ANALYSIS OF RURAL HOUSEHOLDS' USE OF ORGANIC FARMING PRACTICES IN SOUTH – SOUTH, NIGERIA

BY

ATOMA, CHARITY NWAMAKA

B.Sc (ed) Agric Sc.(DELSU,) M.Sc Agric Ext. Services(Ibadan)

Registration No.: 20104739378

A THESIS SUBMITTED TO THE POSTGRADUATE SCHOOL, FEDERAL UNIVERSITY OF TECHNOLOGY, OWERRI.

In Partial fulfilment of the Requirements for the Award of Doctor of Philosophy (Ph.D) Degree in Agricultural Extension.

NOVEMBER, 2015.

CERTIFICATION

This is to certify that this work entitled, "Analysis of Rural Households' Use of Organic Farming Practices in South-South, Nigeria", was carried out by **Atoma, Nwamaka Charity** in the Department of Agricultural Extension, Federal University of Technology, Owerri, Nigeria.

Prof. F. N. Nnadi
(Major supervisor)
14th April, 2016
Date

Prof. C.C Asiabaka
(Co-Supervisor)
04/04/16
Date

Prof. E. C. Matthews-Njoku
(Co – Supervisor)
4/4/16
Date

Prof. A.O. Ani,
(H.O.D., Agricultural Extension)
04-04-16
Date

Prof. B.O. Esonu,
(Dean, School of Agriculture)
13/04/16
Date

Prof. (Mrs) K.B. Oyoh
(Dean, Post Graduate School)
Date

External Examiner

ii

DEDICATION

With all my love to my dearest husband, **Atoma, Johnson Oghenewogaga,** and my sweet mother, **Madam Felicia Izah (K.C Sunshine).**

ACKNOWLEDGEMENTS

It would be impossible to adequately thank all the individuals and organizations that gave me valuable assistance in the course of this research. I sincerely appreciate the major supervisor of this thesis, Professor F. N Nnadi. Sir, you patiently read, guided, made suggestions and fine-tuned this thesis. I marvelled at your kindness and motivation. I wish I have the capacity to reward you but I pray that the Almighty God will lift you above your imagination and enable you fulfil your destiny. Thank you so much.

Professor E.C. Matthews- Njoku and Professor C. C. Asiabaka were the co-supervisors of this work. I did not only gain academic experience from Prof. Matthews-Njoku but gained tips to becoming a better person. Ma, you gave me so much confidence that I can go through this work successfully. Having Professor C. C. Asiabaka as my supervisor made me proud because I know his opinions are respected in the field of Agricultural Extension. Sir, your books helped me immensely as a teacher of extension courses. I am grateful for your input into this work.

I acknowledge Education Trust Fund for providing me a Ph.D scholarship for three years. My sincere thanks go to Prof. Ejechi Bernard, former Rector of Delta State Polytechnic, Ozoro. You encouraged me to start this programme and sourced for ETF fund for me. The Almighty God will send you help at any point

of your need. I also owe much gratitude to Dr. J. S. Oboreh, Rector Delta State Polytechnic, Ozoro for various assistance rendered to me.

I am grateful to the Dean, School of Agriculture and Agricultural Technology, Prof. Esonu, B.O., the Head of Department of Agricultural Extension, Prof Ani, A. O, Dr Ukpongson, M. A. and Dr Chikaire, J. U. for their encouragement. I sincerely thank the entire staff of the Department of Agricultural Extension, Dr. F. C. Anaeto, Dr. P. Onu, Dr. E. Ejiogu – Okereke, Dr. R. N. Nwakwasi and Mr F. O.Ugwoke for their friendliness.

The help of Dr O.M Adesope in handling the analysis of the large volume of data for this work cannot be ignored. Thank you. I am indebted to you, Dr (Mrs) Ugboma, M. for the counselling , prayers and advice I received from you. I am grateful to my lecturer, Prof. A Udoh who helped me in reaching the extension agents in Akwa Ibom State. I will not forget to thank John Asukwo, the Zonal Manager of Uyo Zone of Akwa Ibom Agricultural Development Programme (AKADEP) and the team of extension staff. You took the administration of my research questionnaire to the farmers with great enthusiasm and joy. You made my experience in Akwa Ibom a memorable one. My two friends in Bayelsa State Agricultural Development Programme (Agricultural Extension Department), - Mr R. G. Atim and Mr Okumo, G. J. I cannot thank you enough for the sacrifice you made in helping me reach my target farmers in Brass. Also the Zonal Manager, Delta Central ADP, I salute you. A special appreciation goes to my

pastor and mentor –Pastor Eze, Joe Eze for his spiritual backing. My profound gratitude goes to the numerous farmers interviewed. This study was partly possible because of the valuable information you provided. My heart-felt gratitude also goes to my father who encouraged me to climb to the apex of academic degree. I appreciate your guidance. Next to God in reaching where I am today is my mother. You laid my academic foundation to a point that adding a stone to the top was a work over. You will live long to enjoy the fruit of your labour.

To my sisters, brothers, nieces, nephews, uncles, aunties – Rita, Rose, Tessy, Vicky, Bob K, Rupert, Linda and Oby God bless you all for every input made to make this thesis a success. Worthy of note was a surprise financial motivation from Vicky to support me. Rupert sent to me a high HP Desk top with accessories that made typing and all computer work throughout the time of this dissertation very easy. My wonderful gifts from God – Micah, Evi, Precious and Emmanuel tirelessly typed this work and did several jobs as the need arose. You made the task of carrying out this enormous assignment very light. You will get to the apex of your career as well.

The three God's heritage to me- Samuel, Emmanuella and Gods Glory, have been a source of inspiration to me ever since they were born. Thank you for coming to make me a complete woman. I love you.

My husband, you were wonderfully supportive. The journey was cool because you backed me up. All I needed, you provided and above all, you showed much understanding by taking care of the home and the children in times I travelled to see that the work was accomplished. Your encouragement cannot be quantified. Again I won't forget to thank Christopher Ekrede, whose driving expertise and Gods' help made travelling on the difficult terrain of the East-West Road to Owerri easy. Also worthy of thanks is Augustine Chukwuogu for his assistance in typing this work.

Finally, I thank God Almighty who divinely led me to a wonderful school-Federal University of Technology, Owerri, School of Agricultural and Agricultural Technology, Department of Agricultural Extension. Holy Spirit, I specially thank you for the unusual strength given to me. Despite the many things I needed to attend to, I still was able to accomplish this work. It was not by my power but by your spirit O' Lord.

ABSTRACT

The study analyzed organic farming practices among rural households in South-South Nigeria. The study determined the level of awareness and use of organic farming practices in the study are, identified the sources of information on organic farming practices; assessed farmers perceived benefits of organic farming practices; identified constraints to organic farming and determined strategies for the improvement of organic farming practices. Data were collected with structured questionnaire from 464 crop, livestock and fish farmers and were analyzed using descriptive and inferential statistical tools such as frequency table, percentage, mean and bar charts, ordinary least square multiple regression, Analysis of Variance (ANOVA) and Z-test. The level of awareness of organic farming was generally low. Among crop farmers, farmyard manure ($\bar{x}$ =2.79), intercropping ($\bar{x}$ = 2.58), bush burning ($\bar{x}$ = 2.50), and mulching ($\bar{x}$ = 2.50) were practiced. The highly used organic farming practices among livestock farmers were adequate feeding ($\bar{x}$ = 2.65) and fresh drinking water ($\bar{x}$ = 2.77). The fish farmers used eco-friendly design ($\bar{x}$ = 2.56), locating site far away from polluting substances ($\bar{x}$ = 2.57) and protection of pond from predators ($\bar{x}$ = 2.70). The level of use was determined by the socio-economic variables of sex, education, farming experience and income. They were constrained by non-availability of organic farming policy, poor governmental support, political and social factors, low awareness, poor marketing etc. Based on the findings, the following recommendations among others were made. Organic farming practices should be included in the curriculum of agricultural science undergraduates and there should be the organization of capacity building programmes for extension agents to develop the knowledge, skills and attitude needed for training farmers on organic farming practices.

Keywords: Organic farming practices, use, rural households, livestock, fishery and crop production, South-south Nigeria.

TABLE OF CONTENTS

CHAPTER THREE: Methodology

CHAPTER FOUR: Results and Discussion

LIST OF TABLES

LIST OF FIGURES

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

The main stay of Nigeria economy is agriculture. It is the major means of livelihood to about 70% of the populace who reside in the rural areas, peri urban and urban areas (World Bank, 2001). Agriculture accounts for over 38 percent of the non-oil foreign exchange and employs about 70 percent of the active labour force of the population (Bureau of Public Enterprise (BPE) 2004). It is expected that with this high level of involvement in agriculture, food production should meet the need of the populace but the reverse is the case. In order to increase food production to meet the need of the world ever growing population, the use of agro-chemicals was adopted. Despite the apparent boost of crop and animal production by the use of synthetic fertilizers and other agro – chemicals, a number of side effects have been recorded in recent times. According to Smil (2001) the inorganic fertilizers used to increase crop yield are leached and washed away by erosion to rivers causing water pollution which is dangerous to aquatic life and human health. Most of the synthetic fertilizers and other agro-chemicals that are used are manufactured using resources such as fossil fuel which are not renewable and using such resources can cause pollution and contribute to environmental degradation (Oyesola & Obabire, 2011).

Organic farming represents a deliberate attempt to make the best use of local natural resources and is an environmental friendly system of farming. It relies much on ecosystem management which excludes external input, especially the synthetic ones. Anderson, Jolly & Green (2005) stated that organic farming is a production system that excludes the use of synthetically manufactured fertilizers, pesticides, growth regulators and livestock feed additives. The system relies on crop rotation, crop residues, animal manures, legumes, green manures, off-farm organic wastes, mechanical cultivation and biological pest control to maintain soil tilth. Organic farming technology is generally regarded as the solution to environmental problems that are related to agriculture as well as food safety (Agbamu, 2002). Also, Conor (2004) pointed out that organic farming was developed as a response to what was perceived to be polluting food supply by modern farming methods and the ensuing degradation of the environment with chemical and other by-products of the industry. Two farming systems (organic and conventional) studied at farm level in Central Italy emphasized differences on soil quality (Adebayo & Oladele, 2014). The work revealed that organic management affects soil microbiological and chemical properties by increasing soil nutrient availability, microbial biomass and microbial activity, which represent a set of sensitive indicators of soil quality (Marinari, *et al.*, 2006). Rigby & Caceres (2001) reported that organic agriculture tends to conserve soil fertility and system stability better than conventional farming systems. The Food and Agriculture Organization of the

United Nations regards organic agriculture as an effective strategy for mitigating climate change and building robust soils that are better adapted to extreme weather conditions associated with climate changes (International Federation of Organic Agriculture Movement 2009; Pretty, 1999).

The past decades have been characterized by public concern towards nutrition, health and food safety issues (Crutchfield *et al*., 2000). As a result, consumers perceive relatively high risks associated with the consumption of conventionally grown produce compared with other public health hazards (Williams & Hammitt, 2000). Fruits and vegetables produced organically as observed by Mitchell *et al*., (2007) have increased levels of flavonoids which are reported to protect against cardiovascular disease (Hertog & Hollman, 1996) and to a lesser extent against cancer and other age related diseases such as dementia (Commenges *et al,* 2000).

The description of organic farming above has led to several interests in the farming practices. At the second national conference on organic agriculture held in Nigeria under the auspices of the International Federation of Organic Agriculture Movement (IFOAM) the participants were charged with the responsibilities of developing organic farming in Nigeria (IFOAM, 2007).

The major goal of organic farming activities is a sustainable production of food with little or no effect on the environment. This goal and many others have not been achieved by conventional farming hence the need to encourage organic

farming which is capable of providing solutions to the current environmental challenges like the climate change and environmental hazards and also help to achieve maximal production of quality food sustainably (IFOAM, 2005). Organic farming is beneficial in agriculture because it provides basis for healthy food and healthy living. Organic farming practices ensure and sustain bio-diversity. Organic farming integrates agro bio diversity and soil conservation and takes low intensity farming a step further by eliminating the use of chemical fertilizers, pesticides and genetically modified organisms, which is not only an equipment for human health and agro bio- diversity but also for the associated off farm communities. Food and Agriculture Organization ((2008) clearly states that organic agriculture promotes ecological resilience, improves bio-diversity, healthy management of farm and surrounding environment and building community knowledge and strength. The benefit of organic farming in fauna and flora activities is well documented. Stolze (2000) reported that organic farming clearly performs better than conventional farming in respect to floral and fauna diversity. Organic farming conserves soil fertility and system stability (Rigby & Caceres, 2001).

Gbadegesin (2013) in his keynote address at the 9th National Conference on organic agriculture observed that most organic agriculture practitioners have revealed the ability of organic agricultural practices to sustain environmental resources and provide healthy and safe foods. He emphasised that in Nigeria

and many developing countries, organic agriculture is just developing and there is need to fast track this development.

There are evidences that organic farming shows better performance in case of organism abundance and species diversity. The work of Fuller *et al.*, (2005) revealed that organic farming increases insect pollination and overall specie richness. According to him, the number of arthropods and earthworms were more abundant in organic than in conventional agro-system of different types of orchards and vineyards. Further, they revealed that organic farms provide better benefit for a range of wild life (including wild flowers, beetles, spiders, birds, and bats) than their counterparts. They found out that organic fields were estimated to hold 68-105% more plant species than non-organic field, support 5-48% more spiders in pre harvest crops, 16-62% more birds in first winter and 6-75% more bats.

Organic agriculture is gaining momentum in Africa as it is increasingly seen as significant for addressing food insecurity, land degradation, poverty and climate change (IFOAM, 2005). Research and specific experiences of farm families engaged in organic agriculture show that organic agriculture offers African small holders and farm family a wide range of economic, environmental and social benefits by -:

a) increasing yields in the long run through the use of affordable inputs largely based on local biodiversity,

b) improving livelihoods and food security,

c) building resilience to climate change,

d) reducing financial risk by replacing expensive chemicals input with locally renewable resources,

e) integrating traditional farming practices,

f) allowing farmers access to new markets opportunities both at home and abroad,

g) combating desertification,

h) providing much greater resilience of the farming systems in times of climate extremes such as drought and heavy rains,

i) improving human health and maximising environmental services; and

j) contributing to climate change mitigation as it reduces green house gas emissions and affordably sequesters carbon in the soil. (www.ifoam.org/en/benefits-organicagriculture).

Organic agriculture differs from conventional agriculture not only in principles and practices but also fundamental:

a) implementing organic principles and practices seem to provide a new quality on how the agro ecosystem bio-diversity work.

b) organic farming improve soil fertility in an eco-friendly manner and consistently respect ecological principles, practices and ethics.

c) the uniqueness of organic farming is centred on various standards, ethics, laws and regulations that almost all synthetic chemicals and associated inputs are prohibited while soil fertility is built on crop rotation practices.

According to Gbedegesin (2013), Opinion poll conducted in the United Kingdom MAFF project in 2000 revealed that about 50% of the people believe that foods produced by traditional methods are more nutritious than conventional products. Most people consider organic production as better for the environment.

The population of Nigeria is put at a total of 140,003,542 with rural dwellers forming over 50% of the total (NPC, 2006). A rural household is defined as a group of people who feed from the same pot**.** The major activities carried out by the rural populace are agriculture-related (Akpabio, 2005). This fact was supported by other authors who identified agriculture as the major sustainable livelihood activity of the rural people (Asiabaka, 2002; Ekong, 2010; and Mgbada, 2010). Ozor *et al.*, (2010) observed that 71 percent of rural households in southern Nigeria have farming as their major occupation. Rural dwellers therefore provide the bulk of food which is consumed for good health, they also provide raw materials and produce crops for export. In developed countries, buyers take note of what they consume whether organically or conventionally cultivated. The agricultural practices engaged in has effect on the products produced, consumed and the environment. One of the targets of the Millennium

Development Goals is to ensure environmental sustainability. (MDG Report, 2010). According to Agbamu (2002) organic farming technology is frequently regarded as the solution to environmental problems related to agriculture and safety.

1.2 Statement of Problem

Over the past 30 years, public interest in organic food and organic farming has been increasing in the United States. This is evident by the increases observed in consumer demand for organically produced foods and the number of public funded research and policy projects pertaining to organic food production (Whitney, 2009). According to Crutchfield *et al.*, (2000) the past decades have been characterized by escalating public concern towards nutrition, health and food safety issues. Consumers perceive relatively high risks associated with the consumption of conventionally grown produce compared with other public health hazards (Williams & Hammit, 2000; 2001). The case is not different in Africa and developing nations like Nigeria (IFOAM, 2007). Before now, the challenge of food insecurity and increasing population called for measures to increase food production by all means thus farmers were encouraged to embrace conventional farming practices. Traditional farming practices were considered as not good enough and will not yield enough result to cater for the people's need and solve the problem of hunger (Okoye, 1989). He also noted that a nation which depends on traditional agriculture is inevitably poor. The use of

fertilizer and other forms of inorganic substances to boost crop and animal production were introduced based on the above assumption. However, in recent years, a number of interrelated crises have caused concern; one of such is the global climate change. The attention of all has mostly been on trying to protect those most vulnerable to food security primarily by creating long term strategies to ensure food for increasing number of hungry people. The main focus in the bid to tackle hunger has been on how to produce enough food on a global level for a growing population with the use of chemical inputs and genetically modified and high yielding varieties of crops and animals.

Organic farming has been regarded as low yielding and unproductive (Okoye, 1989) It is even seen by some people as a luxury production for the few who can afford to pay extra for its products. According to Halberg, Paramaiyan & Walaga (2009), organic farming is seen as a luxury when limiting the understanding of organic to an export production of certified organic products such as special tea, fruits and the like from the global south to the wealthy North and West. Certified Organic farming is seen as being driven and supported by political, cultural, economic, social structures that are located within western ideologies and practices (Vaarst, 2010)

When organic farming is understood in the light of the above descriptions, the misconception of it as expensive and non productive may arise.

Evidence abound that prove that it is a false conception especially when talking about sustainable agriculture. Halberg *et al.*, (2006) (a) emphasised that organic agriculture does not increase food security problems but on the contrary present solutions to them both in terms of increased productivity and of improved access to food. Even though there are literatures supporting drop in yield when converting chemical farming system to organic production. Several studies show that yield often more than double through consciously building up of soil fertility using purely non-chemical methods (Pretty & Hine, 2001; Halberg *et al* 2006 (b); Pretty *et al* 2006; Badgly *et al*, 2007;). Also, use of organic farming methods can maintain or even increase the fertility of the soil while producing healthy, diverse food locally for people (Pretty *et al*, 2006). Organic farming contributes to the idea of a farming and food system that is sustainable, meaning one which can be seen as meeting the needs of the present generation without compromising the possibilities of the future generations to meet their own need. The evidences presented from a recent study by UNCTAD-UNEP (2008) support the argument that organic agriculture can be more conducive to food security in Africa than most conventional production systems and that it is more likely to be sustainable in the long term. This corresponds with the findings of the Food and Agricultural Organizations of the United Nations (FAO) international conference in organic agriculture and food security held in May 2007. Orji (2013) outlined reasons why people choose organic farming to include the following:

a. Organic growing increases and up-builds soil structure and fertility. It does not pollute the rivers and other water resources.

b. It is safe and friendly to the environment.

c. It provides long-term benefits to humans and to animals.

d. It re-cycles and re-uses locally available resources.

e. It provides tasteful and nutritious food crops at the best affordable prices.

f. It uses natural and non-chemical means to control farm pests, diseases and weeds.

g. Organic farming has real concerns and re-assurances of the natural rights and welfares of farm animals.

h. It is an inexpensive modern system of farming that anyone can afford.

i. It relatively brings in higher incomes for farmers, even at local community levels. … etc,

Considering the benefits of Organic farming, Vaarst (2010) encouraged decision makers and development practitioners in Africa and around the world to take a new look at this promising production system – Organic farming with fresh eyes. According to him, it offers not only improved food security but also an array of other economic, health and social benefits. Organic Agriculture has shown over the years that it has the capacity to influence ecosystem to better adjust to the effect of climate change and also offers potentials to reduce emission of agricultural green house gas. In addition to its potential beneficial

effect on the environment, consumers are attracted to organic food stuff because of the positive health effects due to the absence of pesticide or artificial hormones. The work of Chihabra *et al.,* (2013) reveals the detrimental effect of pesticides application to include disruption of neuro-endocrine signalling or development of cancer depending on the particular class of pesticide.

Studies have shown also that organically grown foods are more nutritious, safe and of high quality. They are therefore more important in ensuring human health compared to foods grown under conventional methods (Bavec, 2006; Worthington, 2001)

Human survival demands that environmental consideration should be paramount in pursuit of development. Any development that threatens the integrity of the environment must not be adopted or encouraged. Sustainable agricultural system must address the issue of environmental, social and economic sustainability in its approach.

A review of previous studies on organic farming practices show that little effort has been made by researchers to capture South-south agro-ecological zone. The study of Adebisi, *et al.,* (2010) investigated factors influencing the awareness and use of organic farming practices by horticultural farmers in Oyo state, South-western Nigeria. The work of Adebayo & Oladele (2013) analysed the adoption of organic farming practices in South-western Nigeria. Oyesola & Obabire (2011) assessed farmers' perception of organic farming in Ekiti state,

South-western Nigeria. Attempt was made by Adesope, *et al.*, (2012) to capture South-south by investigating effects of socio economic characteristic of farmers on their adoption of organic farming practices in Rivers state, Nigeria.

Irrespective of the several benefits of organic farming, the coverage is still low. This may be as a result of lack of awareness of the potentials of organic farming practices. According to Oyekanini, Coyne & Fawole (2008) the poor performance of Nigerian farmers is attributed to their lack of awareness and use of sustainable agricultural practices. Many scientists now believe that conventional agricultural practices are unsustainable. Therefore, availability of relevant information on the importance of organic farming practices could enhance its adoption among farmers. There is scarcely any literature on whether or not farmers are aware of the benefits of organic farming. This apparent lack of enough empirical data in organic farming practices by farmers in the study area has created lacuna in knowledge thus culminating in gap that this study intends to fill. Seeking information is a part of almost every learning process resulting in some changes to farm business management. Most changes to the practice are influenced by interaction with and information from a number of sources including print and electronic media, peers, experts and training activities (Kirkpatrick, 1996). There is usually preference over a list of practices, most researchers concentrated on farming practices without highlighting the preference of farmers against the various organic farming

practices. This study will not only find out the organic farming practices farmers are engaged in but will also determine their preference and reasons for the preference of any one or more of the practices.

Apart from south-south not being captured enough by researchers, available research results indicate that researchers have made serious efforts to study specific enterprise vis-à-vis organic farming practices. For example the work of the researchers cited above concentrated on crops and farmers generally. None of the studies undertook more than one enterprise at a time to enable data generation for comparison. The present study analyses three enterprises- livestock, fishery and crop.

To actualize this, the following questions were addressed:

a. What are the demographic and socio economic characteristics of the farmers?
b. Are farmers in South-south Nigeria aware of organic farming practices?
c. What are the organic farming practices engaged in by crop, fisheries and livestock farmers?
d. What are the farmers' present sources of information?
e. What are the farmers' perceived advantages of organic farming practices and dangers of conventional farming practices?
f. What are the determinants of their use of organic farming practices?
g. What are the constraints faced by farmers engaged in organic farming?

h. What are the strategies for improvement of organic farming practices in South-south Nigeria?

1.3 Objectives of the study

The broad objective of the study is to analyse rural household's use of organic farming practices in South-south Nigeria. The specific objectives were to:

(i) describe the socio-economic characteristics of the farmers;

(ii) determine the level of awareness of organic farming practices;

(iii) identify the level of use of organic farming practices;

(iv) ascertain the farmers' source of information on organic farming;

(v) find out the farmers' perceived benefits of organic farming practices;

(vi) assess constraints to organic farming by the farmers and

(vii) identify strategies for improving organic farming practices

1.4 Hypotheses (Null)

The following null hypotheses were tested

(i) There is no significant relationship between the socio economic characteristics of the farmers and their level of awareness of organic farming practices;

(ii) There is no significant relationship between the rural households' socio-economic characteristics and their perceived benefits of organic farming practices;

(iii) There is no significant relationship between the socio economic characteristics of the farmers and their level of use of organic farming practices;

(iv) There are no significant differences in the farmers' level of use of organic farming practices based on the three states of the study;

(v) There is no significant difference in the level of use of organic farming practices between male and female farmers.

1.5 Justification of the Study

The goal of organic farming practices is a sustainable production of quality food with little or no effect on the environment. This goal cannot be achieved by the conventional farming. There is need to encourage organic farming which is capable of providing solution to the current agricultural problems and help to achieve optimal production of quality food sustainably (IFOAM, 2005). The global challenge of environmental degradation, climate change and dangers associated with continuous practice of inorganic farming, calls for the understanding of the farming practices engaged by farmers in South-South Nigeria.

Literature on organic farming activities among farmers exist in various countries. For example Uganda has about 200,000 certified Organic farmers, (Tumnushabe *et al* 2006, Helga and Yussefi, 2006) Ethiopia and Tanzania with

over 160,000 and 100,000 respectively (Helga and Yussefi 2006). This study will increase the resource base for Organic Farming literature in Nigeria.

The result of this research will add to the body of existing literature on organic farming and this will be a valuable reference material for extensionists, lecturers, researchers and students. In the same manner, development practitioners and interventionists on programme and development in the rural areas will find the result of the study a veritable benchmark in advancing policies and programmes in organic farming. It would serve as a source of useful information for effective planning and propagation strategies for organic farming practices. Crusaders of organic farming and extension agents will find the work valuable in their campaign and teaching programmes.

1.6. Scope of the study

The study focused on rural households' use of organic farming practices. The organic farming practices studied were those of crops, livestock and fish. The study was carried out in South- south Nigeria.

CHAPTER TWO

LITERATURE REVIEW

In this chapter, a review of literature on the following was presented:

1. The concept, principles and prospect of organic farming
2. The origin and development of organic farming in Nigeria.
3. Organic farming as solution to food problem in Nigeria.
4. Relevance and disadvantages of organic farming
5. Organic Livestock and fish farming as well as their challenges in developing countries.
6. Concept of rural area.
7. Theoretical and conceptual frame

2.1 Organic Farming – Concept and Principles

2.1.1 Concept of Organic Farming

Organic farming is an agricultural technique of naturally producing quality crops, vegetables, or animals, without harming the environment; the people; the animals as well as other micro organisms that are living around (Orji, 2013). It is an application of modern eco-friendly farming practices that works in agreement with nature. "Does it mean going back to the ancient and traditional methods of farming"? Not necessarily. What organic farming does is to apply the very bests of these past techniques in combinations with modern knowledge of science and technology. Organic farming is knowledge intensive unlike

traditional farming. As to how to farm organically, it is entirely a matter of the farmer's personal choice. In the simplest terms, farming organically implies that the farmer uses real natural means rather than using petro-chemicals- artificial hormones; antibiotics, vaccines; pesticides and herbicides in his or her agricultural productions.. Organic farming not only excludes synthetic inputs- pesticides, herbicides and fertilizers but also focuses on sufficient biological processes such as composting and other measures to maintain soil fertility, natural pest control, diversifying crops and livestock. Organic agriculture gives priority to long – term ecological health, such as biodiversity and soil quality, contrasting with conventional farming, which concentrates on short term profit (Trewavas, 2001). National Organic standards Board of the USA (1996) defined organic farming as an ecological production management system that promote and enhance biodiversity, biological activity. It is based on minimal use of off-farm inputs and on management practices that restore, maintain and enhance ecological harmony. Tomas (2003), also explained that the organic associations in Scandinavia have agreed on the following definition of organic farming: Organic farming means a self- sufficient and sustainable agro- environmental system in equilibrium. The system is based on local and renewable resources. Organic farming builds on an integrated ethos, which encompasses the environmental, economic and social aspects in agricultural production both from a local and global perspective. Organic farming perceives nature as an entity, which has value in its own rights; human-beings have a moral

responsibility to steer the course of agriculture so that the cultivated landscape makes a positive contribution to the countryside. Codex (1999), viewed organic farming as holistic production management systems (for crops and livestock) emphasizing the use of management practices in preference to the use of off-farm inputs. This is accomplished by using, cultural, biological and mechanical methods in preference to synthetic materials. However, in the context of this paper, organic agriculture is agricultural production without the use of synthetic chemicals (fertilizers, pesticides, antibiotics, e.t.c.). For crop production, organic materials such as compost and manure are used to maintain soil organic matter and as sources of nutrients. Nitrogen-fixing as well as pest resistant plant varieties are utilized. Further, the incorporation of soil management techniques such as mulching, inter- cropping and crop rotation are integral components of an organic farming system. Another important characteristic of an organic farming system is the use of agro- forestry system. An organic production system is designed to work constructively with natural biological cycles and to operate with minimal external inputs. In order to ensure that the organic system is efficient and sustainable in the long term, sustainable crop rotations, nutrient recycling, encouragement of a rich biodiversity and other management practices are necessary prerequisites. According to Codex (1999), an organic production system have the following objectives: increase soil biological activity; maintain long-term soil fertility; recycle waste of plant and animal origin in order to return nutrients to the land; minimize the use of non-renewable resources; rely

on renewable resources in locally organized agricultural systems; promote the healthy use of soil, water and air, as well as minimize all forms of pollution that may result from agricultural practices; handle agricultural products with emphasis on careful processing methods in order to maintain the organic integrity and vital qualities of the product at all stages; established an existing farm through a period of conversion; the appropriate length of which is determined by site-specific factors such as the history of the land, and type of crops and livestock to be produced.

2.1.2 Principles of Organic Farming in Developing Countries

Human survival demands that environmental considerations should underpin all aspects of development, whether physical or social and must not threaten the integrity of the environment. Sustainable agricultural system must address issues of environmental, economic and social sustainability in its approach apart from inputs or tools consideration. Hence, the needs to adopt production systems that are environmentally friendly especially in food production, this is the bases for organic farming strategy.

Organic production systems are based on specific and precise standards of production, which aim at achieving agro- ecosystems, which are economically, socially and ecologically sustainable. According to Reganold *et al.*, (2001), Organic farming aims at improving soil fertility by providing an ideal soil

system for plant growth. It improves the physical, chemical and biological properties of the soil and thus, builds up the soil health.

The use of organic amendments is synonymous to soil productivity (Reichard *et al.*, 2000). Increasing soil organic matter has added benefit of improving soil quality and thereby enhancing the long –term sustainability of agriculture (Laird & Kingery, 2001).

Organic farming is also about animal welfare, and the regulations governing organic farming contain detailed guidelines as to how specific livestock should be bred and fed. Organic livestock farming is however, based on the principle of a close link between animals and the soil. This is exemplified by providing opportunities for animals to have free access to outside areas for exercise, and their feed not only being organic, but produced on the farm. This sector of organic farming is, more or-less, strictly regulated by provisions on animal welfare and veterinary care. A common feature of all organic objectives is that farming people are considered to be part of nature- in a rotation. Moreover, nature is so complex that we do not have a full understanding of the consequences of our actions on it- hence, there is need to be careful when working on it. Organic farming also takes cognizance of the cultural and social aspects of agriculture, (Tomas, 2003). Sources of organic manure, the fertility and biological activity of the soil must be maintained or increased by the

cultivation of legumes, green manure or deep-rooting plants in a multi-annual rotation program.

The main sources of organic manure have been identified to include the following:

(a) **The use of compost:** Compost is a well- or partially decomposed, humidified organic materials. According to Eghball, (2001), among the practices recommended for improvement of the soil quality and fertility in tropical regions is the application of composted organic wastes, which slowly release significant amounts of nitrogen and phosphorus. As reported by Nyamangara *et al.*, (2003), management of soil organic matter with the use of composted organic waste is the key for sustainable agriculture. The use of composted organic waste as fertilizer and soil amendment not only results in an economic benefit to the small- scale farmer but it also reduces pollution due to reduced nutrient run-off, and N leaching

(b) **The use of green manure and crop residue:** Organic growers are increasingly utilizing legume cover crops as green manures in rotations to meet Nitrogen needs of crops. Cover crop Nitrogen accumulation and total biomass depend on the length of growing season, local climate and soil conditions. Beltran *et al*., (2002) reported that green manures when composted increased soil organic matter (SOM), provides nutrients for

plant growth, alleviate aluminium toxicity, and render phosphorus more available to crops. Cover crops and other plant material when left or ploughed into the soil enhance and protect soil quality. Dabney *et al.*, (2004); also noted that soil tillage following residue removal increased soil loss between 26 - 47%.

(c) **Poultry manure as fertilizer:** The concentration of animal production systems has increased efficiency and improved overall economic return for animal producers. Manure, once valued as a waste by farmers, is now treated as a resource for the sustainability of the soil. Poultry, Swine and Cattle manure has long been recognized as the most desirable of all natural animal fertilizers because of the high nitrogen content. Some work indicated high nitrogen manure arising from poultry and swine, to suppress diseases by generating high ammonia and/ or nitrous acid concentration in the soil (Lazarovits, 2001). The primary way of reducing the risks associated with land application of these animal manures is by addressing the application rate, timing, and location during utilization.

2.2 Origin and development of Organic Farming

2.2.1 Origin of organic farming

Organic farming originated in England from the theories developed by Albert Howard in his Agricultural Testament in 1940, following the work of Rodale in late 1930s in the United States, but this idea was known as the use of organic

manure in Africa (Bello, 2008). By the end of the 1970s, organic farming came to the forefront in response to the emerging awareness of environmental conservation issues (Ojeniyi, 2000). New associations grew up, involving producers, consumers and others interested in ecology and lifestyle more tuned with nature. These organizations draw up their own specifications, with rules governing production methods.

There have been three important movements: Biodynamic agriculture, which appeared in Germany under the inspiration of Rudolf Steiner in 1920. Biological agriculture started in Switzerland by Hans-Peter Rush and Hans Muller in 1930s. However, the inception of the concepts is in –line with traditional farming which came into focus in the early 70s when concerted effort began on soil characteristics. Soil organic matter is significantly correlated with cation exchange capacity, and all available nutrients especially N.P.K. Mg, S, Zn, and Cu in soils of South-Western Nigeria. Charreau (1994) then described organic carbon as a life wire of soils in the tropics, particularly in the dry-land region of Africa and marks the stage back into organics. Despite all the differences of emphasis mentioned above, the common features of all these movements, which are the source of some of the terms protected by community rules, is to stress the essential link between farming and nature, and to promote respect for natural equilibrium. The principle is in line with Agboola 1970s idea, who had advocated for better farming systems which will employ a

combination of fertility building practices appropriate to the local conditions for crop production in south west Nigeria . The movements distance themselves from the interventionist approach to farming, which maximizes yields through the use of various kinds of Synthetic products. By the end of the 1970s, organic farming came to the forefront in response to the emerging awareness of environmental conservation issues. New associations grow up, involving producers, consumers and others interested in ecology and lifestyle more tune with nature. These organizations draw up their own specifications, with rules governing production methods. It was in the 1980s that Organic farming really took off, when the production method continued to develop, along with consumers' interest in its products, in almost all part of the world. The situation conducive to the development of organic farming was mainly due to consumers' acceptance and its environment-friendly products. At the same time, the public were gradually recognizing organic farming, focusing it as research topics and adopting specific legislation (e.g. in Australia, France, and Demark).

2.2.2 Organic Farming Development in Nigeria

The Nigerian Organic Agriculture Network (NOAN) has drawn up organic standards on crop, livestock, aquaculture and snail farming for Nigerian local markets which was adapted from the International Federation of Organic Agriculture Movement (IFOAM) norms for organic production and processing. Between 2004 and 2007, Organic Agriculture Projects in Tertiary

Institutions in Nigeria (OAPTIN) created awareness and enhanced the development of organic agriculture towards optimizing its potentials in Nigeria (Nigeria Organic News, 2009). OAPTIN has successfully trained 23 agriculture graduates under the Work, Earn and Learn Project (WELP), 4 senior agricultural development programme staff, 9 University teachers and practicing farmers in advanced courses on organic agriculture in collaboration with foreign partners, particularly the European union, British council and Coventry University, UK. The project is affiliated to IFOAM. (Mustapha *et al.,* 2012).

Until 2004, there was no known organic agriculture network in Nigeria (Balogun, 2010). In the same year, an interdisciplinary team under the aegis of Organic Agriculture Projects in Tertiary Institutions in Nigeria (OAPTIN) began the process of convening a national conference that held in 2005 at the University of Agriculture, Abeokuta where stakeholders in organic agriculture adopted the project name and discussed the way forward for organic agriculture development in Nigeria (Balogun, 2010). At present several organic groups exists in Nigeria. To further strengthen the impacts of the various organic groups, the Nigerian Organic Agriculture Network (NOAN) was formed which was supported by the International Federation of Organic Agriculture Movement (IFOAM).

2.3 Organic Farming - Solution to Food Problems in Nigeria

Orji, (2013) outlined the points below as organic farming solutions to food problems in Nigeria:

1. **Agricultural Localization**

One of the greatest ways to use organic farming in solving Nigeria food and agricultural problems is by localizing agriculture, even down to the rural communities. There is a real urgent need for Nigeria's government to attend to this particular problem. This is because almost everything that exists in modern agriculture today, is a mere state of total exploitations in the cover of agricultural industrialization or privatization. But, with agricultural localization, the rural communities and individual families can organically grow their own local foods with their own available resources.

2. **Alleviation of poverty**

Organic farming is a sure solution to Nigeria's food problems because it is a very lucrative source of job provision in local communities. And as most of the organic farm jobs provide incomes, they as well provide food and poverty alleviation to individuals and to families within the country.

3. **Organic Agric Education**

Another way to use organic farming as solution to Nigeria's food problems is by educating families and rural farmers on how and why it is best to grow food

organically. By creating this kind of awareness, both the quality and quantity of Nigeria's local foods will improve greatly.

4. **Use of Inexpensive Farm Tools & Techniques**

The use of inexpensive farm tools and techniques is another plus for organic farming in terms of solving Nigeria's food problems. Anyone, anywhere can successfully grow organic food as neither expensive chemicals nor hormones nor any industrial machine is compulsorily required for you to be able do it yourself.

5. **Use of Renewable Energy**

The use of renewable non-petroleum based energy is also an additional force for organic farming as solution to Nigeria food and agricultural problems. Wind, solar and organic fertilizer such as compost, are not only renewable but also nation-wide affordable unlike petroleum; nuclear, or chemical fertilizers and hormones.

6. **Non-use of Petroleum-based Chemicals**

Organic farming can equally help in solving Nigeria's food and agricultural problems, because of its non-use of petroleum-based chemicals like herbicides, pesticides, hormones and inorganic fertilizers. Unlike organic products, the use of petroleum-based chemicals is known to have diverse effects on human health, soil, environment, as well as on the real tastes and quality of food.

7. Creation of Jobs and Income Opportunities

Organic farming is such a very powerful tool that can generate jobs and income opportunities in the grass-root levels of Nigeria's rural communities. By providing agricultural local jobs and incomes, organic farming will as well provide surplus food to feed the nation.

8. Re-use of waste products as fertilizers

The re-use of farm and house-hold waste products as organic fertilizer, is a safety and protective measure to humans and to the environment, as well as to plants, to animals and to other micro organisms.

This extent of friendliness contributes a great lot for organic farming in terms of using it as solution to Nigeria’s food problems.

9. Ensuring the right and welfare of animals

Organic farming can also help as solution to Nigeria’s food and agricultural problems as it ensures that the actual natural rights and welfare of farm animals are fully kept. In short, the modern methods and practices of intensive livestock farming do often give rise to various sorts of a heartless and unjust abuses; sufferings and cruelties to innocent farm animals. Organic agricultural methods of animal husbandry, is on the other hand a complete re- assurance to the rights and welfare of all farm animals.

2.4 Relevance and Disadvantages of Organic Agriculture

2.4.1 Relevance of Organic Agriculture

Organic farming is regarded as that solution to environmental problems that are related to agriculture as well as well as food safety (Agbamu, 2002). Organic Agriculture is fast emerging as the only sustainable long term approach to food production (Adebayo, 2014). Its emphasis on recycling techniques, biodiversity, low external input and high output strategies makes it an ideal replacement for the petroleum intensive agricultural methods that are currently contributing to global warming (IFOAM, 2008; Swift et al, 2004).

There are a number of issues that make organic agriculture relevant. They include:

1. Organic agriculture and climate change mitigation

Climate change is one of the major problems facing agriculture worldwide. It has negative effects on agriculture, wrecking havoc on crops, livestock and fishery productions in different capacities, ranging from storms, tornado, flood, erosion, drought and severe winter (Gbedegasin, 2013). Ozor, (2010) defined climate change as change in climate overtime, whether due to natural variability or as a result of human activities and is widely recognized as the most serious environmental threat facing our planet today.

Climate change as described by climatologist is as a result of earth's natural variations and men's activities which cause emissions of green house gases

thereby increasing global warming. It is this global warming that actually induces the change in climate.

Organic systems have been found to sequester more carbon dioxide than conventional farming, while techniques that reduce soil erosion convert carbon lose into gain. Organic Agriculture is also self sufficient in nitrogen due to recycling of manures from livestock and crop residues through composting as well as planting of leguminous crops. Lee (2005) explained that organic farming reduces atmospheric carbon dioxide by pulling it from the air and storing it within the soil as carbon. Moreso, the financial requirements of organic agriculture as an adaptation strategy to climate change is low (Muller, 2009).

Organic agriculture holds an especially favourable position since it has mitigation and adaptation potentials, particularly with regard to soil capacity, increasing yields in areas with medium to low input agriculture and adaptation potential, particularly with regard to soil capacity, increasing yields in areas with medium to low input agriculture and in agro-forestry (Khor, 2009).

2. Organic agriculture and food safety/quality

Consumers perceive relatively high risk associated with the consumption of conventionally grown food compared with other health hazards (William and Hammit, 2001). Organic food tend to have higher micronutrient contents and more plant secondary metabolites and conjugated fatty acids that contribute to

better human health including lower incidences of non-communicable diseases (Gallagher *et al,* 2005). Wholesomeness, absence of chemicals, environmental friendliness, and a better taste were the primary reasons to buy organic foods (Makatouni, 2002. Magnusson et al, 2001).

3. Ecosystem services and biodiversity conservation

Organic farming is environmentally friendly. This is because it is well known that chemicals have destroyed many beneficial insect species and have caused environmental degradation. For instance, Korean researchers had reported that avoiding pesticides in paddy fields encourage the muddy loach fish, which effectively control mosquitoes that spread malaria and Japanese encephalitis (John, 2002). The ever-increasing threat to ground water pollution from inefficient and indiscriminate use of fertilizers and pesticides respectively, demand much concern. These threats are eliminated in organic farming systems since natural pest control is practiced. It is confirmed in California that Organic tomato production without synthetic insecticides does not lead to increased crop losses as a result of pest damage (Letourneau & Goldstein, 2001).

Higher biodiversity organic farming also provides energy for microbial activity and this has been suggested as an indicator of change for soil properties because the size and activity of the microbial quotient is directly related to the amount and quality of carbon available (Breland & Eltun, 1999). Organic farms, often explores biodiversity than conventional farms because it is usually with more

trees, a wider diversity of crops and many different natural predators, which control pests and help prevent disease. (Parrott & Marsden, 2002). Organic farming is generally associated with higher levels of biodiversity with regard to both flora and fauna (Marinari *et al,* 2006). The farming system has the positive effects on species richness and abundance. Several research findings revealed the advantages of the organic system on ecosystem conservation. For example, Mmbaga and Friesen (2003) discovered that the inclusion of legumes in small scale maize production improves yield through soil amelioration thus reducing soil degradation. Increasing soil organic matter by organic farming has the added benefit of improving soil quality and thereby enhancing the long-term sustainability of agriculture (Laird & Kingery 2001). Organic agriculture also helps to conserve and improve precious resource-the topsoil, compaction, nutrient loss and erosion, organic farmers use trees, shrubs, leguminous plants to stabilize and feed soil, dung and compost to provide nutrients, and terracing which prevent erosion and conserve ground water (Parrot & Marsden, 2002).

Organic farming leads to many improvements to the natural environment, including increased water retention in soils, improvement in the water table, reduced erosion combined with improved organic matter in soil leading to better carbon sequestration and increased agro-biodiversity (Hine & Pretty 2007).

The system of farming is based on minimal use of farm inputs and on farm management that restores, maintains and enhances ecological harmony (ATTRA, 2007).

4. Consumer benefits

Consumers prefer organically produced foods to conventional ones. Willer & Youssefi (2007) observed that there is an increasing demand for organic produce in recent years. Consumers are now turning to organic food because they believe it to be tastier, as well as healthier, both for themselves and the environment (Orji, 2013).

Soil under organic farming conditions has low bulk density, higher water holding capacity, higher microbial biomass, carbon and nitrogen and higher soil respiration activities compared to the conventional farms (Sharma, 2003). This indicates that sufficiently higher amount of nutrients are made available to crops due to enhanced microbial activities under organic farming.

Organic farming does not use inorganic pesticides or herbicides. Pollution disaster caused by agro chemical use result in the contamination of groundwater reserves with poisonous substance, particularly (in Australia) Atrazine and Simazine, also Dieldrin, Chlorphyriphos, Amitrol, Mitolachlor, Trifluraline and Diuro Dieldrine, Lindane and Alachlor. Systematic monitoring of pesticides contamination of groundwater in Australia is limited, available tests have

detected pesticides in at least 20% of samples indicating significant contamination (Australian state of the environment report, 2001).

Pesticides contamination is a serious health threat to current and future ground water users (World Health Organization, 2006)

A number of consumers perceive organic produce as less damaging to the environment and healthier than conventionally grown food product (Chen, 2007). Other consumer benefits include.

a. **Nutrition:** The nutritional value of food is largely a function of vitamins and mineral content. Organically grown food is superior in mineral content to the conventionally grown foods. (Benbrook *et al*, 2008).

b. **Poison free-** A major benefit to consumers of organic food is that it is free of contamination with health harming chemicals such as pesticides, fungicides and herbicides (Willer & Kilcher, 2011). As you would expect of population fed on chemically grown foods, there has been a profound upward trend in the incidence of diseases associated with exposure to toxic chemical. The work of Mondelagers *et al* (2009) noted that organic vegetables contain less contamination and more nutrients and as such are healthier and more nutritious and as such are healthier and safer compared to the conventional.

c. Food taste better and keeps longer:

The findings of Reganold *et al* (2001) reveal that organic system produced sweeter and less tart apples, higher profitability and greater energy efficiency. Organic plants are nourished naturally rendering the structural and metabolic integrity of their cellular structure superior to those conventionally grown. As a result, organically grown foods can be stored longer and do not show susceptibility to rapid mould and rotting.

d. Value addition

Value added products can be raw products that farmers grow, modify, enhance or change. In so doing, the raw products can change significantly and fetch a higher value (Ohmart, 2003). Consumers are becoming more quality focused and demanding on how foods are grown and processed (Babcock, 2008). This is the reason for the importance attached to the process of value addition.

There is no doubt, organic system produce sweeter food than the conventional food. Personal experience proved that organic maize taste better than those cultivated with inorganic fertilizer.

Mitchell *et al* (2007) reported that the level of flavonoids increased over time in samples from organic treatments whereas the levels of flavonoids, did not vary in conventional treatments.

5. Market niche

Organic agriculture is a set of market opportunities and networks. A market niche is based on standards that specify the special conditions for production, processing, certification, control and branding of the products (Alroe and Noe, 2008). The market for organic foods is developing fast throughout Europe (Wier and Calverley 2002). Recently in 2015, an organic market was launched in Ibadan, Oyo State, Nigeria by the Association of Organic Agriculture Practitioners of Nigeria in 2015. (www.homef.org/news/ibadan_organic_farmers_market_launched_nigeria). Organic agriculture generates income through international exports or by saving production cost (Scialabba, 2000). Today, the organic market is described by industry analyst as the most dynamic and rapidly growing sector of the global food industry. What was once a small-scale market according to Macey (2004) is now a $23 billion global enterprise.

6. Growers benefits

A healthy plant grown organically in properly balanced soil resists most diseases and insect pests. Some benefits of organic farming to farmers are;

i. Low incidence of pest: bio control methods like neem based pesticides to Trichoderma are available. Prakash (2003) revealed in his work that indigenous technological products such as Panachagavya (five products of cow origin) which was experimented at the University of Agricultural

Sciences, Bangalore was found to control effectively wilt disease in tomato.

ii. Increased crop productivity and income. The International Fund for Agricultural Development and the United Nations advocate conversion to organic as a strategy for alleviating poverty in third world countries (Hak-su, 2002). The practice also enhances economic efficiency through savings on input but more labour is required. A study of 100 farmers in Himachal Pradesh during a period of 3 years found that the total cost of production of maize and wheat was lower under organic farming and the net income was 2 to 3 times higher. Another study of 100 farmers on organic and conventional methods in five districts of Karnataka indicated the cost of organic was lower by 80 percent than that of the conventional one (Thakur, et al 2003)

Narayanan, (2005) explained other indirect benefits of organic farming. According to him, several indirect benefits from organic farming are available to both the farmers and consumers. While the consumers get healthy foods with better palatability and nutritional values, the farmers are indirectly benefited from healthy soils, flora, fauna and increased biodiversity and the resulting benefits to all human and living things are great advantages of organic farming.

2.4.2 Disadvantages of Organic Farming.

Ahmet, (2011) gave three disadvantages of organic farming. They are:

a) Lack of convenience: Conventional farming is convenient because farmers buy the agro-chemicals and apply them while in organic farming you need to create a compost or to rotate the crops. Though in recent time there are packaged organic fertilizers or pesticides but they are expensive

b) Time consuming: Organic farming method is time consuming and it is one of the biggest disadvantages of organic farming. Organic farming requires greater interaction between farmers and their crops for observation and timely intervention. It is inherently more labour intensive than conventional agriculture.

c) Chemical alternative's information: For operating this type of farm, a farmer must have a complete understanding of organic alternative of chemical. Organic farmers do not have some convenient chemical fix on the shelf for every problem they encounter.

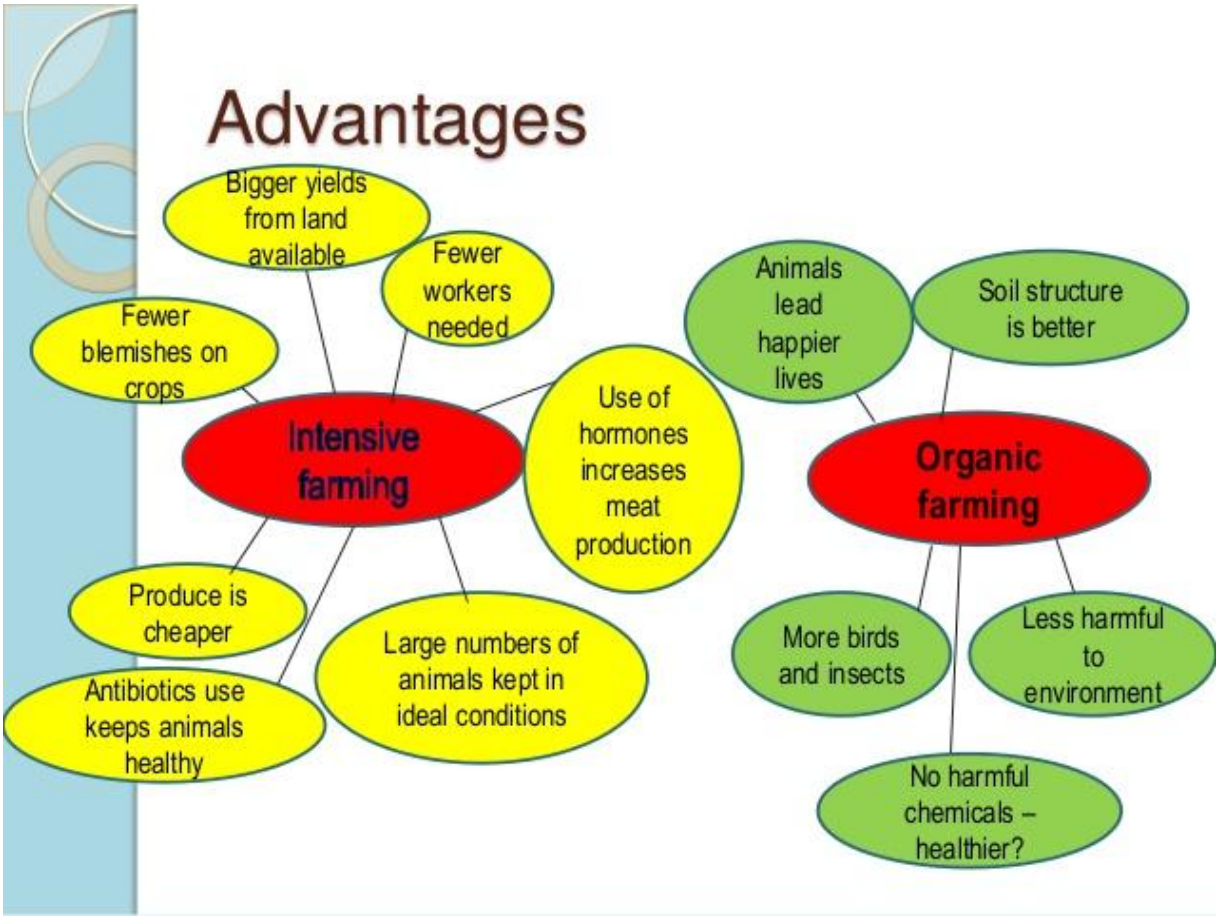

Figure 1: Advantages of conventional farming versus organic farming

Source: (Willer & Kilcher 2011 in http://www.rural21.com/fileadmin/_migrated/ RTE/ RTEmagicC_graph-S23a.jpg.jpg)

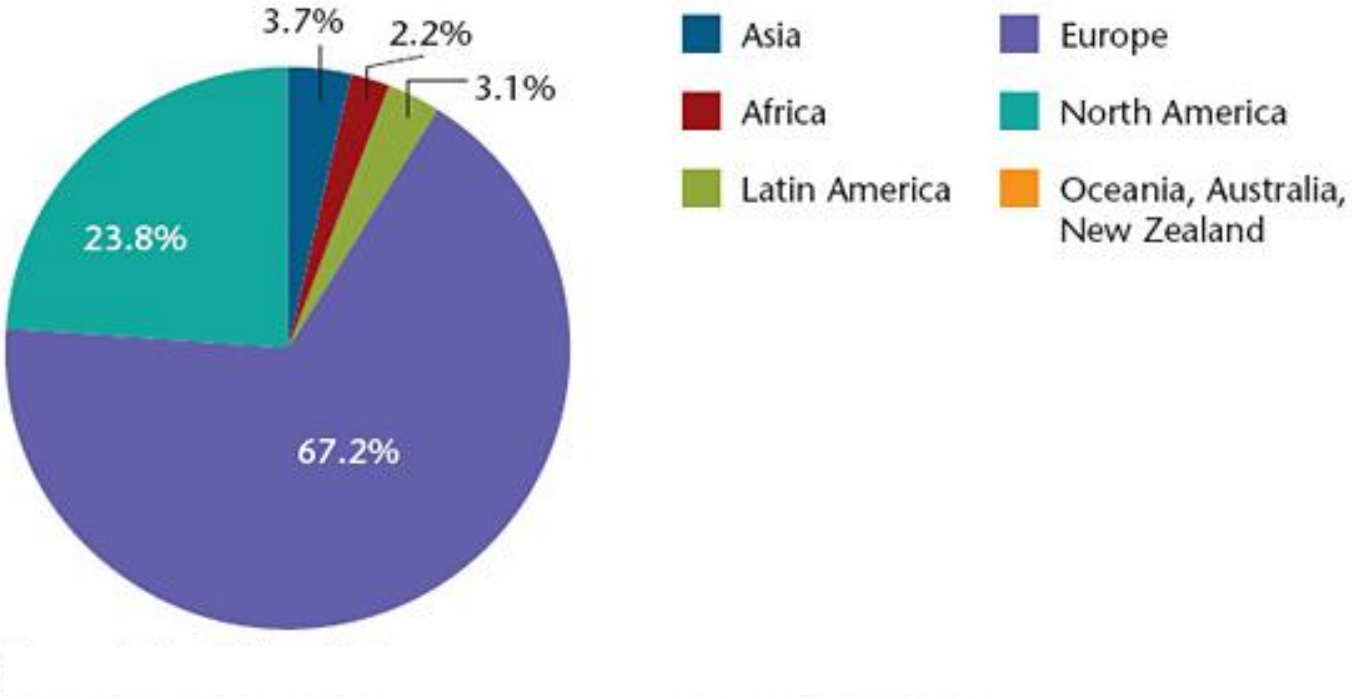

Figure 2: Distribution of organic farming areas worldwide according to continent 2009 total 5.5 million hectares)

Source: (Willer & Kilcher 2011 in http://www.rural21.com/fileadmin/ _migrated/ RTE/ RTEmagicC_graph-S23a.jpg.jpg)

2.5 Organic Livestock and Fish Farming and their challenges in Developing countries.

2.5.1 Organic livestock farming

Organic animal husbandry is defined as a system of livestock production that promotes the use of organic and biodegradable inputs from the ecosystem in terms of animal nutrition, animal health, animal housing and breeding. It deliberately avoids the use of synthetic inputs such as drugs, feed additives and genetically engineered breeding inputs.

Farmers in resource-constrained countries traditionally use few external inputs, such as allopathic medicines and antibiotics, and follow grazing-based extensive or semi- intensive production systems. In many ways, they are thus closer to organic farming systems, though largely by default. However, a lack of appropriate agro-ecological knowledge means that they fail to gain most of the environmental, social and economic benefits of organic management, which translate into ecological intensification (i.e. sustainable farming). Nevertheless, developing countries are becoming important suppliers of organic foods, since organic practices tend to suit the conditions under which their producers farm, especially in the case of smallholders living in rain-fed areas. The fact that most organic markets and consumers are in developed countries and are prepared to pay a premium for organic products makes organic farming a niche area with excellent prospects for exports. Organic farming is practised in 160 countries

and 37.2 million hectares of agricultural land are managed organically. Global sales of organic food and drink reached US$54.9 billion in 2009 (Willer & Kilcher, 2011). Forty percent of the world's organic producers are in Asia, followed by Africa (28%) and Latin America (16%). The countries with the most producers are India (677,257), Uganda (187,893) and Mexico (128,862). Yet animal products are still a small share of the organic market, compared to fruits, cereals and herbs, and, in terms of exports, are almost negligible in developing countries (Willer & Kilcher, 2011).

The evidence presented in a United Nations study, which explored the relationship between organic agriculture and food security in Africa, supports the argument that organic agriculture can be more conducive to food security in Africa than most conventional production systems, and is more likely to be sustainable in the long run (United Nations Conference on Trade and Development (UNCTAD, 2008). This is in line with the findings of the Food and Agriculture Organization of the United Nations (FAO) International Conference on Organic Agriculture and Food Security (Food and Agriculture Organization of the United Nations (FAO, 2007), where it was concluded that organic agriculture has many benefits, for developing countries in particular. Organic agriculture not only offers improved food security, but also an array of other economic, environmental, health and social advantages (United Nations Conference on Trade and Development (UNCTAD, 2008). All organic

livestock feed prohibit the use of antibiotics except in medical emergencies. Animal are given access to outdoor fresh air and sunlight.

Good animal health and welfare is an important goal for organic husbandry. In contrast to crops, animals are not just part of the farming system; they are also sentient creatures and as such deserve special care and moral consideration. Animal management is therefore different from crop management in that humans have a moral obligation to treat animals well and to intervene before they suffer or die, as this is unacceptable. Organic farming principles go further in promoting animal welfare than simply avoiding suffering; they also recommend unlimited access to 'natural' behaviour, which substantially broadens the concept of 'welfare'. Organic livestock production and animal welfare go hand in hand so, with the rising importance of animal welfare, organic animal production may also get a boost in coming years.

The animal welfare goal of avoiding suffering allows the use of synthetic medicines for treating sick animals, even when it results in that animal losing its organic status. This is the only circumstance in organic agriculture where the use of 'chemicals' is allowed and recommended, even in Europe (Van der Honing 2005). According to him, no matter how diseases are managed, the most sustainable way of avoiding suffering and the need for veterinary treatment is to make more fundamental changes in husbandry methods, such as:

– breeding for increased disease resistance

– allowing more access to the natural environment

– introducing more species-appropriate housing – feeding a well-balanced diet.

2.5.1.1 Key Considerations in Organic Livestock Production

Developing and applying the principles of organic animal husbandry at all times requires a thorough analysis of the problems and opportunities involved and existing local knowledge (Vaarst *et al,* 2006). Some key considerations in organic animal husbandry that producers and other stakeholders need to take into account as listed by Chander, *et al* (2011) are:

Origin of livestock

All livestock (and all products from these livestock) that are sold, labelled or advertised as organic must be raised under continuous organic management from the last third of gestation or at hatching (Geoffey & Baier, 2012)

Livestock feed

The total rations of livestock that are produced under organic management must consist of agricultural products that have been organically produced and handled organically (Minnesota Department of Agriculture, 2005). This includes pasture, forage and crops. Certain non-synthetic and synthetic substances may be used as feed additives and supplements. Twenty percent of the feed for dairy cattle under nine months of age is allowed to come from non

organic sources (Yitbarec & Berhane, 2014). Plastic pellets, urea, manure and by-products from mammalian or poultry slaughter are not allowed.

Living conditions

An organic livestock producer must create and maintain living conditions that promote the health and accommodate the natural behaviour of the animal. These living conditions must include access to the outdoors, shade, shelter, fresh air, direct sunlight suitable for the particular species and access to pastures for ruminants (Soil Association, 2015, United States Department of Agriculture (USDA), 2013)

Waste management

Organic livestock producers are mandated to manage manure so that it does not contribute to the contamination of crops, soil or water and optimises the recycling of nutrients. (http://www.ams.usda.gov/nop, Geoffey & Baier, 2012)

Health care

Organic livestock production requires producers to establish preventive health care practices. These practices include:

i. selecting the appropriate type and species of livestock
ii. providing adequate feed
iii. creating an appropriate environment that minimises stress, disease and parasites

iv. administering vaccines and veterinary biologics

v. following animal husbandry practices to promote animal well-being in a manner that minimises pain and stress.

Producers cannot provide preventive antibiotics. Producers are encouraged to treat animals with appropriate protocols, including antibiotics and other conventional medicines when needed, but these treated animals cannot be sold or labelled as organic (Merrigan, 2008) . Producers cannot administer hormones or other drugs for growth promotion.

Record keeping/audit trail

Organic livestock operators need to maintain records for a number of reasons. Certainly, records are important for the financial management of any organic livestock enterprise. However, records are also important to verify the organic status of the animals and the production, harvesting and handling practices associated with them and their products. These records must demonstrate compliance with the Organic Food Production Act in the USA and equivalent legislation elsewhere. Because organic production generally requires more record keeping than conventional crop production, it can seem onerous to producers in developing countries. According to Baier (2011), National Organic Programme (NOP) regulations require certified producers to keep records that are adapted to their operations, disclose all activities and transactions maintained for not less than Five years.

2.5.1.2 Problems in Developing Organic Animal Husbandry

According to Chander *et al* (2011), while many tropical countries are making concerted efforts to boost organic production, especially of high- value commercial crops, with considerable success, some serious problems are still restricting growth in organic farming. Some of these potential obstacles as highlighted by them especially when exporting livestock products, are as follows:

Lack of knowledge

There is inadequate awareness of organic production practices, animal welfare issues and the requirements of importing countries, especially by individual organic trainers/advisers and farmers. Organic production calls for an in-depth understanding of the principles, standards, production practices and requirements of the organic certification agencies. Most of the literature on organic farming is available in English, through the print medium and the Internet. Much of this material is inaccessible to small-scale farmers in the South, where illiteracy is common and most do not speak English. Technical knowhow is a production constraint of farmers in developing countries (Twarog & Vossenaar, 2002)

Small farms

In tropical countries, especially in Asia and Africa, small- scale farmers depend on livestock production for their livelihood. However, the landless animal

husbandry system, which is common in India, is not allowed under organic systems of livestock production. Small farms are generally not suitable for the development of organic livestock production, especially for exports. Small farms mean small volumes, coupled with a lack of processing infrastructure, which results in poor quality. Milk production in tropical countries is largely the domain of small producers producing small volumes. Dilution, contamination and traceability are common problems with this small scale. Therefore, both technical and policy interventions are crucial to resolve these issues. Governments must support added-value initiatives and product marketing to help make the small farm production system more sustainable. Various essential goods and services, including credit, insurance and improved technologies, must be made available to improve the efficiency of small producers (Taneja, 2005). Contract farming may be a potential solution. Under this system, many small farmers can contract their farms out to companies that produce organic food products on consolidated holdings. Such contract farming may be mutually beneficial and organic farming would be easier to pursue under such arrangements, for obvious reasons.

Livestock feeding

The United States Department of Agriculture has published new regulations addressing the use of pastures in organic livestock production (Chander et at, 2011). These rules strengthen the existing standards and clarify the USDA's

emphasis on pasture-based livestock production for producers, consumers and certifiers.

An important requirement of the final regulation is that: ‘animals must obtain a minimum of 30% dry matter intake from grazing pasture during the grazing season’. This ruling establishes that not only must animals be outside, but that the pasture must be well managed, so that it makes a significant contribution to their nutrition (Villalón, 2010). It has important implications for the livestock sector in tropical countries, where livestock intensification is increasingly being attempted to increase per-unit productivity. The organic alternative may help these farmers to reap greater benefits without intensifying their production systems, instead relying on the free-range, grazing-based systems that are already common in African and South and Central American countries.

Approximately two-thirds of organically managed land worldwide, roughly 23 million ha, was pasture in 2009. In developed countries, organic regulations are increasingly requiring that animals should be raised on pasture. In addition, further requirements are being placed on pasture quality. For example, EU regulations require that pastures be suitable for the natural nutritional and behavioural needs of particular species. These market drivers, along with a burgeoning market for grass-fed meat, has created great interest in developing pasture improvement strategies for the organic sector. Pastures may also have a large role in mitigating climate change through carbon sequestration. But, to

date, little research has been done on organic pastures in arid regions, although these areas are largely dependent on their pastures and livestock (Food and Agriculture Organization of the United Nations (FAO, 2009).

Sanitary regulations

Only a few developing countries are able to export even conventional livestock products due to the strict sanitary requirements imposed by importing countries. These disease control regulations are even more strictly monitored when it comes to organic livestock products. Governments of tropical countries are taking the initiative in this regard by emphasising their adherence to the guidelines for clean milk production, good manufacturing practices (GMP), hazard analysis and critical control points (HACCP), International Organization for Standardization (ISO) certification, and best practices recommended by GLOBALGAP (Global Good Agricultural Practices). It is a private sector body that sets voluntary standards for the certification of agricultural production processes), among others. These efforts must continue if access to international markets for organic livestock products is to be improved. This may be difficult but not impossible, especially since some developing countries, such as Argentina and Brazil, can already export organic livestock products to the EU (Harris *et al*, 2003). Massive efforts are needed to improve hygiene and disease control measures, especially during the production, processing and packaging stages. Many donor countries are coming forward to help developing countries

to produce safe and nutritious products, including organic products, through project-based assistance. Such assistance must be harnessed effectively to develop organic livestock production systems. In addition, projects may be submitted that seek international help to develop good- quality organic animal products for consumers who are ready to pay a little more for such items.

Traceability

The U.S Food and Drug Administration (FDA) proposes the following definition of traceability as ‘ the ability to identify by means of paper or electronic records a food product and its producer from where and when it came, and to where and when it was sent (OECD, 2003)

Importing countries emphasise farm-to-table traceability and, over recent times, this requirement has become even more important. It may be comparatively easy to trace the origin of products in western countries, where farms are large, with high volumes of production per farm. In the context of developing countries, where milk and meat are sourced from numerous small farmers, traceability is a more difficult option. Traceability tools that are both cost effective and suitable for mixed farming conditions in tropical countries, and, furthermore, that are acceptable to importing countries, will have to be developed. However, product traceability is also an issue in conventional production. Thus, whether developing nations seek to export organic products or conventional products, they will still need to evolve acceptable traceability

mechanisms to assure consumers that their food comes from a reliable source, with high standards of food safety, hygiene and animal welfare.

Existence of diseases

The prevalence of infectious/zoonotic diseases also adversely affects trade in livestock products. Better animal health conditions are needed, especially in the case of organic livestock production. Foot and mouth disease (FMD), swine fever and Rift Valley fever restrict exports from much of the developing world. Thus, controlling such infectious diseases should be a high priority for these countries. Indian authorities, for example, are focusing on controlling FMD, an economically important OIE-listed disease which has far-reaching implications for production and trade. Such countries can begin with the creation of disease-free zones, in which organic livestock production can be encouraged. For the most part, the animal health services of tropical countries, which are largely under government control, are often criticised for their poor reach and efficiency.

In organic livestock production, the focus is on preventing health problems and diseases through better management practices. However, despite the benefits of such an approach for animal welfare and animal-friendly production, the basic standards seem, as yet, to be insufficient to ensure a higher animal health status and a better quality of product, when compared to conventional production. Comparative studies investigating the health situations of organic and

conventional dairy farms show that there seems to be no fundamental difference between these two production methods in terms of the animal health status of dairy cows (Sundrum, 2001).

Lack of training and certification facilities

There are few local training and certification facilities available to small farmers at an affordable cost. Small farmers in tropical countries may find it difficult to pay for mandatory inspections which are often carried out by foreign certification agencies through their affiliates in producing countries. This may deter many farmers from switching over to organic production, especially if the domestic market is weak and export prospects are poor for livestock products. If we are to harness the potential benefits of organic farming, then training in organic production practices for both organic trainers/advisers and farmers is essential. Governments of tropical countries may consider sponsoring certification to encourage environmentally friendly production. In India, such efforts are being made but at present they occur mostly for high- value commercial crops, for which a strong export market is already available.

In addition to these problems, organic livestock production is not yet developed in Asian countries due to a lack of organic feed and pastures. Limited amounts of certified organic animal products, mainly poultry and pork, are available in some domestic markets. Compliance requirements are so stringent that the first organic Japan Agricultural Standard- (JAS-) certified beef sold in Japan

reportedly came from an Australian operation in 2008. Organic aquaculture (shrimp and fish), on the other hand, is emerging in China, Indonesia, Vietnam, Thailand, Malaysia & Myanmar (Wai, 2009).

2.5.2 Organic fish and farming

2.5.2.1 Organic fish

Agriculture is an important animal farming activity, and the husbandry practices used and the associated welfare issues are becoming increasingly focused on by policy makers, scientist and consumers (Awuror & Karugu, 2014). The council of Europe adopted a recommendation on the welfare of farmed fish in 2005 and in 2008 the world organization for Animal Health adopted guiding principles for fish welfare, (European Food Safety Authority (EFSA), 2009). The place of fish in protein and industrial needs of people cannot be over – emphasised. According to World Bank (2000), fish, one of the water resources is being targeted as well as improving the economic base. A hotel in Kenya – Bridges organic and Health restaurant is a place where all the foods served is considered organic (Kagai 2005). This is because all their suppliers grow their raw materials organically. The fish that are produced under natural conditions according to the organic agricultural principles, not exposed to any protective additives or genetic modification, fed with baits prepared with completely natural materials and certified by a control agency are called organic fish (Awuror & karugu, 2014).

2.5.2.2 Organic fish farming

The methods of farming engaged in by our forefathers centuries ago were less injurious to the environment, animals and humans. The need for an eco-friendly farming system arose from the ill effects of the chemical farming practices adopted world wide about a century ago. In recent years, organic agriculture has been gaining considerable relevance. Some farmers are shifting from conventional methods to organic cultivation as means of producing safe foodstuff and respecting the environment. Organic farming favours lower input costs, conserve non-renewable resources, high value markets and boost farm income besides improving quality of the product. Organic fish farming system rely on practices such as cultural and biological disease management and virtually prohibit utilization of synthetic chemicals in fish production. The organic fish farming is a holistic management system which promotes and enhances agro-ecosystem health including biodiversity, biological cycle and soil biological activities. (Bjorklund *et al*., 1990). Ecological aquaculture is based on minimal use of off-farm inputs and on-farm management practices that restore, maintain and enhance species diversity and natural harmony (Costa, 2010). Polyculture is the recommended system for organic aquaculture where different species occupy distinctly separate feeding niches within the aquaculture eco-system. Ponds and cages are the recommended rearing system for organic aquaculture. Tank systems are permitted for hatcheries and nurseries but not for grow out operations on the farm. The stocking density of cultured species is

limited and must be less than that of conventional aquaculture 10kg/m^{2}. The use of mechanical aeration is usually banned, while an exception is made for mechanical mixing and destratification of the water column for a limited number of hours per day with a small number of devices. Organic aquaculture aims to reduce instances of diseases and emphasizes preventive treatments. Chemicals and antibiotics are not permitted but vaccines and probiotics are permitted in aquaculture (Prein *et al*., 2012). Feeds should come from certified organic agricultural inputs or from aquatic sources that have been cultured under controlled organic conditions.

2.6 Concept of Rural Area

The nature of the term 'rural' varies from place to place. It often refers to areas in the country concerned which are less densely populated. A typical African rural area may not be the same as in a country like the United States of America or other developed countries. Traditionally in Nigeria, census figures had been used to differentiate rural area from urban areas. For instance, in 1953, the colonial government in Nigeria decided that an urban center is any compact settlement with a population of at least 5,000 persons while a settlement with less than 5,000 persons is a rural area. In the 1963 Nigerian census, an urban area was simply defined as one with a population of 20,000 or more inhabitants and any area with lesser population than 20,000 is regarded by implication as

rural. But the fact that there is no consensus on the use of figures had made the use of census definition problematic.

Ekong, (2010) generally defined a rural area as an area of settlement in which half or more than half of the household working population is engaged in farming. He stressed that such settlement is usually featured with lack of, or inadequate basic infrastructure or amenities such as pipe-borne water, electricity, hospitals, good road network, industries, modern banking services, commercial centres, recreational facilities etc. This means that a greater population of the country is included irrespective of settlement pattern. However, it does not just end in people working as farmers but anyone who lives in an incorporated area with less than 2,500 inhabitants is a rural resident. With the fast growth in development, it is difficult to identify rural areas, since the indices of urbanization are appearing everywhere. Rural area used to be seen as places with low population densities but recent population explosions makes it difficult to pin point rural areas and many areas are merging together to give urban areas. Again most rural areas are heterogeneously occupied by people from various places or races, hence the homogeneity nature of rural areas can also said to be fading.

Akpabio, (2005) described rural areas in three aspects as discussed below:

1. An ecological facet

The ecological characteristics of rurality include low population size, lack of infrastructural facilities and low population density.

2. An occupational dimension

Occupational characteristics assume that the dominant form of occupation in the rural area is extractive in nature i.e. farming, fishing, hunting, mining or some agriculturally-related activity like agro-processing, agro-marketing etc.

3. A socio-cultural component

Socio-cultural characteristics are difficult to define because they are based on certain observable and subjective differences in the socio-cultural behaviour of rural and urban people. A look at major characteristics of rural people will facilitate the understanding of rural area.

2.6.1 Characteristics of Rural Area

Ten essential characteristics of the rural community as explained by Puja (2015) are as follows: a. Size of the Community b. Density of Population c. Agriculture is the Main Occupation d. Close Contact with Nature e. Homogeneity of Population f. Social Stratification g. Social Interaction h. Social Mobility i. Social Solidarity j. Joint Family.

a. Size of the Community:

The village communities are smaller in area than the urban communities. As the village communities are small, the population is also low.

b. Density of Population:

As the density of population is low, the people have intimate relationships and face-to-face contacts with each other. In a village, everyone knows everyone.

c. Agriculture is the Main Occupation:

Agriculture is the fundamental occupation of the rural people and forms the basis of rural economy. A farmer has to perform various agricultural activities for which he needs the cooperation of other members. Usually, these members are from his family. Thus, the members of the entire family share agricultural activities.

d. Close Contact with Nature:

The rural people are in close contact with nature as most of their daily activities revolve around the natural environment. This is the reason why a ruralite is more influenced by nature than an urbanite. The villagers consider land as their real mother as they depend on it for their food, clothing and shelter.

e. Homogeneity of Population:

The village communities are homogenous in nature. Most of their inhabitants are connected with agriculture and its allied occupations, though there are people belonging to different castes, religions and classes.

f. Social Stratification:

In rural society, social stratification is a traditional characteristic, based on caste. The rural society is divided into various strata on the basis of caste.

g. Social Interaction:

The frequency of social interaction in rural areas is comparatively lower than in urban areas. However, the interaction level possesses more stability and continuity. The relationships and interactions in the primary groups are intimate. The family fulfils the needs of the members and exercises control over them.

It is the family, which introduces the members to the customs, traditions and culture of the society. Due to limited contacts, they do not develop individuality and their viewpoint towards the outside world is very narrow, which makes them oppose any kind of violent change.

h. Social Mobility:

In rural areas, mobility is rigid as all the occupations are based on caste. Shifting from one occupation to another is difficult as caste is determined by birth. Thus, caste hierarchy determines the social status of the rural people.

i. Social Solidarity:

The degree of social solidarity is greater in villages as compared to urban areas. Common experience, purposes, customs and traditions form the basis of unity in the villages.

j. Joint Family:

Another characteristic feature of the rural society is the joint family system. The family controls the behaviour of the individuals. Generally, the father is the head of the family and is also responsible for maintaining the discipline among members. He manages the affairs of the family.

According to Mgbada, (2010), the rural society possesses the following Characteristics:

1. Closeness to nature

People in rural areas are directly in contact with elements in their physical and biological environments. The physical environment here includes all topographic factors like soil inorganic elements, natural forces such as wind, radiation gravity e.t.c while the biological environment includes all micro-organisms, insects, parasites wild plants and animals. They also feed on food materials that are fresh from the farm, greater percentage of what they eat or use are as nature made it unlike urban people who depend mostly on already processed or artificial materials.

2. Occupation

In many developing countries, farming is a rural activity, farming and pastoral activity had formed the basis of rural economy. Although some ruralities are engaged in retail and petty trading, arts craft, weaving, pottery and other

primary industries, only a few tend to combine these with farming and a greater proportion of them in fact are full-time farmers.

3. Density of population

Rural areas have large expenses of land with relatively small populations; the population density (i.e. the number of persons per unit area of land) is rather low. There is a negative relationship between density of population and rurality, that is in relation to demographic concentration. This implies that as population density increases the community tends towards urban community thus the pattern of settlement changes from individual dwelling houses to multi family buildings typical of an urban setting.

4. Community size

The rural community is always smaller than the urban community, there is a higher land to man ratio of agricultural land than for industry. Therefore rural areas have a low population per square meter, in developing countries two reasons can be adduced for the difference in population size; one major reason for this is the acute dearth of rural infrastructures in the rural areas and this results to the tendency for youths to move to the urban areas where amenities are found. Secondly the population that is left in the areas is characterised by a high man to land ratio because land is abundant.

5. Homogeneity

Homogeneity refers to similarity in socio and psychological characteristics such as language, beliefs and pattern of behaviour. Members of a village share common interest and major occupation through frequent face to face contact. The ‘we feeling’ is very strong in rural areas than urban areas. What concerns a family is usually of interest to other families. This is exactly the opposite of what is obtainable in towns where people are heterogeneous in terms of language, religion, behaviour, norms and others. The culture of the rural people is simple because it is homogeneous while that of the urban people is complex as a result of the heterogeneous nature of the people.

6. Social control

Social control is stronger in the rural areas and people are expected to conform strongly to establish rules of conducts. While in urban areas compliance with prescribed rules and orders is mandatory and there are definite penalties associated with contra ventures such as fines and imprisonment. Rural communities have established ways or methods of dealing with deviants; for example, ostracism is a severe form of punishment in which villagers are forbidden to have any dealings with the culprits. In the rural area, the behaviour of individuals tends to be guided more by the internalization of societal norms and values. \informal means such as gossips and ostracism are applied to effect control while instance justice is demanded in cases of violation of norms. Urban

areas tend to rely more on formal institutions such as police, traffic warden etc. for maintenance of law and order generally.

7. Standard of living/level of living

Level of living is generally used to describe the quality of goods and services actually consumed by an individual and his family. This includes the ownership and use of such items as radio, television, refrigerators, cooker, eating of balanced regular meals, being well clothed, living in a decent house and surroundings, owning some means of transportation etc.

When all these modern house-hold facilities, goods and services are considered, it is obvious that people in the rural areas in Nigeria enjoy a lower level of living than their counterparts in the urban areas. Standard of living usually describes the level of desired consumption of goods and services by an individual or group. It is rather tricky to say that the standard of living in the rural area is lower than that of the urban areas since the standard of living which one desires is a function of his exposure. A man who has never seen a gas cooker or a refrigerator would not feel any loss of standards when his wife cooks with fire wood or brings him clay pot cooled water to drink. Similarly a person who has never used a water system toilet would not feel odd squatting on a latrine. However, a man who is used to these luxuries would suddenly feel his standard of living has fallen if circumstances should drive him to using these other lesser quality facilities.

8. Leadership pattern

In the rural areas, leaders are chosen on the basis of their personal merit. Such leaders are respected and accorded all the immunity and privileges due to the position he/she is occupying.

9. Social Cohesion

Social cohesion in rural areas is strong. This is because rural people share similar experiences and have common objectives.

2.6.2 Importance of Rural Areas

Rural communities are very different from the urban ones. However, they are of vital importance for the country's development including the national economy Akpabio, (2005), outlined the importance of rural areas as;

a) About seventy percent(70%) of Nigeria's total population resides in rural communities that have spread all over the countries landscape thereby making rural communities training ground for Nigeria's future leaders and technocrats. They therefore contribute an important sector of the economy which cannot be ignored in natural issues.

b) Rural dwellers provide the bulk of food which is consumed for good health. They also provide industrial raw materials and produce crops for export. They therefore assist in providing a substantial part of the nation's foreign exchange earnings.

c) The rural population constitutes the resource base of the nation. Being the largest segment of the society, they help to sustain various levels of governance by paying their taxes. They are also consumers of equipment seeds, chemical and other farm inputs, consumer's goods and other durables. In this wise, they help to sustain urban industries.

d) Rural communities are potential sources of manpower, which will be ultimately retrained fit into the urban sectors of the economy, and they are substantial converters of labour and local materials into capital.

e) Rural communities nurture and sustain the major institutions of religion and family which socialize the majority of new-dwellers in a community and they help to preserve the cultural heritage of a nation, since these areas are less exposed to change than urban areas.

f) The rural population also ensures the sustenance of urban life. They depopulate wild animals by hunting and hence ensure they do not sojourn into urban areas. Through their agricultural activities, they also ensure natural supply of oxygen for human survival.

g) Our politicians cannot survive without the rural electorate. It is they who come out in quantum and ensure sustenance of democracy by voting, unlike the urban dwellers who may be very apathetic, towards voting or registration for voting, except when compelled by regulations or fear of government sanctions.

h) Finally, it is important to note that a well-developed rural community prevents excessive rural-urban migration and the attendant social consequences of urban slums and social crimes. A well developed rural community and citizenry is also a necessity for social stability and geo-political strength. This is because an illiterate, impoverished, poorly fed and disease ridden rural citizenry cannot be relied upon to defend the national interest in times of crises.

2.6.3 Problems of Rural Areas

Some of the problems facing rural dwellers are examined below:

Rural Health

Rural areas often lack sufficient numbers of health care professionals, hospitals, and medical clinics. The National Rural Health Association (2012) points out that although one-fourth of the US population is rural, only one-tenth of physicians practice in rural areas. Urban areas have 134 physician specialists for every 100,000 residents, but rural areas have less than one-third this number. The case should be worse in developing countries like Nigeria

Rural Poverty

Rural poverty is more persistent than urban poverty because of the factors that contribute to its high rate. These factors include the out-migration of young, highly skilled workers; the lack of industrial jobs that typically have been higher paying than agricultural jobs; and limited opportunities for the high-paying jobs

of the information age. Biotech companies, electronics companies, and other symbols of the information age are hardly ever found in the nation's rural areas. Instead, they locate themselves in or near urban areas, in which are found the universities, masses of people, and other necessary aspects these companies need to succeed.

Compounding the general problem of poverty, rural areas are also more likely than non rural areas to lack human services programs to help the poor, disabled, elderly, and other people in need of aid (National Advisory Committee on Rural Health and Human Services, 2011).

Social infrastructure:

This includes educational facilities, health facilities, water supply, electricity supply, communication system etc.

Physical infrastructure:

This includes transportation roads and railways, storage and processing facilities, irrigation, flood control and water development facilities and soil conservation facilities.

Institutional infrastructure

Rural credit and financial institutions, research and agricultural extension institutions, cooperative societies and farmers unions, agricultural service

centres, rural community development and self-help agencies, land revenue systems, etc.

2.7 Theoretical Framework

The International Federation of Organic Agricultural Movements (2002) defines organic agriculture as a whole system approach based upon sustainable ecosystems, safe food, good food, animal welfare and social justice. Organic farming therefore is more than a system of production that includes or excludes certain inputs.

The aim of organic farming is to create integrated, humane, environmentally and economically viable agriculture systems in which maximum reliance is put on local or on farm renewable resources and the management of ecological and biological processes.

Certified organic food are those food that are produced according to documented standards. They are processed in a manner that avoids the use of synthetic fertilizers, pesticides, hormones, Genetically Modified Organism and they meet minimum animal welfare standards. Certified organic agriculture is defined as a certified system of agricultural production that seeks to promote ecosystem health while minimising adverse effects on natural resource. It is not just a modification of conventional practices but as a restructuring of whole farm system. Nevertheless, organic farming is not limited to certified organic farms and products but can include all productive agricultural systems that use

sustainable, natural processes rather than external inputs to enhance agricultural productivity (Scialabba & Hattam, 2002).

Organic farming practices conserve resources, enhance biodiversity and maintain the ecosystem for sustainable production and can lead to increased food production. In most cases, doubling of yields (Park, Stablar, Jones 2008) Non certified organic farming therefore is defined as local, often traditional agriculture, that is managed more or less in accordance with the principles of organic agriculture but is not based on certification, trade and premium prices and promises an alternative development path in rural areas of low income countries (Halberg *et al.*, 2006), This last group is the focus of the study.

The work of De cork (2005) shows that attitude towards organic farming, perceived attitude of the social environment and perceived feasibility of the organic production standards be used to predict the intention of conventional farmers to convert to organic farming methods. Quality and environmental oriented farmers are more likely to convert to organic farming than farmers who do not put this objective as important in their decision process. It is assumed therefore that the better farmers are informed about organic farming the better and higher their usage of Organic Farming Practices.

Sustainable farming practices enhance productivity and have proved to be superior to the use of chemical fertilizers (Kassie *et al.*, (2009). They further indicated the factors that influence farmers' decision to adopt sustainable

agricultural production practices with special focus on conservation tillage and compost. It was disclosed that poverty and access to information, the age of the household head, availability of household labour conditions, land rights among other factors, impact the choice of farming practices significantly. It was observed further that the impact of gender on technology adoption is technology specific and the decision to adopt technology is also location specific.

The multiple regression model used by Kafle (2011) for the determinants of adoption of organic vegetables farming reveals that farmers participation in organic farming- related training and visits, farm size and compatibility of organic vegetable farming have significant influence on the level of adoption, lack of adequate information on organic agriculture was seen to be the major reason for non-adoption. It was also revealed from the work that neighbours were the highest source of information.

2.8 Conceptual Framework

The conceptual framework of the study is based on the relationship between the independent variables of the study and the dependent variables. The independent variables are the socio-economic characteristics of the farmers which include age, sex, educational level, marital status, religion, farming experience, farm/stock size, household size, membership of farmers' association, extension contact and income per annum (A).

The dependent variables are the level of awareness of Organic Farming Practices (C) level of use of organic farming practices (D) and perceived benefits (E). The framework explains that the socio-economic characteristics of the farmers influence the level of awareness of organic farming practices. It goes further to explain that the moment the level of awareness is high, the level of use will increase also and vice versa. In the same manner, high level of use will confer more benefits, that is, as the level of use increases, the perceived benefits also increase. The benefits include increase in soil organic matter, reduced cost of inputs, high social value, practice compatible with the cultural systems, practice is inexpensive etc.

However, between the dependent and independent variables are intervening variables (B). The variables include economic conditions, government policy, climate change etc. The variables could inhibit or accelerate the relationship between the dependent and independent variables. In the same manner, there could be constraints to the level of awareness, use and perceived benefits. These could include the issue that organic farming practices is time consuming, transportation difficulty, inadequate technical knowledge, inadequate training by extension agents, inadequate information, etc.

The relationship between the variables are expressed below:

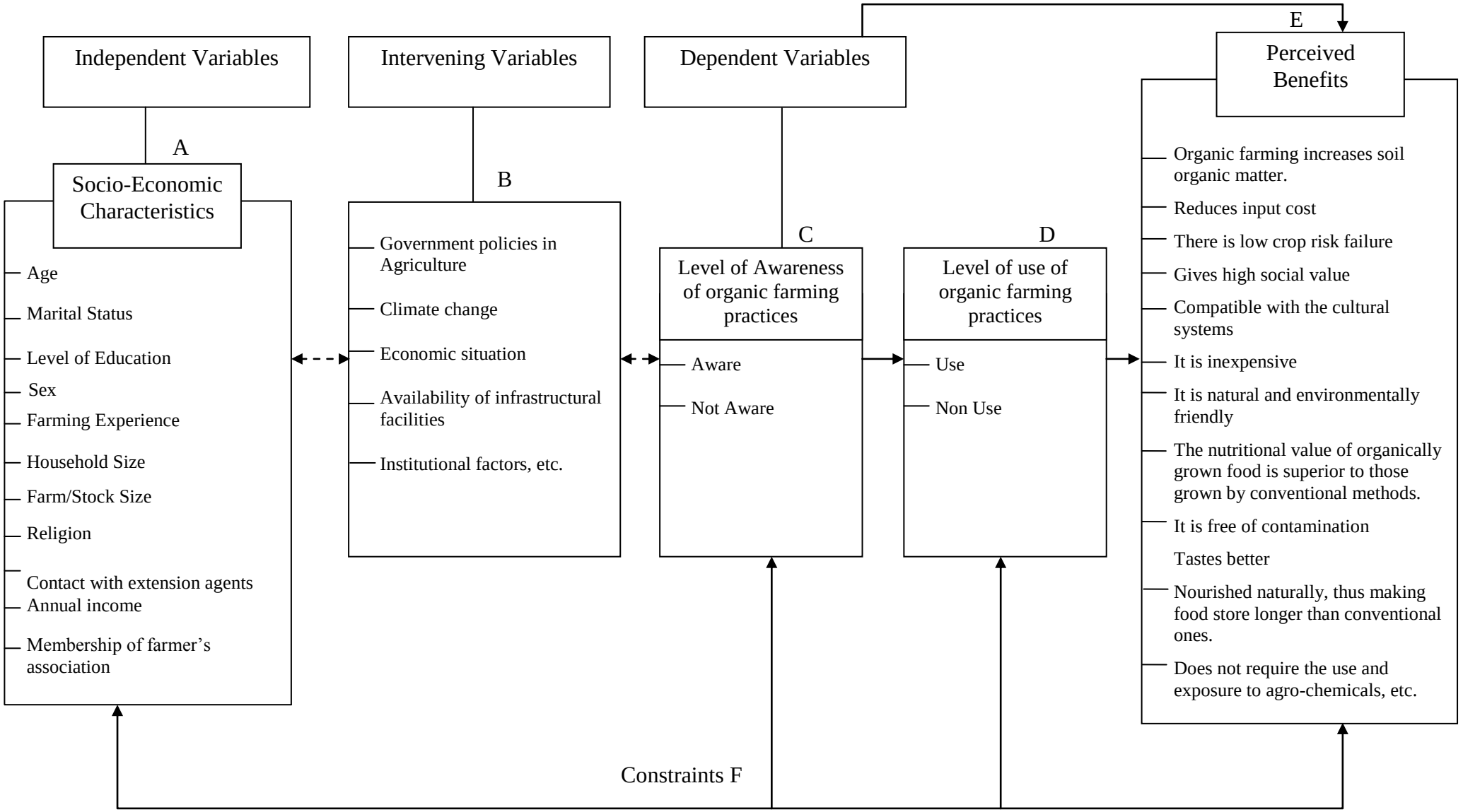

Fig. 3: Schema for describing rural household farmers' use of organic farming practices in South-south Nigeria.

CHAPTER THREE

METHODOLOGY

3.1 Study Area

The area of study is South-South, Nigeria which comprises six (6) states namely: Delta, Bayelsa, Edo, Rivers, Cross River and Akwa Ibom. The South-South region of Nigeria is strategically located at the point where the Y tail of the river Niger joins the Atlantic Ocean through the Gulf of Guinea. Though a relatively small stretch of land, the south of the country provides the economic mainstay of the economy: oil. In addition to oil and gas, the region equally contributes other key resources, with potential huge investment opportunities in tourism and agriculture. South-south zone has a population of 21,044,081(National Population Commission, 2006). The region is characterised by the tropical hot monsoon climate and a high annual rainfall which varies within the Delta. Heavy rains begin in January and falls till November with peaks in July and September before the incidence of climate change. The South-south region is endowed with very rich alluvial soil structure that supports swamp agriculture in most cases. The states that make up South- south Nigeria are described briefly below:

Figure 4: Map of South-south Region of Nigeria.

SOURCE: ("South-South Agenda: BRACED For Regional Growth", 2012)

3.1.1 Akwa-Ibom State

Akwa-Ibom is located in the coastal part of the country, with an area of 7,081km^2 and a population of almost five million. The state lies between latitudes 4° .33' and 5° 33' North and longitudes 7^0.25' and 8^0.25 East. (Wikipedia Encyclopaedia) The state shares boundaries with Cross River State, Rivers State, Abia State and the Atlantic Ocean, with Uyo the capital city. The main languages in the state are Ibibio, Annang, Eket, and Oron. Akwa-Ibom has a rich historical and cultural heritage with major attractions like the Ibeno Sand Beach, Oron Museum, Mary Slessor House and monument tomb. Akwa-Ibom State is the third largest producer of crude oil in the country and is endowed with various resources such as natural gas, salt, silver nitrate, limestone, clay, coal, and glass sand. The climate is tropical, hot and humid (Akwa Ibom State Ministry of Development, 2004). There are 31 local government areas in Akwa ibom state and they are divided into 6 agricultural zones – Ikot –Ekpene, Uyo, Eket, Oron, Abak and Etinan. The State is densely populated with a population of about 1.9 million people (National Population Commission, 2006). The main crops grown are cassava, oil palm, maize, plantain, cocoyam, okra, fluted pumpkin, water leaf, rice, rubber and raffia palm (Wikipedia encyclopaedia).

Figure 5: Map of Akwa-Ibom state Nigeria

Source: ("Media Nigeria: News in Nigeria", 2015).

3.1.2 Bayelsa State

Bayelsa is located in the lower southern part of the Niger Delta region, and its capital is Yenagoa. *Bayelsa State* is geographically located within *Latitude* 04^{o} 15' North, 05^{o} 23' South and *longitude* 05^{o} 22' West and 06^{o} 45' East (bayelsanewmediateam.blogspot.com/.../bayelsa-state-general-information) This state is blessed with many historical attractions, like the Slave Transit Hall and cultural festivals (Ekpetiama Okelede new yam festival, Odemimon festival and others), and houses a population of two million people occupying an area of 10,773km^{2} (*http://en.wikipedia.org/wiki/bayelsastate*).There are 10 languages spoken in the state; of these, Izon, Nembe, Ogbia and Epie-Atissa are the most predominant. Bayelsa State, a major oil and gas producing area, accounts for over 30% of Nigeria's oil production and is also renowned for fishing, farming, trading, carving and weaving. (*http://en.wikipedia.org/wiki/bayelsastate*) With the majority of the state under sea level, over three quarters of the area are covered by water and consists of a maze of meandering creeks and mangrove swamps. In addition, Bayelsa has large reserves of clay, sand and gravel which are of utmost importance to the industrial sector.

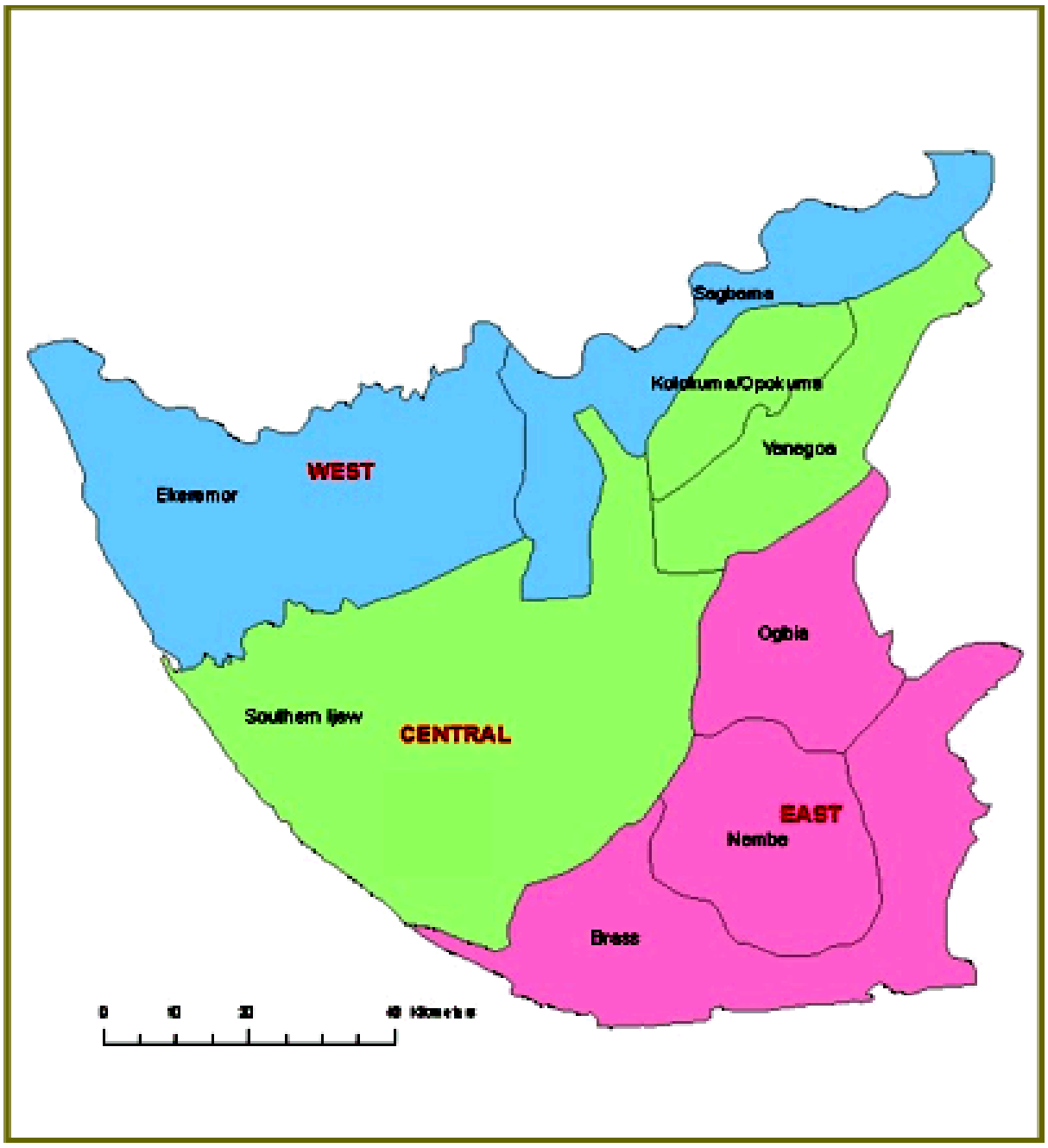

Figure 6: Map of Bayelsa state Nigeria

Source: ("Maps of Various States and their Local Governments in Nigeria", 2012).

3.1.3 Cross River State

Cross River, one of the South-South states has the capital as Calabar. It shares boundaries with Benue State to the west, Abia State to the south and the Atlantic Ocean to the east. The major languages spoken in Cross River State are Ejagham and Efik.

Cross River State is home to some of Nigeria's most beautiful scenery.Over half the land is covered by tropical rain forests, making it one of the world's biodiversity hotspots. The state is also blessed with natural resources like oil and gas, limestone, kaolin, clay, salt, barite and quartzite. The State has 18 Local Government Areas: Abi, Akampu, Akpabuyo, Bakassi, Bekwara, Biase, Boki, Calabar-Municipal, Calabar South, Etung, Ikom, Obanliku, Obubra, Obudu, Odukpani, Ogoja, Yakurr, Yala. It occupies a land area of about 20,156 square kilometres, the state has a population of 3.338 million ***(****www.crossriverstate*. *gov.ng/)*

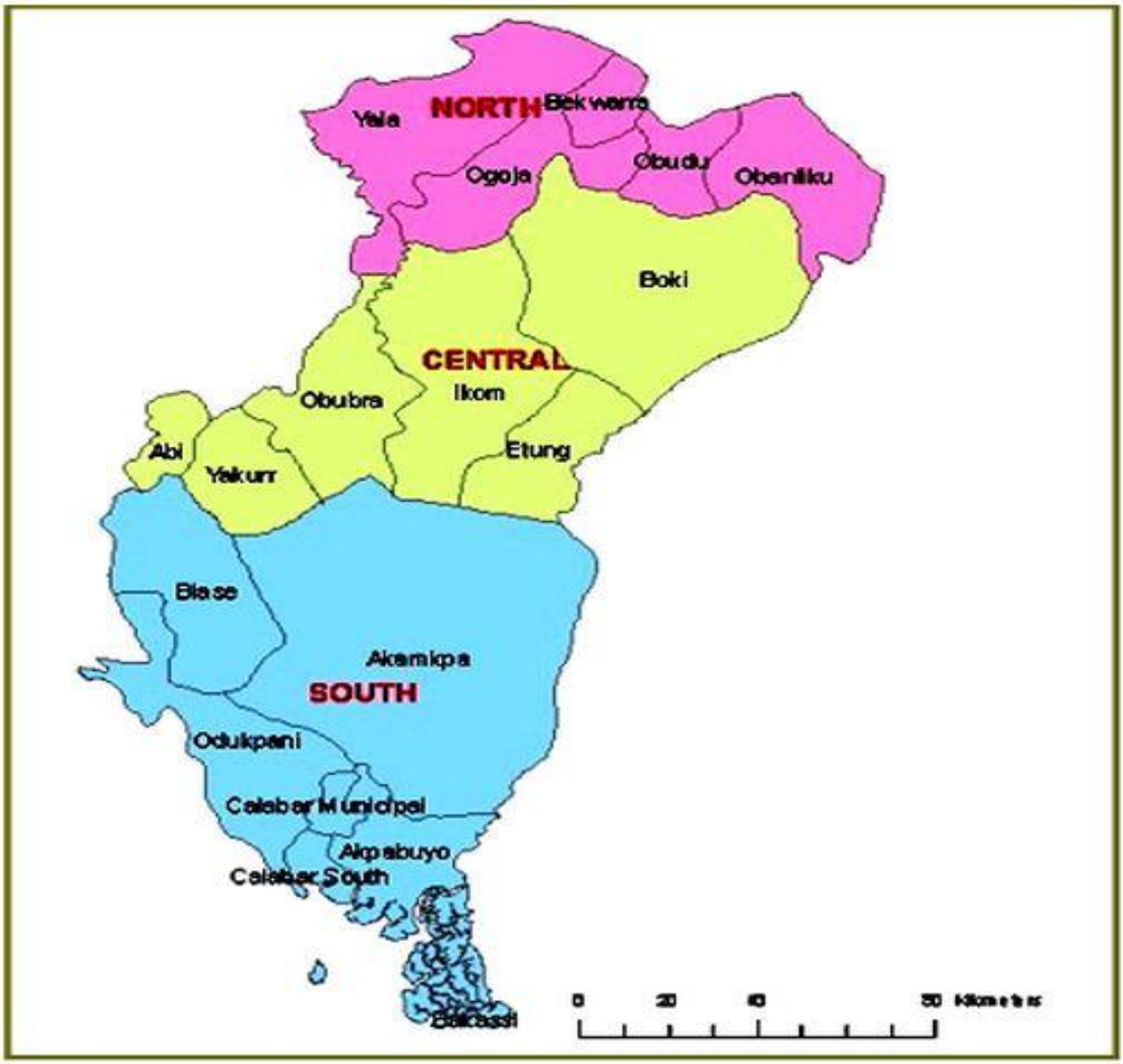

Figure 7: Map of Cross River State
Source: ("Maps of Various States and their Local Governments in Nigeria", 2012).

3.1.4 Delta State

Delta state was carved out from the former Bendel state. Delta State is an oil and agricultural producing state of Nigeria, situated in the region known as the South-South geo-political zone with a population of 4,098,291 (National Population Commission, 2006). The state covers a landmass of about 18,050 km², of which more than 60 percent is land. The state lie approximately between Longitude 5°00 and 6°.45' East and Latitude 5°00 and 6°.30' North. (*http://en.wikipedia.org/wiki/deltastate*.) Delta state shares common boundaries with Edo and Ondo state to the North-west, Imo and Anambra to the North-east, Rivers and Bayelsa to the South-east. The State has Asaba as its capital and is made up of 25 local government areas. There are various solid mineral deposits in the state which include crude oil, industrial clay, silica, lignite, kaolin, tar sand, decorative rocks and limestone, with many serving as raw materials for industries. Some major tourist attractions include Nana's Palace, Koko, Asaba Beach, Abraka River Resort Motel and River Ethiope. There are also traditional festivals in every community; the Ishe Festival for peace and progress in Ewulu town, the Edjenu of the Agbarha Clan which takes place only once or twice in a lifetime and the Oki Masquerade of Torugbene. Delta state is a major oil producing state. The State is also rich in major tubers and root crops such as cassava, cocoyam, yam and potatoes (Http//www.deltastate.gov.ng). Delta State Agricultural Development Programme, for administrative convenience, divided

the state into 3 Agricultural zones of Delta North, South and Central. Delta North agricultural zone with 9 extension blocks – Ika North-east, Ika South, Ukwani, Oshimili South, Oshimili North, Ndokwa East, Ndokwa West, Aniocha North and Aniocha South. Delta central zone has 10 extension blocks- Ughelli South, Ughelli North, Uvwie, Isoko South, Isoko North, Ethiope East, Ethiope West, Sapele, Udu and Okpe. Delta South has 6 extension blocks – Warri South, Warri North, Warri South-east, Patani, Bomadi and Burutu.

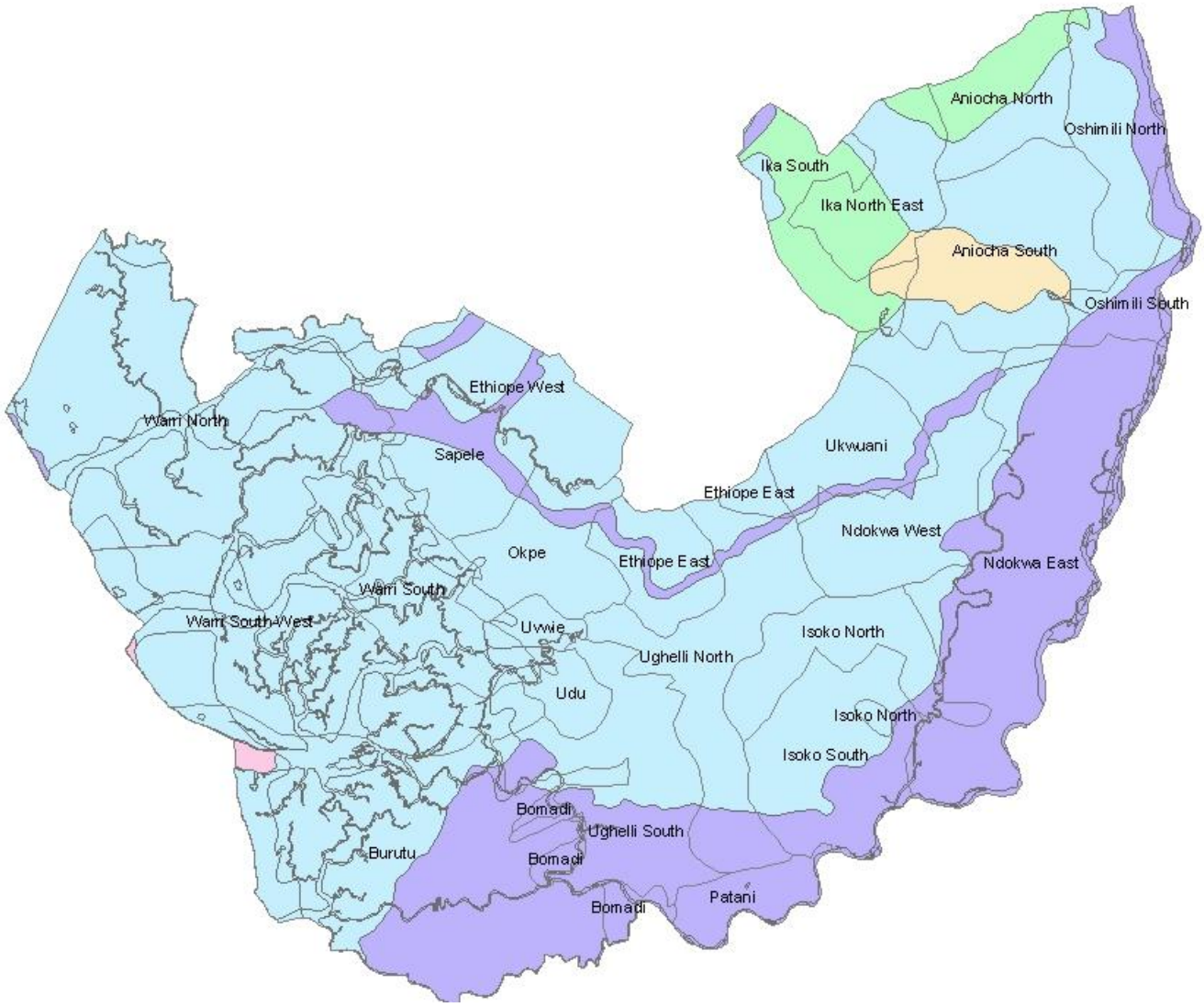

Figure 8: Map of Delta State Nigeria

Source: (http://theeagleonline.com.ng/wp-content/uploads/2013/06/Map-of-Delta-State.jpg)

3.1.5 Edo State

Benin City is the capital of Edo State. Edo state lies roughly between longitude 06° 04E and 06°43E and latitude 05° 44N and 07°34N. It is bounded in the south by Delta state, in the west by Ondo state, in the North by Kogi state and in the East by Kogi and Anambra states. It occupies a land area of about 17,802 square kilometres, the state has a population of 2,159,848 (NPC, 2006). The state is acclaimed for its abundant natural resources of crude oil, clay, chalk, marble, natural gas and limestone. Edo is home to several ethnicities with 18 local government areas. There are many tourist attractions in the state: Oba's Palace in Benin City, Ramat Park, Sakpoba Holiday Resort, the Emotan statue in Benin City, Ise Lake and River Niger Beach in Agenebode, among others. There are over 100 major festivals celebrated in Edo State between September and March annually.

Edo state is one of the food basket states of Nigeria and it is a major producer of cash crops, grains and cereals (Yahaya & Kisaiku, 2006). According to them, the predominant occupation of the populace especially in the rural areas is subsistence farming. The state is divided into 3 agricultural zones – Edo central, Edo North and Edo south. Edo central has 5 blocks – Esan central, Esan west, Esan north east, Esan south-east and Igueben. Edo north has 6 blocks – Owan west, Akoko Edo, Etsako west, Etsako east, Owan east and Etsako central. Edo south has 7 blocks – Oredo, Ovia south –west, Ovia north-east, Ikpoba-Okha, Ego, Uhunmeroge and Orhionwon. There are 18 local government areas in Edo state.

Figure 9: Map of Edo State

Source:http://www.nigerianmuse.com/wp-content/uploads/2012/11/Edo state_map.jpg

3.1.6 Rivers State

Port Harcourt is a cosmopolitan city and capital of Rivers State, which makes it the second largest commercial centre in Nigeria. Rivers State boasts of a diverse ethnic population of over six million people and occupies an area of 11,077km^2 (NPC 2006). The major languages are Ijaw and Ikwerre, although 23 languages are spoken altogether. Rivers State currently consisted of 23 Local Government Areas, Rivers State accounts for over 40% of Nigeria's crude oil production and food production - no wonder it's called the 'treasure base of the nation'. Rivers State is one of the leading states in the production of yam, cassava, cocoyam, maize, rice and beans. About 39% (760,000 hectares) of the state's total land mass, particularly in the upland area, is suitable for cultivation. Major cash crops produced are oil palm products, rubber, coconut, raffia palm and jute. Other crops grown for food include vegetables, melon, pineapples, mango, pepper, banana and plantain. The fishing industry is an important sector in Rivers State. Besides being lucrative, fishing is also a favourite past time activity. There are approximately 270 species of fish existing; with many artisanal fishermen in the riverine areas. The state provides valuable seafoods such as crabs, oysters, shrimps and sea snails among others. It occupies a land area of about 11,077 km^2 and a population of 5,185,400 millions. *(https://en.wikipedia.org/wiki/Rivers_State)*

Figure 10: Map of Rivers State.

Source:**http://www.nigerianmuse.com/wpcontent/uploads/2012/11/Rivers_state_map.jpg**

3.2 Sample and Sampling Procedures

Three prominent agricultural enterprises of fishery, livestock and crop were purposively sampled for the study. This was based on their dominance in agricultural production system of the people. The population therefore comprised rural households engaged in fish, livestock and crop production. Multistage random selection technique was employed. The first stage was the random selection of three states out of the six states that make up South-south Nigeria. The states sampled were Bayelsa, Delta and Akwa-Ibom. One-third (33.3%) of the number of agricultural zones in the states sampled were selected. Delta state is divided into three Agricultural zones- Delta North, Delta South and Delta Central out of which Delta central was selected. Bayelsa state is also classified into three Agricultural zones- Brass, Yenagoa and Sagbama out of which Brass zone was sampled. Akwa-Ibom is divided into six Agricultural zones- Abak, Eket, Etinan, Ikot Ekpene, Oron and Uyo zones. Two zones Uyo and Ikot Ekpene were sampled in Akwa- Ibom state. In each zone, three blocks were randomly selected for Delta and Bayelsa while two blocks from each of the two zones sampled in Akwa Ibom state giving a total of ten blocks. Two circles were further sampled from each selected block in Delta and Bayelsa. Twelve circles were thus selected from the two states. Two cells were sampled from each block in Akwa-Ibom. Eight circles were sampled in the state. The total number of circles used was twenty. Two rural communities were then selected from each circle giving a total of forty communities for Delta, Bayelsa and Akwa- Ibom states. Lastly, four

farmers (Household heads) for crop, livestock and fish each were randomly sampled from the forty communities giving a total of four hundred and eighty farmers. The lists of farmers were gotten from the Zonal Managers in charge of each zone.

Table 3.1: Sampled States, Blocks, Zones and Circles.

States	Zones	Blocks of Sampled Zones	Circles
Delta	Delta Central	Ethiope east	2. a) Okurekpo b) Abraka
		Isoko north	2. a) Enwe b) Aviara
		Ughelli north	2. a) Orogun b) Agbarha-Otor
Bayelsa	Brass	Nembe Bazambiri	2. a) Agrisaba b) Okoroba
		Anyama	2. a) Otuegwe b) Onuebum
		Imiringi	2. a) Imiringi b) Elebele
Akwa Ibom	Ikot Ekpene	Ikot Ekpene	2. a) Ifuho b) Ibiakpan Nto Akpan
		Urua Akpan	2.a) Nto Obio Akpan b) Ikot Adar Utor
	Uyo	Afua	2. a) Ikot Obio Akpan b) Ikot Ina Ono
		Ikot Ibio	2. a) Uyo Urban b) Nung Uyo

3.3 Data Collection

Data for this study were gathered from both primary and secondary sources. Research reports, proceedings, journals, books, internet and information from the ministry of Agriculture in the various states made up the secondary sources while information generated with questionnaire/interview schedule from farmers constituted the primary data.

The questions in the questionnaire were structured to capture and elicit information from the respondents based on the objectives and hypotheses of the study:

i. Socio economic characteristics of the respondents
ii. Farmers' awareness of organic farming practices,
iii. Organic farming practices by fish, livestock and crop farmers.
iv. Farmers' perceived benefits of organic farming
v. Farmers' sources of information on organic farming.
vi. Constraints to organic farming by the farmers
vii. Strategies for improving organic farming.

The researcher with the assistance of three trained enumerators administered and retrieved the research instrument from the respondents in the three states used for the study.

3.4 Measurement of Variables.

The variables of the study were:

Section A: Socio-economic characteristics

Age: The chronological years of life indicated by the respondents was measured in years

Level of education: (no formal education (1), primary (2), secondary (3), tertiary (4).

Sex: (dummy variables; male (1), female (0)

Marital status: (Single (0), Married (1), Widowed (2), Separated (3), Divorced (4)

Farming experience: (years)

Household size: (number of persons that eat from the same pot)

Farm size: (crop- hectares, livestock – no of animals, fish- no of stock).

Major aim of production: (sale (1), consumption (2), both (3)

Source(s) of information about organic farming practices

Dummy, yes (1) no (0) to sources of information. Frequency of use of information sources was ascertained by a 4- point Likert type scale of very often (4) often (3) rarely (2) not at all (1)

Information source use factors; Relevance (dummy, relevant (1), not relevant (0), usefulness (dummy, useful (1). Not useful (0). Credibility- (dummy, credible (1) not credible (0)

Farm enterprise characteristics – cost (dummy, expensive (1), not expensive (0), profitability-(dummy, profitable (1), not profitable (0)

Section B

Respondent awareness was measured by using dummy; aware (1) not aware (0).

Level of awareness was measured by a response to a 4-point Likert type scale of high (4). moderate (3.) low (2). not at all (1) to the organic farming practices of crop, livestock and fishery respectively.

Section C

Organic farming practices used were determined by making a list of organic farming practices and respondents indicated the ones they engaged in.

Level of use was ascertained using 4-point Likert type scale of very regularly (4) regularly (3) rarely (2) never (1)

Section D

Farmers perceived benefits of practising organic farming was measured using a 4 point Likert-type scale on 25 items statement. . The statements were assigned weights as follows strongly disagree (1); disagree (2); agree (3); strongly agree (4)

Section E

Constraints to organic farming practices were ascertained using 4 point Likert-type rating scale of strongly agree to strongly disagree as in 'D' above over item statements of assumed constraints.

Section F

Strategies for improving organic farming practices were also ascertained by responses to 4 points Likert type scale of very good (4), good (3), poor (2) , not at all (1) to a list of possible strategies to overcoming the constraints. .

3.5 Standardization of the research instruments

3.5.1 Validation of the Data Collection Instrument

Validity refers to the extent to which an empirical measure or operational definition adequately reflects the true meaning of the concept under study (Eboh, 2009). It is concerned with whether the research instrument is measuring what it intends to measure. The Jury method and rational judgement were used. In validating the measuring tools, the structured questionnaire was subjected to thorough review by the Project Supervisors and experts in Agricultural extension of the Federal University of Technology, Owerri (FUTO) and Delta State University, Abraka. The questions were examined by the experts for their relevance, importance and adequacy in eliciting the needed information. The

questions judged relevant and important to the objectives of the study were used for the study.

3.5.2 Reliability of the Data Collection Instrument

Reliability means the degree to which a given measurement procedure gives the same description of a phenomenon if the measurement is repeated. (Eboh, 2009). It is concerned with whether a particular technique will yield the same object. The split-half method which assesses reliability by measuring subjects at only one point in time was used to assess the reliability. A total of 100 copies of the questionnaire were administered to 100 respondents randomly selected from four local government area not included in the study. Data collected were shared into two categories of even and odd numbers. The Spearman Rho Correlation statistical tool was used to analyse the result. The correlation coefficient result determined the reliability following the standard recommended by Udofia (2011).

3.6 Method of Data Analyses

Data obtained were analysed using descriptive and inferential statistics namely frequency table, percentages, charts, graphs, mean, Ordinary least square multiple regression (OLS), Analysis of variance (ANOVA) and Z-test.

Objective 1: Socio-economic characteristics of the farmers were analysed using descriptive statistical tools namely; frequency table, percentage and mean.

Objective 2: Level of awareness and use of organic farming practices were analysed using percentages and mean.

(1) The mean was computed by adding the weights of the responses to the items using the scale and dividing by the number of scales :

High + Moderate + Low + Not at all/ 4 i.e 4+3+2+1/4=2.5 (Discriminating index) Mean score of 2.5 and above were considered as those that they were aware while those below 2.5 were considered otherwise.

The level of use of organic farming practices (objective 2) was analysed with percentages and mean. Based on the rating of the level of use measured on a 4-point likert type scale of use very regularly (4), regularly (3) rarely (2), never use (1), the weight of the rating scales was added and divided by 4 (the number of scales) to get the discriminating index 4+3+2+1/4=2.5. Items with mean scores of 2.5 and above were considered as those organic farming practices used while mean scores below 2.5 were considered otherwise.

Objective 3: Sources of information about organic farming practices was analysed with frequency table and percentages.

Objective 4: Perceived benefits of organic farming practices was analysed using mean score on a 4-point Likert type scale on the item statements. The statements assigned weights of; strongly agreed (4), agreed (3), disagreed (2) and strongly disagreed (1), had the weight of the scales added and divided by the number of

scales. The resultant mean score of 2.5 served as the discriminating index of benefit and below as not beneficial.

Objective 5: Information source use factors were measured thus; Relevance (dummy variables, relevant (1), not relevant (0), Credibility (dummy variables, credible (1), not credible (0), Usefulness (dummy variables, useful (1), not useful (0) Farm enterprise characteristics were measured thus; Cost of the technology (dummy variables, expensive (1), not expensive (0). Profitability (dummy variables, profitable (1), not profitable (0).

Objective 6: Constraints to organic farming practices was analysed with mean on a 4- point Likert- type rating scale of item statements of assumed constraints. highly (4), moderately (3), lowly (2), and not at all (1). The weights of the scales were added and divided by the number of scales. Mean score of 2.5 and above were considered as constraint while mean score below 2.5 were considered otherwise.

Objective 7: Strategies for improving organic farming practices was ascertained by dividing the total weight of the scale by the number of scales in the 4- point Likert type scale of very good strategy (4), good strategy (3), fair strategy (2), and poor strategy (1). Mean score of 2.5 and above were regarded as possible strategies while below 2.5 were discountenanced.

Hypothesis 1

Ordinary least square multiple regression analysis OLS was used to generate the t-ratio that was used to test the hypothesis which states that the level of awareness of organic farming practices among rural households is not significantly related to the socio-economic characteristics of the rural households – age, marital status, level of education, farming experience, household size, farm size, status of farming, sex and income.

The OLS regression model was explicitly stated as

$Ya = f(X_1X_2X_3X_4X_5X_6X_7X_8X_9.X_{10}\ X_{11}....e)$

Where Ya = pooled index of level of awareness of organic farming practices for each of crop, livestock and fishery

X_1 = Sex (Dummy variable, male = 1, female= 0)

X_2 = Age (years)

X_3 = Marital status (Single (0), Married (1), Widowed (2), Separated (3), Divorced (4)

X_4 = Level of education (no formal education (1), Primary (2), Secondary (3), Tertiary (4)

X_5 = Farming experience (Years)

X_6 = Household size (Number of persons per household that feed from the same pot

X_7 = Farm size (Hectares for crops, number of animals (livestock and fish)

X_8 = Type of farming (Dummy Full time (1) part-time (0)

X_9 = major aim of production. (Measured on a 3 point Likert type scale of consumption = 1, sale = 2, consumption and sale = 3)

X_{10} = Contact with extension agents (Dummy variables, yes = 0, no = 1)

X_{11} = Annual income (Naira)
E = Error term

It is expected a *priori* that the coefficient of $X_1X_2X_3X_4X_5X_6X_7X_8X_9X_{10}X_{11} > 0$

The four functional forms of the model namely linear, double log, exponential and semi-log were tried out. The model with the best fit, highest number of significant variables, highest coefficient of multiple determination R^2 and concurred with a *priori* expectation was used to describe the result.

Hypothesis 2

Ordinary Least Square Multiple regression analysis (OLS) was used to generate the t-ratio that was used to test the hypothesis which states that the perceived benefits of organic farming practices is not significantly related to the farmers' socio-economic characteristics. The OLS regression model was stated as follows:

$Y = f(X_{1,} X_2$ ---------X_9 e)

Where Y = Pooled index of perceived benefit of Organic .Farming (based on statements measured on 4 point Likert- type scale of Strongly Agree = 4, Agree = 3, Disagree = 2, Strongly Disagree = 1)

X_1 = Sex (dummy variable, male = 1, female = 0)

X_2 = Age (years)

X_3 = Marital status (Single (0), Married (1), Widowed (2), Separated (3), Divorced (4).

X_4 = Level of education (level of formal schooling expressed as: No formal education (1), Primary (2), Secondary (3), Tertiary (4)

X_5 = Farming experience (years)

X_6 = Household size (number of persons per household that feed from the same pot

X_7 = Farm size (hectares for crops, number for livestock and fish)

X_8 = Status of farming (dummy variable, part-time=0, full- time 1)

X_9 = Major aim of production. (consumption = 1, sale = 2, consumption and sale =3)

X_{10} = Contact with extension agents Dummy variables, yes = 0, no = 1)

X_{11} = Annual income (Naira)

E = error term

It is expected a *priori* that the coefficient of $X_1X_2X_3X_4X_5X_6X_7X_8X_9X_{10}X_{11} > 0$

Four functional forms of the model namely linear double log, exponential and semi log was estimated. A lead equation was chosen based on the magnitude of

coefficient of multiple determination (R^2) statistical significance of the variables and a priori expectation.

Hypothesis 3

Ordinary Least Square Multiple regression analysis (OLS) to test hypothesis 3 which states that - There is no significant relationship between the socio economic characteristics of the farmers and their level of use of organic farming practices

$Ya = f(X_1X_2X_3X_4X_5X_6X_7X_8X_9X_{10}X_{11})$.

Where Ya = pooled index of level of use of organic farming practices.

X_1 = Gender (dummy variable, male=1, female=0)

X_2 = Age (years)

X_3 = Marital status (Single (0), Married (1), Widowed (2), Separated (3), Divorced (4).

X_4 = Level of education (No formal education (1), Primary (2), Secondary (3), Tertiary (4)

X_5 = Farming experience (years)

X_6 = Household size (number of persons per household that feed from the same pot)

X_7 = farm size (hectares for crops, number of animals (livestock and fish)

X_8 = Type of farming (dummy variable, full- time = 1, part-time = 0

X_9 = major aim of production. (sale = 1, consumption = 2, both = 3)

X_{10} = Contact with extension agents Dummy variables, yes = 0, no = 1)

X_{11} = Annual income (Naira)

E = error term

It is expected *a priori* that the coefficient of $X_1X_2X_3X_4X_5X_6X_7X_8X_9X_{10}X_{11} > 0$

Linear, double log, exponential and semi-log were estimated and the model with the best fit (highest number of significant variables, coefficient of multiple determination and F-ratio in addition to the *a priori* expectation).

Hypothesis 4

ANOVA model was used to test the hypothesis which states that there are no significant differences in the farmers' use of organic farming practices in the three sampled states of the study.

Generally, ANOVA formula (Udofia 2011) is represented thus :

$$F = \frac{\text{Between Sample variance}}{\text{Within Sample Variance}}$$

$$= \frac{MSS\ B}{MSS\ W}$$

$$= \frac{SSB/k-1}{SSW/n-k}$$

$$= \frac{SSB/n-k}{SSW/k-1}$$

SST = SSW + SSB

$$SSW = \sum_{I=1}^{nj} \sum_{J=1}^{k} [0ij - 0j]$$

$$SSB = \sum_{J=1}^{k} nj \; [0-0]$$

Where

SST = the total sum of square

SSB = the between sum of square

SSW = the within sum of square

Nj = Sample size from population

K = number of samples

Oj = mean of sample population

O = grand mean

N = number of observations

Oij - i^{th} = observation from the population j

k-1 = degrees of freedom for between samples

n-k = degrees of freedom within sample.

The result was further subjected to a Post Hoc multiple comparism test to specifically find out where exactly the difference in their organic farming practices lie.

Hypothesis 5

Z test was used to test the hypothesis. There is no significant difference in the level of use of organic farming practices between male and female farmers.

The z test is represented thus:

$$\frac{\overline{X}_1 - \overline{X}_2}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}}$$

Source Ohiajianya (2004)

Where z = the value by which the statistical significance of the mean difference is to be judged.

$\overline{X}_1$ – mean use of OFP by the male farmers

$\overline{X}_2$ - mean use of OFP by the female farmers

S_1^2 - The variance of the use by the male farmers

S_2^2 - The variance of the use by the female farmers

n_1 – The number of respondents in group 1

n_2 - The number of respondents in group 2

The higher the Z ratio, the lower the probability of obtaining a sample difference equal to or greater than the difference actually observed.

CHAPTER FOUR

RESULTS AND DISCUSSION

The findings of the study were presented in this chapter under eight subheadings namely:

a) Socio economic characteristics of respondents

b) Awareness / level of awareness of organic farming practices among crop, livestock and fish farmers.

c) Farmer's information sources

d) Use of organic farming practices among crop, livestock and fish farmers.

e) Farmers' perceived benefits of organic farming

f) Constraints to using organic farming practices.

g) Suggestions for the improvement of organic farming

h) Hypotheses of the study

4.1 Socio-economic characteristics of respondents

4.1.1: Sex

Table 4.1: Distribution of the farmers by sex.

Sex	Frequency	Percentage
Male	295	63.6
Female	169	36.4
Total	**464**	**100**

Field survey, 2015.

From the results in Table 4.1, the majority (63.6%) of the respondents were male while 36.4 percent were female. It shows that males are more involved in farming in South-South Nigeria. This could be attributed to the socio- cultural advantages in favour of male in the zone. These could include right to land for farming economic trees and institutional support services like extension, credit, etc all skewed in support of male. This result is supported by the findings of Nwankwo, Peters & Benkelman (2009) that male gender still dominated farming activities in Nigeria.

4.1.2: Age

Table 4.2: Distribution of the farmers by age

Age (years)	Frequency	Percentage (%)	Mean ($\bar{x}$)
19-32	93	20.04	
33-46	202	43.53	
47-60	141	30.39	43
61-74	28	6.03	
Total	**464**	**100**	

Field survey, 2015.

Table 4.2 shows that 20.0 percent of the respondents were between the ages of 19-32 years; 43.5 percent were between the ages of 33-46 years; 30 percent were between 47-60 years while 60.3 percent were between 61-72 years. The mean age was 43 years. The result implies that the farmers are young and this is an asset to organic farming practices. Young farmers are innovative and thus can adopt innovations faster. They are full of energy and as such can withstand the drudgery associated with farming. This agrees with the work of Obi, (2013) which revealed that most farmers in South-south Nigeria fall between ages 41-60 years.

4.1.3: Marital status

Table 4.3: Distribution of the farmers by marital status.

Marital status	Frequency	Percentage (%)
Single	59	12.7
Married	354	76.3
Widowed	25	5.4
Separated	14	3.0
Divorced	14	2.0
Total	**464**	**100**

Field survey, 2015.

Table 4.3 indicates that the married farmers formed the majority with 76.3 percent; 12.7 percent were single, while 10.4 percent were widowed, separated or divorced. Marriage confers legal right to use the services of either of the spouses and the attendant offspring(s). The dominance of the distribution by married farmers could be to ensure food security to the household at easy daily reach.

4.1.4: Level of education

Table 4.4: Distribution of farmers by level of education

Education	Frequency	Percentage (%)
No formal	95	20.5
Primary	68	14.7
Secondary	148	31.9
Tertiary	153	32.80
Total	**464**	**100**

Field survey, 2015.

The result in Table 4.4 showed that 20.5 percent of the respondents had no formal education and 14.7 percent had primary education, 31.9 percent had secondary education while 32.8 had tertiary education. The level of education of farmers from this result is high. This is very good because educational status of farmers influence adoption of improved technologies even organic farming practices. This is confirmed by Agwu & Anyanwu (1996) which noted that increase in educational status of farmers positively influence adoption of improved technologies and practices.

4.1.5: Religion

Table 4.5: Distribution of farmers by religion

Religion	Frequency	Percentage (%)
Islam	26	5.6
Christian	406	87.3
Traditional /other religion	33	7.1
Total	**464**	**100**

Field survey, 2015.

The result of the distribution of farmers by religion revealed that 87.3 percent were Christians and 5.6 percent were Muslims, while traditional/other religions were 7.1 percent Farmers in South-south Nigeria are predominantly Christians. The riverine environment and the entrance / activities of the missionaries through the route may have been instrumental to this. Religion confers brotherhood and could be a platform for the dissemination of innovations and technologies of organic farming.

4.1.6: Farming experience

Table 4.6: Distribution of farmers by farming experience

Farming experience (years)	Frequency	Percentage (%)	Mean ($\bar{x}$)
1-2	379	81.7	
21-40	82	17.7	
41-50	0	0.0	12
51-70	3	0.6	
Total	**464**	**100**	

The farming experience distribution of the farmers, Table 4.5 reveals that 81.7 percent had farming experience ranging between 1 - 20 years. 17.1 percent had farming experience ranging from 21-40 years, while 0.6 percent had farming experience ranging from 51-70 years. The mean farming experience was 12 years. Experience is a valuable asset in farming. It shapes a farmer's opinion and guides his decision making prowess. Experience could engender adoption of innovations as the farmer's encounter in his environment directs his will and drive. The use of organic farming practices could be favoured with farmers having several years of farming experience.

4.1.7: Farm size

Table 4.7 Distribution of farmers by farm size

Farm size (hectares)	Frequency	Percentage (%)	Mean ($\bar{x}$)
Farm size (crop)			
0.1-0.5	124	89.2	
0.6 – 1	7	5.0	
1.1 – 1.5	3	2.1	4
1.6 – 2	0	0	
Above 2	5	3.7	
Total	139	100	
Farmsize (livestock)			
Cattle			
None	97	98.0	
0–5	2	2.0	
6–10	0	0	
11-15	0	0	
16-20	0	0	
Above 20	0	0	
Total	99	100	
Farm size (poultry)			
0-500	56	56.6	
501-1000	10	10.0	
1001-1500	5	5.0	
1501-2000	8	8.1	
2001-2500	3	3.0	1223
2501-3000	6	6.0	
3001-3500	1	1.0	
3501-4000	5	5.0	
4001-4500	0	0	
Above 4500	5	5.0	
Total	99	100	

Farm size (sheep)			
None	94	94.9	
1-5	2	2.0	
6-10	3	3.0	
11-15	0	0.0	0
16-20	0	0.0	
Above 20	0	0.0	
Total	99	100	
Farm size (goat)			
None	80	80.8	
1-5	5	5.0	
6-10	3	3.0	
11-15	4	4.0	9
16-20	5	5.0	
Above 20	2	2.0	
Total	99	100	
Farm size (fish)			
≤ 1000	30	26.1	
1001-2000	29	25.3	
2001-3000	23	20.1	
3001-4000	10	8.7	
4001-5000	6	5.2	
5001-6000	4	3.5	2683
6001-7000	4	3.5	
7001-8000	4	3.5	
8001-9000	1	0.9	
9001 and above	4	3.5	
Total	115	100	

Field survey, 2015.

The distribution of the farmers by farm size in Table 4.7 reveals that 89.2 percent of farmers had farm size ranging from 0.1-0.5 hectares, 5.0 percent had farm size ranging from 0.6-1 hectares, 2.1 percent had from 1.1-1.5 hectares . The mean farm size was 4 hectares. The small farm size distribution could be attributed to

alternative land uses, fragmentation of holdings and the wide coverage of the environment by the Atlantic Ocean. A number of authors reported that majority of sub-Sahara population living in rural areas can be considered as smallholders mainly because of their limited resources relative to other farmers in the same sector (Dixon Taniguchi, Wattenbach & Tanyeri- Arbur, 2004). For the Livestock farmers, answers to the questions posed during interview revealed that 19.2 percent rear goats, 5 percent rear sheep, 2 percent rear cattle while 80.8 percent were into poultry. For the specific enterprises, the average stocking capacity for fish was two thousand six hundred and eighty three. The average farm / stock size for cattle was 0, poultry was 1223 birds, sheep was 0 and goats was 9. Farm size could be a serious factor in farm decision making. Large farm size could predispose to increased adoption of innovations or high use of organic farming practices. It could also be a pointer to the level of investment and status of operation. This could determine the level of commitment to the business.

4.1.8: Household size

Table 4.8: Distribution of farmers by household size

Household	Frequency	Percentage (%)	Mean ($\bar{x}$)
1-5	288	62.1	5
6-10	167	36.0	
11-13	9	1.93	
Total	**464**	**100**	

Field survey, 2015.

The household distribution of the farmers shows that 62.1 percent had household size of 1-5 persons; 36.0 percent had between 6-10 persons and 1.9 percent had between 11-13 persons. The average household size was 5. Akinnnagbe and Ajayi (2010) in their study revealed that majority of households in rural areas in Nigeria maintain household size of 6-10. The household size is moderate. A large household size could pre- dispose conversion of investible fund to consumptive as the farmer has many mouth to feed. Here the farmer may have less to commit to the farm business and this could degenerate entanglement within the vicious cycle of poverty. However, large household size could furnish farm labour and ensure the receipt of more extension messages. A small household size could culminate in low labour supply and reduced consumption.

4.1.9: Membership of Farmers' association

Table 4.9: Distribution of farmers by membership of farmers' association

Farmer association	Frequency	Percentage (%)
Yes	240	51.7
No	224	48.3
Total	**464**	**100**

Field survey, 2015.

The result in Table 4.9 shows that 51.7 percent of the farmers indicated that they belonged to farmers' associations and 48.3 percent do not belong to any. The reason for this large percentage in farmers' membership of association is because farmers have always worked in groups in order to enjoy benefits together. Lopez & Reguena (2005) reported that the adopters of organic farming practices in Spanish olive orchard were commonly members of agricultural association and had received more information and trainings about organic practices. The membership of farmers' association could be an asset to the use of organic farming practices. The farmers would be fast in analysing the obvious gains and observe possibly from one another's farms the applicability of the practices.

4.1.10: Aims of production

Table 4.10: Distribution of farmers by aims of production.

Aims of production	Frequency	Percentage (%)
Sale	111	23.9
Consumption	33	7.1
Both	320	69.0
Total	**464**	**100**

Field survey, 2015.

The study reveals that majority (69.0 percent) of the respondents have both sale and consumption as their major aim of production while 23.9 percent indicated sale, the remaining 7.1 percent were for consumption. It is not surprising that majority identified sales and consumption. Most of the farmers have families to feed and the excess after consumption they sell for income to meet up with other needs of theirs. However, the indication for sale only could be by farmers who have other sources of income from where consumption needs are met. They could be part- time farmers. The percentage that indicated for consumption only could be those that do not take farming as a business but as a way of life. Thus, their scope of production would be very low. The aim of production would determine the scope of operation and subsequently the use of organic farming practices.

4.1.11: Annual income

Table 4.11: Distribution of farmers by annual income.

Annual income	Frequency	Percentage (%)	Mean ($\bar{x}$)
0 - 2,000,000	415	89.4	1,000,000
2,000,001 – 4,000,000	28	6.0	
4,000,001 – 6,000,000	9	1.9	
6,000,001 – 8,000,000	3	0.7	
8,000,001 – 10,000,000	3	0.7	
10,000,001 – 12,000,000	1	0.2	
12,000,001 – 14,000,000	2	0.4	
14,000,001 – 16,000,000	1	0.2	
16,000,001 – 18,000,000	1	0.2	
18,000,001 – 20,000,000	0	0	
20,000,001 – 22,000,000	1	0.2	
TOTAL	**464**	**100**	

Field survey, 2015.

Most of the farmers 89.4 percent earned annual income less than 2,000.00 while 6 percent earned 2,000,001- 4,000,000. Also 1.9 percent earned between 4,000,001 - 6,000,000. Again 0.7 percent earned 6,000,001 – 8,000,000, and 8,000,001- 10,000.00 respectively. Others included 0.2 percent for 10.000.001 – 12,000.000, 14,000,001 – 16,000,000, 16,000,001 – 18,000,000 and 20,000,001 – 22,000,000 respectively. In the same manner, 0.4 percent had 12,000,001 – 14,000,000. The mean annual income was 1,000,000 naira. (₦1m). This was an average of eighty-four thousand naira monthly and two thousand six hundred naira daily, over and above the poverty level of $1 (one dollar per day)

4.1.12: Contact with extension agents.

Table 4.12: Distribution of farmers by contact with extension agents and frequency of contact

Contact With Ext. Agents	Frequency	Percentage (%)
Yes	319	68.8
No	145	31.2
Frequency of contact		
Not at all	145	31.2
Once in a fortnight	212	45.7
Once in a month	95	20.5
Twice in a year	7	1.5
Once in a year	5	1.1

Field survey, 2015.

Most of the respondents, 68.8 percent had contact with extension agents while 31.2 percent had no contact with extension agents. On the frequency of contact, no contact at all was 31.2 percent, once in a forth-night 45.7 percent, once in a month 20.5 percent, twice a year 1.5 percent, while once in a year 1.1 percent. It is interesting to note that over 50 percent of the farmers had contact with extension agents. This implies that farmers were familiar with extension agents and like anyone else, people believe who they are familiar with. Therefore, any programme geared towards improvement and encouragement of farmers in adopting an innovation like organic farming would be better done through agricultural extension agents.

4.2 Awareness and level of awareness of organic farming practices among crop, livestock and fish Farmers.

4.2.1: Awareness of Organic Farming Practices

4.2.1.1: Awareness of Organic Farming Practices Among Crop Farmers

Table 4.13: Distribution of the crop farmers by awareness of organic farming practices.

Organic Farming Practices	**Aware**	**%**	**Not aware**	**%**
Crop Rotation	71	51.1	68	48.9
Green Manure	106	76.3	33	23.7
Cover Crops	81	58.3	58	41.7
Farmyard Manure	116	83.5	23	16.5
Composting	81	58.3	58	41.7
Intercropping	96	69.1	43	30.9
Use of bio Control	42	30.2	97	69.8
Proper farm Spacing	35	25.2	104	74.8
Mulching	99	71.3	40	28.7
Farm cleanliness	70	50.4	69	49.6
Tillage	89	64.2	50	36.6
Spot bush burning.	97	69.8	42	30.2
Natural pesticide	57	41	82	59.0
Organic Fertilizer	94	67.6	45	32.4
Natural storage system	88	63.3	51	36.7

Field survey, 2015

Result in Table 4.13 showed that 83.5 percent of crop farmers were aware of farmyard manure, green manure (76.3 percent) and mulching (71.3 percent). Also use of spot bush burning is known by 69.8 percent, intercropping by 69.1 percent, organic fertilizer by 67.6 percent, tillage by 64.2 percent and natural storage system by 63.3 percent. Also, 58.3 percent were aware of composting and cover crops respectively. Additionally, 50.4 percent were aware of farm cleanliness while 51.1 percent were aware of crop rotation. Use of bio-control measures and proper farm spacing recorded 30.2 and 25.2 percent awareness respectively. The awareness was relatively high and this could be as a result of the practices being in line with the culture which the farmers were already familiar with and have been using. Although, awareness does not signify or mean adoption, it is an imperative prelude.

4.2 .1.2: Awareness of organic farming practices among livestock farmers.

Table 4.14: Distribution of livestock farmers by awareness of organic farming practices

Organic Farming Practices for livestock	**Aware**	**%**	**Not aware**	**%**
Adequate land holding	66	66.7	33	33.3
Farm diversification	55	55.6	44	44.4
Free movement of animals / Provision of fresh air and natural day light	38	38.4	61	61.6
Protection against adverse weather condition	42	42.4	57	57.6
Resting areas	42	42.4	57	57.6
Clean and dry beddings	44	44.4	55	55.6
Enough space for exercise	47	47.4	52	52.5
Access to fresh drinking water	87	87.9	12	12.1
Allowing livestock to Express natural behaviour	70	70.7	29	29.3
Use of local breed	40	40.4	59	59.6
Natural reproduction technique	46	46.4	53	53.6
Produce without genetic engineering , ionizing radiation or sewage sludge	48	48.4	51	51.5
Adequate feeding	83	83.9	16	16.2
Animal feeding is 100% organic	83	83.4	32	32.3
Prompt treatment of sick animals	72	72.4	27	27.3
Manage animals without antibiotics	25	25.3	74	74.7
Traditional/natural treatment of sick animals	37	37.4	62	62.6
Vaccinate only during disease outbreak	30	30.3	69	69.7
Manage without added growth hormones	34	34.5	45	45.5
Accurate record keeping	66	66.7	33	33.3

Field survey, 2015

As shown in Table 4.14, eight out of twenty outlined organic livestock practices were above 50 percent. Supply of livestock with fresh drinking water had the highest percentage of 87.9 percent followed by adequate feeding (83.9 percent), animal feeding of 100% organic (83.4 percent), prompt treatment of sick animals (72.4 percent), allowing livestock to express natural behaviour (70.7 percent), adequate land holding (66.7 percent), accurate record keeping (66.7 percent) and farm diversification (55.6 percent). Other practices were below 50 percent. These included clean and dry beddings, enough space for exercise, free movement of animals/ provision of fresh air and natural day light and local breed is used. It is worthy to note that only 40 percent of the responded items scored was 50 percent and above. This implies that the awareness of organic livestock farming practices is low.

4.2.1.3: Awareness of Organic Farming Practices Among Fish Farmers

Table 4.15: Distribution of fish farmers by awareness of organic farming practices

Organic Farming Practices	Aware	%	Not aware	%
Eco-friendly design	93	80.9	22	19.1
Manage without growth Hormone	84	73.0	31	27.0
Antibiotics is only used in clinical cases where no other treatment would work	50	43.5	65	56.5
Cultivate without genetic engineering.	71	61.7	44	38.3
Site is far from polluting substances	52	45.2	63	54.8
High quality water source (stream, river, ,	84	73.0	31	27.0
Organic fertilizer	61	53.0	54	47.0
Low stock density	76	60.1	39	39.9
Manage without synthetic appetizer and colouring	75	65.2	40	34.8
Poly- culture	45	39.1	70	60.9
Proper record keeping	50	43.5	65	56.5
Pond protection from predators	102	88.7	13	11.3
Use of resistant species	86	74.8	29	25.2
Natural treatment (homeopathy)	72	62.6	43	37.4

Field survey, 2015.

From table 4.15 it was revealed that a good number of the organic farming practices had over 50 percent awareness. Pond protection from predators (88.8 percent), eco-friendly design (80.9 percent), use of resistant specie (74.8 percent), management without growth hormones and high quality water source (73.0 percent). Also, management without synthetic appetizer and colouring (65.2 percent), natural treatment (62.6 percent), cultivation without genetic engineering (61.7 percent), low stock density 10kg/m (60.1 percent) and organic fertilizer (53 percent). Only four organic farming practices were below 50 percent. They were location of site faraway from polluting substances (45.2 percent), antibiotics used only in clinical cases where no other treatment would work (43.5 percent), proper record keeping (43.5 percent), and poly-culture (39.1 percent). The grand mean of the percentage ratings was 71. This high percentage of awareness could also be attributed to fish farming practices being in line with the traditional method of fish farming.

4.2.2: Level of awareness of organic farming practices

4.2.2.1: Level of awareness of organic farming practices among crop farmers.

Table 4.16: Distribution of crop farmers by level of awareness of organic farming practices.

Organic Farming Practices	Not at all	Low	Moderate	High	Mean	Std Deviation
Crop Rotation	68 (43.9)	12 (8.6)	41 (29.5)	18 (12.5)	2.06	1.14
Green Manure	33 (23.7)	33 (23.7)	54 (38.8)	19 (13.7)	2.42	0.99
Cover Crops	58 (41.7)	16 (11.5)	43 (30.9)	22 (15.8)	2.20	1.15
Farmyard Manure	23 (16.5)	18 (12.9)	59 (42.4)	39 (28.1)	2.82	1.02
Composting	58 (41.7)	5 (3.6)	43 (30.9)	33 (23.7)	2.36	1.25
Intercropping	43 (30.9)	15 (10.8)	46 (33.1)	35 (25.2)	2.53	1.17
Use of bio-control	97 (69.8)	18 (12.9)	12 (8.6)	12 (8.6)	1.56	0.97
Proper farm spacing	104 (74.8)	10 (7.2)	21 (15.1)	4 (2.9)	1.46	0.85
Mulching	40 (28.7)	14 (10.1)	54 (38.8)	31 (22.3)	2.54	1.13
Farm cleanliness	69 (49.6)	12 (8.6)	38 (27.3)	20 (14.4)	2.06	1.16
Tillage	50 (35.97)	5 (5.04)	43 (30.9)	39 (28.05)	2.51	1.23
Spot bush burning	42 (30.2)	6 (4.3)	61 (43.9)	30 (21.6)	2.56	1.13
Natural pesticide	82 (59.0)	16 (11.5)	35 (15.2)	5 (4.3)	1.74	0.98
Organic fertilizer	45 (32.4)	10 (7.2)	34 (24.5)	50 (36.0)	2.64	1.27
Natural storage system	51 (36.7)	15 (10.8)	48 (34.5)	25 (18.0)	2.3	1.15

Field survey, 2015.

Mean score ≥2.50 = aware (A), mean score < 2.50 = not aware (NA)

Values in parenthesis stand for percentages

From Table 4.16, out of the fifteen listed organic farming practices based on the level of awareness, the farmers were aware of six of such practices. The practices were farmyard manure $\bar{x} = 2.81$, SD $= 1.02$, organic fertilizer $\bar{x} =$ 2.64, SD = 1.27, Spot burning $\bar{x} = 2.56$, SD = 1.13, mulching $\bar{x} =$ 2.54, SD = 1.13 intercropping $\bar{x} =$ 2.53, SD = 1.17 and tillage $\bar{x} = 2.51$, SD = 1.23. The mean scores of other practices were below 2.50, the discriminating index. The organic practices in this category were green manuring. ($\bar{x} = 2.42$, SD = 1.02, composting ($\bar{x} = 2.36$, SD = 1.25), natural storage system ($\bar{x} = 2.30$, SD = 1.15), use of cover crops ($\bar{x} = 2.20$, SD = 1.15), crop rotation and farm cleanliness ($\bar{x} = 2.06$, SD = 1.14 and 1.16) respectively, use of natural pesticides ($\bar{x} =$1.74, SD = 0.98), use of bio-control measures ($\bar{x} =$1.56, SD = 0.97), and proper farm spacing ($\bar{x} =$1.46, SD = 0.85).

Generally, the awareness level was low as only six out of 15 items (40%) had above the 2.50 mean index. This could be attributed to low emphasis on organic farming practices by the Agricultural Development Programme. It calls for increased sensitization using several means to reach the farmers.

4.2.2.2: Level of awareness of organic farming practices among livestock farmers

Table 4.17: Distribution of livestock farmers by level of awareness of organic farming practices.

Organic Farming Practices for livestock	Not at all	Low	Moderate	High	Mean	Std Deviation
Adequate land holding	33 (33.3)	40 (40.4)	14 (14.1)	12 (12.1)	2.05	0.98
Farm diversification	44 (44.4)	29 (29.3)	25 (25.5)	1 (1.0)	1.82	0.85
Free movement of animals/Provision of fresh air and natural day light	61 (61.6)	6 (6.1)	25 (25.3)	7 (7.1)	1.77	1.05
Protection against adverse weather condition	57 (57.6)	2 (2.0)	30 (30.3)	10 (10.1)	1.92	1.14
Resting areas	57 (57.6)	16 (16.2)	13 (13.1)	13 (13.1)	1.81	1.10
Clean and dry beddings	55 (55.6)	3 (3.0)	29 (29.3)	15 (15.2)	2.09	1.29
Enough space for exercise	52 (52.5)	3 (3.0)	29 (29.3)	15 (15.2)	2.07	1.19
Access to fresh drinking water by livestock	12 (12.1)	1 (1.0)	59 (59.6)	27 (27.3)	3.02	0.88
Allowing livestock to express natural behaviour	29 (29.3)	11 (11.1)	40 (40.1)	19 (19.2)	2.50	1.11
Use of local breed	59 (59.6)	2 (2.0)	26 (26.3)	12 (12.1)	1.90	1.16
Natural reproduction technique	53 (53.6)	11 (11.1)	20 (20.2)	15 (15.2)	1.96	1.16
Produce without genetic engineering , ionising radiation or sewage sludge	51 (51.5)	25 (25.3)	15 (15.2)	8 (8.1)	1.79	0.98
Adequate feeding	16 (16.2)	64 (64.6)	0 (0.0)	19 (19.2)	2.86	0.91
Animal feeding is 100% organic	32 (32.3)	3 (3.0)	24 (24.2)	40 (40.4)	2.72	1.29
Prompt treatment of sick animals	27 (27.3)	10 (10.1)	51 (51.5)	11 (11.1)	1.74	1.01
Manage animals without antibiotics	74 (74.7)	10 (10.1)	7 (7.1)	8 (8.1)	1.48	0.94
Traditional/natural treatment of sick animals	62 (62.6)	11 (11.1)	15 (15.2)	11 (11.1)	1.74	1.08
Vaccinate only during disease outbreak	69 (69.7)	16 (16.2)	8 (8.1)	6 (6.1)	1.50	0.88
Manage without added growth hormones	45 (45.5)	29 (29.3)	15 (15.2)	10 (10.1)	1.89	1.01
Accurate record keeping	33 (33.3)	1 (1.0)	40 (40.4)	25 (25.3)	2.57	1.20

Field survey, 2015.

Mean score ≥ 2.50 = aware (A), mean score < 2.50 = not aware (NA)

Values in parenthesis stand for percentages.

Table 4.17 shows that farmers were adequately aware of allowing livestock access to fresh drinking water $\bar{x}$ =3.02 and SD of 0.86, adequate feeding ($\bar{x}$ = 2.86 and SD of 0.91), animal feeding of 100% organic ($\bar{x}$ =2.72 and SD of 1.27) and accurate record keeping ($\bar{x}$ = 2.57 and SD of 1.20). The four practices above had mean scores above the discriminating index. The other practices were below the discriminating index of 2.50. These included farm diversification with mean of 1.82 and standard deviation of 0.85, free movement of animals / provision of fresh air and natural day light ($\bar{x}$ = 1.77 and SD = 1.05), protection against adverse weather condition with mean 1.92 and standard deviation of 1.14, provision of resting areas ($\bar{x}$ = 1.81, SD = 1.10), clean and dry bedding ($\bar{x}$ = 2.09, SD = 1.29), enough space for exercise ($\bar{x}$ = 2.07, SD = 1.19).

In the same manner, use of local breed of livestock had mean of 1.90 and SD of 1.26, natural reproduction technique ($\bar{x}$ =1.96, SD = 1.16, produce without genetic engineering with mean of 1.77 and standard deviation of 0.98, prompt treatment of sick animals with mean of 1.74 and SD of 1.00, managing animals without antibiotics ($\bar{x}$ =1.48, SD = 0.94), traditional / natural treatment of sick animals ($\bar{x}$ = 1.74, SD = 1.08), vaccinate only at disease outbreak ($\bar{x}$ = 1.50, SD = 0.88) and no addition of growth hormones ($\bar{x}$ = 1.89, SD = 1.01)

The grand mean was 2.04 which falls below the discriminating index of 2.50. This could be as a result of poor extension campaign in organic livestock practices and this call for increased extension campaign to sensitize people and sustain interest.

4.2.2.3: Level of awareness of organic farming practices among fish farmers

Table 4.18: Distribution of fish farmers by level of awareness of organic farming practices

Organic Farming Practices	Not at all	Low	Moderate	High	Mean	Std deviation
Eco-friendly design	22 (19.1)	4 (3.5)	51 (44.3)	38 (33.0)	2.91	1.06
Manage without growth Hormone	31 (27.0)	3 (2.6)	61 (53.0)	20 (17.4)	2.60	1.06
Antibiotics is only used in clinical cases where no other treatment would work	65 (56.5)	2 (1.7)	19 (16.5)	29 (25.2)	2.10	1.32
Cultivate without genetic engineering.	44 (38.3)	5 (4.3)	21 (18.3)	45 (39.1)	2.58	1.34
Site is far from polluting substances	63 (54.8)	4 (3.5)	20 (17.4)	28 (24.3)	2.11	1.30
High quality water source (stream, river)	31 (27.0)	1 (0.9)	31 (27.0)	52 (45.2)	2.90	1.24
Organic fertilizer	54 (47.0)	4 (3.5)	20 (17.4)	31 (27.0)	2.24	**1.29**
Low stock density 10kg/m	39 (39.9)	6 (5.2)	47 (40.9)	23 (20.0)	2.46	1.16
Manage without synthetic appetizer and colouring	40 (34.8)	15 (13.0)	44 (38.3)	16 (13.9)	2.31	1.09
Polyculture	70 (60.9)	13 (11.3)	18 (15.7)	14 (12.2)	1.79	1.10
Proper record keeping	65 (56.5)	3 (2.6)	18 (15.7)	29 (25.2)	2.09	1.32
Pond protection from predators	13 (11.3)	2 (1.7)	36 (31.3)	64 (55.7)	3.31	0.97
Use of resistant species	29 (25.2)	1 (0.9)	34 (29.6)	51 (44.3)	2.95)	1.21
Natural treatment (homeopathy)	43 (37.4)	8 (7.0)	11 (9.6)	53 (46.1)	2.64	1.38

Source: Field survey, 2015.

Mean score ≥ 2.50 = aware (A), mean score < 2.50 = not aware (NA)

Values in parenthesis stand for percentages

Amongst fish farmers, out of the 14 listed organic farming practices; results as shown in Table 4.18 revealed that farmers were aware of six of such practices. They are eco friendly design ($\bar{x}$=2.91, SD = 1.06), high quality water source ($\bar{x}$ = 2.90, SD = 1.24), pond protection from predators ($\bar{x}$ =3.36, SD = 0.97), use of resistant species ($\bar{x}$ = 2.95, SD = 1.21), natural treatment ($\bar{x}$ = 2.64, SD = 1.38), cultivation without genetic engineering ($\bar{x}$ = 2.58, SD = 1.34) and management without growth hormones ($\bar{x}$ = 2.60, SD = 1.06). Other practices were below mean score of ($\bar{x}$=2.50). These were low stock density 10kg/m ($\bar{x}$ = 2.46, SD = 1.16), management without synthetic appetizer and colouring ($\bar{x}$ = 2.31, SD = 1.09), organic fertilizer ($\bar{x}$ = 2.24, SD = 1.29), location of site faraway from polluting substances ($\bar{x}$ = 2.11, SD = 1.30), antibiotics only use in critical cases ($\bar{x}$ = 2.10, SD = 1.32) and poly-culture ($\bar{x}$ = 1.79, SD = 1.10).The grand mean was 2.49. This implies a high awareness level which could be as a result of organic fish farming practices being in line with the traditional method of fish farming.

4.3 Use / level of use of organic farming practices among crop, livestock and fish farmers in South-South Nigeria

This section shows the result of the table on organic farming practices used by farmers in south-south Nigeria. The section outlines the different organic farming practices for crop, livestock and fish farming respectively.

4.3.1: Use of organic farming practices

4.3.1.1: Use of organic farming practices by crop farmers

4.19: Distribution of crop farmers by use of organic farming practices

Organic farming practices	Use	%	Non use	%
Crop rotation	80	57.6	59	42.4
Use of Green manure	103	74.1	36	25.9
Cover crops	82	59.0	57	41.0
Farmyard manure	113	81.3	26	18.7
Composting	72	51.8	67	48.2
Intercropping	93	68.9	46	31.1
Use of bio control measures	41	29.5	98	70.5
Proper farm spacing	35	25.2	104	74.8
Mulching	104	74.8	35	25.2
Farm cleanliness	71	51.1	68	48.9
Tillage	75	54.0	64	46.0
Spot bush burning	97	69.8	42	30.2
Natural pesticide	45	32.4	94	67.6
Organic fertilizer	89	64.0	50	36.0
Natural storage system	80	57.6	59	42.4

Field survey, 2015

The use of the various organic practices in crop production had varied percentage ratings. The use of farmyard manure had the highest percentage (81.3 %) followed by mulching with 74.8 percent. Green manure had 74.8 percent and spot bush burning 69.8 percent. Also, intercropping had 68.9 percent, cover crops 59.0 percent, crop rotation and natural storage had 57.6 percent respectively. Others were tillage (54 percent), composting (51.8 percent), farm cleanliness (51.1 percent), organic fertilizers (36.6 percent), natural pesticides (32.4 percent), bio-control (29.5 percent) and proper farm spacing (25.2 percent). The average percentage of use was 80.

The high percentage of use rating could be attributed to availability, usability, cost and efficiency in use. It is however worthy to note that some of the practices are in line with what obtains traditionally in the environment and as such do not involve hassles and stress in the procurement and use.

4.3.1.2: Use of Organic Farming Practices by livestock farmers.

Table 4.20: Distribution of livestock farmers by use of organic farming practices.

Organic farming practices	Use	%	Non use	%
Organic Farming Practices for livestock				
Adequate land holding	44	44.5	55	55.5
Farm diversification	39	39.4	60	60.5
Free movement of animals	50	50.5	49	49.5
Provision of fresh air and natural day light				
Protection against adverse weather condition	29	29.9	70	70.1
Resting areas	25	25.3	74	74.7
Clean and dry beddings	41	41.4	58	58.6
Enough space for exercise	46	46.6	53	53.4
Access to Fresh drinking water	75	75.8	24	24.2
Allowing livestock to Express natural behaviour	63	63.6	36	36.4
Use of local breed	49	49.5	50	50.5
Natural reproduction technique	57	57.6	42	42.4
Produce without genetic engineering , ionizing radiation or sewage sludge	40	40.4	59	59.6
Adequate feeding	73	73.3	26	26.3
Animal feeding is 100% organic	52	52.5	47	47.5
Prompt treatment of sick animals	60	60.6	39	39.4
Manage animals without antibiotics	21	21.2	78	78.8
Traditional/natural treatment of sick animals	36	36.4	63	63.6
Vaccinate only during disease outbreak	23	23.2	76	76.8
Manage without added growth hormones	31	31.3	68	68.7
Accurate record keeping.	54	54.5	45	45.5

Field survey, 2015.

The use of the various organic practices in livestock production had varied percentage ratings. The use of fresh drinking water had the highest percentage (75 percent), followed by adequate feeding 73 percent. Whereas allowing livestock to express natural behaviour had 63 percent, prompt treatment of sick animals had 60 percent. Also, natural reproduction technique had (57 percent), accurate record keeping (54 percent), animal feed is 100 % organic (50 percent), free movement of animals / provision of fresh air and natural day light, (49.5 percent), local breed is used (49 percent), enough space for exercise (46 percent), adequate land holding (44 percent), clean and dry beddings (41 percent), produce without genetic engineering, ionizing radiation or sewage sludge (59.6 percent). Others were farm diversification 39 percent, traditional / natural treatment of sick animals (36 percent), manage without added growth hormones (31 percent), protection against adverse weather condition (29 percent), resting areas (25 percent), vaccinate only during disease outbreak (23 percent) and manage animals without antibiotics (23 percent).

Out of twenty organic livestock practices, only eight were above average and this is not up to fifty percent rating. This is not surprising since most livestock farmers are yet to be abreast with what organic livestock entails. That is, awareness is low.

4.3.1.3: Use of organic farming practices by fish farmers

Table 4.21: Distribution of fish farmers by use of organic farming practices

Organic Farming Practices	Use	%	Non use	%
Eco-friendly design	91	79.1	24	20.9
Manage without growth Hormone	84	73.0	31	27.0
Antibiotics is only used in clinical cases where no other treatment would work	70	60.9	45	39.1
Cultivate without genetic engineering.	64	55.7	51	44.3
Site is far from polluting substances	87	75.7	28	24.3
High quality water source (stream, river)	63	54.8	52	45.2
Organic fertilizer	56	48.7	59	51.3
Low stock density 10k/m	35	30.4	80	69.6
Manage without synthetic appetizer and colouring	46	40.0	69	60.0
Poly-culture	59	51.3	56	48.7
Proper record keeping	53	46.1	62	53.9
Pond protection from predators	93	80.9	22	19.1
Use of resistant species	80	69.6	35	30.4
Natural treatment (homeopathy)	65	66.5	50	43.5

Field survey, 2015.

The use of organic farming practices among fish farmers varied slightly in percentages. Pond protection from predators had the highest percentage of 80.9 percent. The next practice was eco- friendly design (79.1 percent) followed by site protection far from polluting substances (75.7 percent). Manage without growth hormones (73.0 percent) and use of resistant varieties had (69.5 percent). Others included; natural treatment (66 percent), antibiotics is used in clinical cases where no other treatment would work (60.9 percent), cultivated without genetic engineering (64 percent), high quality water source (54.8 percent), poly-culture (51.3 percent), organic fertilizer (48.7 percent), proper record keeping (46.1 percent), manage without synthetic appetizer or colouring (40.0 percent) and low stock intensity 10kg/m. 30.4 percent. The use of organic farming practices by fish farmers was high. This could be attributed to the fact that most of the organic practices are in line with the traditional practices and what obtains in the study area.

4.3.2: Level of use of organic farming practices

4.3.2.1: Level of use of organic farming practices among crop farmers

Table 4.22: Distribution of crop farmers by level of use of organic farming practices

Organic farming practices	Never	Rarely	Regularly	very regularly	Mean	Std. Deviation
Crop rotation	59 (42.4)	13 (9.4)	56 (40.3)	11 (7.9)	2.13	1.06
Green manure	36 (24.5)	34 (24.5)	61 (43.9)	8 (5.8)	2.29	0.92
Cover crops	57 (41.0)	18 (12.9)	58 (41.7)	6 (4.3)	2.09	0.99
Farmyard manure	26 (18.7)	10 (7.2)	75 (54.0)	28 (20.1)	2.76	0.98
Composting	67 (48.2)	12 (8.6)	41 (29.5)	19 (13.7)	2.43	1.15
Intercropping	46 (30.09)	8 (5.76)	60 (43.12)	28 (17.9)	2.58	1.12
Use of bio control measures.	98 (70.5)	21 (15.1)	17 (12.2)	3 (2.2)	1.46	0.79
Proper farm spacing	104 (74.8)	13 (9.4)	13 (10.8)	7 (5.0)	1.46	0.87
Mulching	35 (25.2)	23 (16.5)	57 (41.0)	24 (17. 3)	2.50	1.05
Farm cleanliness	68 (48.9)	17 (12.2)	37 (26.6)	12 (12.2)	2.02	1.12
Tillage	64 (46.6)	6 (4.3)	49 (35.3)	20 (14.4)	2.17	1.16
Spot bush burning	42 (30.2)	11 (7.9)	60 (43.2)	26 (18.7)	2.50	1.05
Natural pesticide	94 (67.6)	10 (7.2)	30 (21.6)	5 (3.6)	1.61	0.94
Organic fertilizer	50 (64.0)	40 (28.8)	7 (5.0)	3 (2.15)	1.45	1.15
Natural storage system	59 (42.4)	13 (9.4)	56 (40.3)	11 (7.9)	2.13	1.06

Field survey, 2015

Mean score ≥ 2.50 = Use (U), mean score < 2.50 = Non Use (NU)

Values in parenthesis stand for percentages

a) Farmyard manure

From Table 4.22, farmyard manure had mean score of 2.79 and standard deviation of 0.98. This indicates that many farmers in the study area were aware of the potential of farmyard manure for soil fertility.

This result is in agreement with the report of Mafongoye *et al.*, (2006) that in Africa, farmyard manure is one of the mostly used organic inputs, as the need for increased agricultural production rises but it has been found to be limited in quality and quantity

b) Mulching

Most of the farmers practice mulching with mean score of 2.50 and standard deviation of 1.05. Mulching is a highly cost effective means of crop residue usage against soil erosion in annual row-cropping systems on sloping lands; and is at the centre of a resurgent soil conservation ethic in much of North America (Shelton *et al*, 1995). The findings of Junge *et al* .,(2009) showed that mulching and cover cropping were highly cost effective, compatible and easy to adopt. Decomposed organic materials add nutrient to the soil.

c) Spot bush burning

It is shown from the table that farmers use spot bush burning for land clearing and preparation ($\bar{x}$ = 2.50, SD = 1.05). The use has several advantages like not killing the whole micro- organisms and delaying of weeds emergence. Killing the weeds present in the farm of course reduces labour cost.

d) Intercropping

The result shows that majority practice intercropping. The mean score was $\bar{x}$=2.58 and standard deviation of 1.12. Baumann *et al.*, (2000) found out that intercropping as a cultural method can be used to suppress weeds and reduce pest population because of the different kinds of crops grown. A significant percentage carry-out intercropping on their farm activities. Cropping different kinds of crop help farmers to generate income at different intervals of harvests. As farmers wait for crops with long time maturation, they harvest the ones that have short maturation duration and take them to the market for sale.

e) Use of green manure

Green manure is the practice of burying weeds in the soil so that it can decay and return nutrients to the soil. The mean score was 2.29 with SD of 0.92. The practice binds the soil in addition to increasing nutrient content.

f) Tillage

The result shows that tillage had a mean score of 2.17 and S.D of 1.16. This again is insignificantly practiced. The advantages of tillage in crop production cannot be over emphasized. However farmers practice is low considering the mean score. Reason may be as a result of the labour intensive nature of tillage practices.

g) Crop rotation

Crop rotation is a practice that is as old as farming practice. It is the practice of allowing the soil to rest and regain its fertility. A mean score of ($\bar{x}$ =2.13, SD = 1.06) were recorded. It was therefore insignificantly practiced.

h) Cover Crops

The mean score of 2.09 and SD of 0.99 were recorded in the use of cover crops. Farmers usually grow cover crops as intercrop with other crops so as to cover the soil to prevent evaporation. Such cover crops are watermelon, melon, sweet potatoes, etc. Dabney *et al*., (2001) stated that cover crops can improve soil quality.

i) Composting

The practice had a mean score of 2.08 and standard deviation of 1.15. Again the mean was below 2.50 (the discriminating index) and was regarded as not significantly practiced. This is in line with the work of Adebayo (2014) which revealed that 60.4 percent of farmers do not practice composting. This low use of composting may be as a result of stress involved in making compost. Again there are technicalities involved in compost making and not all farmers are knowledgeable about this. Singh (2003) in his work among the India organic farmers reported the capacity of manure (compost) to fulfil nutrient demand of crops adequately and promote most activities of beneficial macro and micro flora in the soil. Farmers are aware of the benefits of compost in improving soil quality (Ouedraogo et al., 2001).

j) Farm cleanliness

Farm cleanliness is keeping the farm clean. This helps to prevent growth and multiplication of weeds, pest and diseases. Hardworking farmers always keep their field clean by visiting their farms daily. Mean score of 2.02 and SD of 1.12 was recorded.

k) Natural pesticides

Any non-toxic substance used to control fungi, insects or parasites in agriculture is referred to as natural pesticide. The mean score was 1.61 and SD of 0.94. The mean score is far below the discriminating mean. Most farmers do not understand the meaning of natural pesticides.

l) Use of bio-control measures and proper farm spacing

The result shows high level of non use of the practices. The mean of 1.46 was recorded respectively for the two organic farming practices. This may be because the farmers are not aware of these practices and possibly that they do not fit into their cultural farming practices.

m) Organic fertilizers

The use of organic fertilizer had a mean score of 1.45 and SD of 1.15. It indicates low level of usage as the mean was below 2.50, the discriminating index. Therefore organic fertilizer was rarely used by farmers in South-south Nigeria. Organic fertilizer usage though is not new but the technology of packaging it now is new and most farmers are familiar with inorganic fertilizers. There are few companies producing organic fertilizers and it is quite expensive compared to

inorganic fertilizers. The low use of organic fertilizer is supported by the work of Olayide *et al*., (2011) where 37 percent of the respondents used organic fertilizer despite its potentials. Adebayo (2014) reported that 68.9% of vegetables farmers in south west Nigeria do not use organic fertilizers.

4.3.2.2: Level of use of organic farming practices among livestock farmers.

Table 4.23: Distribution of livestock farmers by level of use of organic practices

Organic Farming Practices for livestock	Never	Rarely	Regularly	Very regularly	Mean	Std Deviation
Adequate land holding	55 (55.5)	9 (9.1)	25 (25.3)	10 (10.1)	1.89	1.10
Farm diversification	60 (60.5)	9 (9.1)	20 (20.2)	10 (10.1)	1.79	1.08
Free movement of animals/Provision of fresh air and natural day light	49 (49.5)	16 (16.2)	34 (34.3)	0 (0.00)	1.84	0.90
Protection against adverse weather condition	70 (70.1)	1 (1.0)	28 (28.3)	0 (0.00)	1.57	0.90
Resting areas	74 (74.7)	5 (5.1)	20 (20.2)	0 (0.00)	1.45	0.81
Clean and dry beddings	58 (58.6)	1 (1.0)	39 (39.4)	1 (1.0)	1.83	1.00
Enough space for exercise	53 (53.4)	15 (15.2)	20 (20.2)	11 (11.1)	1.89	1.09
Access to fresh drinking water	24 (24.2)	1 (1.0)	48 (48.5)	26 (26.3)	2.77	1.09
Allowing livestock to Express natural behaviour	36 (36.4)	3 (3.0)	57 (57.6)	3 (3.0)	2.27	0.99
Use of local breed	50 (50.5)	1 (1.0)	37 (37.4)	11 (11.1)	2.09	1.15
Natural reproduction technique	42 (42.4)	1 (1.0)	46 (46.5)	10 (10.1)	2.24	1.12
Produce without genetic engineering , ionizing radiation or sewage sludge	59 (59.6)	4 (4.0)	32 (32.3)	4 (4.0)	1.81	1.03
Adequate feeding	26 (26.3)	1 (1.0)	54 (54.5)	18 (18.2)	2.65	1.09
Animal feeding is 100% organic	47 (47.5)	3 (3.0)	34 (34.3)	15 (15.2	2.17	1.19
Prompt treatment of sick animals	39 (39.4)	1 (1.0)	57 (57.6)	2 (2.0)	2.22	1.01
Manage animals without antibiotics	78 (78.8)	3 (3.0)	17 (17.2)	1 (1.0)	1.40	0.80
Traditional/natural treatment of sick animals	63 (63.6)	8 (8.1)	27 (27.3)	1 (1.0)	1.65	0.92
Vaccinate only during disease outbreak	76 (76.8)	11 (11.1)	11 (11.1)	1 (1.0)	1.36	0.72
Manage without added growth hormones	68 (68.7)	2 (2.0)	29 (29.3)	0 (0.00)	1.60	0.91
Accurate record keeping	45 (45.5)	3 (3.0)	50 (50.5)	1 (1.0)	2.07	1.00

Source: field survey, 2015
Mean score ≥2.50 = Use (U), mean score < 2.50 = Non Use (NU)
Values in parenthesis stand for percentages

According to Chander *et al.,* (2011), key considerations in organic livestock production that producers and stakeholders need to take into account are: the origin of the livestock feeds, living conditions, waste management, health care and record keeping.

In discussing organic farming practices among livestock farmers, the items measured will be discussed under the headings listed above.

a) Origin of livestock

All livestock that are sold, labelled or advertised as organic must be raised under continuous organic management from hatching for poultry (Chander *et al.,* 2011). From Tables 4.23, use of local breed had a mean score of 2.09 (SD= 1.15) which is lower than the discriminating mean of 2.50.

b) Livestock feed

The total rations of livestock that are produced under organic management must consist of agricultural products that have been organically produced and handled organically. From Table 4.23, access to fresh drinking water had a mean score of 2.77 and standard deviation of 1.09, produce without genetic engineering, ionising radiation or sewage sludge had a mean score of 1.81 and SD of 1.03, adequate feeding 2.65 and SD of 1.09, animal feeding hundred percent organic 2.17 and SD of 1.19 and manage animal without added growth hormones 1.40 and SD of 0.91. Out of five items measuring livestock feed, only two; access to fresh drinking water 2.77 and adequate feeding 2.65 had mean above 2.50 while

the other three were negative. Even though 73 percent claimed they feed adequately, the source of feed was not 100 percent organic and this is a vital aspect of organic livestock production practices.

c) **Living condition**

An organic livestock farmer must create and maintain living conditions that promote the health and accommodate the natural behaviour of the animal. From Table 4.23, Adequate land holding had 1.89 mean score and standard deviation of 1.10, free movements of animals/provision of fresh air and natural daylight ($\bar{x}$ = 1.84, SD = 0.90), protection against adverse weather condition ($\bar{x}$ = 1.57, SD = 0.90), resting areas ($\bar{x}$ = 1.45, SD = 0.81), clean and dry beddings ($\bar{x}$ = 1.83, SD = 1.00) and enough space for exercise ($\bar{x}$ = 1.89, SD = 1.09). The various items measuring living condition of the livestock were all below 2.50 which indicate that livestock farmers in South-South Nigeria do not practice them.

d) Health

Organic livestock production requires producers to establish preventive health care practices. From Table 4.23, prompt treatment of sick animals had a mean of 2.22, SD of 1.01, traditional/natural treatment of sick animals had 1.65, SD of 1.01, vaccinate only during disease outbreak ($\bar{x}$ = 1.36, SD = 0.72) and manage animals without antibiotics ($\bar{x}$ = 1.40, SD = 0.80). The entire practices in relation to health had mean scores below 2.50 which indicate non use.

e) Record keeping

According to the standards of organic livestock production, keeping of farm records is one essential requirement. A significant number of livestock farmers do not keep farm records. Even though majority of the farmers have good educational background, they do not find any use for keeping record though 54.4 percent acknowledge that they keep record, but the level of record keeping with mean score of 2.17 (SD = 1.00) indicate low level of record keeping. This agrees with the work of Pathak & Chander (2002) that Indian organic farmers do not keep written records and none of them keeps any farm record though they have a good memory in respect of inputs used and output obtained.

The result shows that organic livestock production practices' in South-south Nigeria is low (10 percent). That is, out of twenty outlined practices, only two (10%) had mean score of 2.50 (Discriminating index) and above. This is very low compared to countries like India with 75 percent of the farmers in organic farming. (Prabir & Mahesh 2012).

4.3.2.3: Level of use of organic farming practices among fish farmers.

Table 4.24: Distribution of fish farmers by level of use of organic farming practices

Organic Farming Practices	Never	Rarely	Regularly	Very. regularly	Mean	Std Deviation
Eco-friendly design	24 (20.9)	6 (5.2)	81 (70.4)	4 (3.5)	2.56	0.86
Manage without growth hormone	31 (27.0)	5 (4.3)	79 (68.7)	0 (0.0)	2 41	0.89
Antibiotics is only used in clinical cases where no other treatment would work	45 (39.1)	29 (25.2)	40 (34.8)	1 (0.9)	1.97	0.88
Cultivate without genetic engineering.	51 (44.3)	7 (6.1)	38 (33.0)	19 (16.5)	2.21	1.18
Site is far from polluting substances	28 (24.3)	9 (7.8)	62 (53.9)	16 (13.9)	2.57	1.01
High quality water source (stream, river,	52 (45.2)	2 (1.7)	53 (46.1)	8 (7.0)	2.14	1.09
Organic fertilizer	59 (51.3)	11 (9.6)	43 (37.4)	2 (1.7)	1.89	0.98
Low stock density 10k/m	80 (69.6)	2 (1.7)	29 (25.2)	4 (3.5)	1.62	0.98
Manage without synthetic appetizer and colouring	69 (60.0)	1 (0.9)	30 (26.1)	15 (13.0)	1.92	1.78
Polyculture	56 (48.7)	7 (6.1)	50 (43.5)	2 (1.7)	1.98	0.99
Proper record keeping	62 (53.9)	1 (0.9)	44 (38.3)	8 (7.0)	1.98	1.10
Pond protection from predators	22 (19.1)	1 (0.9)	81 (70.4)	11 (9.6)	2.70	0.89
Use of resistant species	35 (30.4)	3 (2.6)	69 (60.0)	8 (7.0)	2.43	1.00
Natural treatment (homeopathy)	50 (43.5)	35 (30.4)	26 (22.6)	4 (3.5)	1.86	0.89

Field survey, 2015

Mean score ≥ 2.50 = Use (U), mean score < 2.50 = Non Use (NU)

Values in parenthesis stand for percentages

Organic fish production is a model of production which raises fishes with low stock density and attaches importance to human health without using any chemical pesticides or the products modified genetically (Do cytowanian *et al* 2010). Table 4.24, presents the level of use of organic farming practices among fish farmers. The result revealed that out of the fourteen (14) practices outlined, fish farmers engaged in the use of three of such practices. Farmers agreed to the use of eco-friendly design ($\bar{x}$ = 2.56 and SD = 0.86), site is far from polluting substances ($\bar{x}$ = 2.57 and SD =1.01) and pond protection from predators ($\bar{x}$ = 2.70 and SD = 0.89). From the result, the following were considered not being used; Management without growth hormones ($\bar{x}$ = 2.41 and SD = 0.89), antibiotics is used in critical cases where no other treatment would work ($\bar{x}$ = 1.97 and SD = 0.88), cultivate without genetic engineering ($\bar{x}$ = 2.21 and SD = 1.18), quality water source ($\bar{x}$= 2.14 and SD = 1.09), organic fertilizer ($\bar{x}$ = 1.89 and SD = 0.98), low stock density 10kg/m3 ($\bar{x}$= 1.62 and SD= 0.98), manage without synthetic appetizer and coloring ($\bar{x}$= 1.92 and SD= 1.78), poly-culture ($\bar{x}$= 1.98 and SD = 0.99), proper record keeping ($\bar{x}$ = 1.98 and SD = 1.10), use of resistant species ($\bar{x}$ = 2.43 and SD = 1.00) and natural treatment (homeopathy) ($\bar{x}$ = 1.86 and SD = 0.89).

The low use of organic farming practices among fish farmers could be as a result of challenges or difficulties in carrying out such practices and lack of awareness of the dangers associated with the conventional practices. This does not augur

well for the quest for healthy living. The work of Sakib *et al*., (2014) revealed a positive relationship between knowledge of agricultural practice and innovativeness of farmers. Shibanda (1996) in his assessment of small holder fish farmers information needs, underscored the value of information as a commodity itself and the need to recognize it as an essential resource for the small farmer in taking decisions and improving farming practices. Also, policy makers have continued to draft and pass policies such as those encouraging the importation and use of cheap agro- chemicals and fertilizers (East Africa Community, 2004). Farmers have no choice but to stick to conventional practices. Farmers are still unaware of the difference between Bio- manure and Bio- fertilizers, and inorganic and organic fertilizers.

4.4: Information sources

4.4.1: Sources of information on organic farming to farmers in South-south Nigeria

Table 4.25: Distributions of farmers by sources of information

Sources	Yes	Percentage %
Newspaper	105	35.6
Television	245	52.8
Radio	183	39.4
Sales agents	154	33.2
Extension agents	269	57.5
Family members	199	42.9
Neighbours	214	46.1
Contact farmers	182	39.2
Farmers organization	181	39.0
Agricultural show/world food day	121	26.1
Posters	119	25.6
Leaflets/pamphlets	143	30.8
Research institutions	97	20.9
NGO	91	19.6
Universities, colleges poly	110	23.7
Agricultural journal/manuals/news letters	137	29.5
Internet	106	22.8
Meetings	157	33.8
Mobile phone	142	30.6

Field survey, 2015.

From Table 4.25, out of the twenty sources of information presented, the most prominent source of information was extension agents with 57.5 percent and ranked 1st. This agreed with the work of Adebayo (2014), in his research on the sources of information on organic agriculture among vegetable farmers in South western Nigeria where extension agents ranked 1st among other sources. This is also supported by the work of Ntui *et al*., (2012) that extension agent was the most available interpersonal channel of communication. The work of Usanga *et al.*, (2011) revealed extension agents as the highest source of information on organic farming in the Derived Savannah of South-East- Ecological zone of Nigeria. This could mean that extension agents were actually having regular contacts with farmers. Personal observation of the activities of extension workers in AKADEP revealed constant and regular forth-nightly training of staff, good staff morale and effective relationship between extension agents and farmers.

Television emerged as the second on the list of sources of information with 52.8 percent. This could be because of the relative popularity of television in homes. This does not agree with popular literature. For example T.V recorded 0% source of information in fish farming (Aphunu & Agwu, 2013). However, T.V ranked 8th among twenty-one sources of information to vegetable farmers in South western Nigeria (Adebayo, 2014)

Neighbours (45.7 percent) were the third on the list of sources of information identified. This may be because neighbours are close by and farmers easily reach

out to their fellow farmers within the neighbourhoods. Also in the work of Aphunu and Agwu (2013), fellow farmers ranked 1st among the sources of information on fish farming.

Family members (42.9 percent) were the fourth on the list. There is no doubt that family members were perceived almost as partners. This is because, farmers have parents, brothers and extended family members within the same neighbourhood who are engaged in farming and can supply relevant information to one another. The study conducted by Boz (2002) found out that farmers' neighbour and farmers' own family members were the most important sources of information among Kahramanmaras rice producers. This is also supported by Ntui *et al.,* (2012), that family members is one of the most available interpersonal channels of communication. It agrees equally with the work of Okwu and Daudu (2011) carried out in Benue state, Nigeria.

Radio (39.4 percent) was fifth on the list. Radios are available everywhere and in different sizes affordable by farmers. Through mobile phones educated farmers can tune to radio stations in their handsets. Agwu *et al.,* (2008) noted that the radio farmer agricultural programme enhanced the extent of adoption of agricultural technologies.

Contact farmers (39.2 percent) and farmers organization (39.0 percent) ranked 6th in the order of sources of information to farmers. This is so because farmers most

times form groups to enjoy some benefits like credit and information sharing Lopez & Reguena (2005) reported that the adopters of organic farming practices in Spanish olive orchards were more commonly members of agricultural associations and had received more information and training about organic practices. Most often, the contact farmers are leaders in the community which makes the fellow farmers to confide and seek information from them.

Mobile phones (38.8 percent) was the 8th in ranking of the sources of information by the respondents. Mobile phones are serving a good source of information in agricultural sector and other sectors as well.

Other sources as acknowledged by farmers included meetings (30.6%), sales agents (33.3 %), newspapers/ leaflets/pamphetets (35.6%) and (30.9%), agricultural journals, manuals and newsletters (29.5%), posters (25.6 %), internet (22.8%), agricultural shows/world food days (26.1%), universities, colleges/polytechnics (23.7 %), research institutions (20.9 %), and lastly NGO's (19.6%).

4.4.1.1: Frequency of use of information sources

Table 4.26: Distribution of farmers by frequency of use of information sources.

Information sources	Not at all	Rarely	Often	Very often	Mean	Std. Deviation
Newspaper	299 (64.4)	80 (172)	73(15.7)	12(2.6)	1.56	0.85
Television	219 (47.2)	28 (6.0)	157 (33.8)	60 (12.9)	2.13	1.15
Radio	281 (60.6)	18 (3.9)	143 (30.8)	22 (4.7)	1.59	1.03
Sales agents	310 (66.8)	39 (8.4)	106 (22.8)	9 (1.9)	1.59	0.90
Extension agents	195 (42.0)	24 (5.2)	217 (46.8)	28 (6.0)	2.16	1.05
Family members	265 (57.1)	29 (6.3)	148 (31.9)	22 (4.7)	1.84	1.02
Neighbours	250 (53.9)	29 (6.3)	133 (28.7)	52 (11.2)	1.97	1.13
Contact farmers	282 (60.8)	17 (3.7)	148 (31.9)	17 (3.7)	1.78	1.01
Farmers organization	283 (61.0)	33 (7.1)	112 (24.1)	36 (7.8)	1.78	1.06
Agricultural show/world food day	343 (73.9)	47 (10.1)	71 (15.3)	3 (0.6)	1.42	0.77
Posters	345 (74.4)	43 (9.3)	64 (13.8)	12 (2.6)	1.44	0.82
Leaflets/pamphlets	321 (69.2)	40 (8.9)	89 (19.2)	14 (3.0)	1.56	0.90
Research institutions	367 (79.1)	36 (7.8)	59 (12.7)	2 (0.4)	1.34	0.71
NGO	373 (80.4)	29 (6.3)	58 (12.5)	4 (0.9)	1.33	0.73
Universities, colleges poly	354 (76.3)	39 (8.4)	65 (14.0)	6 (1.3)	1.40	0.77
Agricultural journal/ Manuals/newsletters	327 (70.5)	40 (8.6)	88 (19.0)	9 (1.9)	1.52	0.86
Internet	358 (77.2)	24 (5.2)	68 (14.7)	14 (3.0)	1.43	0.84
Mobile phone	307 (66.2)	47 (10.1)	81 (17.5)	29 (6.3)	1.63	0.97
Meetings	322 (69.4)	27 (5.8)	87 (18.8)	28 (6.0)	1.61	0.98

Field survey, 2015.

Mean score of ≥ 2.50 = source of information (accepted), < 2.50 = not a source of information (rejected)

From Table 4.26, none of the information sources was acknowledged by farmers as sources of information on organic farming practices. This is because the mean score of all the items were below 2.50 (the discriminating index). The standard deviation ranged from 0.71 to 1.15. This agreed with the work of Adewoyin (2015) carried out in Edo State on the awareness of ecological organic agriculture in Nigeria. Only seminar among other sources of information was acknowledged by 41.5 percent as their source of information. Every other source was below 30 percent. It is therefore not a surprise that the level of awareness and use of organic farming practices as revealed from this research is low. Usanga *et al* (2011) revealed also that farmers have low access to information on organic farming. In their work, sources of information on organic farming, extension agents had 28.1 percent, farmers association 18.1 percent, radio 15.6 percent, television 11.8 percent, internet 0.62 percent and mobile phones 9.3 percent.

From Table 4.26, out of the twenty sources of information presented, the source of information with the highest mean score (2.15) was Extension agents, Television emerged as the second with mean score of 2.13. Neighbours had a mean score 1.97, Family members (1.84), Radio (1.59), Contact farmers and farmer's organization (1.78), Mobile phones (1.63), meetings (1.69), sales agents (1.59), newspapers/leaflets/pamphlets (1.56), agricultural journals, manuals and newsletters (1.52), posters (1.44), internet (1.43), agricultural shows/world food days (1.42), universities, colleges/polytechnics (1.40), research institutions (1.34)

and lastly NGO's (1.30). Responses to sources of information did not vary as such. Standard deviation ranged from 0.01 – 1.15. Generally, the frequency of use of information sources was low. This could be responsible for the low level of awareness and use of the practices recorded in the work.

4.4.1.2: Information source use factor

Table 4.27: Distribution of farmers by information source use factor

	Credibility		Usefulness		Relevance	
Information Source	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**
Newspaper	112 (24.1)	352 (75.9)	140 (30.2)	324 (64.8)	90 (19.7)	374 (80.6)
Television	134 (28.9)	330 (71.1)	155 (33.4)	309 (66.6)	80 (17.5)	384 (82.8)
Radio	128 (27.6)	336 (72.4)	136 (29.3)	328 (70.7)	92 (19.8)	372 (80.2)
Sales agents	95 (20.5)	369 (79.5)	137 (29.5)	327 (70.5)	100 (21.6)	364 (78.4)
Extension agents	172 (37.1)	292 (62.9)	198 (42.7)	266 (57.3)	154 (32.2)	310 (66.8)
Family members	78 (16.8)	386 (83.2)	142 (30.6)	322 (69.4)	93 (20.0)	371 (80.0)
Neighbours	90 (19.4)	374 (80.6)	131 (28.2)	333 (71.8)	101 (21.8)	363 (78.2)
Contact farmers	124 (26.7)	340 (73.3)	142 (30.6)	322 (69.4)	127 (27.4)	337 (72.6)
Farmers organization	98 (21.1)	366 (78.9)	160 (34.5)	304 (65.5)	104 (22.4)	360 (77.6)
Agric show/world food day	89 (19.2)	375 (80.8)	126 (27.2)	338 (72.8)	92 (19.8)	372 (80.2)
Posters	72 (15.5)	392 (84.5)	90 (19.4)	374 (80.6)	92 (19.8)	372 (80.2)
Leaflets/pamphlets	72 (15.1)	392 (84.5)	100 (21.6)	364 (78.4)	77 (16.6)	387 (83.4)
Research institutions	72 (15.5)	392 (84.5)	93 (20.6)	371 (80.0)	83 (17.9)	381 (82.1)
NGO	74 (15.9)	390 (84.1)	93 (20.6)	371 (80.0)	85 (18.3)	379 (81.7)
Universities, colleges poly	86 (18.5)	378 (81.5)	107 (23.1)	357 (76.9)	93 (20.0)	371 (80.0)
Agric journal /manuals	116 (25.0)	348 (75.0)	125 (26.9)	339 (73.1)	117 (25.2)	347 (74.8)
Internet	87 (18.6)	377 (81.3)	98 (21.1)	366 (78.9)	85 (18.3)	379 (81.7)
Mobile phone	98 (21.1)	366 (78.9)	93 (20.0)	371 (80.0)	95 (20.5)	369 (79.5)
Meetings	93 (20.1)	371 (80.0)	107 (23.1)	357 (76.9)	80 (17.5)	384 (82.8)
Others	31 (6.7)	433 (93.3)	42 (9.1)	422 (90.9)	41 (8.8)	423 (91.1)

Source: Field survey, 2015.

From Table 4.27, credibility, usefulness and relevance, three different information source use factors were measured. From the table, none of the information source use factor rated up to 50 percent. The credibility rating for the information sources ranged from 6.7 percent for others which included friends, town criers, churches to 37.1 percent for extension agents. The usefulness rating ranged from 9.1 percent for other information sources like churches, friends, town criers to 34.5 percent for farmers' organization. Also, the percentage rating for the relevance of information sources ranged from 8.8 percent for other sources like churches, friends and town cries to 25.2 percent for agricultural journals / manuals. The percentage ratings show that the information sources were regarded by respondents as not being credible, useful and relevant. The low ratings could be attributed to poor reportage as in media use or inaccessibility possibly occasioned by paucity of personnel as in extension.

4.5: Perceived benefits of organic farming practices

Table 4.28: Distribution of farmers by perceived benefits of organic farming

Perceived benefits	SD	D	A	SA	Mean	Std Deviation
Organic Farming increases soil organic matter	7 (1.5)	31 (6.7)	218 (47.0)	208(44.8)	3.35	0.67
Reduces input cost	29 (6.3)	22 (4.7)	265 (57.1)	148 (31.9)	3.14	0.77
There is low crop risk failure	27 (5.8)	50 (10.8)	285 (61.4)	102 (22.0)	2.99	0.75
Gives high social value	22 (4.7)	19 (4.1)	299 (64.4)	124 (26.7)	3.13	0.69
Compatible with the cultural systems	34 (7.3)	98 (21.1)	196 (42.2)	136 (19.3)	2.93	0.89
It is inexpensive	32 (6.9)	40 (8.6)	264(56.9)	128 (27.6)	3.05	0.79
It is natural and environmentally friendly	29 (6.3)	21 (4.5)	214 (46.1)	200 (43.7)	3.26	0.81
The nutritional value of organically grown food is superior to those grown by conventional methods	16 (3.4)	25 (5.4)	170 (36.6)	253 (54.5)	3.42	0.74
A major benefit of organic food to consumer is that it is free of contamination (poison free)	16 (3.4)	20 (4.3)	156 (33.6)	273 (58.6)	3.47	0.73
Organically grown food taste better than conventional ones	20 (4.3)	20 (4.3)	221 (47.6)	203 (43.7)	3.39	1.56
Organically grown plants or animals are nourished naturally thus making organic foods store longer than conventional ones.	17 (3.7)	14 (3.0)	251 (54.1)	182 (39.2)	3.28	0.69
Organic farming does not require the use and exposure to agro-chemicals that has negative effects on man, animal and aquatic organisms.	18 (3.9)	17 (3.7)	251 (54.1)	178 (38.3)	3.33	1.55
Organic farming helps mitigate climate change as practices are environmentally friendly.	67 (14.4)	98 (21.1)	185 (39.9)	114 (24.6)	2.74	0.99
Consumers who recognize the greater food value of organic produce will pay premium prices for it	56 (12.1)	156 (33.6)	146 (31.5)	106 (22.8)	2.65	0.96
Organic farming benefits agric production without destroying our environmental resources ensuring sustainability for not only the current but also future generation	42 (9.1)	33 (7.1)	231 (49.8)	158 (34.1)	3.09	0.88
Genetically modified crops or animals have detrimental effect on humans and the environment	61 (13.1)	41 (8.8)	213 (45.9)	149 (32.1)	2.97	0.97
Organic farming produces less green house emissions and it is considerably more climate friendly	30 (6.5)	56 (12.1)	220 (47.4)	156 (34.1)	3.09	0.88
Organic vegetables contain substances that help fight against cancer and other age related diseases	19 (4.1)	20 (4.3)	166 (35.8)	259 (55.8)	3.43	0.76
I am convinced that organic farming is better than conventional (use of agro- chemicals)	15 (3.2)	23 (5.0)	206 (14.4)	220 (47.4)	3.35	0.72
Inorganic substances such as fertilizers, pesticides, herbicides are harmful to mankind irrespective of their ability to boost agric production.	20 (4.3)	22 (4.7)	150 (32.3)	272 (58.6)	3.45	0.78

Field survey, 2015

Mean score ≥ 2.50 = Accepted, mean score < 2.50 = Rejected

Values in parenthesis stand for percentages

Farmers' responses to item statement on the benefits of organic farming practices were rated on a 4-point Likert-type scale. A mean of or greater than 2.50 denotes positive response and below is the contrary.

From Table 4.28, result showed overall general positive response on perceived benefits of organic farming practices. All the items mean scores were above 2.50, the discriminating point. The prominent benefit as ranked by the farmers were statements that organic farming is free of contamination (Poison free) ($\bar{x}$ = 3.47), inorganic substance such as fertilizers pesticides, herbicides are harmful to mankind irrespective of their ability to boost agricultural production ($\bar{x}$ = 3.45), Organic vegetables contain substances that help fight against cancer and other age-related diseases. ($\bar{x}$ = 3.43), the nutritional value of organically grown foods is superior to those grown by conventional methods ($\bar{x}$ = 3.42), organic foods taste better ($\bar{x}$ = 3.39), organic farming increases soil organic matter, ($\bar{x}$ = 3.35), organic farming does not require the use and exposure to agro-chemicals that have negative effect on man, animals and aquatic organisms ($\bar{x}$ = 3.33), they store better ($\bar{x}$ = 3.28), organic farming is natural and environmentally friendly ($\bar{x}$ = 3.26), reduce input cost ($\bar{x}$ = 3.14), gives high social value (= 3.13), organic farming produces less green house emission and it is considerably more climate friendly ($\bar{x}$ = 3.09), organic farming benefits agricultural production without destroying the environmental resources thus ensuring sustainability for not only the current but also for the future generation ($\bar{x}$ = 3.08), and it is inexpensive

($\bar{x}$ = 3.05) Others include that there is low risk ($\bar{x}$ = 2.99), genetically modified crops or animals have detrimental effect on human and the environment ($\bar{x}$ = 2.96), organic farming is compatible with the cultural system ($\bar{x}$ = 2.93), it helps mitigate climate change ($\bar{x}$ = 2.74), consumer who recognize the greater value of organic produce will pay premium prices ($\bar{x}$ = 2.65). The grand mean of the perceived benefits was 3.17 out of 4.00. This shows that the perceived benefits of organic farming were high.

The positive responses to the item statements on the benefits of organic farming go a long way to confirm certain previous research results. The freedom of organic produce from contamination lays credence to the report of Adeoye (2013) of a family of five that died after consuming vegetables contaminated with Gammalin 20 purchased from the market without strict observance of the expiration date of the effect of the chemical before the consumption. The work of Mondelagers *et al*., (2009) noted that organic vegetables contain less contamination and more nutrients and as such are healthier and safer compared to the conventional.

On the nutritional aspect, Gbadegesin (2013) reported that opinion poll conducted by the United Kingdom Mass Project in 2000 revealed that about 50 percent of the people believed that food produced organically are more nutritious than the conventional produce. In the same perspective, Sharma (2005) noted that organic products have no side effect, no pollution, ensure efficient use of local resources,

maintenance of soil fertility , lower economic burden on the farmer, tasty and nutritious, longer durability in storage and balance of pest and predators. Orji (2013) confirmed that organic foods are healthier and tastier.

On the impact on the environment, IFOAM (2009) and Pretty (1999) observed that FAO regards organic farming as an effective strategy for mitigating climate change and building composting soils that are better adapted to extreme weather conditions associated with climate change. Thus Parrot & Marsden (2002) noted that organic farming is sustainable and environmentally friendly. On soil quality and fertility, the work of Katyal (2000) showed that organic farming is the only option to improve soil organic carbon for sustenance of soil quality and future agricultural productivity. In the same manner, Rigby & Carceres (2001) noted that organic farming conserves soil fertility and system stability.

About the inexpensive nature of organic farming, the cost which the farmers would have incurred in the purchase of inorganic fertilizers, growth hormones, antibiotics, etc is avoided. The work of Bateman (1993) reported that organic farming involves a reduction in inputs. In response to perceived benefits of organic farming the standard deviation scores were below one (1) indicating similar responses. Only two items had a score of 1. 56 and 1.55.

4.6 Constraints of organic farming practices

Table 4.29: Distribution of farmers by constraints to organic farming practices

Constraints	Strongly Disagreed	Disagree	Agree	Strongly agreed	Mean	Std Deviation
Organic farming is time consuming	95 (20.5)	132 (28.4)	135 (29.1)	102 (22.0)	2.58	1.72
Transportation of organic materials for use is difficult	62 (13.4)	168 (36.2)	148 (31.9)	86 (18.5)	2.55	0.94
Not enough technical know-how	42 (9.1)	123 (26.5)	208 (44.8)	91 (19.6)	2.75	0.87
Lack of effective training by extension agents	46 (9.9)	148 (31.9)	194 (41.8)	76 (16.4)	2.64	0.87
Inadequate information	73 (15.7)	52 (11.2)	215 (46.3)	124 (26.7)	2.84	0.99
Consumers are yet to appreciate the difference between the produce of the two farming system	94 (20.3)	110 (23.7)	169 (36.4)	91 (19.6)	2.55	1.02
More labour intensive when compared to the use of chemicals/mechanical farming	36 (7.8)	170 (36.6)	137 (29.5)	121 (26.1)	2.73	0.93
Unavailability of organic inputs	64 (13.8)	74 (15.9)	177 (38.1)	149 (32.1)	2.88	1.01
No encouragement from government	36 (7.8)	114 (24.6)	124 (26.7)	190 (40.9)	3.00	0.98
It is not appreciated, therefore no benefit	147 (31.7)	241 (51.9)	45 (9.7)	31 (6.7)	1.95	1.24
No access to organic fertilizers	58 (12.5)	149 (32.1)	130 (28.6)	127 (27.4)	2.70	1.00
Lack of awareness	40 (8.6)	153 (33.0)	163 (35.1)	108 (23.3)	2.75	1.05
Output marketing problem	70 (15.1)	162 (34.9)	174 (37.5)	58 (12.5)	2.47	0.89
Shortage of bio mass	51 (11.0)	125 (26.9)	171 (36.9)	117 (25.2)	2.76	0.95
High input cost	122 (26.3)	199 (42.9)	94 (20.7)	49 (10.6)	2.15	0.93
Non availability of farm inputs	83 (17.9)	96 (20.7)	177 (38.1)	108 (23.3)	2.66	1.02
Lack of appropriate agricultural policy	24 (5.2)	69 (14.9)	219 (47.2)	152 (32.8)	3.07	0.82
Lack of financial support	35 (7.5)	51 (11.0)	164 (35.3)	214 (46.1)	3.20	0.91
Low production	86 (18.5)	201 (43.3)	96 (20.7)	81 (17.5)	2.37	0.98
Lack of quality standard for bio inputs	34 (7.3)	73 (15.7)	202 (43.5)	155 (33.4)	3.03	0.89
Political and social factors	24 (5.2)	29 (6.3)	184 (39.7)	227 (48.9)	3.32	0.81

Field survey, 2015.

Mean score ≥ 2.50 = Accepted, mean score < 2.50 = not accepted

Values in parenthesis stand for percentages

In Table 4.29, the result of the analysis of farmers' responses to item statement on the constraints of organic farming practices were presented. Based on mean discriminating index of 2.50, 17 item statements were considered as constraints while 4 were not. The mean ranged from 1.95 to 3.32. The items - organic farming is not being appreciated therefore has no benefit ($\bar{x}$ = 1.95), high input cost ($\bar{x}$ = 2.15), low production ($\bar{x}$ = 2.37) and output marketing problem ($\bar{x}$ = 2.47) were not seen as constraints of organic farming in the study area. This contradicts the work of Barkley (2002) which revealed that production, distribution and marketing of organic foods is costlier than conventional food. The outstanding constraints as shown in Table 4.29 included political and social factors with mean score of 3.32, (1^{st}), lack of finance with mean score of 3.20 (2^{nd}), lack of appropriate agricultural policy with mean score of 3.07 (3^{rd}), lack of quality standard with mean of 3.03 (4^{th}) and no encouragement from government with mean score of 3.00 (5^{th}). Other items of importance were unavailability of organic inputs $\bar{x}$= 2.88 (6^{th}), inadequate information ranked 7^{th} with mean score of 2.84. Shortage of biomass, $\bar{x}$ = 2.76 (8^{th}), lack of awareness and not enough technical know-how with mean score of 2.75 ranked 9^{th} respectively, more labour intensive ($\bar{x}$ = 2.73) (11^{th}), no access to organic fertilizers (2.70) (12^{th}), non-availability of farm input ($\bar{x}$ = 2.66) (13^{th}), lack of effective training by extension agents (2.64) (14^{th}), organic farming is time consuming (2.58) (15^{th}), transportation of animal materials for use is difficult (

2.55) (16^{th}) and consumers are yet to appreciate the difference between organic and conventionally cultivated food (2.55) (17^{th}). The results suggest that there are several constraints to organic farming practices. The implication is that effort should be geared towards enhancing the use of organic farming practices. Result of the standard deviation ranged from 0.01 – 1.24 except for an item statement (organic farming is time consuming) with a score of 1.72.

4.7 Suggestions for the Improvement of Organic Farming Practices

Table 4.30: Distribution of farmers by suggestions for the improvement of organic farming practices

Suggestions	Strongly Disagreed	Disagree	Agree	Strongly agree	Mean	Std Deviation
Ministry of agriculture and extension services should be more functional in sourcing and making information on organic farming available to farmers	8 (1.7)	7 (1.5)	158 (34.1)	291 (62.7)	3.57	0.62
There should be campaign and sensitization of farmers and the entire populace on the benefits of organic farming/foods	9 (1.9)	6 (1.3)	247 (53.3)	202 (43.5)	3.38	0.61
Capacity building for extension on organic farming.	13 (2.6)	7 (1.5)	190 (40.9)	254 (54.7)	3.47	0.67
Research institutes should be funded specifically for intensive research on organic farming	12 (2.6)	9 (1.9)	258 (55.6)	185 (39.9)	3.32	0.44
Raising awareness on the severity of problems of conventional farming	11 (2.4)	14 (3.0)	268 (57.8)	171 (36.9)	3.29	0.64
Developing necessary infrastructure so that information on organic farming practices remain extensive and constant in reaching farmers	11 (2.4)	11 (2.4)	272 (58.6)	170 (36.6)	3.29	0.63
Government should make legislation in order to ensure a regulatory framework to enable all stakeholders play on a level ground	10 (2.2)	6 (1.3)	237 (51.1)	211 (45.5)	3.39	0.63
Development of a strong domestic market to protect the interest of producers	9 (1.9)	9 (1.9)	269 (58.0)	177 (38.1)	3.32	0.61
Organic standards should be published for the knowledge of farmers, consumers and the general populace	14 (3.0)	8 (1.7)	217 (46.8)	225 (28.5)	3.40	0.68

Field survey, 2015

Mean score ≥ 2.50 = Accepted, mean score < 2.50 = Rejected

Values in parenthesis stand for percentages

Table 4.30 presents the strategies for improving organic farming practices. Based on 2.50 mean discriminating index, the nine item strategies were agreed to. The mean scores ranged from 3.21 to 3.57. The item, Ministry of Agriculture and extension services should be more functional in sourcing and making information on organic farming available to farmers with mean score of 3.57 ranked 1st, capacity building for extension agency on organic farming practices had a mean of 3.47 and ranked 2nd. Organic standard should be published for the knowledge of farmers, consumers and general populace ($\bar{x}$= 3.40) ranked 3rd, government should make legislation in order to ensure a regulatory framework to enable stakeholders play on a level ground ($\bar{x}$ = 3.94) and ranked 4th. Campaign and sensitization of farmers and the entire populace on the benefits of organic farming foods (($\bar{x}$ = 3.38) and ranked 5th. Raising awareness on the severity of problems of conventional farming and developing necessary infrastructures so that information on organic farming practices remain extensive and constant in reaching farmers ranked 6th with mean score of 3.29, respectively. Also developing a strong domestic market to protect the interest of producers ranked 8th with mean score of 3.32.

Lastly, research institutes should be funded specifically for intensive research on organic farming as a strategy had a mean score of 3.3.2 and ranked 9th. This implies that with adequate measures in place as listed above, the use of organic farming would be enhanced. Standard deviation scores were all bellow one (1). This shows there was insignificant variation in farmers' responses.

4.8 Hypotheses of the study.

4.8.1 - Hypothesis 1: There is no significant relationship between the socio economic characteristics of the farmers and their level of awareness of organic farming practices;

4.8.1.1 Ordinary least square multiple regression analysis of the relationship between socio-economic characteristics of the livestock farmers and their level of awareness of organic farming practices

Table 4.31: Socio-economic determinants of livestock farmers' level of awareness of organic farming practices.

	Regression Models for Livestock			
Coefficients	**Exponential-Log**	**Double log**	**Semi log**	**Linear log**
Constant	B:1.469 t:13.534* sig:0.000	B:1.513 t:13.770* Sig:0.000	B:32.430 t:3.444* sig:0.001	B:30.967 t:3.346* sig:0.001
Age	B:0.000 t:-.252 sig:0.801	B:.027 t:.562 sig:0.576	B:3.088 t:.763 sig:0.448	B:0.037 t:-0.365 sig:0.716
Sex	B:.033 t:1.435 sig:0.155	B:.101 t:1.309 sig:0.194	B: 9.628 t:1.455 sig:0.149	B:3.110 t:1.582 sig:0.117
Educational level	B:000 t:010. sig:0.992	B:.027 t:.449 sig:0.655	B:1.972 t:.376 sig:0.708	B:9.259 t:0.000 sig:1.000
M.status	B:-.009 t:-.580 sig:0.992	B:-.078 t:-.932 sig:0.354	B: −7.590 t: −1.054 sig:0.295	B:0.010 t:-0.682 sig:0.497
Religion	B:.055 t:2.029* sig:0.046	B:.306 t:2.797* sig:0.006	B:25.282 t:2.698* sig:0.008	B:4.626 t:1.966* sig:0.497
Farming experience	B:.003 t:1.670 sig:0.099	B:.048 t:1.274 sig:0.206	B:6.694 t:2.082* sig:0.040	B:5.413 t: 2.604 sig:0.011
Stock size	B:-.001 t:-1.085 sig:0.281	B:.032 t:-1.438 sig:0.154	B:-4.283 t:-2.219* sig:0.029	B:-0.158 t:-1.653 sig:0.102
House hold size	B:.002 t:.412 sig:0.681	B:-.011 t:-.245 sig:0.807	B: −1.720 t:.-.464 sig:0.644	B:0.161 t:0.357 sig:0.722
Farmers association.	B:.012 t:.470 sig:0.640	B:.049 t:.560 sig:0.577	B:3.438 t:.454 sig:0.651	B:0.925 t:0.408 sig:0.684
Extension contact	B:-.018 t:-.613 sig:0.541	B:-.045 t:-.452 sig:0.653	B: −4.766 t:-.555 sig:0.581	B:-2.122 t:0.838 sig:0.404
Income	B:2.58E-09 t:.362 sig:0.718	B:-.008 t:-.703 sig:0.44	B:.-.688 t:-.696 sig:0.488	B:3.652 t:-0.599 sig:0.550
R^2	**0.187**	**0.205**	**0.287**	**0.279**
F-stat	**1.820**	**2.034**	**3.184**	**3.065**
P-value	**0.062**	**0.034**	**0.001**	**0.002**

The level of significance: 0.05 t-value significant at 0.05.
Decision Rule: Reject H_0 if the P (probability) value is less than 0.05 (level of significance).
Source: Computed from survey data, 2015.

Ordinary least square multiple regression analysis was used to determine the significant relationship between the level of awareness of organic farming practices for livestock and the farmers' socio-economic characteristics. From the SPSS output of the four functional models, the semi-log multiple regression produced the best fitted model with the highest coefficient of determination (R^2 = .287), which is 28.7 % variation of the data that is explained or accounted for by the regression model Y- (pooled responses on level of awareness of organic farming practices for livestock) F- value of 3.184 and 3 significant variables.

The result shows that the combined effects of the socio-economic characteristics significantly related with level of awareness of organic farming practices for livestock (p-values of 0.001 less than level of significance 0.05). The combined effects, resulted in 28.7 percent variation in the magnitude of the dependent variable. This implies that the socio-economic characteristics of the farmers were found to be significant predictors of level of awareness of organic farming practices for livestock. The null hypothesis that there is no significant relationship between socio-economic characteristics of farmers and awareness of organic farming practices among livestock farmers is rejected. The alternative; there is a significant relationship between the farmers socio-economic characteristics and their level of awareness of organic farming practices is accepted.

The result indicates that religion from the regression coefficients of 25.282 had t- value of 2.698 with a p-value of 0.008 which is less than 0.05 (level of significance). This shows that religion is significantly related with the level of awareness of organic farming. Religion could serve as a platform for disseminating information on organic farming. Thus, the more committed the farmers were in religion, the more their level of awareness of organic farming practices. John, Robert and Chris (2003), revealed in their work – improving agricultural extension through Faith-Based Organization that many churches and Islamic organizations operating in Kenya are involved not only in spreading their faith but also in promoting socio-economic development by working with local communities. According to them, the Catholic Diocese of Nakuru has community development programmes. The case is not different in Nigeria. Most health information are passed through the religious organizations to the populace.

Farming experience from the regression coefficients of 6.694 with t – value of 2.082 showed a p-value of 0.040 which is less than 0.05 (level of significance). This shows that years of experience is significantly related with the level of awareness of organic farming practices for livestock. This is not surprising as it is expected that farmers who have spent more years in farming should be more knowledgeable of farming practices.

Farm size from the regression coefficients of -4.283 had t- value of -2.219 and a p-value of 0.029 which is less than 0.05 (level of significance). This shows that the stock size of a farmer is significantly related with the level of awareness of organic farming practices for livestock. The result implies that farmers who have large farm sizes had low level awareness of organic farming practices for livestock. This could be as a result of stereotype teaching and learning in which they tried to maintain the status quo. The work of Kassie *et al.,* (2009) established a relationship between the farm size of farmers and farming practices.

The other variables of age, sex, marital status, household size, farmers' association, extension contact and income were not significant.

4.8.1.2: Ordinary least square multiple regression analysis of relationship between socio-economic characteristics of the fish farmers and their level of awareness of organic farming practices

Table 4.32: Socio-economic determinants of fish farmers' level of awareness of organic farming practices.

	Regression models for Fish			
Coefficients	**Linear**	**Exponential**	**Double log**	**Semi log**
Constant	B:18.704	B:1.238	B:1.077	B:9.091
	t:4.314*	t:16.758*	t:9.672*	t:1.393
	sig:0.000	sig:0.000	sig:0.000	sig:0.166
Age	B:.096	B:0.002	B:.091	B:5.640
	t:1.971*	t:1.835	t:1.500	t:1.592
	sig:0.051	sig:0.069	sig:0.134	sig:0.114
Sex	B:-.443	B:.-.008	B:-.066	B:-3.378
	t:-.442	t:-.483	t:.-1.030	t:-.900
	sig:0.659	sig:0.630	sig:0.305	sig:0.370
Educational level	B:-.856	B:-.012	B:-.053	B: −3.908
	t:-1.601	t:-1.362	t:-1.163	t:-1.464
	sig:0.112	sig:0.176	sig:0.248	sig:0.146
M.status	B:-.987	B:.-.017	B:-.099	B: −5.690
	t: −1.379	t: −1.389	t:-1.622	t: −1.585
	sig:0.171	sig:0.168	sig:0.108	sig:0.116
Religion	B:242.	B:.006	B:.071	B:1.374
	t:1.242	t:1.854	t:.990	t:.326
	sig:0.217	sig:0.067	sig:0.324	sig:0.745
Farming experience	B:0.043	B:.001	B:.028	B:1.832
	t:.810	t:.652	t:1.018	t:1.130
	sig:0.420	sig:0.516	sig:0.311	sig:0.261
Stock size	B:.0342	B:.001	B:.066	B:3.589
	t:-0.646	t:.900	t:2.462*	t:2.279*
	sig:0.520	sig:0.370	sig:0.015	sig:0.025
House hold size	B:-.005	B:1.088E-00	B:.009	B:.505
	t:.200	t:.023	t:.253	t:.235
	sig:0.842	sig:0.981	sig:0.801	sig:0.814
Farmers association.	B:.280	B:.001	B:.051	B:3.944
	t:.249	t:.068	t:.762	t:.999
	sig:0.804	sig:0.946	sig:0.448	sig:0.320
Extension contact	B:-1.873	B:-.029	B:-.175	B: −10.374
	t:-1.415	t:-1.298	t:-2.282*	t:-2.306*
	sig:0.160	sig:0.197	sig:0.025	sig:0.023
Income	B:-1.464E-0	B:-2.494E-09	B:-.005	B:-.179
	t:-.723	t:-.723	t:-.425	t:-.287
	sig:0.471	sig:0.471	sig:0.672	sig:0.775
R^2	0.152	0.156	0.168	0.166
F-stat	1.677	1.735	1.889	1.864
P-value	0.089	0.076	0.049	0.053

The level of significance: 0.05 t-value signicant at 0.05
Decision Rule: Reject H_0 if the P (probability) value is less than 0.05 (level of significance).
Source: Computed from survey data, 2015.

Ordinary least square multiple regression analysis was used to determine the relationship between the level of awareness of organic farming practices and the socio-economic characteristics of the fish farmers. From the SPSS output of the four functional models in Table 4.13, the double-log multiple regression produced the best fitted model with the highest coefficient of determination (R^2 = .168), which is 16.8 % variation of the data that was explained or accounted for by the regression model Y-Dependent variable (level of awareness of organic farming practices for fish) on the $X_{,S}$ Independent variables (socio-economic characteristics).

Model summary of double log regression analysis revealed that when age, level of education, marital status, religion, years of experience, stock size, household size, farmers association, contact and income were all entered as independent variables, the combination significantly related with the level of awareness of organic farming practices for fish (p-values of 0.049 less than level of significance 0.05), This shows that the socio-economic characteristics of the farmers were significant predictors of level of awareness of organic farming practices for fish. The null hypothesis was therefore rejected.

Farm size from the regression coefficients of 0.066 and a t- value of 2.462 showed a p-value of 0.015 less than 0.05 (level of significance). This implies that farm size was significantly related with the level of awareness of organic farming for fish. Also contact with extension agents had a coefficient of - .175

with t- value of 2.282 and showed a p-value of 0.025 which was less than 0.05 (level of significance), meaning that contact with extension agents was significantly related with the level of awareness of organic farming practices for fish. The result imply that as stock size increases, the level of awareness of organic farming practices increases whereas increased extension contact culminated in reduced level of awareness of organic fish farming practices. This could be attributed to low emphasis on organic farming practices in extension teachings. It could also be that extension agencies still dwell on conventional farming practices.

The other variables of education, sex, marital status, household size, farmers association, farming experience, income and religion were not significantly related and as such should be discountenanced in decision making and policy implementation.

4.8.1.3: Ordinary least square multiple regression analysis of relationship between socio-economic characteristics of the crop farmers and their level of awareness of organic farming practices.

Table 4.33: Socio-economic determinants of crop farmers' level of awareness of organic farming practices.

	Regression models for Crop			
Coefficients	**Linear**	**Exponential**	**Double log**	**Semi log**
Constant	B:43.070	B:1.691	B:1.408	B:24.045
	t:4.852*	t:13.198*	t:8.636*	t:2.135*
	sig:0.000	sig:0.000	sig:0.000	sig:0.035
Age	B:-.018	B:-.001	B:.080	B:7.520
	t:-.153	t:-.708	t:.939	t:1.280
	sig:0.878	sig:0.480	sig:0.349	sig:0.203
Sex	B:-1.230	B:-.033	B:-.093	B:-4.649
	t:-.777	t:-1.451	t:.-1.117	t:-.807
	sig:0.439	sig:0.149	sig:0.266	sig:0.421
Educational level	B:.239	B:.002	B:-.056	B: 5.162
	t:.739	t:.495	t:.902	t:1.193
	sig:0.461	sig:0.621	sig:0.369	sig:0.235
Marital status	B:1.959	B:.030	B:.107	B: 9.045
	t:1.628	t:1.746	t:1.069	t:1.307
	sig:0.106	sig:0.083	sig:0.287	sig:0.194
Religion	B:-4.733	B:-.081	B:-.329	B: −19.903
	t: −1.857	t:-2.197*	t:-1.676	t:-1.469
	sig:0.066	sig:0.030	sig:0.096	sig:0.144
Farming experience	B:-.105	B: −.001	B:-.005	B: −3.011
	t: −.810	t:-.291	t:-.103	t:-.903
	sig:0.413	sig:0.772	sig:0.918	sig:0.353
Farm size	B:-.163	B: −.002	B:-.068	B: −5.041
	t:-1.350	t:-1.255	t: −1.852	t:-1.973*
	sig:0.179	sig:0.212	sig:0.066	sig:0.051
House hold size	B:.059	B:.003	B:-.026	B:-1.965
	t:.120	t:.0450	t:-.442	t:-.478
	sig:0.905	sig:0.654	sig:0.659	sig:0.634
Farmers' association.	B:7.030	B:.091	B:.308	B:24.740
	t:3.475*	t:3.102*	t:2.965*	t:3.441*
	sig:0.001	sig:0.002	sig:0.004	sig:0.001
Extension contact	B:-9.376	B:-.113	B:-.274	B: −24.209
	t:-4.387*	t:-3.671*	t:-2.259*	t:-2.888*
	sig:0.000	sig:0.000	sig:0.026	sig:0.005
Income	B:3.027E-00	B:3.085E-09	B:.010	B:.843
	t:1.919	t:1.355	t:1.285	t:1.586
	sig:0.057	sig:0.178	sig:0.201	sig:0.115
R^2	0.336	**0.290**	**0.259**	**0.310**
F-stat	5.836	**4.722**	**4.030**	**5.176**
P-value	0.000	**0.000**	**0.000**	**0.000**

The level of significance : 0.05 t-value significant at 0.05
Decision Rule : Reject H_0 if the P (probability) value is less than 0.05 (level of significance).
Source: Computed from survey data, 2015.

Ordinary least square multiple regression analysis was used to determine the relationship between the level of awareness of organic farming practices for crop and the farmers socio-economic characteristics. From the SPSS output of the four functional models, the linear multiple regression produced the best fitted model with the highest coefficient of determination (R^2 = .336), which is 33.6 % variation of the data that was explained or accounted for by the regression model Y-Dependent variable (level of awareness of organic farming practices for crop) on the $X_{,S}$ Independent variables (socio-economic characteristics). (Table 4.33).

Model summary of linear regression result revealed that when age, level of education, marital status, religion, years of experience, farm size, household size, membership of farmers association, contact and income were all entered as independent variables, the combination significantly related with level of awareness of organic farming practices for crop (p-values of 0.000 less than level of significance 0.05). This implies that the socio-economic characteristics were found as significant predictors of level of awareness of organic farming practices for crop. The null hypothesis was therefore rejected

The result showed that membership of farmers' association from the regression coefficient of 7.030 with t- value of 3.475 had a p-value of 0.001 which is less than 0.05 (level of significance). Therefore it was significantly related with the level of awareness of organic farming for crops. Farmers' associations furnish

members with agricultural information. It serves as a platform for disseminating useful information in addition to serving the social needs of members.

Contact with extension agents from the regression coefficients of -9.376 and t-value of 4.387 shows a p-value of 0.000 which was less than 0.05 (level of significance). The result is significant. However, the negative sign in the t-value signifies that increased extension contact gave rise to decreased level of awareness of organic farming practices.

The other variables sex, education, marital status, farming experience, religion, farm size, income and household size were not significant and as such should not be considered in taking decisions on disposing variables to the level of awareness of organic farming practices in crop production

4.8.2 Hypothesis 2:

There is no significant relationship between the rural household farmers' socio-economic characteristics and their perceived benefits of organic farming practices.

4.8.2.1 Ordinary least square multiple regression analysis of relationship between rural households' socio-economic characteristics and their perceived benefits of organic farming practices

Table 4.34: Rural household farmers' socio-economic determinants of the perceived benefits of organic farming practices.

	Regression models			
Coefficients	**Linear**	**Exponential**	**Double log**	**Semi log**
Constant	B:69.052	B:1.823	B:1.996	B:90.661
	t:18.189*	t:55.674*	t:24.338*	t:9.559*
	sig:0.000	sig:0.000	sig:0.000	sig:0.000
Age	B:-0.183	B:-0.001	B:-.149	B:-21.188
	t:-3.048*	t:-2.521*	t:-2.982*	t:-3.666*
	sig:0.002	sig:0.012	sig:0.003	sig:0.000
Sex	B:0.241	B:.005	B:.010	B:.451
	t:0.259	t:.564	t:.346	t:.134
	sig:0.796	sig:0.573	sig:0.729	sig:0.894
Educational level	B:-0.007	B:-5.90E-05	B:-.009	B: −1.111
	t:-0.025	t:-.024	t:-.458	t:-.469
	sig:0.980	sig:0.981	sig:0.729	sig:0.639
Marital status	B:0.792	B:.007	B:.055	B:7.105
	t:1.139	t:1.223	t:1.712	t:1.912*
	sig:0.255	sig:0.222	sig:0.088	sig:0.057
Religion	B:-0.064	B:.007	B:.008	B:-.024
	t:-0.266	t:-.128	t:.232	t:-.006
	sig:0.790	sig:0.898	sig:0.816	sig:0.995
Farming Experience	B:0.208	B:.001	B:.035	B:6.301
	t:3.480*	t:2.508*	t:2.453*	t:3.772*
	sig:0.001	sig:0.012	sig:0.015	sig:0.000
Farm size	B:-0.013	B:-2.91E-05	B:.002	B:-.072
	t:-0.515	t:-.133	t:.226	t:-.068
	sig:0.607	sig:0.895	sig:0.821	sig:0.946
House hold size	B:0.088	B:.001	B:.012	B:.126
	t:.388	t:.589	t:.503	t:.046
	sig:0.736	sig:0.556	sig:0.616	sig:0.963
Membership of farmers associtio n	B:-.044	B:.003	B:.007	B:-.502
	t:-.042	t:.326	t:.217	t:-.138
	sig:0.967	sig:0.744	sig:0.829	sig:0.891
Contact with extension.	B:-1.612	B:-.013	B:-.059	B: −1.212
	t:-1.374	t:-1.273	t:-.276	t:-1.699
	sig:0.170	sig:0.204	sig:0.111	sig:0.090
Income	B:-1.437	B:-1.32E-09	B:-.002	B:.051
	t:-0.607	t:-.649	t:-.276	t:.055
	sig:0.544	sig:0.516	sig:0.782	sig:0.957
R^2	0.047	**0.033**	**0.039**	**0.058**
F-stat	2.015	**1.416**	**1.682**	**2.513**
P-value	0.026	**0.162**	**0.075**	**0.004**

The level of significance : 0.05 t – value significant at 0.05
Decision Rule : Reject H_0 if the P (probability) value is less than 0.05 (level of significance).
Source: Computed from survey data, 2015.

Ordinary least square multiple regression analysis was used to determine the relationship between perceived benefits of organic farming practices and farmers' socio-economic characteristics. From the SPSS output of the four functional models, the semi-log was the best fitted model with the highest coefficient of determination (R^2 = .058), which is 5.8 percent variation of the data that were explained or accounted for by the regression model Y-Dependent variable (perceived benefits of organic farming practices) on the $X_{,S}$ Independent variables (socio-economic characteristics). (Table 4.33).

Model summary of semi log regression models revealed that when age, level of education, marital status, religion, years of experience, farm size, household size, membership of farmers association, contact with extension and income were all entered as independent variables, the combination significantly related with perceived benefit of organic farming practices (p-values of 0.004 less than level of significance 0.05), This implies that the socio-economic characteristics were found to be significant predictors of perceived benefits of organic farming practices. The null hypothesis was thus rejected.

The regression coefficients of -21.188 with t- value of -3.666 showed a p-value of 0.000 which is less than 0.05 (level of significance) for age. This implies that age is positively correlated with the farmers' perceived benefit of organic

farming practices. We can imply from this that farmers who are advanced in age were more likely to understand the benefits of organic farming practices.

Farming experience from the regression coefficients of 6.301 and t- value of 3.772 showed a p-value of 0.000 which was less than 0.05 (level of significance). This implies that years of experience were positively correlated with the perceived benefits of organic farming practices. The result implies that farmers who have high level of experience were more likely to perceive organic farming practices as beneficial.

The other socio – economic variables – sex, education, marital status, religion, farm size, household size, membership of farmers' association, extension contact and income were not significant and as such should be discountenanced in intervention and advocacy.

4.8.3 Hypothesis 3.

There is no significant relationship between the socio economic characteristics of the farmers and their level of use of organic farming practices;

4.8.3.1 Ordinary least square multiple regression analysis of relationship between socio-economic characteristics, and farmers level of use of organic farming practices.

Table 4.35: Rural household farmers' socio-economic determinants of level of use of organic farming practices.

	Regression models			
Coefficients	**Linear**	**Double log**	**Semi log**	**Exponential log**
Constant	B:66.751	B:1.683	B:38.289	B:1.820
	t:9.546	t:19.345*	t:2.229*	t:51.471*
	sig:0.000	sig:0.000	sig:0.026	sig:0.000
Age	B:-0.022	B:-0.028	B:-4.878	B:0.000
	t:-.0203	t:-.523	t:-.466	t:-0.187
	sig:0.839	sig:0.601	sig:0.641	sig:0.852
Sex	B:0.649	B:.039	B:6.897	B:0.005
	t:0.380	t:1.247	t:1.129	t:0.537
	sig:0.704	sig:0.213	sig:0.260	sig:0.592
Educational level	B:1.436	B:.090	B:17.856	B:0.007
	t:2.763*	t:4.139*	t:4.166*	t:2.840*
	sig:0.006	sig:0.000	sig:0.000	sig:0.005
Marital status	B:-.778	B:.-.018	B:.-5.480	B:-0.002
	t:-.608	t:-.521	t:-.814	t:-0.332
	sig:0.544	sig:0.603	sig:0.416	sig:0.739
Religion	B:.223	B:.006	B:2.213	B:0.001
	t:.507	t:.164	t:.289	t:0.492
	sig:0.612	sig:0.870	sig:0.773	sig:0.623
Farming	B:0.400	B:.077	B:16.420	B:0.002
experience	t:3.638*	t:5.009*	t:5.426*	t:3.286*
	sig:0.000	sig:0.000	sig:0.000	sig:0.001
Farm size	B:-.040	B:-.008	B: −.750	B:0.000
	t:-.849	t:-.822	t:-.392	t:-0.869
	sig:0.396	sig:0.411	sig:0.695	sig:0.385
House hold size	B:0.770	B:.027	B:3.533	B:0.005
	t:1.607	t:1.076	t:.717	t:-1.869
	sig:0.109	sig:0.282	sig:0.474	sig:0.863
Membership of	B:.867	B:.028	B:6.767	B:0.003
farmers	t:.449	t:.626	t:1.025	t:0.304
association.	sig:0.654	sig:0.410	sig:0.309	sig:0.761
Extension contact	B:-3.738	B:-.036	B:-5.930	B:-0.022
	t:-1.730	t:-.925	t:-.771	t:-2.030*
	sig:0.084	sig:0.356	sig:0.441	sig:0.043
Income	B:4.817E	B:.018	B:3.544	B:2.113
	t:1.106	t:2.111*	t:2.101*	t:0.959
	sig:0.269	sig:0.036	sig:0.036	sig:0.338
R^2	0.109	0.149	0.090	0.112
F-stat	5.024	7.175	7.140	5.178
P-value	0.000	0.000	0.000	0.000

Dependent variable: level of use

The level of significance: 0.05 Decision Rule: Reject H_0 if the P (probability) value is less than 0.05 (level of significance).

Source: Computed from survey data, 2015.

Ordinary least square multiple regression analysis was used to determine the relationship between the level of use of organic farming practices and farmers' socio-economic characteristics. From the SPSS output in Table 4.34 of the four functional models, the double-log was the best fitted model with the highest coefficient of determination (R^2 = .149), which is 14.9% variation of the data that was explained or accounted for by the regression model Y-Dependent variable (level of use of organic farming practices) on the $X_{,S}$ Independent variables (socio-economic characteristics).

The Model summary of double- log regression results analysis revealed that when age, level of education, marital status, religion, years of experience, farm size, household size, membership of farmers' association, extension contact and income were all entered as independent variables, the combination significantly related with level of use of organic farming practices (p-values of 0.000 less than level of significance 0.05). This implies that the socio-economic characteristics were found to be significant predictors of level of use of organic farming practices. The null hypothesis was therefore rejected.

The test of sub hypothesis on education from the regression coefficients of .090 and t- value of 4.139 showed a p-value of 0.000 which was less than 0.05 (level of significance). The null hypothesis was rejected and the alternate hypothesis that the level of education of a farmer was significantly related to the level of use of organic farming practices was accepted. This implies that educational

level is significantly related with level of use of organic farming practices. According to Crutchfied *et al.,* (2000), the past decades have been characterized by escalating public concern towards nutrition, health and food safety issues. It is not a surprise that farmers who are more educated embrace organic farming more than the illiterate farmers who are not abreast with current issues. This position is supported by Ekwe & Nwachukwu (2006) who reported the crucial role of education in farmers' knowledge, attitude and productivity.

Farming experience from the regression coefficients had a p-value of 0.000 which was less than 0.05 (level of significance). The null hypothesis was rejected and therefore the alternate hypothesis that farming experience of a farmer is significant was accepted. This implies that years of experience are significantly related with the level of use of organic farming practices. The result implies that farmers' who have high level of experience were more likely to use organic farming practices. This agrees with the work of Adebayo (2014) which revealed that farming experience is positively related with attitude of farmers to organic farming practices.

The test on income and use of Organic farming practices from the regression coefficients of .018 , t- value of 2.111 showed a p-value of 0.035 which was less than 0.05 (level of significance). The null hypothesis was rejected and the alternate hypothesis that income is significantly related with the level of use of organic farming practices was accepted. The result implies that farmers who

have better income were more likely to use organic farming practices. This is supported by the work of Paswell and Christopher, (2007) that farm income has positive effect on the likelihood of adoption.

The other variables – sex, age, marital status, religion, farm size, household size membership of farmers association and extension contact were not significantly related to the level of use of organic farming practices.

4.8.4 Hypothesis 4

There are no significant differences in the farmers' level of use of organic farming practices based on their states of origin.

Table 4.36: Analysis of Variance (ANOVA) of the use of organic farming practices based on their state of origin.

Sources of variation	Sum of squares	df	Mean square error	F_{ratio}	Sig. (p-value)
Between groups	18,096.005	2	9048.002	36.541	0.000
Within groups	113,902.630	460	247.614		
Total	131,998.635	462			

The level of significance: 0.05
Decision Rule: Reject H_0 if the P (probability) value is less than 0.05 (level of significance).

Table 4.37: Multiple comparisons test

(I)State	(J)State	Mean difference (I-J)	Sig.(p-value)
1	2	-9.17182	0.000
	3	-14.97081	0.000
2	1	9.17182	0.000
	3	-5.79898	0.000
3	1	14.97081	0.000
	2	5.79898	0.000

The mean differences are significant at 0.05 since the probability value in all cases is 0.000 which is less than 0.05 the level of significance.

Table 4.38: Homogeneous Subsets

Scheffe Model

		Subset for alpha=0.05		
STATE	**N**	1	2	3
1	162	102.0679		
2	146		111.2397	
3	155			117.0387
Sig.(p-value)		1.000	1.000	1.000

The ANOVA table reveals that the p- value of 0.000 is less than the level of significance 0.05, we therefore reject the null hypothesis (H_0) and accept the alternative hypothesis that states that there exist significant differences in the farmers' level of use of organic farming practices based on their states of origin. Since there is existence of significant differences, a post hoc multiple comparison test using the Scheffe model was carried out to determine actually where the differences lie.

From Table 4.38 of the Scheffe Model, it was observed that significant differences existed between Delta state $\bar{x}$ = 102.0679, Bayelsa $\bar{x}$ = 111.2397 and Akwa-Ibom state $\bar{x}$ = 117.0387.

Since the p-value is 0.000 from Table 4.36, it implies that there exist significant difference between farmers' use of organic farming practices in Delta state and Bayelsa state and the difference is 9.17182. It can therefore be inferred that Bayelsa state is better than Delta state in the use of organic farming practices.

Also, there exist significant difference between farmers' use of organic farming practices in Bayelsa state and Akwa-Ibom state and the difference is 5.79898. It can be can be inferred that Akwa- Ibom state is better than Bayelsa state in the use of organic farming practices.

Again, there exist significant difference between farmers' use of organic farming practices in Delta state and Akwa-Ibom state and the difference is 14.97081. It could be inferred that Akwa-Ibom state is better than Delta state in the use of organic farming practices.

Therefore, it was concluded from the analysis that farmers' in Akwa-Ibom state make use of organic farming practices best, followed by Bayelsa state and the least is Delta state.

4.8.5 Hypothesis 5

There is no significant difference in the use of organic farming practices between male and female farmers.

Table 4.39: Z-Test of two samples for means to determine the significant difference in the use of organic farming practices between male and female farmers.

	Female	Male
Mean	75.51429	74.62284
Known variance	373.54	409.14
Observations	169	295
Hypothesizes mean difference	0	0
Z-cal.	0.473117	
P (Z ≤ z) one tail	0.318065	
Z critical one-tail	1.644854	
P (Z ≤ z) two tail	0.644854	
Z critical one-tail	1.959964	

Table 4.40: Homogeneity of variance test

	Levene's Test for equality of variances	
	F	sig.(p-value)
Equal variances assumed	.032	0.858
Equal variances not assumed		

The level of significance: 0.05
Decision Rule: Reject H_0 if the P (probability) value is less than 0.05 (level of significance).

μ_{male} = Population of male farmers
μ_{female} = Population of female farmers

The Z-test was adopted because the sample size is large with $n_{male} = 295$ and $n_{female} = 169$ respectively.

Since the sample sizes are large we assume the distribution to be approximately normally distributed.

The homogeneity of variance test using Levene test from Table 4.40 reveals that the two samples have equal variances, since p-value = 0.858 and greater than 0.05 The null hypothesis that the two samples assumed variances are equal was accepted.

From Table 4.39 for the two tail independent sample test, the null hypothesis was accepted since the probability value of 0.644854 is greater than 0.05 level of significance adopted for the study. The null hypothesis was accepted and this implies that there is no significant difference in the use of organic farming practices between male and female farmers**.**

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS.

5.1 Summary

Organic farming is an agricultural technique of naturally producing quality crops, vegetables or animals without harming the environment, people, animals as well as other micro organisms. Studies have shown that organically grown foods are more nutritious, safe and of high quality. It offers improved food security and an array of other economic, environmental, health and social advantages (UNCTAD 2008). They are more important in ensuring human health compared to foods grown under conventional methods. (Bavec 2006, Worthington, 2001). Organic farming emphasizes the use of management practices in preference to the use of farm inputs. This is accomplished by using where possible agronomic, biological and mechanical methods as opposed to using synthetic materials to fulfil any specific functions within the system (FAO 1999). Anderson, *et al.*, (2005) defined organic farming as a production system that excludes the use of synthetically manufactured fertilizers, pesticides, growth hormones and livestock feed additives. In crop production, the system relies on crop rotation, animal manure, green manure, organic fertilizers, mechanical cultivation and aspects of biological pest control to supply plant nutrients and control insects, weeds and other pests. Conventional farming unlike organic farming uses harmful agents such as pesticides and synthetic

fertilizers. According to Smil (2001), the inorganic fertilizers used to increase crop yield are leached and washed away by erosion to rivers causing water pollution which is dangerous to aquatic life and human health.

Organic farming is not only about crop production .Organic livestock and fish farming is the production of these animals with the use of organic and biodegradable inputs from the ecosystem for their upkeep, feeding, health, housing and breeding. Synthetic inputs such as drugs, feed addictives and genetically modified inputs are avoided.

Organic Agriculture is gaining momentum in Africa as it is increasingly seen as significant for addressing food insecurity, land degradation, poverty and climate change (IFOAM Organic Internationals, 2014). The global challenge of environmental degradation, climate change and health dangers associated with continuous practice of inorganic (conventional) farming calls for the understanding of whether or not farmers in South-south Nigeria are engaged in organic farming practices.

Literature on organic farming activities among farmers exist in various countries. For example Uganda has about 200,000 certified organic farmers (Tumushade *et al.*, 2006) Ethiopia and Tanzania with over 160,000 and 100,000 respectively (Helga and Yussefi, 2006). This study will increase the resource base for organic farming literature in Nigeria.

The broad objective of the study was to analyse rural households' use of organic farming practices in South-South Nigeria. The specific objectives were to ascertain and describe the socio-economic characteristics of the farmers, determine level of awareness of and use of organic farming practices; identify the farmers' sources of information on organic farming awareness level; use level and perceived benefits. Constraints to the use of organic farming were assessed and strategies for improving organic farming practices were identified.

The study area was South-South Nigeria which comprises Six states- Edo, Delta, Bayelsa, Rivers state, Cross-river and Akwa-Ibom. Three prominent agricultural enterprises of fishery, livestock and crop were purposively chosen for the study. This was based on their dominance in agricultural production system of the people. The population therefore comprised rural households' engaged in fish, livestock and crop production.

Multistage random selection technique was employed. The first stage was the random selection of three states out of the six states that make up South-south Nigeria. The states sampled were Bayelsa, Delta and Akwa-Ibom. The list of farmers was gotten from the zonal managers and extension agents in charge of each zone / cells. Total sample size for the research was four hundred and ninety two (492) respondents

The objectives / hypothesis were analysed using descriptive and inferential statistical tools – frequency tables, percentages mean, ordinary least square multiple regression, Analysis of variance (ANOVA) and Z-test .

The findings of the study under the socio economic characteristics indicated that majority of the respondents were male (63.6 percent), married (76.3 percent) with average age of 43 years. The result revealed that majority were educated since only 14.7 percent had no formal education. Farmers in South-south Nigeria are predominantly Christian (87.3 percent). As regards farming experience, 81.7 percent had farming experience ranging from 1-20 years and only 17.6 percent, ranging from 20 years and above. Average household size was 5 persons and membership of farmer association was 51.7 percent. Average annual income of farmers was ₦997, 291.00 Most (68.8 percent) of the respondents had contact with extension agents.

On the awareness of organic farming practices among crop farmers, out of the fifteen listed organic farming practices based on the level of awareness, farmers were aware of six of such practices. The practices were farmyard manure ($\bar{x} = 2.81$), organic fertilizer ($\bar{x} =$ 2.64), spot bush burning ($\bar{x}$ =2.56), mulching ($\bar{x}$ =2.54), intercropping ($\bar{x}$ =2.53) and tillage ($\bar{x}$ =2.51).

Among livestock farmers, high levels of awareness were indicated for access to fresh drinking water $\bar{x}$ =3.02, adequate feeding ($\bar{x}$ =2.86), animal feeding

100% organic ($\bar{x} = 2.72$) and accurate record keeping .On fishery, the farmers were highly aware of eco friendly design ($\bar{x} = 2.91$), high quality water source ($\bar{x} = 2.90$),pond protection from predators ($\bar{x} = 3.36$), use of resistant species ($\bar{x} = 2.95$), natural treatment ($\bar{x} = 2.64$) cultivating without genetic engineering ($\bar{x} = 2.58$) and managing without growth hormones ($\bar{x} = 2.60$)

On the use of organic farming practices amongst crop farmers; the use of farmyard manure ($\bar{x} = 2.79$), intercropping ($\bar{x} = 2.58$), mulching ($\bar{x} = 2.50$) and spot bush burning($\bar{x} = 2.50$) were the practices used by farmers.

The highly used organic farming practices among livestock farmers were access to fresh drinking water ($\bar{x} = 2.77$) and adequate feeding ($\bar{x} = 2.65$). The fish farmers used eco - friendly design ($\bar{x} = 2.56$), site being far from polluting substances ($\bar{x} = 2.57$) and pond protection from predators ($\bar{x} = 2.70$).

The perceived benefits of organic farming practices included amongst others that organically grown foods are free from contamination ($\bar{x} = 3.47$), organic products contain substances that fight against cancer and other age – related diseases ($\bar{x} = 3.45$) and quality of organic food is superior to the conventionally cultivated food ($\bar{x} = 3.42$).

The constraints to organic farming include time consuming ($\bar{x} = 2.58$), transportation of organic materials is difficult ($\bar{x} = 2.75$), poor information dissemination ($\bar{x} = 2.84$) and insufficient technical knowhow ($\bar{x} = 2.75$). The

strategies for improving organic farming practices included amongst others - sourcing and making information available by the Ministry of Agriculture ($\bar{x}$ = 3.57), sensitization campaign ($\bar{x}$ = 3.38) and capacity building ($\bar{x}$ = 3.41) .

Ordinary least square multiple regression analysis (SPSS) result showed a significant relationship between the farmers' socio-economic characteristics and their perceived benefits of organic farming practices with age and experience as significant variables.

The Ordinary least square multiple regression analysis result indicated that a significant relationship existed between the level of use of organic farming practices and the farmers' socio-economic characteristics. Education, age, and income were significantly related to the level of use of organic farming practices.

The ANOVA result revealed that there are significant difference among farmers in the three states of South-south Nigeria used in the study and their level of use of organic farming practices.

The results of the Z-test analysis of difference between male and female farmers in their level of use of organic farming practices showed that no differences existed. Thus male and female farmers used them equally.

5.2 Conclusion

Organic farming is synonymous with natural agricultural practices where the environment and culture are sustainably managed to produce quality food. The organic farming practices used included farmyard manure, mulching, spot bush burning and intercropping among crop farmers'. The highly used organic farming practices among livestock farmers were access to fresh drinking water and adequate feeding. The fish farmers used eco - friendly design, farm site being established far from polluting substances and protected pond from predators. There were positive perceived benefits of organic farming practices. The level of use was determined by the socio-economic variables of sex, education, farming experience and income. They were constrained by non-availability of farm input, policy, poor government support, political and social factors, low awareness, marketing etc.

5.3 Recommendations

Based on the findings of the study, the following recommendations were made;

1. Extension education campaign should be mounted on organic agricultural practices to sensitize farmers on the use and benefit. This will create awareness among farmers as well as sustain interest of those already in the practice.
2. Organic agricultural practices should be incorporated in the curriculum of agricultural science undergraduates to equip the prospective graduates

with the requisite knowledge, skill and competences needed for successful entrepreneurship in agriculture.

3. Capacity building programme should be organized for extension agents to develop the knowledge, skill and attitude needed for training farmers on organic agricultural practices
4. The identified socio-economic determinants of organic farmers' level of awareness, use and benefits of organic farming should guide policy formulation, advocacy and interventions.
5. The government should put in place infrastructural facilities that stimulate and enhance organic farming practices, processing, storage and marketing.

REFERENCES

Adebayo, S. A. (2014). *Information - seeking behaviour and adoption of organic farming practices among vegetable farmers in South-south, Nigeria* (Unpublished Doctoral thesis, North West University, Mafinkeng Campus.).

Adebayo, S.A., & Oladele, I.O. (2014). *Organic agricultural practices among small holder farmers in South Western Nigeria.* Retrieved from http://dx.doi.org/10.5772/57598

Adebayo, S.A., & Oladele, O.I. (2013). Adoption of Organic farming practices in South western Nigeria. *Journal of Food, Agriculture and Environment, Vol 11, No 2,* 403-410.

Adebisi, O.I., Ibe, B.I., Olayide, Taiwo, I.O., & Amao, 101. (2010). Socio-economic factors influencing awareness and use of Organic farming practices by horticulture farmers in Oyo state. *Continental Journal of Agricultural Economics Vol 4,* 32-38.

Adeoye, G.O. (2005). Organic Agriculture: A review and possible adoption for food security in Nigeria In: F.O. Olasantan, I. O. O. Aiyelaagbe, V. I. O. Olowe, B. B. Philip, and O. A. Babalola (Eds.) *Organic agriculture for sustainable food security. Proceedings of the 1st National Conference on Organic Agriculture in Nigeria held at the University of Agriculture, Abeokuta, October 25-28, 2005. (221p).*

Adeoye, G.O. (2013). Speech at the 9th National Conference on Organic Agriculture held at Ogun-Osun River Basin Development Authority, Abeokuta. 11th – 15th, November, 2013.

Adesope, O. M., Matthew, Njoku .E. C., Oguzo N.S., & Ugwuaja, V.C. (2012). *Effects of socio- economic characteristics of farmers on their adoption of Organic Farmjng Practices.* Crop Production Technologies Peeyush Sharma (Ed) ISBN; 978-953-307-787-1 InTech. Retrieved from http;// www.Intechopen/.com/book//crop production technology/effects of socio-economic characteristics of farmers on their adoption of OFP.

Adewoyin, O.B. (2015). Awareness of Ecological Organic Agriculture in Nigeria: Case Study of Edo State Nigeria. In Rahmann G., Olabiyi T.I., & Olowe V.I.O. (Eds). *Scientific Track Proceedings of the 3rd African Organic Conference.* October 5th – 9th, 2015, Lagos, Nigeria. (Pg. 107-112.)

Agbamu, J.U. (2002). Agricultural research extension farmer linkages in Japan: "Policy issues for Sustainable agricultural development in developing countries", *International Journal of Social and Policy Issues, 2002(1),* 252-263

Agricultural Marketing Service—National Organic Program United States Department of Agriculture. Retrieved from http://www.ams.usda.gov/nop/

Agwu, A.E, Ekwueme, J,N. & Anyanwu, A.C. (2008). Adoption of improved agricultural technologies disseminated via radio farmer programme by farmers in Enugu state, Nigeria. *African Journal of Biotechnoloy, 7* (9), 1277-1286.

Agwu, E.A., & Anyanwu, A.C. (1996). Social-cultural and Environmental Constraints in Implementing the NALDA Programme in South- eastern Nigeria. A case study of Abia and Enugu State. *Journal of Agriculture and Education, Vol. 2*, Pp 68-72.

Ahmet, K. (2011). *Advantages and disadvantages of organic farming methods*. Retrieved from http://www.agriculturegуide.org/advantages-and-disadvantages-organic-farming-methods.

Akinnagbe, O.M., & Ajayi, (2010). Assessment of farmers' benefits derived from Olam Organization sustainable cocoa production extension activities in Ondo State, Nigeria. *Journal of Agricultural Extension, Vol 14*, (1), June 2010.

Akpabio, (2005). Rural and Agricultural sociology In Ike Nwanchukwu (Ed) *Agricultural extension and rural sociology*. Snap press limited Enugu.

Akwa Ibom State Ministry of Agriculture and Rural Development (2004). *Overview of agriculture in Akwa Ibom State.* (A manual of the Ministry of Agriculture Akwa Ibom State, Nigeria).

Alroe, H. F., and Noe, E., (2008). What Makes Organic Agriculture Move, Meaning or Market. A Polyocular Approach to the Dynamics and Governance of Organic Agriculture. *International Journal of Agricultural Resources. Governance and Ecology, 7, (1-2),* 2008.

Anderson, J. B., Jolly D. A,. & Green, R. (2005). *Determinants of farmer adoption of organic production methods in the fresh – market produce sector in California. A logistic regression analysis.* A paper presented at the Western Agricultural Economics Association 2005. San Francisco California. Retrieved from http://ageconsearch.umn.edu/bitstream/36319 /1/sp05an01.pdf, July 2011.

Aphunu A., & Agwu A.E. (2013). Information and training needs of clustered fish farmers in Delta state, Nigeria. Implications for transformation of fishery sub-sector. *Proceedings of 18th Annual National Conference AESON 5th – 9th* May 2013. (Pp 11 and 12).

Appropriate Technology Transfer for Rural Areas ATTRA, (2007). *An overview of organic crop production, fundamentals of sustainable agriculture ATTRA Fayetteville.*

Asiabaka, C.C. (2002). *Agricultural Extension; A handbook for development practitioners,* Omoku Rivers State: Moslem United Services.

Association of Organic Agriculture Practitioners of Nigeria (2015). www.homef.org/news/ibadan_organic_farmers_market_launched_nigeria

Australian State of Environmental Report (SOE) (2001). *Comprehensive National Report on Australian Environment and heritage.* Retrieved from http://www/environment/gov/au/science_and_reserach/state_environment_reporting/soe_2001.

Awuror, E., & Thuo Karugu, C., (2014). Assessment of establishment and management of organic fish farming in Kenya; A case study of Kiambu District. *European Journal of Business Management vol 6*, no 12. Pp 194-195.

Badgley, C., Moghtader, J., Quintero, E., Zakem, E., Chapell, M.J., Aviles Vazquez, K., Samulon, A., & Perfecto, I., (2007). *Renewable Agriculture and food system, Vol. 22,* pp. 80-85.

Baier, A., (2011). Documentation forms 92 for organic crop and livestock producers. USDA Organic. Appropriate Technology Transfer for Rural Areas (ATTRA) pp 2

Balogun, O.O., (2010). Address by the National Coordinator, Organic Agriculture Projects in Tertiary Institutions in Nigeria at the *6th National Conference on Organic Agriculture Held at the University of Maiduguri, Nigeria*, 21st – 25th November.

Barkley, A., (2002). Organic Growth: Producer profits and corporate farming. *Economics, Kensas state, August 15-16 2012. Presentation at the risk and profit conference, department of Agricultural*

Bateman, D. I., (1993). Organic Farming and Society: An economic perspective. 45pp. In; The economics of organic farming: An international perspective, Lampkin, N. H. And Padel, S. (Eds) CAB International pp 280-284.

Baumann, D.T., Bastiaan, S. L., & Kropff, M.J., (2000). Competition and crop performance in a leek- celery inter-cropping system. *Crop science 41*, 764-774

Bavec F. (2006). *Organic production and use of alternative crops*. London: CRC Press, pp 241.

Bayelsa State Seneral Information Area - BNMT. Retrieved from http://bayelsa newmediateam.blogspot.com/.../bayelsastategeneralinformation

Bello, W.B., (2008). Problems and prospect of organic farming in developing countries. *Ethiopian Journal of Environmental Studies and Management Vol. I, No.I,* Pp 36 -43

Beltran, E.M., Miralles de imperial., Porcel, M.A., Delgado, M.M., Beringola, M.I., & Bigerigo, M., (2002). *Effect of sewage sludge compost application on ammonium, nitrogen and nitrate-nitrogen content on olive grove soils. Proceedings of 12th International Soil Conservation Organisation Conference* May 26th to 31st, Beijing China.

Benbrook, C., Zhao, X., Yáñez, J., Davies, N. & Andrews, P. (2008). *New Evidence Confirms the Nutritional Superiority of Plant-Based Organic Food.* Retrieved from https://organic-center.org/reportfiles/Nutrient ContentReport.pdf

Bjorklund, H., Bondestam, J., & Byland, G. (1990). Residue of oxytetracycline in wildfish and sediments from fish farm. *Aquaculture, 86*: 359-367.

Boz, I., (2002). Does early adoption influence farmers, use of the extension service. *Journal of International Agricultural Extension Education, 9*, 77-82.

BPE (Bureau of Public Enterprise Nigeria). (2004). *BPE Data*. Retrieved from http//www.bpeng.org/101031773/656532b asp

Braier, A. (2011). *Documentation forms for organic crop and livestock producers.* USDA Retrieved from https://www.ams.usda.gov/sites/ default/files/media /NOP-DocumentationFormsIntro.pdf

Breland, T.A., & Eltun, R., (1999). Soil microbial biomass in ecological, Integrated and conventional forage and Arable cropping system, *Biology and Fertility of Soils, 30,* pp 193-201.

Chander M., & Pathak P., (2010). *Farmers' existing livestock production practices in relation to organic standards: An Indian study.* Paper presented in National workshop on organic animal husbandry standard IVRI Izatnagar, 26-27 November 2002.

Chander M., Subrahmanyeswari, B., Mukherijee, R., & Kumar, S., (2011). Organic livestock production: an emerging opportunity with new challenges for producers in tropical countries. *Rev. Sci. Tech Off int Ep12, 2011, 30(3),* 969-982

Charreau, (1994). Organic matter and biochemical properties of soils in the dry tropical zone of West Africa. *FAO soils bulletins Rome Italy. 27,* 313-341.

Chen, M. F. (2007) "Consumer attitudes and purchase intentions in relation to organic foods in Taiwan: Moderating effects of food-related personality traits", *Food Quality and Preference, Vol. 18,* No. 7, pp. 1008-21.

Chihabra, R., Santharam, R., & Johannes, H.B. (2013). Organically grown foods provide healthy benefits to Drosophilia Melanogaster. *Open Access publication Jan 9 2013.* Retrieved from http://www.phosone.pog/article/info.doi%2F10137%Fjournal pone 0052988

Codex, A. (1999). Guidelines for the production, processing, labelling and marketing of Organic produced foods Commission CAI/GI.32.

Commenges, D., Scotet, V., Renaud, S., Jacqmin-Gadda, H., Barberger-Gateau, P., & Dartigues, J. F. (2000). Intake of flavonoids and risk of dementia, *European Journal of Epidemiology 2000, 16,* 357-363.

Conor, J. O., (2004). Organic Matter, *Bi-monthly Magazine of Irish Organic farmers and a growers association* West Cork: waterfall, Beara. 2(14).

Costa, P.B.A. (2010). Sustainable ecological aquaculture systems: The need for a new social contract for Aquaculture Development. *Marine Technology Society Journal, 44,* 88-112

Crutchfield, S., Buszby, J., Frenzen, P., Allshoues, J., & Robert, D. (2000). *The economics of Food Safety and International Trade in Food Products*, United States Department of Agriculture Economic Research Service: 1800M Street NW Washington DC, 20036.

Dabney, S. M., Delgado, J. A., & Reeves, D. W., (2001) Using winter cover crops to improve soil and water quality. *Communication Soil Science Plant Analysis 32,* 1221-1250

Dabney, S.M., Wilson, G.V., Mcgregor, K.C., & Foster, G.R. (2004). History residue and tillage effect on erosion of loessial soil. *Transactions of the American Society of Agricultural Engineer* pp740-775.

De Cork, L (2005). *Determinants of organic farming conversion*. Poster paper prepared for presentation at the XIth International Congress of the EAAE (European Association of Agricultural Economists). The future of Rural Europe in the Global Agri- food system, Copenhagen, Denmark, August 24-27, 2005.

Delta State Millennium Development Goals Report (2010).

Dixon J, Taniguchi K, W attenbach W, & Tanyeri-Arbur. (2004). Small- holder, globalization and policy analysis, AGSF Occasional Paper 5. Retrieved at http:www.fao.org/docrep/007/y5784e00.htm#contents.

Do cytowanian, O. Y., Ozden, O., & Orles, S. (2010). Organic fish production and the standards. *Acta Sci. Pol, Technol Aliment. 9(2),* 125-131.

East African Community (EAC) (2004). *Climate, Food, Trade: where is the policy Nexus? Lessons from teh East African Community?* Retrieved from http://www.cuts.genera.org/pdf/PACK_EAC_synthesis_report_lessons_from_east_africa.

Eboh, E. (2009). *Implications of climate change for Economic growth and sustainable development in Nigeria*. Enugu forum policy paper 10. African Institute for Applied Economics Nigeria.

Eghball, B. (2001). *Composting manure and organic residue.* Cooperative extension publication: Institute of Agriculture and Natural Resources, University of Nebraska Linkoln.

Ekong, E. E. (2010). *Rural Sociology,* Uyo Nigeria: Dove Educational Publishers.

Ekwe K.C., & Nwachukwu, I. (2006). Influence of household factors on the utilization of improved garri processing technology in south-eastern Nigeria. *Journal of Agricultural Extension*, *9*, 134-140

European Food Safety Authority. (2009). In Awuror E., & Thuo Karugu, C. (2014). Assessment of Establishment and management of organic fish farming in Kenya; A case study of Kiambu District. *European Journal of Business Management vol 6,* no 12. Pp 194-195.

F.A.O, (2001). Production year book. Food and Agriculture Organization. *Vol 1, 55, Global Environmental report.* 76pp. Retrieved from http://www.unep.org/geo/ yeerbook.

F.A.O, (2001). *The economics of soil productivity in Africa soils Bulletin*. Food and Agriculture Organization Rome.

F.A.O, (2007). *Adaptation to climate change in agriculture, forestry and fisheries; perspective framework and priorities.* FAO Rome.

F.A.O, (2008). *Organic Agriculture and Climate Change*. Food and Agriculture organization. Rome.

FAO, (1999). Organic Agriculture, Food and Agriculture Organization of the United Nations, Rome, In Adebayo S., & Oladele I. Organic agricultural practices among small holder farmers in South Western Nigeria at odn. *Intechopen.com/pdfs-wm/4654pdf*

Food and Agriculture Organization of the United Nations (FAO) (2007). *– Proc. International Conference on Organic Agriculture and Food Security, 3–5* May, Rome. FAO, Rome, 142 pp.

Food and Agriculture Organization of the United Nations (FAO), (2009). – Organic Research Centres Alliance project proposal: start-up phase for the Organic Research Centres Alliance (ORCA) and prototype centre on humid and sub- humid areas (HUSHA). GCP/GLO/289/MUL. FAO, Rome. Available at: www.fao.org/fileadmin/templates/organicag/ files/HUSHA_Proposal_for_website.pdf

Fuller, R.J., Norton, L.R., Feber, R.E., Johnson, P.J., & Chamberlain D.E. (2005). Benefits of Organic Farming to biodiversity vary among Taxa. *Bio/.lett.1:* 431-434 Dol 10: 1098/Vsbl 2005. 0357

Gallapher, K., Ooi, P., Mew, T., Borromeo, E., Kenmore, P., & Ketelaar, J.W. (2005). Ecological basis for low – toxicity integrated pest management (IPM) in rice and vegetables, In The pesticide detox J Pretty (ed) London, UK: Earthscan pp 116-234.

Gbadegesin, A.S. (2013). *A keynote address presented at the 9th National Conference on Organic Agriculture Abeokuta, Nigeria 11 – 15th Nov 2013. Pp 1-11.*

Geoffey, L., & Baier, A.H. (2012). *Management of manure, compost, motalities and waste materials: Guide for Organic Livestock Production*. National Center for Appropriate Technology (NCAT) Pp 71-72

Geographical Features. Retrieved from http://Www.Onlinenigeria.Com /Geography.Asp#Ixzz2ucp1mmbx

Hak-su, K. (2002). *Organic agriculture and rural poverty alleviation, Potential and best practices in Asia*. United Nations Economics and Social Commission for Asia and the pacific (UNESCAP), Bangkok. P21

Halberg, N. Sulser, T.B., Hogh Jensen, H., Posegrant M.W., & Knudson, M.T. (2006) (a). *The impact of organic Farming on Food Security in a regional and global perspective*. In hulberg N.

Halberg, N., Alroe, H. F., Knudsen, M.T., & Kristensen, E. S., (2006). (b). Synthesis; prospects for organic agriculture in a global context, CAB International Global Development of Organic Agriculture; Challenges and Prospects pp 343-357.

Halberg, N., Peramaiyan, P., & Walaga, C. (2009). Is organic Farming an unjustified luxury in a world with too many hungry people. In Willer, Helga & kilcher Lucas (Eds). The World of Organic Agriculture Statistics & Emerging trends 2009 FIBL and IFOAM 95-100

Harris, P.J.C., Brown,e A.W., Barrett, H.R., & Gandiya, F. (2003). – The organic livestock trade from developing countries: poverty, policy and market issues. In Final technical report, Programme of Advisory Support Services for Rural Livelihoods, Department for International Development. School of Science and the Environment, Coventry University, United Kingdom.

Helga, W., & Yussefi, M. (Eds). (2006). *The world of organic agriculture, statistics and emerging trend*. *International Federation of Organic Agriculture Movement. (IFOAM) Bonn Germany and Research Institute of Organic Agriculture* FiBL, Frick, Switzerland pp 211.

Hertog, M.G.L., & Hollman, P.C.H., (1996). Potential health effects of the dietary flavonol quercetin, *European Journal of Clinical Nutrition* 1996, 50, 63- 71

Hine, R., & Pretty, J. (2007). Capacity Building Study 3. Organic Agriculture and Food Security in East Africa ' Promoting Production and Trading Opportunities for Organic Agricultural Products in East Africa ' University of Essex, Horticultural techniques in the UK, *Journal of Agricultural Economics, 50 (1)*, 47-63

IFOAM Organics International (2014). Retrieved from http://www.ifoam.bio /en/benefits-organic-agriculture

IFOAM, (2005). *Principles of organic agriculture preamble* 4Pp Retrieved from http//www.ifoam.org/organicfacts/principles/pdfs/IFOAM_FS_principles (pdf)

IFOAM, (2008). *Cultivate the future*. International Federation of Organic Agriculture Movement Organic World Congress, Modena, June 2008.

IFOAM, (2009). *Global Organic Agriculture: Continued Growth*. BioFacch World Organic Trade Fair 2009 in Nurenberg, Germany.

IFOAM. (2002). *Norms for Organic Production and Processing.* International Federation of Organic Agriculture Movements Bonn. Retrieved from www.ifoam.org

IFOAM. (2007). *Organic Agriculture – Role in countering climate change. Ifoam Germany*. Retrieved from www.ifoam.org/en/benefits-organic agriculture.

John, B. (2002). Organic rice is as twice nice. Report from the International Congress of Ecology, 1. *Three apple production nature. 410*:926-930.

John, G.M., Robert, A., & Chris, J.G. (2003). Improving Agricultural Extension through Faith-Based Organizations. A case of Bahati Farmer Project in Kenya. *Journal of International Agricultural Extension Education 10* (1), 11-19.

Junge, B., Deji, O., Abaidoo, R., Chikoye, D., & Stahr, K. (2009). Farmers adoption of soil conservation technologies: Acase study from Osun state, Nigeria. *Journal of Agricultural Education and Extension, 15*: 3. 257-274.

Kafle, B. (2011). Diffusion of uncertified organic vegetable farming among small farmers in Chitwan district, Nepal; A Case of Phoolbari village. *International Journal of Agriculture Research and Review 1(4)* 157-163, Retrieved from http;//www.ecisi.com.

Kagai, J.K. (2005). National plan for Development of Aquaculture in Kenya-In FAO *Aquaculture Planning in Africa. ADCP/REP/75/1.Pp 61-65.*

Kassie, M., Zikhali, P., Manjur, K., & Edwards, S. (2009). Adoption of sustainable agriculture practices; Evidence from semi-arid region of Ethiopia, *Natural Resources Forum. 33(3); 189-198.*

Katyal, J.C. (2000). Organic matter maintenance; Mainstay of soil quality, *Journal of the Indian Society of Soil Science, 2000,* 704-716

Khor, M., (2009).The Food Crisis, Climate Change and the Importance of Sustainable Agriculture, Environment and Development Series 8, Third World Network 131 Jalan Macalister 10400 Penang, Malasia. 10 p. www.twnside.org.sg

Kirkpatrick, S., (1996). *Change, Training and Farm Profitability,* Caribbean National Farmers Federation.

Laird, D.A., & Kingery, W.I., (2001). Nature of clay Homic complexes in an Agricultural soil. Chemical, biological and Spectroscopic analysis. *Soil science society of American Journal 65,* Pp 1413-1418.

Lampkin N.H., (1990). *Organic Farming; Agriculture with a future*. Ipswich: Farm press book.

Lazarovits, G. (2001). Management of soil pathogens with organic soil amendments. A disease control strategy savaged from the past. *Journal of plant Pathology (23)* 1-7

Lee, D. R. (2005). Agricultural sustainability and technology adoption: Issues and policies for developing countries. *American Journal of Agricultural Economics, 68:* 519 - 527

Letourneau, D.K., & Goldstein, B. (2001). Pest damage and arthropods community structure in Organic Conventional tomato production California, *Journal of Applied Ecology 38*(3) 557-570.

Lopez, C. P., & Reguena J. C. (2005). Diffusion and adoption of organic farming in southern Spanish olive groves, *Journal of Sustainable Agriculture, 30(1).* Retrieved from http://www.inia.es/gcontrec/Pub/005-016-%288905-Factors_rela_1161759971234.pdf

Macey, A. (2004). *'Certified Organic' The Status of the Canadian Organic Market in 2003.* Report to Agriculture and Agri- Food Canada Contract # 01B6830423 March 2004. P32

Mafongoya, P.L., Bationo, A., Kihara, J., & Waswa, B.S. (2006). Appropriate technologies to replenish soil fertility in Southern Africa, *Nutrient Cycling in Agro ecosystem 76;* 127 – 151.

Magnusson, M.K., Arvola, A., Hursti, U., Aberg, L., Sjoden, P. (2001). Attitudes towards organic foods among Swedish consumers. *British Food Journal 103 (3):* 209–227

Makatouni, A. (2002). What motivates consumers to buy organic food in the UK Results from a qualitative study. British *Food Journal 104(3/ 4/5):* 345–352.

Maps of Various States and their Local Governments in Nigeria (2012). Retrieved from http://www.nigerianmuse.com/wp-content/uploads/2012/10/Bayelsa state_map .jpg)

Maps of Various States and their Local Governments in Nigeria (2012). Retrieved from http://www.nigerianmuse.com/wp-content/uploads/2012/11/Edo state_map.jpg

Marinari, S., Mancinelli, R., Campiglia, E., & Grego, S., (2006). Chemical and biological indicators of soil quality in organic and conventional farming systems in Central Italy, *Ecological Indicators 6 (2006)* 701–711

Media Nigeria: News in Nigeria (2015). Retrieved from http://www.medianigeria.com/wp-content/uploads/2015/04/Akwa-Ibom.jpg?f8a902)

Merrigan, K. A. (2008). Organic Food Regulations Part Art, Part Science . In Hasier C. M. (ed) *Regulations of Functional Foods and Nutraceuticals: A Global Perspective.* Blackwell publishing Pp 69-78

Mgbada.J.U, (2010). *Agricultural Extension: The Human Development Perspective.* Computer Edge Publishers, Enugu.

Millennium Development Goal (MDG) (2010). Millennium Development Goals Report. *Nigeria.unfa.org/files/2010MDG Report Nigeria.*

Minnesota Department of Agriculture (2005) State of Minnesota (US) http://www.mda.state.mn.us/esap/organic

Mitchell, A. E., Hong, Y. J., Koh, E., Barrett, D. M., Bryant, D.E., Denison, R. F., & Kaffka, S., (2007). Ten-Year comparison of the influence of organic and conventional crop management practices on the content of flavonoids in tomatoes. *Journal of Agricultural and Food Chemistry 2007, 55*, 6154-6159

Mnbaga, T. E., & Friesen, D., (2003). *Maize / Legume systems for improved maize production in northern Tanzania. African Crop Science Conference Proceedings 6:587-591*

Mondelagers, K., Verbeke, W., & Van Huylenbroeck, G., (2009). Importance of health and environment as quality traits in the buying decision of organic products. *British Food Journal 111 (10):* 1120-1139q.

Muller, A. (2009). Benefits of Organic Agriculture as Climate Change Adaptation and Mitigation for developing countries. Retrieved from http://www.ifr.ac.uk/waste /Reports/BenefitsOfOrganicAgriculture.pdf

Mustapha, S.B., Bzugu, P.M., & Sanusi, A.M., (2012). Development of organic agriculture in Nigeria. *Journal of Environmental management and safety. Vol 1* no 1 pp 44-53.

N.P.C. (2006). National Population Commission. *National population census*, Federal Republic of Nigeria official gazette 94 (4) Lagos, Nigeria.

Narayanan S (2005) *Organic farming in India: Relevance, Problems and Constraints.* Department of Economic Analysis and Research. National Bank for Agriculture and Rural Development. Occasional paper . Mumbai 38.

National Advisory Committee on Rural Health and Human Services. (2011). *The 2011 report to the secretary: Rural health and human services issues*. Washington, DC: US Department of Health and Human Services.

National Organic Standard Board Of U.S.A. (1996). Retrieved from https://www.google.com.ng/?gfe_rd=cr&ei=bmJMVrazMYLF8AeWs6Mw&_gws_rd=ssl#q=nATIONAL+ORGANIC+BOARD+OF+THE+USA+1969

National Rural Health Association. (2012). What's different about rural health care? Retrieved from http://www.ruralhealthweb.org/go/left/about-rural-health.

Nigeria Organic News (NON) (2009). *Strengthening Human Capacity Development and Skill Training in Organic Practices*. A Newsletter Series of the Organic Agriculture Project in Tertiary Institutions in Nigeria.

Ntui, O. E., Ofem, N.I., & Ajigo, L. (2012). *Assessment of farmers' awareness and adoption of sustainable soil management practices in Cross River State, Nigeria. Proceeding of the 8th Annual conference on organic Agriculture (UNICAL ORGANIC 2012) 5TH-9TH Nov.2012.* University of Calabar, Calabar, Nigeria pp 37-42.

Nwankwo, U. M., Peters, K. J., & Bokelmann, (2009). Information access and relevance affect adoption decision: Rethinking adoption categorization, *Research Journal of Agriculture and Biological Sciences* 5:411-224

Nyamangara, J., Bergstron I. F., Piha, M.I., & Guller K. E. (2003). Fertilizer use efficiency and nitrate leaching in tropical sandy soil. *Journal of Environmental Quality. 32;*599-606.

Obi, C.C. (2013). Climate change and its effects on rural agricultural production in South-east and South-south, Nigeria. (Unpublished doctoral thesis, School of Agriculture and Agricultural Technology).

OECD. (2003). "Farm household income issues in OECD countries. A synthesis report". *AGR/CA/APM(2002)11/FINAL.*

Ohajianya, D.O. (2004). Socio economic determinants of multiple uses of water for irrigation in Kaduna State, Nigeria. *Journal of Modeling and Simulation Techniques in Enterprise. AMSE France. Vol. 25*, No. 1, Pp. 67 – 77.

Ohmart, J. L. (2003) *"Direct Marketing with Value added products (or 'Give me the biggest one of those berry tarts")*. University of California Sustainable Agriculture Research and Education Programme.

Ojeniyi, S.O. (2000). Effects of goal manure on soil nutrients and okra yield in a rainforest area of Nigeria. *Applied Tropical Agriculture. 5:*20-23.

Ojeniyi, S.O. (2000). Effects of goat manure on soil nutrients and Okra yield in a rainforest area of Nigeria. *Applied Tropical Agriculture 5:*20. -23

Okoye, A.A. (1989). Factors affecting adoption process by farmers in selected L.G.A of Anambra state. *Journal of Agric. Society of Nigeria.* Pp. 124-127

Okwu, O. J., & Daudu, S. (2011). Extension communication channels usage and preference by farmers in Benue state Nigeria. *Journal of Agricultural Extension and Rural Development* vol 3*(5) Pp 88-94*

Olayide, O, E., Anthony, E I., Arega D.A., & Vincent A. (2011). Assessing farm level limitations and potentials for organic agriculture by agro- ecological zones and development domains in Nigeria, West Africa. *Journal of Human Ecology*. 34(2): 75-85

Organic principles/standards and cattle production. Retrieved from (http://www.veeru.reading .ac.uk/comp2/Cattleweb/health/stan.htm)

Orji, S.C. (2013). *How to solve Nigeria's Problem of food through organic farming.* Retrieved from http://www.nigeriasinamerica.com/article/ 6000/1/how-to-solve-Nigeria-problem-of-food-through-organic farming/page i html.

Ouedraogo, E., Mando, A., & Zombre, N, P., (2001). Use of compost to improve soil properties and crop productivity under low input agricultural system in West Africa, *Agriculture, Ecosystems and Environment, 84*(3):259-266

Oyekanini, E. O., Coyne D.L., & Fawole, B. (2008*).* Utilization of the potentials of selected micro organisms as Bio control and fertilizer for enhanced crop improvement. *Journal of Biological Sciences 8(4):* 746-752

Oyesola, O.B., & Obabire, I. (2011). Farmers' perception of organic farming in Ekiti state Nigeria. *Journal of Organic System 6*(1) Pp 20-26

Ozor, M., Madukwe, M.C., Enete, A A., Amaechina, E. C., Onokala P., Eboh, E. C., Ujah, O., & Garforth, C.J. (2010). Barriers to climate change adaptation among farming households of Southern Nigeria. *Journal of Agricultural Extension. Vol 14.* (1) pp 114-124.

Pandel, S., & Lampkin, N. (1994). Farm level performance of organic farming system in Lampkin, N and Pande, S. (Ed). *The Economics of Organic Farming: An International Review*

Park, J.R., Stabler, M.J., & Jones, P.J. (2008). Evaluating the role of environmental quality in the sustainable rural economic development of England*, Environment, Development and Sustainability .10,* 69-88

Parrot, N., & Marsden, T. (2002). *The real green revolution: Organic and agro-ecological farming in London*: Green Peace Environment Trust. Pp. 1-6.

Paswell, P.M. & Christopher, B.B. (2007). Household determinants of adoption of improved natural resources management practices among smallholder farmers in Western Kenya, *Food Policy 32(2007)* 515-536

Pathak, P.K & Chander M. (2002). *Awareness of organic livestock production at farmers level: A study in two North Indian villages. Proceeding of 5th IFOAM Asia scientific conference.* Hangzhou city China. October 31-Nov. 4

Patrick, H., & Alain, J. (1999). Organic Farming, *Eurostat* pp 20-30.

Prabir, K.R., & Mahesh, C. (2012). Farmers existing livestock production practices in relation to organic production standards; An Indian study. Paper presented in national workshop on Organic Animal Husbandry Standards Ivri Izanagar 26-27 November 2012

Prakesh, T. N. (2003). A Theoretical framework to promote organic produce marketing in Indian. *Indian Journal of Agriculture Marketing. Conference special* Pp 1-16

Prein, M., Bergleiter, S., Ballauf, M., Brister, D. J., Halwart, M., Hongrat, K., Kahle, J., Lasner, I., ... & Wainberg, A.A. (2012). The future of expanding niche markets. In R. P. Subasinghe., S. S. De Silva., M.

Halwart., N. Hishamunda., C. V. Mohan. and P, Sorgeloos. Farming the water for people and food. *Proceedings of the Global conference on Aquaculture Phuket, Tailand* 22-25 September 2010 Pp 549-567

Pretty, J. (1999). Can sustainable agriculture feed Africa? New evidence on progress, processes and impacts, *Environment, Development and Sustainability* 1: 253–274.

Pretty, J., & Hine, R. (2001). Reducing food poverty with sustainable agriculture. A summary of new evidence. Final report from the SAFE World Research Project, Feb. 2001 University of Essex Colchester, U.K.

Pretty, J., Lang, T., Ball, A., & Morrison, J. (2006). Farm cost and food miles; an assessment of full cost of the weekly food basket. *Food Policy 30* (1) 1-20.

Puja, M. (2015). *Rural Community: Top 10 Characteristics of the Rural Community– Explained!* Retrieved from http://www.yourarticlelibrary .com/sociology/rural-sociology/rural-community-top-10-characteristics-of-the-rural-community-explained/34968/

Reganold, J. P., Glover, J. D., Andrews P. K., & Hinman J. R., (2001). Sustainability of three apple production, Nature. In Bello W. B. *Problems and prospects of organic farming in developing countries. EJESM Vol 1* no 1 2008 Pp 36-43.

Reichard, W., Imibunshi, K., & Tidge, J. (2000). Microbial processes in C and N dynamics in Kirk, G.J.D., & Olk, D.C. (Eds) *Carbon and Nitrogen Dynamics in Flooded Soils.* International Rice research Institute, Makati city, Philippines pp101-146.

Rigby, D., & Caceres, D. (2001). "Organic farming and the sustainability of agricultural systems", *Agricultural Systems*, *68* (1): 21-40.

Rigby, D., & Caceres, D. (2001). Organic farming and the sustainability of agricultural system. *Agricultural Systems 68*, 21-40.

Sakib, H., Alfred, S.I., & Prodhan, F.A. (2014). Farmers knowledge on aquaculture practices in Bogra District of Bangladesh . *International Journal of Agricultural* Extension 02(02) 121-127.

Scialabba, N., (2000). factors influencing organic agriculture policies with a focus on developing countries, IFOAM 2000 Scientific Conference, Basel, Switzerland, 28-31 August 2000 13p

Scialabba, N.E., & Hattam, C. (Eds) (2002). Organic agriculture, environment and food security ; Soundness of organic and conventional agriculture by means of life cycle assessment, Food and Agriculture Organization of the united nations Rome. *British Food Journal 111* (10) 1028-1061.

Sharma, G., (2005). Organic agriculture in Nepal: An analysis into status, policy, technology and psychology. In Sharma G., & Thapa, P.B. (Eds), *Proceedings of the National Workshop on Organic Agriculture and Food Security,* 13-15 December 2005, Katmandu, Nepal 5-17.

Sharma, P.D. (2003). *Prospect of organic farming in India. In Proceedings of National Seminar on organic products and their future prospect . Sher-e-Kashmir University of Agricultural science and Technology.* Sringagar Pp 21-29

Shelton, D. P., Dickey, E. C., Hachman, S. D., Steven, D., & Fairbanks, K. D. (1995). Corn residue cover on soil surface after planting for various tillage and planting systems, *Journal of Soil Water Conservation 50*, 399-404.

Shibanda, G.G. (1996). Fish Farming: The small holder information needs in Kenya. *NAGA, the ICLARM quarterly. 19* (3) Pp 25-26

Singh, M. (2003). Organic Farming: Awareness and beliefs of farmers in Uttarakhand, *India Journal of Human Ecology*, *37*(2): 139-148.2012

Smil, V. (2001). *Enriching the earth: Fritz Haber, cartosch, and the transformation of world food,* Boston: Mit Press.

Soil Association (2008). Fish farming for organic aquaculture. Retrieved from http://www.naturland.de

Soil Association (2015). Better Animal Welfare. Retrieved from http://www.soilassociation.org/Whatisorganic/Organicanimals

South-South Agenda: BRACED For Regional Growth (2012). Retrieved from http://nigeriamasterweb.com/blog/index.php/2012/05/17/nigeria-south-south-agenda-braced-for-regionalgrowth

South-south Region Guide. Retrieved from http://www.mydestination.com/nigeria/regionalinfo/6182974/south-south-region

Stolze, M. (2000). *Environmental impacts of organic farming in Europe*. Organic Farming in Europe Economic Policy.

Sundrum, A. (2001). – Organic livestock farming: a critical review. *Livest. Prod. Sci., 67,* 207–215.

Swift, M. J., Izac, A.M.N., & Van, Noordwijk, M. (2004), Biodiversity and ecosystem services in agricultural landscape- are we asking the right questions. *Agriculture Ecosystem and Environment 104* (2004) 113-134.

Taneja, V.K. (2005). – Integrating livestock-crop systems to meet the challenges of globalization: animal genetic resources in changing production systems in Asia. In Integrating livestock-crop systems to meet the challenges of globalization. In P. Rowlinson, C. Wachirapokorn, P. Pakdee & M. Wanapat, (Eds). *Proc. Animal Husbandry Association of Thailand (AHAT) British Society of Animal Science (BSAS) International Conference*, 14–18 November, Khon Kaen, Thailand, Vol. I BSAS, 317–324.

Thakur, D. S., Sharma, K. D., & Saini, A. S. (2003). Economics of production and marketing of organic produce. *Indian Journal of Agricultural Marketing. Conference number special*

Tomas, F. (2003). Organic farming in Demark, Ministry of Food, Agriculture and Fisheries. Home page of Denish Agricultural Advisory Service. Pp 1-8.

Trewavan, N.A. (2001). Urban Myths of organic farming: Agriculture began as an ideology but carry today's needs. *Nature, March 2001*. 410: 409-410

Tumnushabe, G. W., Naluwairo, R., & Mugyenyi, O. (2006). The status of organic agriculture production and Trade in Uganda: *Background study to an integrated assessment of the sub sector.* Advocates Coalition for Development Environment, Kampala, Uganda pp 20.

Twarog, S., & Vossenaar, R. (2002). "Obstacles facing developing country exports of organic products to developed country markets" in IFOAM, *International Harmonisation and Equivalence in Organic Agriculture*, Conference on Organic Guarantee Systems held by IFOAM in co-operation with FAO and UNCTAD, February, Nuremberg, Germany.

Udofia, E.P. (2011). *Applied statistics with Multivariate methods.* Enugu: Immaculate Publications Limited, pp187-189.

UNCTAD-UNEP (2008). Organic Agriculture and food Security in Africa. *United Nations Conference on Task and Development (UNCTAD) and United Nations Environment programme (UNEP) Geneva and New York.*

United Nations Conference on Trade and Development (UNCTAD). (2008). – Organic agriculture and food security in Africa. United Nations Environment Programme (UNEP) - UNCTAD Capacity-building Task Force report on Trade, Environment and Development. UN, New York and Geneva, 47 pp.

United States Department of Agriculture (USDA) (2013). Retrieved from https://www.ams.usda.gov/sites/default/files/media/Organic%20Livestock%20Requirements.pdf

Usanga, U. J., Essien, B. A,., & Bamidele, A. Y. (2011). Farmers' perception of Organic Farming in the Derived Savannah of South- East- Ecological Zone of Nigeriaq: A case study of Ebonye South Agricultural Zone. *Proceedings of the 7th National Conference on Organic Agriculture, 13th - 17th November, 2011, University of Agriculture*, Makurdi, Nigeria pp 112.

Vaarst, M, (2010). Organic farming as a development strategy; who are interested and who are not. *Journal of sustainable Development Vol 3,* no 1.

Vaarst, M., Roderick, S., Byarugaba, D.K., Kobayashi, S., Rubaire-Akiiki C., & Karreman, H.J. (2006). – Sustainable veterinary medical practices in organic farming: a global perspective In: Halberg N., Alrøe, H.F., Knudsen, M.T., & Kristensen., E.S. (Eds). *Global development of organic agriculture*. CABI, Wallingford, United Kingdom, 241–276.

Van, Der Honing, Y. (Ed.) (2005). – *Book of abstracts of the 56th Annual Meeting of the European Association for Animal Production, 5–8 June, Uppsala, Sweden. EAAP book of abstracts, Vol. 11*. Wageningen Academic Publishers, Wageningen, 409 pp.

Varrst, M. (2010). Organic Farming as a Development strategy: who are interested and who are not. *Journal of sustainable development. Vol. 3,* No. 1. March, 2010. Pp. 39.

Villalón, A.N. (2010). – At last United States Department of Agriculture.. issues, final rule on pasturing livestock, *Organic Standard, 107, 16.*

Wai, Ong Kung. (2009). – Organic Asia: from back to nature movement and fringe export to domestic market trend. In The world of organic agriculture: statistics and emerging trends 2009 (H. Willer & L. Kilcher, eds). International Federation of Organic Agriculture Movements, Bonn; Research Institute of Organic Agriculture, Frick, Switzerland; International Trade Centre, Geneva. Retrieved from: www.organicworld .net/yearbook-2009.html

Whitney, J.W. (2009). Adoption of Organic farming Systems in Missouri. (Unpublished Master's thesis, University of Missouri.\columbis)

Wier, M., & Calverly, C., (2002). Market potentials for organic foods in Europe, *British Food Journal, 104;* 45-65.

Wikipedia Encyclopedia Retrieved from http://en.wikipedia.org/wiki/deltastate

Willer, H. & Kilcher L. (2011). – The world of organic agriculture: statistics and emerging trends 2011. International Federation of Organic Agriculture Movements, Bonn & Research Institute of Organic Agriculture, Frick, Switzerland. Retrieved from: www.organic-world.net/ yearbook-2011- contents.html

Willer, H., & Youssefi, M. (2007). The World of Organic Agriculture – Statistics and Emerging Trends 2007. International Federation of Organic Agriculture Movements IFOAM, Bonn, Germany and Research Institute of Organic Agriculture FiBL, Ackerstrass Swizerland

William, P.R.D., & Hammitt, J.K. (2000). A comparison of organic and conventional fish produce buyers in Boston Area. *Risk Analysis 20* (5), 735-746.

Williams, P.R.., & Hammitt, J.K., (2001). Perceived risk of conventional and organic produce; pesticides, pathogens and natural toxins. *Risk Analysis 21* (2) 319-330.

World Bank (2001). Towards the development of an environment action plan for Nigeria, *World Bank Report 2001*. West African Department. Washington D.C 110-115.

World Bank. (2000). World Development Indicators 2000 – CD Rom, World Bank Washington, D.C In Awuor E. Assessment of establishment and management of organic fish farming in Kenya: A Case study of Kiambu District. *European Journal of Business and Management. ISSN 222 Vol 6*, No 12, 2014

World Health Organization (2006). Pesticides are a leading suicide method. Media centre Retrieved from www. who.int/mediacentre/news/notes

Worthington, V. (2001). Nutritional quality of organic versus conventional fruits, vegetables, and grains. *Journal of Complementary Medicine 7* (2) 161-170.

Yahaya, Mijinyawa., & Kisaiku, O.O. (2006). Assessment of the Edo State of Nigeria tractor hiring services. *CIGR E Journal. Invited Overview Paper Vol Viii*, No 10 March 2006.

Yitbarek, M., & Berhane, G. (2014). Livestock production systems and analysis review. Retrieved from http://www.academia.edu/8035127/Livestock_production_systems_and_analysis_Review.

APPENDIX

QUESTIONNAIRE

Dear Respondent,

I am a Postgraduate Student of the Department of Agricultural Extension, School of Agriculture and Agricultural Technology, Federal University of Technology Owerri. I am carrying out a research titled ' ANALYSIS OF RURAL HOUSEHOLD'S USE OF ORGANIC FARMING PRACTICES IN SOUTH-SOUTH NIGERIA'. This is in partial fulfilment of an award of PhD in Agricultural Extension and Rural Sociology. All information provided will be strictly confidential and used for academic purposes only.

Instruction: Please tick or respond where appropriate.

SECTION A SOCIO ECONOMIC CHARACTERISTICS

State of residence _____

Community of residence _____

1. Age _____
2. Gender: (a) Male [ ] (b)Female [ ]
3. Level of Education: (a)No Formal Education [ ] (b)Primary [ ] (c) Secondary [ ] (d) Tertiary [ ]
4. Marital status: (a) Single [ ] (b)Married [ ] (c) Widowed [ ] (d) Separated [ ] (e) Divorced [ ]
5. Religion: (a) Islam [ ] (b)Christianity [ ] (c)Traditional [ ]
6. Indicate your farming experience in years _____
7. Which of the following farming activities are you engaged in? (a) Crop farming only [ ] (b) Livestock farming only [ ] (c) Fish farming only [ ] (d) Crop and livestock [ ] (e) Crop and fish [ ] (f) All [ ]
8. Indicate your farm size (Plots) for crops _____
9. No. Of livestock _____ Type: Goats_____ sheep _____ cows_____ Poultry _____ others _____
10. No. of stock for fish _____
11. How many are you in your household? _____
12. Do you belong to any farmer's association (a) Yes [ ] (b) No [ ]
13. Do you have contact with extension agents (a) Yes [ ] (b) No [ ]

14. Indicate the frequency of contact with the extension agent (If any)

(a) Not at all [ ] (b) Once in a forth night [ ] (c) Once in a month [ ] (d)Twice in a year [ ] (e) Once in a year [ ]

15. What is your major aim of production? Sale [ ] Consumption [ ] Both [ ]

16. What is your annual income from farming? _____

SOURCES OF INFORMATION

17. Please indicate your sources of information on organic farming/farming practices, frequency of use of each, credibility, reliability and usefulness of each source.

Information Source	Use of information A		Frequency of use B				INFORMATION SOURCE USE FACTOR (C)					
							Credible		Useful		Relevant	
	YES	**NO**	**Not at all**	**Rarely**	**Often**	**Very Often**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**
News paper----------												
T.V adverts ----------												
Radio ----------												
Sales agent ----------												
Extension agent ----------												
Family members ----------												
Neighbours ----------												
Contact farmers ----------												
Farmers organisation ----------												
Agric show/world food days ----------												
Posters ----------												
Leaflets/pamphlets ----------												
Research institutions ----------												
N.G.Os ----------												
Universities, Colleges, Polytechnics --												
Agric journals/manuals/newsletters---												
Internet ----------												
Mobile phones ----------												
meetings ----------												
Others (specify)												

SECTION B AWARENESS OF ORGANIC FARMING

17. Are you aware of organic farming? (a) Yes [ ] (b) No [ ]

CROP FARMERS

19. Please indicate your awareness of the following organic farming practices and the level of awareness

ORGANIC FARMING PRACTICES	YES	NO	IF YES, LEVEL OF AWARENESS			
			Not at all	Low	Moderate	High
Crop Rotation						
Green Manure						
Cover Crops						
Farmyard Manure						
Composting						
Intercropping						
Use of bio Control						
Proper farm Spacing						
Mulching						
Farm cleanliness						
Tillage						
Spot bush burning						
Natural pesticide						
Organic fertilizer						
Natural storage system						

LIVESTOCK FARMERS

Please indicate your awareness to each of the following standards of livestock Organic Farming Practices and level of awareness

Organic Farming Practices for livestock	Yes	No	IF YES, LEVEL OF AWARENESS			
			Not at all	Moderate	High	Low
Adequate land holding						
Farm diversification						
Free movement of animals Provision of fresh air and natural day light						
Protection against adverse weather condition						
Resting areas						
Clean and dry beddings						
Enough space for exercise						
Access to fresh drinking water						
Expression of natural behaviour						
Use of local breed is used						
Natural reproduction technique						
Produce without genetic engineering , ionising radiation or sewage sludge						
Adequate feeding						
Animal feeding is 100% organic						
Prompt treatment of sick animals						
Manage animals without antibiotics						
Traditional/natural treatment of sick animals						
Vaccinate only during disease outbreak						
Manage without added growth hormones						
Accurate record keeping						

Yes means the farmer is aware of the practice and No represent the contrary

FISH FARMERS

Please indicate your awareness to each of the following Organic Farming Practices and level of awareness

Organic Farming Practices for Fish Production	Yes	No	IF YES, LEVEL OF AWARENESS			
			Not at all	Low	Moderate	High
Eco-friendly design						
Manage without growth Hormone						
Antibiotics only used in clinical cases where no other treatment would work						
Cultivate without genetic engineering.						
Site is far from polluting substances						
High quality water source (stream, river, ,						
Organic fertilizer						
Low stock density 10k/m						
Manage without synthetic appetizer and colouring						
Polyculture						
Proper record keeping						
Pond protection from predators						
Use of resistant species						
Natural treatment (homeopathetic)						

18. What category of farming do you classify your farming operation? Organic only [ ] Chemical only [ ] both [ ] none [ ]

FARM ENTERPRISE CHARACTERISTICS

19. If you are engaged in organic farming, how do you rate the enterprise using the under listed? Cost: (a)Expensive [ ] (b) Not Expensive [ ]
    Profitability: (a) Profitable [ ] (b) Not Profitable [ ]

SECTION C: PROFILE OF ORGANIC FARMING PRACTICES (CROP, LIVESTOCK AND FISH) IN SOUTH-SOUTH NIGERIA.

CROP FARMERS

Please indicate your use of each of the following organic farming practices and the level of use

Organic Farming Practices	Use	Non Use	LEVEL OF USE			
			Very regularly	Regularly	Rarely	Never
Crop Rotation						
Green Manure						
Cover Crops						
Farmyard Manure						
Composting						
Intercropping						
Use of bio Control						
Proper farm spacing						
Mulching						
Farm cleanliness						
Tillage						
Spot bush burning						
Natural pesticide						
Organic fertilizer						
Natural storage system						

LIVESTOCK FARMERS

Please indicate your compliance to each of the following standards of livestock Organic Farming Practices

Organic Farming Practices for livestock	Yes	No	IF YES, LEVEL OF USE			
			Very regularly	Regularly	Rarely	Never
Adequate land holding						
Farm diversification						
Free movement of animals Provision of fresh air and natural day light						
Protection against adverse weather condition						
Resting areas						
Clean and dry beddings						
Enough space for exercise						
Access to fresh drinking water						
Expression of natural behaviour						
Use of local breed						
Natural reproduction technique						
Produce without genetic engineering , ionising radiation or sewage sludge						
Adequate feeding						
Animal feeding is 100% organic						
Prompt treatment of sick animals						
Manage animals without antibiotics						
Traditional/natural treatment of sick animals						
Vaccinate only during disease outbreak						
Manage without added growth hormones						
Accurate record keeping						

*Yes means the practice is being used and No represent the contrary

FISH FARMERS

Organic Farming Practices for Fish Production	Yes	No	IF YES, LEVEL OF USE			
			Very regularly	Regularly	Rarely	Never
Eco-friendly design						
Manage without growth Hormone						
Antibiotics is only used in clinical cases where no other treatment would work						
Cultivate without genetic engineering.						
Site is far from polluting substances						
High quality water source (stream, river,						
Organic fertilizer						
Low stock density 10k/m						
Manage without synthetic appetizer and colouring						
Poly-culture						
Proper record keeping						
Pond protection from predators						
Use of Resistant species						
Natural treatment (homeopathy)						

SECTION D: FARMERS' PERCEIVED BENEFITS OF ORGANIC FARMING

Tick (√) where represents your position in the statements below

S/N	STATEMENT	Strongly agree	Agree	Disagree	Strongly disagree
1	Organic Farming increases soil organic matter				
2	Reduces input cost				
3	There is low crop risk failure				
4	Gives high social value				
5	Compatible with the cultural systems				
6	It is inexpensive				
7	It is natural and environmentally friendly				
8	The nutritional value of organically grown food is superior to those grown by conventional methods				
9	A major benefit of organic food to consumer is that it is free of contamination (poison free)				
10	Organically grown food taste better than conventional ones				
11	Organically grown plants or animals are nourished naturally thus making organic foods store longer than conventional ones.				
12	Organic farming does not require the use and exposure to agro-chemicals that has negative effects on man, animal and aquatic organisms.				
13	Organic farming helps mitigate climate change as practices are environmentally friendly.				
14	Consumers who recognise the greater food value of organic produce will pay premium prices for it				
15	Organic farming benefits agric production without destroying our environmental resources ensuring sustainability for not only the current but also future generation				
16	Genetically modified crops or animals have detrimental effect on humans and the environment				
17	Organic farming produces less green house emissions and it is considerably more climate friendly				
18	Organic vegetables contain substances that help fight against cancer and other age related diseases				
19	I am convinced that organic farming is better than conventional (Use of Agro Chemicals)				
20	Inorganic substances such as fertilizers, pesticides, herbicides, are harmful to mankind irrespective of their ability to boost agric productions				

SECTION E CONSTRAINTS TO USING ORGANIC FARMING PRACTICES

Tick (√) on the statement that best suits your position

S/N	STATEMENT	Strongly agree	Agree	Disagree	Strongly disagree
1	Organic farming is time consuming				
2	Transportation of organic materials for use is difficult				
3	Not enough technical know-how				
4	Lack of effective training by extension agents				
5	Inadequate information				
6	Consumers are yet to appreciate the difference between the produce of the two farming system				
7	More labour intensive when compared to the use of chemicals/mechanical farming				
8	Unavailability of organic inputs				
9	No encouragement from government				
10	It is not appreciated, therefore no benefit				
11	No access to organic fertilizers, pesticides and herbicides				
12	Lack of Awareness				
13	Output Marketing Problem				
14	Shortage of Bio mass				
15	High Input Cost				
16	Non availability of farm inputs				
17	Lack of appropriate Agric Policy				
18	Lack of financial support				
19	Low production				
20	Lack of quality standard for Bio inputs				
21	Political and Social factors				

SECTION F SUGGESTIONS FOR THE IMPROVEMENT OF ORGANIC FARMING

S/N	STATEMENT	Strongly agree	Agree	Disagree	Strongly disagree
1	Ministry of agriculture and extension services should be more functional in sourcing and making information on organic farming available to farmers				
2	There should be campaign and sensitization of farmers and the entire populace on the benefits of organic farming/foods				
3	Adequate enlightenment programme should be mounted on organic farming practices so that farmers can adopt				
4	Research institutes should be funded specifically for intensive research on organic farming				
5	Raising awareness on the severity of problems of conventional farming				
6	Developing necessary infrastructure so that information on organic farming practices remain extensive and constant in reaching farmers				
7	Government should make legislation in order to ensure a regulatory framework to enable all stakeholders play on a level ground				
8	Development of a strong domestic market to protect the interest of producers				
9	Organic standards should be published for the knowledge of farmers, consumers and the general populace				