub research question pg.13). List of stakeholders interviewed is in table 1

Table 1 List of stakeholders interviewed

Input supplier (Feed suppliers/veterinary services)	2
Pig farmer(owerri, okigwe, and orlu)	3
Middle man (rivers state)	1
Consumer(discursions with colleagues, consumers in restaurant, and meat shops)	
AST staff	1
Extension worker(owerri, orlu and okigwe)	3
NAFDAC officer	1
Total	12

c) Survey

The third method used in data collection was survey; structured questionnaire was designed for pork traders/retailers. Three clusters were formed with three zones in Imo State. **45** Pork retailers were interviewed; respondents were randomly selected with equal sample population.

The questionnaire was administered on a face- to- face manner to each of the selected respondent. Retailers were asked questions on variables like; reason for selling pork, barriers to pork consumption, levels to be developed first in pork chain, and strategies for development. Survey questionnaire is in Annex 3.

The administration of the questionnaire was done by the researcher and the three S.M.S in three zones of Imo state, meeting was held between the researcher and the three S.M.S, on how the questionnaires will be administered. 27 questionnaires were administered by the researcher, and the remaining 16 was administered by the three S.M.S.

Reason for this decision is because the information gathered by the S.M.S will be checkmate with information from the researcher.

Research questions answered with survey are sub-question 1.2, 1.3, 2.2, Reason for repeating 2.2 is to confirm information form case study

Reason for choosing only pork traders/retailers for survey, is because they are the only group that have representative idea about pork consumption in the State, marketing channel, quality of pork produced, consumers preference, and other information related to Pork Chain in Imo State.

2.1.3 Data Analysis

Data from case study and survey will be used to answer research sub questions which will answer the two research main questions.

(a) Case Study

Case study is analyzed by using SWOT and Stakeholders analysis, and chains; this will help for a better understanding of the current situation of pork supply chain, the roles of different stakeholders, major bottleneck in the chain and strategies to develop the bottlenecks.

(b) Survey

Data collected from survey questions is analysed by using SPSS programme. (Descriptive -cross Tabulation and chi square). Cross Tabulation is used to compare difference between responses retailers in the three different zones of Imo state.

Chi square is used to compare the significance in the samples to a normally distributed set. If the test is non-significant ($p > .05$), it tells that the distribution of the samples is not significantly different from a normal distribution.

(That is it is probably normal) if however the test is significant, ($p < .05$,) the distribution is significantly different from a normal distribution. (Field, 2005).

Bar charts and pie charts is used to present findings from survey.

CHAPTER THREE REVIEW OF LITERATURE

3.1 Supply Chain

Different definition is given to supply chain by different authors depending on their own perspective. Olim,(2003) define supply chain as a set of sequential, vertically organized transaction representing successive stages of value creation.

Vorst,(2007), gave his own definition as activities connected to materials and information flow of money and property right that crosses organizational boundaries, Supply chain not only includes the chain actors which are the input supplier, producer, processor trader and consumer but also depend on logistics flow and transportation of goods and materials.

3.1.1 Pork Supply chain definition

Pork supply chain is a supply chain involving different parties like the pig farm, slaughter houses, processors, distribution, sales channel, consumer and other various parties (Vorst et, al 2008).

Other literatures see pork supply chain a full range of activities from the earliest level of input, through processes along the chain, to delivery of the final product to the consumer. It includes, input suppliers such as feed companies, producers, abattoirs and meat processors, transporters, packers, wholesalers, marketers, retailers, and export/import distributors.

3.1.2 Stakeholders in Pork Supply Chain

Jacques (1999) define stakeholders as parties within and outside the organization that can directly influence and can be influenced by the organisation action.

Hans, (2001) define stakeholder as any group or individual who can affected or is affected by the achievement of organizational objective.

Stakeholders are often people who will be impacted in the strategic plan, and have information, experience or insight that will be helpful in developing plan. They are in a position to either support or influence a vested interest in the work; they are final decision makers or people who must approve the plan (www.calstate.edu/csl/initiatives/documents/stakeholder).For the purpose of this study, stakeholders are people who are directly involve in pork supply chain in Imo state. These include actors, chain supporters and chain Influencers.

3.1.3 Actors in pork supply chain

Chain actors are engaged only in primary processes and have no influence over the management of the chains (Wognum et al, 2008).

Primary process of pork chain consist of various stages, each stage has its own characteristics and key players, the processes are; breeding farrowing, finishing, slaughtering, processing retailing and consumption. (Wognum et al, 2008)

Kit, Fida and IIRR , (2006) define actors as those involved in producing, processing, trading or consuming a particular Agricultural product. They include direct actors and indirect which are commercially involved in the Chain. Actors include input supplier, producers, processing traders, consumption including transporters who act in-between the actors. Actors in pork supply chain are in figure 3.

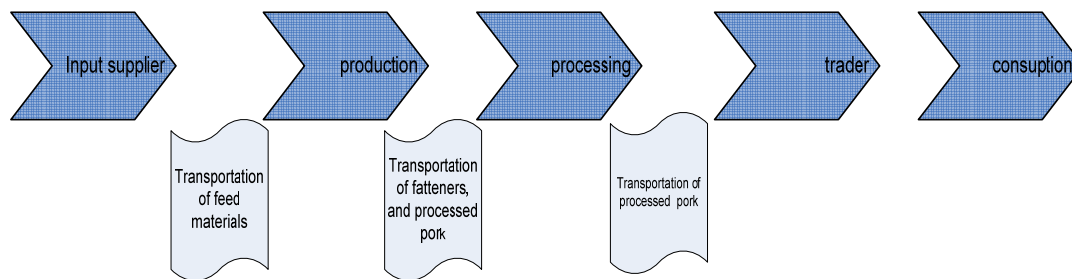


Figure 5 Actors in Pork Chain

3.1.3 Input supplier

These are stockists who distribute input like feeds and equipments to pig farmers. The input supplier according to Vorst et, al, (2008) .is defined as the supporting element in pork chain, like feed technology, advice, transportation of pigs from one link to another or distribution of meat to consumers. Input supplier especially feed industry as reported by Kalathas,(2007) plays the major role in pork supply chain.

3.1.4 Production

Production starts with reproduction, production of piglets, flow through fattening and finishing under good management practices (Nijhof-Sarraki and wevers,, 2008). Pig production is grouped into extensive system (small-scale) Semi intensive (medium scale) and Intensive (large-scale) (Holness, 1991).

(a) Extensive system (small scale)

This is the traditional way of rearing pigs in many parts of the tropics. It is also the cheapest and the simplest method .In this method of rearing, families keep few pigs which are allow to wonder and pick feed when and where they can. Complimentary feed given to them consist of feed with low nutritional quality, such as bananas, maize stalks, rice bran, plant by-products or kitchen waste. Holness, (1991).

Indigenous breeds of pig predominates the extensive system of pig production, this is because, and they are adapted to local environment. Subsistence farmers own majority of scavenging pigs.

(b) Semi Intensive systems (Medium scale)

This system is known as backyard system of pig production, pigs are confined and therefore represent commitment on the part of the part of the farmer to feed his pigs, housing is mainly on simple constriction (Holness, 1991).

Feeding is based on kitchen waste vegetable, by products, and sometimes-commercial feeds. Management is generally minimal. Productivity is relatively low and mortality sometimes is high. Local and exotic breed is used in this system of production.

Marketing is largely indiscriminate, and it is by immediate financial need of the owner. Herd's size and productivity tends to be higher in this system than in scavenging system

(c) Large-scale pig farming (Intensive system)

This is a commercial pig production, the unit consist from 80 heads and above, they are mainly fed with commercial concentrate, housing system is more sophisticated and made of concrete floor, adequate shelter, and pen space is appropriate with feed and water facilities.

In other to justify the increased capital cost, the farmer attempts to manage his pigs to optimize output including some veterinary protection against parasites and diseases. The type of pig normally raised is exotic breed or crosses between exotic and indigenous breed. Marketing may be informal through local butchers, or in the large scale to commercial sectors.

(d) Activities that takes place in large scale farmers

The major activities that takes place at production level include, reproduction and fattening. Reproduction includes breeding, and farrowing. Fattening and finishing.

3.1.5 Middlemen/Livestock Traders

The middlemen or the livestock traders are the common link between farmers and the market. The activity of the middleman is that they buy culled and fattened pigs from pig farmers and sell to the processing plant or the butchers who finally process and sell to consumers.

3.1.6 Processing

Processing of pork involve two major activities, which include slaughtering, and processing.

Slaughtering

It needs to occur in dedicated companies, when pig arrives at the slaughter house; they are kept in an enclosed place for some time to reduce stress from travelling.

The modern slaughter houses process fatteners in a very efficient and highly sanitary process, consisting of the following actions; stunning, bleeding, hair removal, carcass examination, organ removal splitting and chilling. After chilling, most slaughter houses also cut the carcasses. Meat from the slaughter houses is sold to the processors, wholesaler, or retailers.

(a) Processing

These are companies or individuals, which are mostly independent but may also, be part of slaughter houses (Vorst et al, 2008)

Meat processors prepare numerous products like stake, ham and sausages. These products are mainly processed for the retailers

3.1.7 Traders

Trading involved marketing of pork, most meat is sold to the customers by the traders, traders involve supermarket and other channel which include butchers, hotels, hospitals and company restaurants.

Also, effective marketing management requires the analysis of all factors that can affect marketing success and failure for a company. Like the market size, the trend , also the competitors analysis like the strategies and future plans for marketing their products, customers preference like the taste, and also company analysis the share and portfolio.

3.1.8 Consumption

Consumers are the final element of pork chain, their buying and consuming behavior strongly influences pork production. Animal welfare, health, environment, and safety are central issues in pork consumption these days.

However, willingness to pay a higher for pork influences the speed and level of addressing these issues.

3.2 chain supporters

Chain supporters are those who provide support services for various actors in the supply chain, but does not directly deal with products but their services add value to the product

3.3 Chain Influencers

They are the regulatory group, policy makers, they are not directly involved in the chain but have influence over the activities actors in the chain. Chain influences are at local state and National level (Daniel Roduner, 2007)

3.4 Quality Management in Pork Chain

Meat quality control is a system that regulates the measure of extrinsic materials such as chemical residues, toxins, pathogenic microorganisms and putrefied tissues, which could be present in meat and are dangerous to human health (Olugasa *et al*, 2000).

Growing awareness in the food industry of product quality has resulted in the design and application of quality management systems. Quality management as define by Kalathas, (2007) includes policies, processes, and procedure for delivering safe, high quality food.

Quality management system practiced in pork chain in the Netherlands and organization in charge is used as an example to illustrate quality management control in pork chain.

Iso : this consists of requirements for quality management systems. Their factions include management responsibilities, resource management, product service realization, measurement (including customer's satisfaction) analysis and improvement.

GMP (God Management Practices). GMP focus on production processes, it requires the process of documented, all production and testing tools, and equipment used have qualified as suited for use. And all methodologies and procedures in use have been validated according to specification. GM code is developed for animal production including to check, Salmonella control, compound and medicated feed and undesirables substances Luning *et al*, (2006),

HACCP (Hazard Analysis critical Control point,) this organization, has a systematic, preventive approach to assure food safety, that address physical, chemical and biological Hazards by preventing problems to occur.

IKB (Integrated chain control) their regulation relates, to traceability, feed quality, hygiene, use of veterinary medicine and trace of residues. Audits and sanctions by independent body, controls the level of compliance with the **IKB** systems.

GloBAIGAP (Global Good Agricultural Practices).his is a single integrated standard, with modular application for different product group. Ranges from plant, and Livestock production, to plant propagation material and compound feed manufacturing. Example of quality control check in pork chain is shown in Figure 6

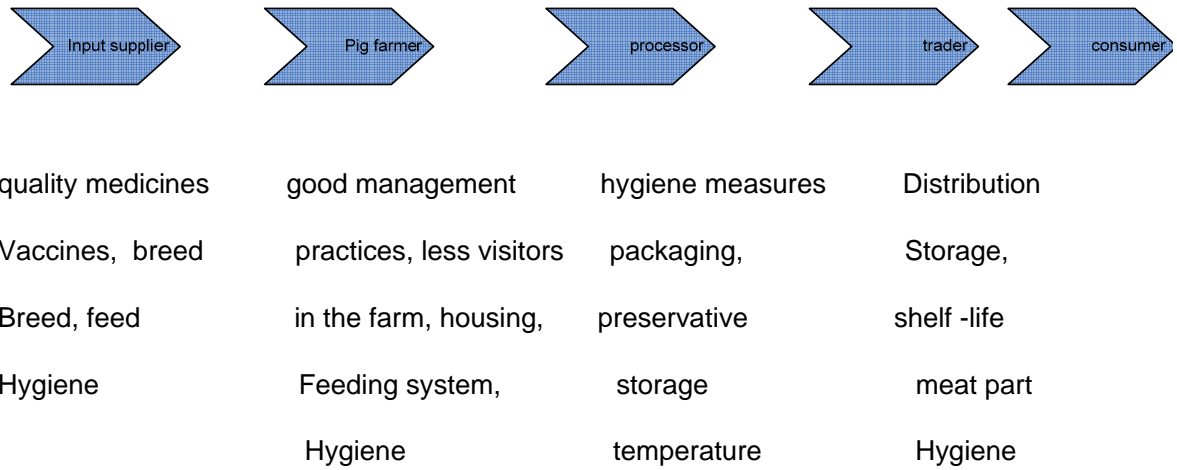


Figure 6 Quality Control Measure Check In An Ideal Pork Chain

Luning et al, (2006), stated that, 'one factor above all others is that quality drives market share. When superior quality and large market shear are both present, profitability is virtually guaranteed'

3.5 Information flow between chain actors an ideal pork chain

Information flow in pork chain is a two way process, it moves from the supply of input to the consumer Vis versa. It is a key to the success of supply chains (Vorst, 2000, p. 85).A competitive Pork supply chain must be able to record and transfer information throughout the chain. Informational flow can reduce costs by providing efficient product flow and add value by allowing product guarantees.

Information technology (IT) can be utilized for two different tasks in supply chain co-ordination which include transactional and analytical. **Transaction IT**; includes recording and sharing information, related to actual supply Chain activities, including point-of-sales data (Vorst, 2000). This type of IT is useful to provide traceability.

The other type of information technology, **Analytical**, IT assists with decision-making in Scheduling production and forecasting demand, (Vorst, 2000). Analytical IT can improve the flow of product from primary producer through to retailer by improving the ability to predict demand. Example is in figure 7

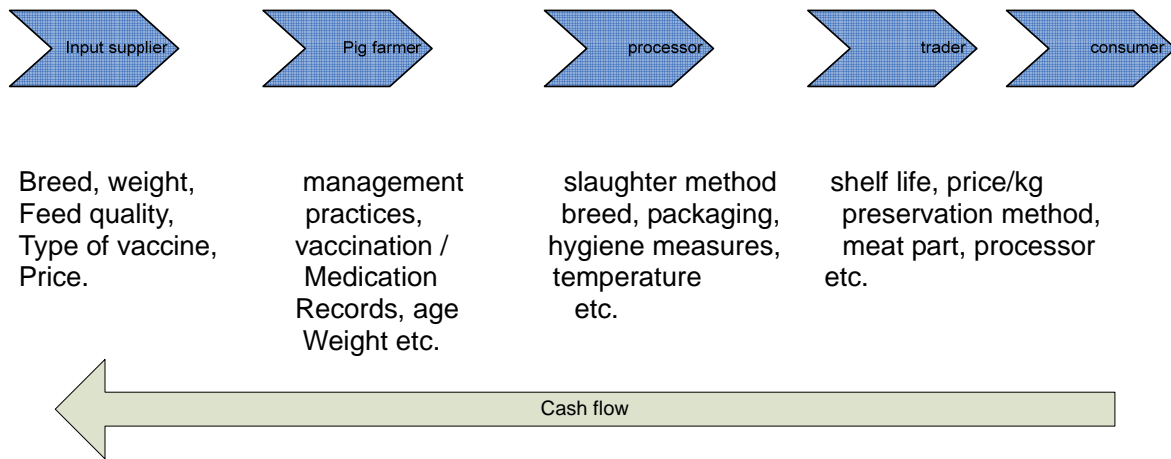


Figure 7 Example Of Information Flow In Ideal Pork Chain

3.5.1 Cash flow

The flow of money within the supply chain is important to supply chain management. However, the industry needs to focus on making money at the end customer. Cash flow in pork chain moves in the reverse order, that is, from the customer to the input supply

3.6 Physical Distribution/Logistics in pork supply chain

Logistics, in its most basic definition, is the efficient flow and storage of goods from their point of origin to the point of consumption. It is the part of the supply chain process that plans, implements and controls the flow of goods. It can also be seen as the management of inventory, in rest or in motion. (Crystal, 2003)

Logistics systems according to Visser and Van Goor, (2006) stated that the discipline of logistics has its own approach to organization, beginning with the primary process that is, the flow of goods, which eventually generate flow of money to the enterprise.

CHAPTER FOUR RESULTS AND DISCUSSIONS

4.0 Introduction

This chapter presents result of the field study which also represents the present situation of pork supply chain in Imo state. The results are presented according to data collection, the first part (4.1 -4.1.8) is answer from case study, while the second part (4.2- 4.4) presents answer from survey.

The third part is level to develop first in pork chain this part is very important because for supply chain development to be successful, it must start from a particular level, the result of the level to be developed first is, presented also in this chapter.

Findings from case study are presented with chains, Stakeholders analysis and tables,. While findings from survey are presented in, bar chats and pie chat. Discussions and conclusions is made after ever result.

4.1 Actors, marketing channel of pork supply chain at Imo state

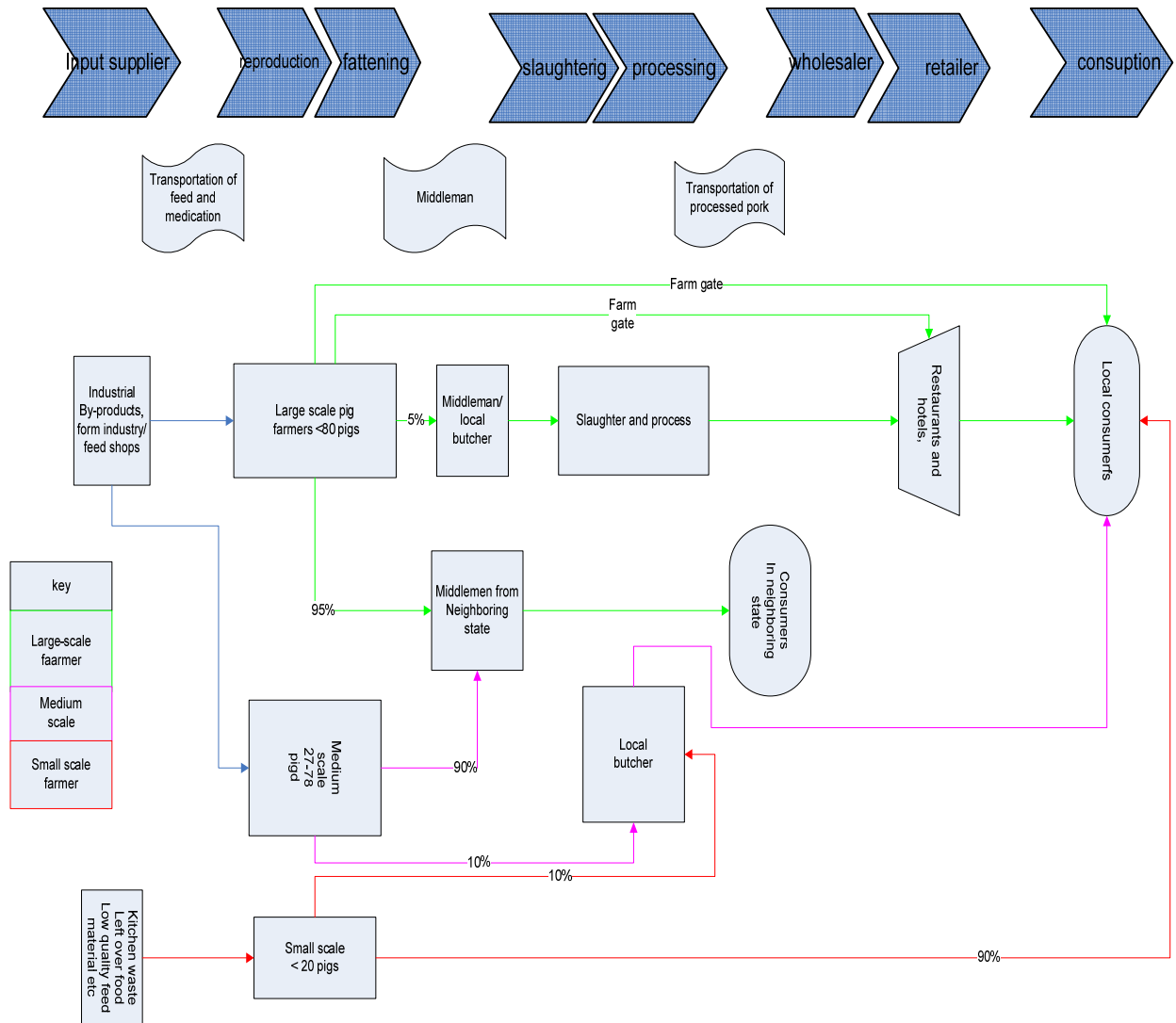


Figure 8 Actors identified in pork chain in Imo state

4.1.1 Input supply

There is no available concentrates for pig in Imo state, and no feed company producing concentrate feed for pigs identified in the state. Pig farmers feed their pig with industrial raw material, example palm kernel cake, wheat offal, cassava meals, soya bean meal, maize offal, breweries dried grain also some animal by-products available are fish meal, bone meal which they buy directly from the industries, as by-products or in feed shops where feed for poultry are sold.

Also, there is no breeding company in the state; farmers raise their own foundation stock through selection. Medications available are mainly locally made, by National Veterinary Research Institutes especially vaccines, but others are imported from the Netherlands and other European countries.

There was no company identified that produces equipment like feeders, drinker, for livestock generally in Imo state, equipments like feeding trough, and drinker which farms use in Imo state are locally made, by brick layers or fabricators.

4.1.2 Production

Total number of pig farmers identified Imo State by mo Imo ADP in the first Quarter of 2008 is 4, 460; That is, owerri 1951 pig farmers, Orlu 2049 and Okigwe 460 at present., which is contrary to (Ibeawuchi, 2007), who stated that the number of pig farmers identified in Imo state is 15,000 registered farmers.

At the production stage, two stages were identified which include; reproduction stage and fattening stage.

Three type of pig production is practiced by pig farmers in Imo state; these include extensive (small scale), semi intensive (medium scale), and intensive system (large scale).

(a) Small scale farmers

In small scale pig farming, there are farmers that have less than 20 pigs, in this type, they feed their pigs with kitchen waste, complimentary feed given to them include, feed materials that have low quality nutritionally, example, bananas, maize stalk.

Major breeds identified in this system are mainly local breeds. Feeding and drinking trough identified in this method old iron buckets and head pans.

This type of system, because the fatteners are not well fed, they stay longer 10-12 months before they attain maturity weight of 80-100 kg.

In marketing the fatteners, 90% of the fatteners are slaughtered by the farmer and sold at the farm gate, while 10 % is sold to local butchers. Who then sells to the final consumers?

In the area of Government assistance, there is no assistance given to the farmers by the government, the finance for pig farming is own by the farmer and the family.

(b) Medium scale

The pigs are confined, the size of the farm <20 pigs, which include one boar, six sow, twenty fatteners and eight piglets. The sow is weaned after two months of farrowing.

Input for farm which include feed material and medication are bought from the veterinary shop and poultry feed shop, sometimes the farmer buy feed materials from industry as an industrial by-products. Examples of these feed materials are, breweries dried grain, Soya bean husk and meal and palm kernel cake.

Based on records from the farmer, Mortality rate is low as compared to the small scale farmers. In this system also, fatteners attain maturity weight of 80- 100kg at the age of 6-7months. Though, farmers encounter low production because of the feed price.

In marketing of the fatteners, 90% is sold to the middlemen while 10% is sold the middlemen from the neighbouring states (Rivers & Bayelsa) state. Fatteners are sold to the middle men according to the size not age.

There is no assistance received by the government or the Extension Agents, farmer manage their pig farms with their own resources.

Large Scale

The case study also revealed another type of production practices which is intensive system of pig production, this system large scale pig production, and more than 80 heads of pigs are housed by the farmer, which include fatteners, sows, weaners, boar, and piglets.

This type of pig production is larger as compared to the first two (intensive and extensive system of pig production), the breed of pig identified in the farm is exotic breed (large white and duroc)

The farmer formulates his own feed, with feed raw materials, example, breweries dried grains, palm kernel cakes, wheat offal's, soy bean meal, premixes like lysine, and methionine in rear cases.

4.1.3 Transportation

They transport feed, piglets, fatteners, and meat between the various parties in the chain. Most of the vehicles are owned by the actors and others are from transport service. Transporters according to result revealed from case study, may play a role in offering product and services including transport.

4.1.4 Middlemen

Middlemen identified by case study are the people that buy fattened pigs from Imo state and sell in their own state mainly Rivers and Bayelsa state.

Case study also revealed that the reason why middlemen buy fatteners from Imo State is because, fatteners are cheaper in Imo state as compared to own state.

Case study also seen that middlemen are from river rime area, what they have in excess is fish, poultry and pork production in the area is low, because of lack of land, the presence of Oil Companies which attracts foreign investors from outside the country to their state, creates high demand for pork and pork products which leads to high cost of fatteners in their own state. To know if there are retailers that also buy fatteners from the middlemen, a question of who is your source of supply was asked, the answer is revealed in second part of the result.

4.1.5 Processing

It was revealed that there is no processing or slaughtering plant for pigs in Imo state. Pork is either processed by farmers or retailers. It was revealed that farmers slaughter their fatteners especially when they have urgent need of money, farms are over congested or demand from consumers in the neighbourhood. Example of farmer performing processing role in is farm premises is in figure 9



Figure 9 processing of pork at farm level

Another processing captured by case study is a local butcher processing pork and selling at the road side shop. Example is in figure 11. Retailers process pork by themselves, and sell to consumers, most of the consumers identified are local consumers,. It was also observed at the butcher does not use scale to sell pork to his customers, according to him he sells according to his cost price and also the consumer that approached him.



Figure 10 Processed Pork at Butchers Shop

Another processing captured is on value addition of pork. , pork is processed by the retailer, roasted and ready for consumers to eat in the shop or take to their houses. Most retailers sell combination of roasted pork and other meat products in their shop. Example of meat products meat pie. Picture in figure12 shows example of value addition of pork in retail shop



Figure 11 Roasted pork, chicken, beef and fish

4.1.4 Traders

Trading in pork supply chain involve both wholesaler function and the retailer function. But in the case study about traders, there is no identified wholesaler for pork; the wholesalers available are cold rooms for fish, chicken. It was also observed that, farmers, middle men local butchers and retailers plays trading function in pork chain in Imo state. Example of marketing channel for pork in Imo state is in figure 13.

4.1.5 Consumption

Consumption level is the final element in pork supply chain as reviewed by Kalathas (2007) their buying and consuming behavior strongly influences pork production, however, willingness to pay a higher price for pork influences the speed and level of addressing these issues of pork chain development. Consumers identified for pork in Imo state are mainly local consumers. All classes of consumers were identified, both rich, medium class and the poor

4.6 Pork chain supporters in Imo State

The chain supporters identified in the chain by the researcher are the group who are not directly involve in pork supply chain, but provide advisory services to actors in pork supply chain in Imo State. Chain supporters are the support structure of pork supply chain. Identified chain supporters in pork chain in Imo state is in table 2.

Table 2 Pork Chain Supporters and Their Key Functions

Supporter	Key function
Veterinary Research Institute	<ul style="list-style-type: none"> ➤ Role is to provide farmers with information about disease outbreak, necessary vaccines for prevention, and other animal health advices.
Ministry of Agriculture (Extension services)	<ul style="list-style-type: none"> ➤ Responsible for the creation of an enabling environment through increasing the opportunities like market information, credit facilities to farmers. ➤ They also provide advisory services to farmers new innovation from the research institutes Information from the research institutes is a two way process. ➤ They also have influence over quality control
Nigerian Agricultural Cooperative Bank, (NACB)	<ul style="list-style-type: none"> ➤ Providing agricultural loan to the farmer, the input supplier, and the Processor and Livestock traders.
National Agricultural Research institutes	<ul style="list-style-type: none"> ➤ They are concern with research and development of livestock production in the country.
Department of Animal Science and Technology (FUTO)	<ul style="list-style-type: none"> ➤ They train students in different specialization of animal production, example, nutrition, genetic and breeding, and livestock management, who will become future actor or supporters in livestock supply chain. ➤ Supply good foundation stock to small scale farmers, ➤ They distribute guides to pig production via workshops and meetings, ➤ They extend research findings to small scale farmers, give advice on pig ration, especially incorporating local feed source in ration of pigs.
Transport Union	<ul style="list-style-type: none"> ➤ They are in-between the whole chain actors, they support in conveying products from one actor to another.

4.1.7 Infrastructural Facilities Available For Actors in Pork Chain

In Imo state, there is no identified facility that is made for pig farmers. Other Physical facilities in term formal market, processing plants available are for ruminant.

In other to confirm the information, two questions were ask in survey about source of supply, and also where they process their pork, the result is shown in the next part.

4.1.8 Barriers to Pork consumption in Imo State

It was reported that, outside religious and social prejudice, another barrier to pork consumption is the cholesterol level of the meat, but since pig farmers adopted advice on good feeding practice, example reducing the energy level of feed to pig and increase the fibre content of feed in other to produce lean meat, pork is now on high demand for majority of households. And also starving fatteners 24-48 hours before slaughter thus also help to improve pork quality.

Since good management has been adopted by some pig farmers, there is rise in demand for pork. The major problem in pork consumption in owerri according to the respondent is availability. The pig farmers are not meeting up with the market demand.

To confirm information given by the respondent about the constraints to pork consumption in the state, question on Constraints to pork consumption in Imo state was asked in survey question the result is also in the next part.

4.1.9 Cost Price

Cost price of fatteners in Imo state is difficult state in the sense that prices of fatteners given by different actors is not consistent.

4.2 Conclusions

It is observed that pork supply chain in Imo state is still in an informal stage; about 85% of farmers are still small scale farmers who are still practicing, traditional method of pig farming. There is no concentrates available for pork in the state which makes farmers not to raise fatteners as they wish, thus also leads to low production.

Transportation of fatteners is still in a crude state, pigs are still moved locally in an old vehicle, wheel barrows, and sometimes tie in a motorbike.

Marketing channel for pork is not really define, all actors both the large, medium scale are playing retailing functions,

Most Slaughtering and processing are still done at the farm level, the retailers/the local butchers; there is no identified processing plant that process pork for farmers.

Hygiene and meat quality is not really observed by the farmers because slaughtering is done in the traditional and crude ways.

There are no identified facilities available for pig farmers except good roads, pipe borne water and electricity in some part of the state. As for formal market, none is identified.

It is difficult to state the cost price or selling price of pork or fatteners because the farmers decide on the price, government or the regulatory group do not decide for the price.

Retailers

This part presents the results to survey questions. The questions analysed in survey are only questions that gives answer to sub- research question. Some questions in case study are repeated in the survey, the reason is to use the answer from the retailers to confirm information from case study. Analysis is done according to sub research questions.

4.2.1 Relationship between actors in the chain

Two questions were asked to confirm if there is good relationship between actors in the chain, the first is on pork trader's organization and the second is information flow.

a) There is strong information flow in Pork Supply chain!

The result shows no significant difference between the three zones, 35.5% of respondents did not agree at all, 40% did not agree, and 24% agreed. Result is presented in figure 12 and Annex E

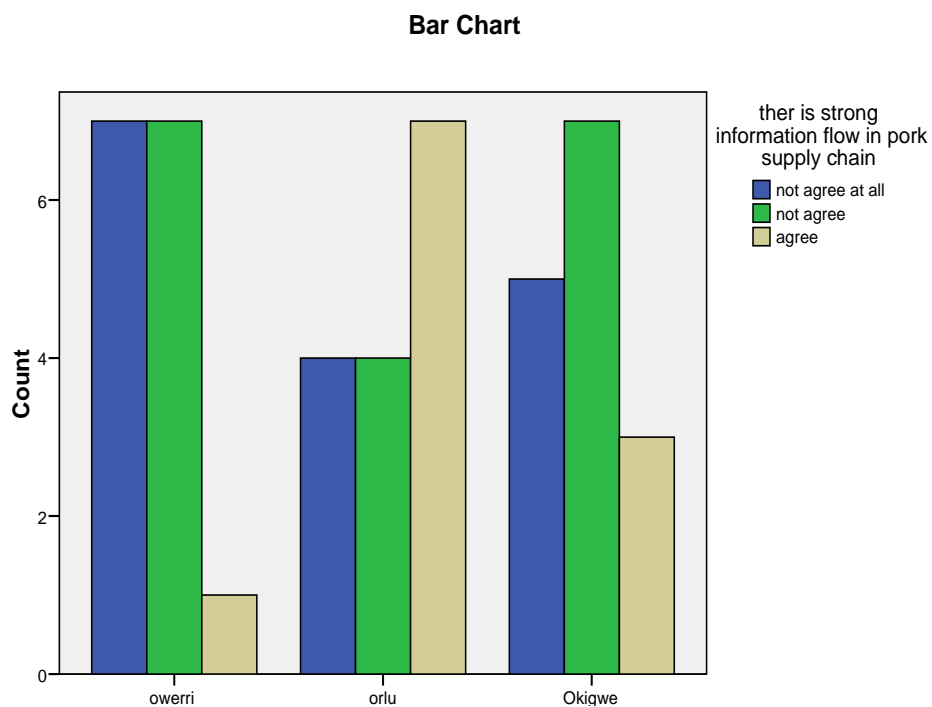


Figure 12 Information flow

Total of 75.4% did not agree that there is strong information flow between actors in the chain while 25% agreed. The result proves that there is no strong information flow between actors in Pork chain.

Further investigation was carried out in orlu zone to find out why majority of respondent agreed that there is strong information flow in the Zone, it was revealed that most pig farmers in Orlu Zone, rear other livestock like poultry, sheep or goat, which have their own separate cooperatives. Pig farmers in belong to cooperatives poultry farmer of sheep and goat farmers where they get information about livestock.

Though, they agreed that there is strong information flow in the chain, but it was observe that there is no transparency among actors.

In owerri and okigwe, it was also observe that the few respondents that accepted that there is strong information flow in the area, accepted in the area of friendly basis not issue concerning pork chain.

b) Pork trader's organization in Imo State is poorly organized

It shows no significant different between views from retailers with chi-square test which proves that pork trades organization in Imo state is poorly organized. The result is presented in Figure 13. chi-square test is in Annex F

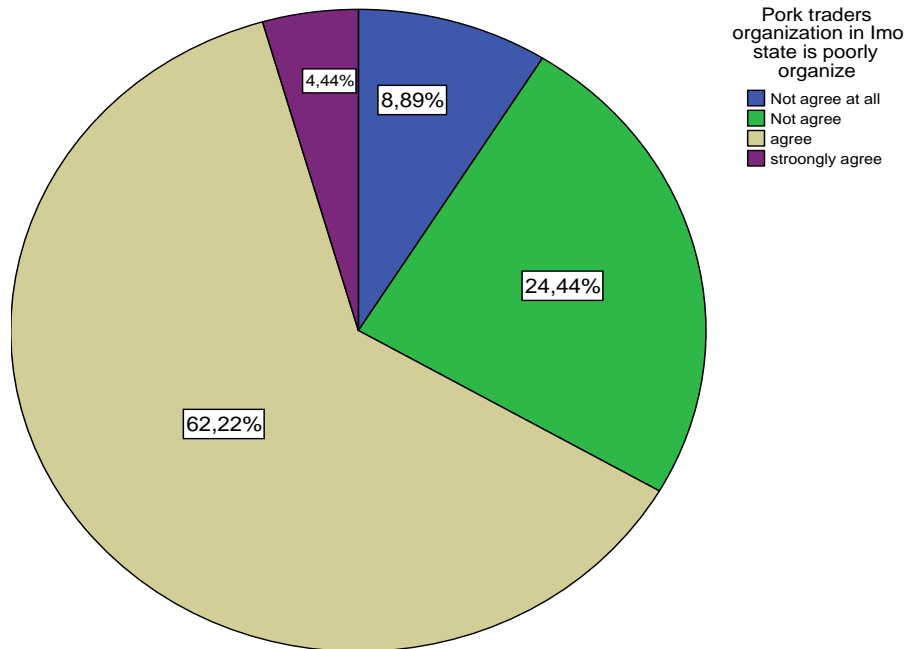


Figure 13 pork traders organization

But with further investigation, it was observed that there is nothing like pork traders organization in the state, 33.33% that never agreed that pork trader's organization in Imo state is poorly organized, sells different meat product in their shops and they belong to poultry or beef trader's cooperative.

Result from first and second question confirms report of Adesehina, (2003) who stated that Pig sector in Imo state still poorly organized with little or no cluster orientation among sector members, poor information flow among actors, weak producer's organisation.

Therefore, for a successful pork supply chain development, there is need to prove history and production practices of the meat, at least to retailers who demand such information. Also if any food safety issue occurs, good traceability will allow the industry to pinpoint which animals or meat are the potential risks.

Finally, for pork supply development to be effective in Imo state, all actors should come together and form cooperative or union where by all issues concerning pork supply chain will be discussed .

4.2.2 Quality Control measures in pork chain in Imo State

There is no significant difference between views from the three zones, $P > .05$. The result is presented in figure 14 and Annex G

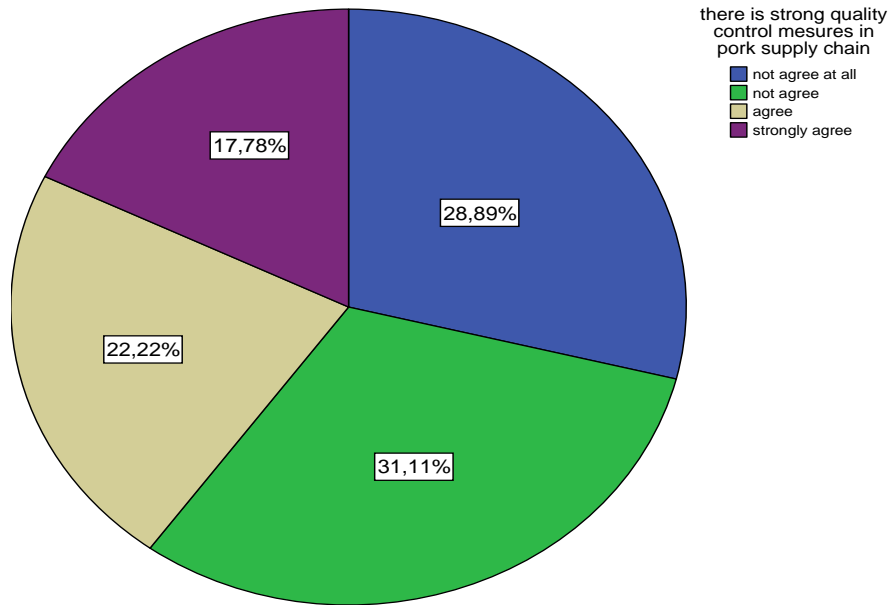


Figure 14 Quality control measures in Pork chain In Imo state

The result shows that 60% of respondents did not agree that there is good quality management, in pork supply chain while 40% agreed.

It was revealed in case study that quality control measures are not observed in pork supply chain in Imo state, starting from the input supply to the retailer.

But due to 40% of the respondent agreed that there is quality control measure in the chain, further investigation was carried out from the input supply to the retailer to find out the quality measures that takes place in the chain.

Finally, it was observe that there is no good quality control measure in pork supply chain in Imo state. Pictures in figure 9 and 10 can serve as a proof to my observation. In the process of developing, pork supply chain, there is need to improve quality control measures alongside with supply chain development.

Major constraints to pork consumption in Imo state

This question is asked to confirm information from case study about the constraints to pork consumption in Imo state, the reason for asking this question to retailers is because, their view will represent the view of consumers, wholesalers, and processors.

The result reveals that 6.7% accepted that the barrier to pork consumption is religion, 22.2% said it is price, 17.8% substitutes while 53.3% availability. The result is presented in figure 15 and Annex H.

Bar Chart

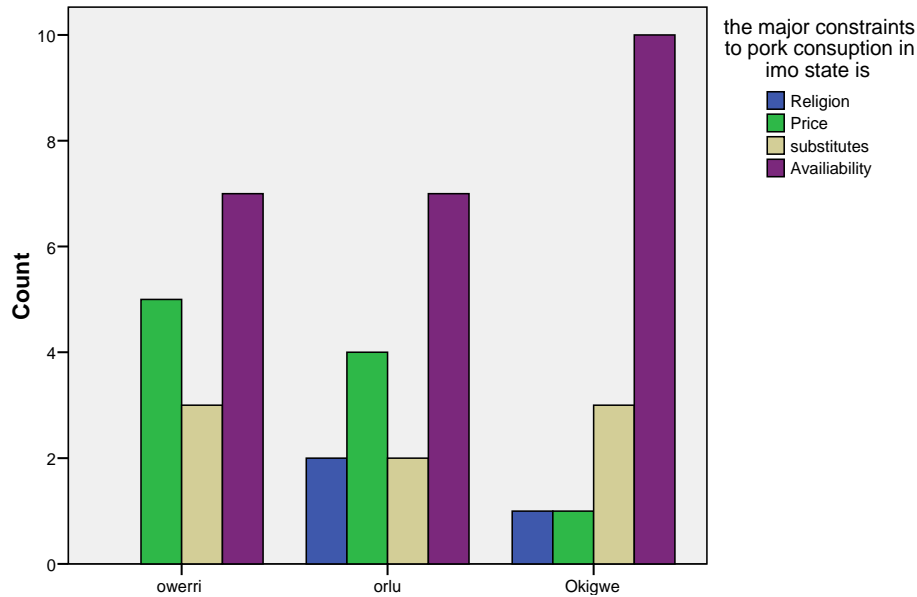


Figure 15 Constraints to Pork Consumption

No significant difference was found between views of retailers from three zones $P < 0.05$, which proves that, major constraints to pork consumption in Imo state is availability.

It was observe that okigwe zone has the highest respondents that reported that the major constraints to pork consumption is availability,

Further investigation was made to find out reasons, it was reported that, in the past, there use to be a large number of pig farmers but recently, due pig farmers not having access to market in area, most of them stopped rearing pig, which leads to reduction in the number of fatteners produced in the area.

Retailers in that area reported that most times they buy their fatteners from owerri and orlu.

Respondent from orlu and owerri reported that availability is the problem in their zone because of middlemen that comes from the neighbouring state, high consumption of pork is also high in their zones. Therefore, there is need to encourage farmers on Pig production in Imo state.

4.2.3 Infrastructural facilities available for actors in pork supply

Two questions were asked about infrastructural faculties available for actors in pork chain. Who is your source of supply, and the other is, who process pork for you.

a) Who is your Source of supply?

The result shows no significant different between views from the three zones $P < 0.05$. Result is shown in figure 16 and chi-square test is in annex I.

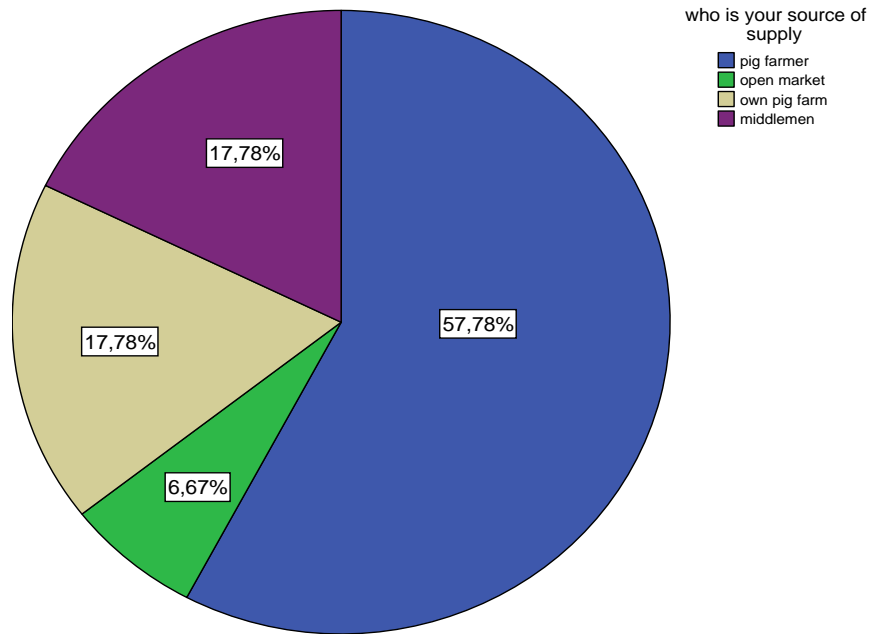


Figure 16 who is your source of supply

After analyzing the result, only 6.7% respondent's from okigwe zone, reported that they buys their fatteners from open market , further investigation was made to find out if there is formal market for pork in Okigwe, it was revealed that farmers make appointment with retailers to supply processed pork or fatteners for them within 4 days intervals. This type of arrangement is mainly seen in Okigwe zone.

The result confirms information in case study and review of Adesehina, (2003) which states that there is no formal market for fatteners or pork in Imo state. Therefore, there is need to establish formal market for pigs in Imo sate.

b) Who process pork for you?

There is no significant difference between views of retailers from the three zones. Result is presented in figure 17 and Annex J.

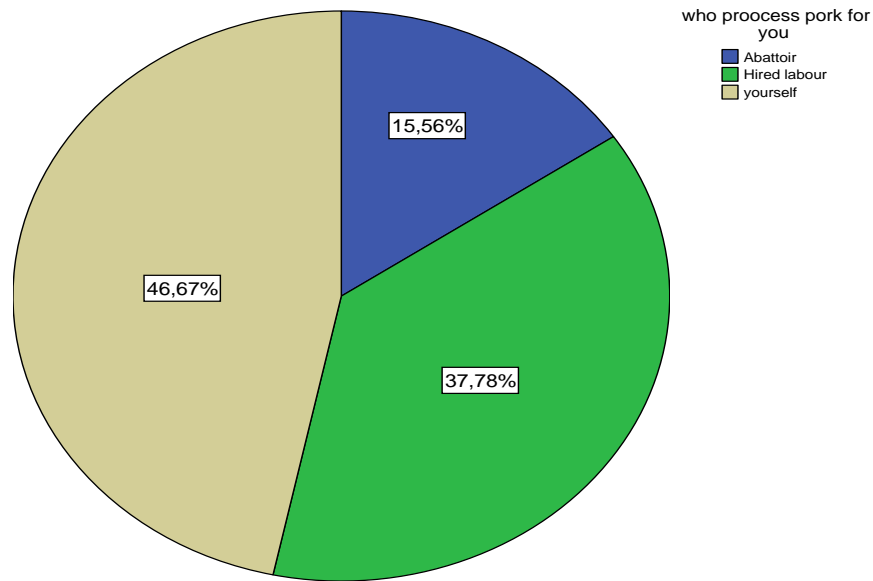


Figure 17 Processing of pork

Abattoir in okigwe was visited to confirm if there are facilities for processing pork, reason for this decision is because okigwe has the highest number (6.7%) of respondent that reported that they processes their pork in Abattoir.

Result for further investigation revealed that the slaughter house /slabs are made for ruminants, not for pigs. But Pig farmers slaughter their fatteners in their farms and take the processed pork to the slaughter house where retailers can easily locate them. The result is in line with case study and review of Adesehina, (2003) which stated that there is no processing plant for pig in Imo state. Therefore, there is need to establish processing plant for pig in Imo state.

Conclusions

The entire pork supply chain in Imo state has problem, result shows that, pork supply chain is poorly organize, there is no good relationship between actors in pork supply chain, which leads to poor information flow among chain actors.

Quality control measures are not observes in pork supply chain, the major constraints to pork consumption in Imo state is availability, also there is no infrastructural facilities identified for actors in the chain.

Strategies to Develop Pork supply Chain in Imo State

This part of the result brings together suggestions from different stakeholders on levels which development of pork supply chain will start. Respondents were restricted to one answer. Also they were asking to suggest strategies to develop their choice.

In other to have one answer from the retailer, a question of where do you think is necessary to develop first in pork chain was asked on survey question. They were also asked to list strategies to develop their choice. Result from retailers is in figure 16 and Annex K.

The result shows that, farm level has 40%, processing has 17.8%, marketing 37.8% and input supplier has 4.4%.

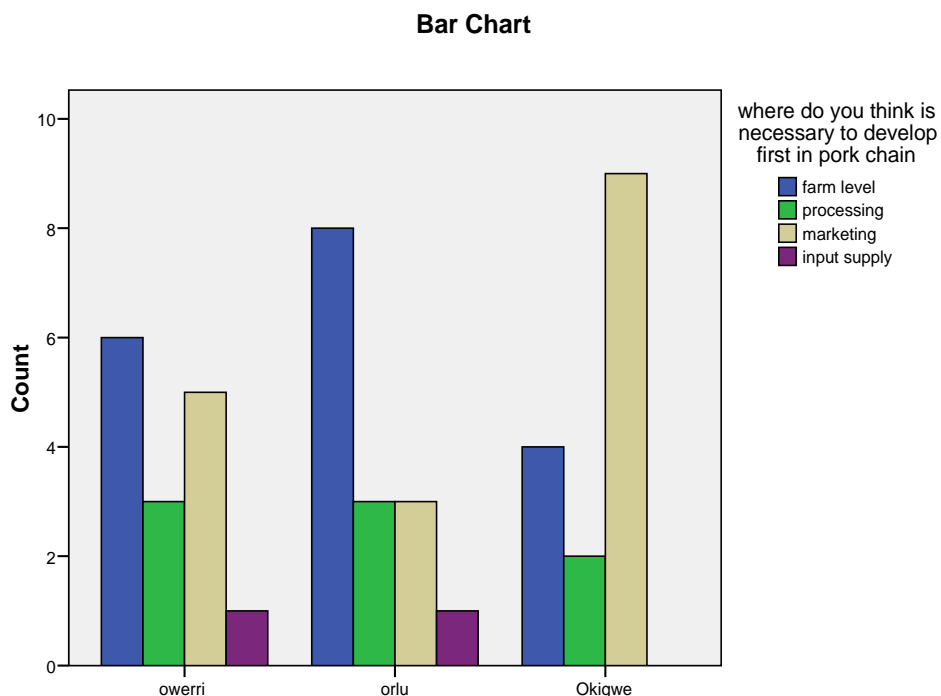


Figure 18 Level to develop in pork chain

The result from the survey in the three zones shows no significant difference, $P > 0.05$, chi-square test is in Annex K.

It is seen in the overall result, of retailers, Farm level which ranked highest (40%).from the retailers view, farm level is the first to develop first.

Summary of levels identified by different stakeholders to be developed first in pork chain.

In other to confirm a particular level that needs to be developed first, ranking method is used to select the level. Since it is observed that the entire pork supply chain in Imo state has problem, it is not feasible to start developing the entire chain at the same time. Development will start from the one that ranked highest to the lowest Summary of the result is in Table 3.

Table 3 levels identified by different stakeholders to be developed

Stakeholder	No	Input supplier is the problem	Farm level is the problem	PROCESSING is the problem	MARKETING is the problem
Feed supplier	1	x			
Veterinary service	1		x		
PIG FARMER (large scale)	1				x
Pig farmer (medium -scale)	1				x
Pig farmer (small-scale)	1				x
Middleman	1		x		
Ast staff	1		x		
Extension worker (owerri)	1				x
orlu	1		x		
okigwe	1				x
" retailer (survey)	1		x		
consumer	1		x		
Regulatory group	1			x	
Total	13	1	6	2	4

Out of 13 stakeholders interviewed, six said the problem is in farm level, four said it is in marketing, two said it is processing, and only one person said it is input supplier. The development will start from the farm level because it ranked highest. Strategies to develop the levels are also suggested by the stakeholders.

a) Strategies to develop farm level

A long list of strategies was mentioned by stakeholders from the three zones of Imo state on the strategies to develop farm level, these strategies are;

Pig farmers should come together and form cooperative or union in other to come out as one body to take decision on how they will organize themselves.

Pig farmers should be trained on how good management practices in their farm, this is because some consumers reported that why they have mixed feeling in pork consumption is because of the environment where the pork are being raised.

Creation of regular market channel will encourage farmers to raise more fatteners since most respondent reported that the constraint to pork consumption is availability.

Availability of formulated feed and raw material will also encourage more farmers to pig production, because one of the major constraints faced by pig farmers as reported is expensive feed and raw materials, because of this some farmers feel reluctant to mix feed for pigs.

The department of Animal science and technology should organize a training programme for farmers on free of charge, where pig farmers learn issues like, waste management, disease control and feed formulation. This could be done in workshops or constructing a pilot project farm pig farmers can learn how to handle different stages of pigs in the farm.

Provision of loan with little interest to pig farmers who are serous in pig business will also help to encourage more farmers into pig business.

For the strategies mentioned above to be effective, the department of Animal science and technology should work in collaboration with ministry of agriculture, Nigerian agricultural cooperative bank should agree on having a follow up programme to pig farmers through the extension Agent

CHAPTER FIVE CONCLUSIONS AND RECOMMENDED

5.1 Conclusions

Conclusion of this study is based on interview, survey and observations. Mostly, the Opinions of stakeholders related to pork chain in Imo state, along with response from survey questions; Statistical information, literature and recent publications also provided background information and contributed to drawing conclusion.

It is observed that pork supply chain in Imo state is still in an informal stage; about 85% of farmers are still small scale farmers who are still practicing, traditional method of pig farming

There is no concentrates available for pork in the state which makes farmers not to raise fatteners as they wish, thus also leads to low production. Transportation of fatteners is still in a crude state, pigs are still moved locally in an old vehicle, wheel barrows, and sometimes tie in a motorbike.

Marketing channel for pork is not really define, all actors are playing retailing functions,

Most Slaughtering and processing are still done at the farm level, the retailers/the local butchers; there is no identified processing plant that process pork for farmers.

Hygiene and meat quality is not really observed by the farmers because slaughtering is done in the traditional and crude ways.

There are no identified facilities available for pig farmers except good roads, pipe borne water and electricity in some part of the state. As for formal market, none is identified.

It is difficult to state the cost price or selling price of pork or fatteners because the Imo state because farmers decide on the price, government or the regulatory group do not have their hands in the price decision,

Quality control measures are not observes in pork supply chain, the major constraints to pork consumption in Imo state is availability, also there is no infrastructural facilities identified for actors in the chain.

Although the level that was pointed out by the stakeholders that needs immediate attention is the farm level, still the entire pork supply chain in Imo state needs development, result shows that, pork supply chain is poorly organize, there is no good relationship between actors in pork supply chain, which leads to poor information flow among chain actors.

5.2 Recommendations

Based on the results it is observed that the entire pork supply chain has problem and needs development. In other to develop the chain, the following recommendations are made;

- In other to increase productivity in pork supply chain, formula for feed production should be made available for pig farmer, in form of hand book/practical guide to enable farmers formulate their own feed, which is cheaper for them, since there is no company that manufacture feed for pigs in Imo state.
- The veterinary store should be advised to provide medicines for farmers that have clear label and direction to use to enable the farmer use medication as directed by manufactures.
- Farmer should be advice, to practice good production and management practices, which enable them increase productivity since it is identified by the stakeholders that the major constraints in pig consumption is availability.

- Availability of processing slab for pork in Imo state will have a long way to develop pork supply chain in the state, because it will attract more consumers in to pork consumption.
- There should be good quality production and marketing, to achieve this, there should be good coordination among actors and this could be done by actors forming Organizations or cooperatives .which can make them come out as one body in making their decisions.
- The supporting bodies like the ministry of agriculture can introduce a follow up programme small scale pig farmers than focusing on the large scale farmers. Also since they have hand on meat quality, the meat inspection unit of the ministry of agriculture should have an eye over handling and transporting of meat and meat products.
- The NAFDAC should look critically into matters that concerns veterinary medicines especially in the area of expiring date and quality
- The NACB should focus their interest on giving loans to small scale pig farmers and other chain actors with minimal interest
- Finally, A.S.T department, should Review their academic curriculum: this should be done by adding more credit hours to practical classes, in other to update the students on current situations about practical aspects of pig production, this can be achieved by sending the students to the field undertake a practical experience with small scale farmers at least one week as practiced in Van hall larenstein.
- The department should also upgrade their social responsibility by having good relationship with input suppliers, farmer, meat processor and other chain supporters like the research institutes, Agricultural Bank where by they can send the students for Vocational training in other to equip them for future because Most of the students in the department will end up being primary actors or chain supporters in livestock supply chain.

REFERENCES

- Alexander, Larsson. 2003. Design and selection of Industrial marketing Channel. Lulea University of Technology, Department of business administration and Social Science, Division of industrial marketing and e-commerce.
- Akinwumi, J.A., and Ikpi A.E. 1995. Trypanotoerant Cattle Production in southern Nigeria, Report to International Livestock Centre for Africa (ILCA). Published by University Press, Ibadan Nigeria. Year of Publication 1995.
- Amadi, J. O. 2007. Practical Guide to Pig Production, A Hand Book for Small Scale Pig Farmers, Agricultural Development Project, Ministry Of Agriculture Owerri Imo State Nigeria. Published by ADP Printing Press Owerri.
- A.O. K. Adesehinwa.2003. Production Strategies for coping with the demand and Supply of Pork In some Peri- Urban Areas of South-western Nigeria. : Institute of Agricultural Research Training, Moor Plantation. P.O.Box 20067, University of Ibadan Nigeria. Year of Publication 2003.
- Boston, M.A, 2000; Organizational change, Management Decision and research centre; Washington, DC
- Christopher, M. 1998. Logistics and Supply Chain Management, London Pit man publishing
- Crystal. G. 2003. What is Logistics? , Published by wiseGEEK articles.
- <http://www.wisegeek.com/what-is-logistics.htm> (accessed 30th August 2008)
- Daniel Roduner. 2007. Community of Practice of Value Chain in Rural Development, Swiss centre for Agricultural Extension and Rural Development. Published by VCRD Cop. Year of Publication July 2007.
- David .H. Holness.1991. Pig, The Tropical Agriculturist. Published by CTA, MacMillan Year of Publication 1991.
- David, Holness .1998. The tropical Agriculturist Centre for Tropical Veterinary Medicine, University of Edinburgh Published by Macmillan education limited London and Basingstoke.
- Emenyeonu, C.A., Ehirim, N.C., and Onyeagocha, S.U.O, 2007. Sustainable Pig Production, under alternative Feed Sources in Owerri Zone, Nigeria. Published in Animal Production Research Advances; Volume 3 Number 3. September 2007.
- Field .A .2005. Discovering Statistics Using SPSS; Second Edition, Published by SAGE Publications, London. Thousand Oaks. New Delhi
- H, Serres. 1989. Manual of pig production in the tropics; Faculty of Agriculture and food Science; University of Nottingham. Published by, C.A.B International.
- Ibeawuchi I.I., 2006. Annual Report on Livestock Production' Imo State Agriculture Development Project, Ministry of Agriculture and Extension Service owerri Imo state Nigeria.
- Kalathas, A.E., 2007. Quality management practices and consumer demand in Dutch pork supply chain, management. Published in Journal of Advanced supply chain management (ASCM) Social science group wageningen University Netherlands

KIT, Faida Mali and IIRR. 2006. Chain Empowerment: supporting Africa farmers to develop Market. Royal Tropical Institute, Amsterdam: Faida Market Link Arusha; and International Institute of Rural Reconstruction, Nairobi.

Lambert, D.M. and Cooper, M.C. (2000), "Issues in Supply Chain Management", Industrial Marketing Management pp. 65-83.

Luning P.A., Marcelis W.J and Jongen, 2006. Food quality management a techno-managerial approach. Published by Wageningen Academic Publishers, The Netherlands.

M.S.Kalah.1996. Livestock systems Research in Nigeria, sub Humid Zone, FAO cooperate Document Repository. Year of Publication July 1996.

Martin Christopher, Adrian Payne and David Ballantyne. 2003. Relationship marketing: Bringing quality Customer service and Marketing together. Centre for Management Cranfield School of Management, Bedford MK43 OAL; Tel: 0234751122.

National Bureau of Statistics (NBS) .2005. Federal Republic of Nigeria. Plot 762 Independence Avenue, Central Business District, P.M.B. 127 Garki – Abuja (<http://www.nigerianstat.gov.ng/mapdet.php?recordID=16> (accessed July 1st 2008))

Nwogu, J.U .2008. First Quarter Report on Livestock Production, Imo State Agricultural Development Project, Ministry of Agriculture and Extension services owerri Imo State -Nigeria.

Olugasa, B.O, Cadmus, S.I.B. and Atsanda, N.N. 2000. Actualization of Strategies for Beef Quality control in reply to South Western Nigeria. In M.J.M Tielen and M.T.H. Voets(Eds.), Proceedings of the 10TH International Congress on Animal Hygiene. Maastricht, Netherlands, ISAH (1), 67-71.

Olin John .M. 2003 School of business, Washington University, 1Brooking Drive, Campus. Box 133, St.Louis, M.O 6313 04899. USA: Tel 314-935-4538: Fax 314935-6359 E-mail: Lazzarinis @olin.wustl.edu. Published in Journal of Advanced supply chain management (ASCM Wageningen University Netherlands

Scholl, H. J. 2001. [Applying stakeholder theory to E-Government. Benefits and Limits.](http://www.ischool.ashton.edu/ischool/papers/scoll/IFIP_2001.pdf) Proceedings of the 1st IFIP conference on e-Commerce and e-Government, October 2001, Zurich, Switzerland
http://www.ischool.ashton.edu/ischool/papers/scoll/IFIP_2001.pdf (accessed July 1st 2008)

Trienekens, Jacques.H 1999. Management of processes in Chain, PhD Thesis, Wageningen University. Number ISBN 90-5808-088-9.

Vorst, J.G.A.J. 2000, and Effective Food Supply Chains: Generating, modelling and evaluating supply chain scenarios, Wageningen: Doctoral Thesis, Wageningen University.

Van der Vorst Jack, Adrie Beulens and Paul Van Beek.2007. Innovation in Logistics and ICT in food supply chain Net work, Department of Social Sciences, Wageningen University, Netherlands

Veschuren P. and Doorewaard H. 1999. Designing a research project. Lemma, Utrecht, The Netherlands.

Visser, H.M. & Van Goor, A.R, 2006. Logistics: Principles and Practice.
Publisher by Wolters-Noordhoff bv, Afdeling Hoger onderwijs, Antwoordnummer 13,
970 VB Groningen/Houten, the Netherlands.

Wognum, N.R.Nijhof and Sarraki, M. wevers .2008. Journal on Advanced supply chain Management, Wageningen University study group Netherlands.

Who are stakeholders?

www.calstate.edu/csl/initiatives/documents/stakeholder (accessed July 1st 2008)

ANNEXES

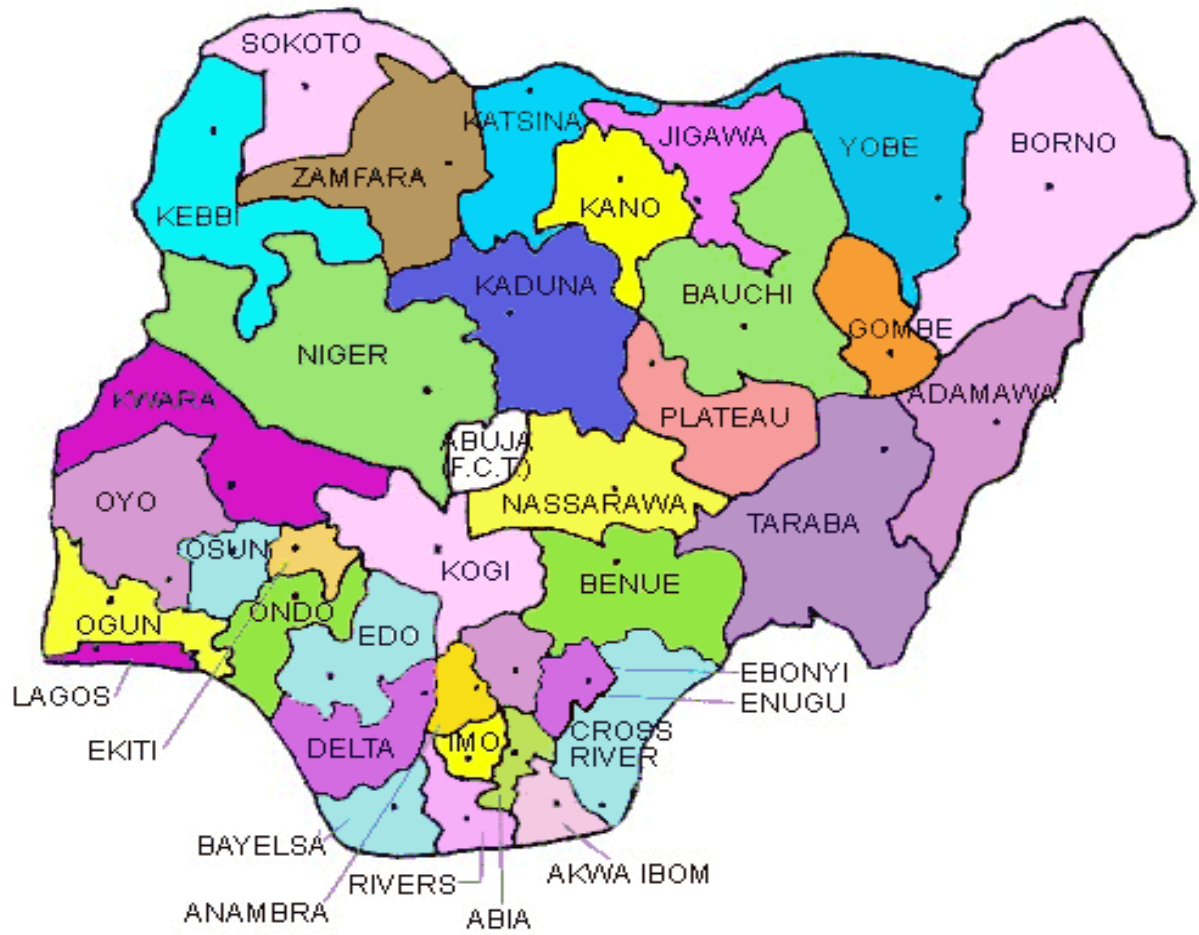
Annex A number of identified pig farmers in 27 local government of Imo state

zone	Local government area	No of identified pig framers	Estimated weight of Fatteners slaughtered per day. (Wt.In tons)
1) Owerri Zone	Aboh Mbaise LGA	250	1.1
::	Ahiazu Mbaise	200	1.0
::	Ezinihitte Mbaise	186	1.0
"	Ngo Okpala	300	2.0
::	Owerri North	350	3.0
"	Owerri West	215	1.5
::	Owerri municipal (state capital)	-	-
::	Mbaitoli	175	1.5
::	Ikeduru	275	1.8
Total	9	1951	11.9
Orlu zone	Ohaji/Egbema	400	2.3
::	Oguta	10	0.9
::	Oru West	80	1.1

::	Oru East	101	1.6
::	Orsu	90	1.3
::	Orlu	110	1.3
::	Ideato North	422	3.3
::	Ideato South	500	2.9
::	Nwangele	150	1.6
::	Njaba	126	1.5
::	Isu	150	1.2
Total	12	2049	19.1
Okigwe zone	Onuimo	15	0.5
::	Okigwe	50	0.8
::	Ehime Mbanano	60	1.0
::	Isiala Mbanano	85	1.5
::	Obowo	100	1.0
::	Ihitte/Uboma	100	1.92
Total	6(LGA)	460	7.72

Source: 2008 Ibeawuchi's field survey.

Annex B **Map of Nigeria indicating study area location**



Annex C Check list for questions in case study

- 1) what is your role in pork chain
- 2) what is the current situation of pork chain
- 3) which level of pork chain needs to be developed first
- 4) what are your reasons for selection
- 5) what is the strategy to develop the level of your choice
- 6) suggestion of strategies to develop the entire pork chain

Annex D Pork retailer questionnaire

Topic: using stakeholder view to develop strategy for pork supply chain in Imo state, Nigeria

Zone.....

Sex

1) How many years have been in meat business?

.....

2) What type of meat do you sale in your shop

- a) Only pork
- b) Pork, beef, chicken,
- c) Pork, beef, chicken and fish
- d) Combination of all

3) What are your reasons for selling pork?

- a) Consumer preference
- b) It is more profitable
- c) Available source of supply
- d) Others.....

4) Who is your source of supply

- a) Pig farmer
- b) Open market
- c) Own pig farm
- d) Middle men

5) Who process pork for you?

- a) Abattoir
- b) Hired labour
- c) yourself
- d) Others.....

6) Where do you sell Pork?

- a) Meat shop
- b) Open market
- c) Hawking
- d) Road side shops

7) What type of pork do you sell in your shop?

- a) Bacon
- b) Lean meat
- c) Processed sausage
- c) Combination of all

8) How do you determine the price for kg pork?

- a) According to cost price
- b) Government regulation

- c) Seasonal price
 - d) Personality of the buyer
- 9)** Pork consumption is mainly made for the rich!
- a) Not Agree at all
 - b) Not agree
 - c) Agree
 - d) Strongly agree
- 10)** Who are your major customers
- a) The poor
 - b) Medium class
 - c) Rich people
 - d) all of the above
- 11)** The major barrier to pork consumption in Imo state
- a) Region
 - b) Price
 - c) Substitutes
 - d) Availability
- 12)** Pork traders organization in Imo State is poorly organize
- a) Not agree at all
 - b) Not agree
 - c) Agree
 - d) Strongly agree
- 13)** There is strong information flow among actors in pork chain!
- a) Not agree at all
 - b) Not agree
 - c) Agree
 - d) Strongly agree
- 14)** There is strong quality control measures in pork industry
- a) Not agree at all
 - b) Not agree
 - c) Agree
 - d) Strongly agree
- 15)** Development of formal market, processing plant etc (supply chain) will promote pork consumption in the state
- a) Not agree at all
 - b) Not agree
 - c) Agree
 - d) Strongly Agree
- 16)** Which level is necessary to develop first in the supply chain?
- a) Farm level

- b) Processing
- c) Marketing
- d) Input supply

17) List at least 3 or more possible ways you think that can be use to improve your choice in question no. 18

1 -----

2. -----

3. -----

Thanks

Tina

Annex E Information flow

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.966(a)	4	.138
Likelihood Ratio	7.183	4	.127
Linear-by-Linear Association	.887	1	.346
N of Valid Cases	45		

Annex F Pork trader's organization

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.299(a)	6	.506
Likelihood Ratio	6.676	6	.352
Linear-by-Linear Association	1.624	1	.203
N of Valid Cases	45		

Annex G Quality control

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	11.141(a)	6	.084
Likelihood Ratio	14.536	6	.024
Linear-by-Linear Association	.114	1	.735
N of Valid Cases	45		

a 12 cells (100.0%) have expected count less than 5. The minimum expected count is 2.67.

Annex H Barrier to pork consumption

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.600(a)	6	.469
Likelihood Ratio	6.865	6	.334
Linear-by-Linear Association	.823	1	.364
N of Valid Cases	45		

a 9 cells (75.0%) have expected count less than 5. The minimum expected count is 1.00.

Annex I source of supply

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	10.500(a)	6	.105
Likelihood Ratio	11.002	6	.088
Linear-by-Linear Association	.801	1	.371
N of Valid Cases	45		

a 9 cells (75.0%) have expected count less than 5. The minimum expected count is 1.00

Annex J who process pork for you

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.672(a)	4	.614
Likelihood Ratio	2.662	4	.616
Linear-by-Linear Association	.248	1	.618
N of Valid Cases	45		

a 3 cells (33.3%) have expected count less than 5. The minimum expected count is 2.33.

Annex K level to develop first in pork supply chain

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.877(a)	6	.437
Likelihood Ratio	6.503	6	.369
Linear-by-Linear Association	.548	1	.459
N of Valid Cases	45		

a 6 cells (50.0%) have expected count less than 5. The minimum expected count is .67.

CONCLUSION AND RECOMMENDATION

Clean technologies have been promoted to serve many purposes, such as the reduction of pollution generated by conventional abattoir operations, the improvement of process efficiency and energy conservation, leading to more cost-effective and profitable operation, and the optimization of the use of raw materials, thereby promoting a more efficient use of natural resources. The maintenance of good environmental conditions by disposing sewage and refuse in a sanitary manner in the abattoir starts with the definition of the minimum requirement for all the links in the production chain and these includes:

- Installation of necessary standard equipment and major functional units of the abattoir such as cold rooms, skinning machines, slaughtering machines and changing rooms for workers;
- Thorough and adequate training on sustainable animal production for the people involved in animal trade from farms to abattoirs and slaughterhouses, including periodic continuing education programs;
- Maintenance of proper hygiene within the abattoir and the environment, target areas for sanitization include: infrastructures and facilities contained therein, equipment, surrounding areas, abattoir workers and visitors;
- Periodic Sanitary-hygienic evaluation of abattoirs and slaughterhouses;
- Enforcement of existing health and hygiene regulations.;
- Development of appropriate technology, which will take care of all the wastes being, generated in the abattoir, including abattoir wastewater treatment and recycling for irrigation; and
- compost and biogas production.