Evaluation of the Performance of Fadama III Agricultural Project in the Niger Delta Area of Nigeria

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CHAPTER ONE

INTRODUCTION

1.1 Background Information

Agriculture is the principal source of food and livelihood in Nigeria, making it a critical component of programmes that seek to reduce poverty and attain food security in Nigeria. The interest in changing agricultural productivity stems from the knowledge that income growth comes from productivity growth and savings-supported investment (Umeta, Lemecha and Mume, 2011). Agriculture had remained the mainstay of the Nigerian economy since independence. In spite of its relegation in terms of export and trade, the Nigerian agriculture between 2000 and 2009 still create employment for a significant portion of the labour force and contributes an average of 40% of the Gross Domestic Product (GDP) per annum (World Bank, 2010). It is estimated that more than 70% of the Nigerian population live on less than US$1.00 per day, suggesting that Nigeria is a poor country (World Bank, 2010). Most of the poor in Nigeria live in the rural areas and the incidence of poverty is highest among households whose livelihoods depend primarily on agriculture.

In a study on Nigerian Agricultural Resources and Economic Growth, Olajide, Akinlabi and Tijani (2011) found a positive relationship between Gross Domestic Product (GDP) and agricultural output in Nigeria. Agricultural sector is estimated to contribute 34.4 percent variation in GDP between 1970 and 2010. In another survey, Emeka (2010) concluded that agriculture's contribution to the GDP has remained stable at between 32 and 42 percent between 2003 and 2010 and employs 70 per cent of the labour force in Nigeria.

A good knowledge of the population of any nation is necessary for agricultural projection. A World Bank Report (2014) revealed that the total population estimate in Nigeria was last recorded at 162.5 million in 2012 from 45.2 million in 1960, amounting to 360 percent increase during the last 50 years. The estimated population growth rate in Nigeria from 2004 –

2012 is shown in Table 1.1. The average population growth rate is about 2.4% for the period 2004 to 2013.

Table 1.1: Population Growth Rate in Nigeria from 2004 – 2013

S/N	Year	Population (millions)	Population Growth Rate (%)
1	2004	134.27	
2	2005	137.54	2.4
3	2006	139.82	1.7
4	2007	143.33	2.5
5	2008	146.95	2.5
6	2009	150.66	2.5
7	2010	154.49	2.5
8	2011	158.42	2.5
9	2012	162.47	2.6
10	2013	166.69	2.6
11	2014	170.86	2.5

***Source**: World Bank (2014)*

Annual growth rate in agricultural production is another factor that is important foragricultural projection in the nation economic developmental plan. A trend analysis by FAO (2012) showed that the average agricultural production growth rate per capita for 2001 – 2010 was 1.4%, while the average growth rate for total agricultural production for the same period was 2.6% (Table 1.2). Furthermore, FAO (2012) revealed that global agricultural production growth rate declined somewhat from the 1960s through the 1980s before resuming higher rates of growth in recent years (Table 1.2). Total production growth rate for crops slightly fluctuates, whereas total production growth for livestock has not increased in the most recent period (1961 – 2010), perhaps because prices for livestock products have not risen as much as for crops. In per capita terms, growth in agricultural production declined very slightly in the latter decades of the last century before accelerating significantly since 2000. The decline and subsequent recovery of per capita production was more pronounced for crops than for all agriculture.

Table 1.2: Average percentage of Annual Growth Rate in Agricultural Production

S/N	Agricultural Sector	1961–1970	1971–1980	1981–1990	1991–2000	2001-2010
	All agriculture					
a.	Total production	2.7	2.4	2.3	2.5	2.6
b.	per capita production	0.7	0.6	0.6	1.0	1.4
	Crop					
a.	Total production	2.7	2.4	2.3	2.5	2.6
b.	per capita production	0.9	0.4	0.3	1.1	1.5
	Livestock					
a.	Total production	2.9	2.5	2.4	2.2	2.2
b.	per capita production	0.9	0.6	0.7	0.7	1.0

Source: *FAO (2012).*

Note: *Annual average change in index of net agricultural production evaluated at 2004 – 2006 constant international reference prices.*

During the 2001 – 2010 period, the annual growth rate of agriculture per capita was 1.4%. National Bureau of Statistics (2010) pointed out that growth in Nigeria's population has substantially increased the demand for food in the countryand that the agricultural sector is the most important non-oil economic activity in Nigeria.

The Federal Government of Nigeria (FGN) has taken several steps over the years to use agriculture as the vehicle to alleviate poverty and attain food security. Agriculture is the principal source of food and livelihood in Nigeria, making it a critical component of programmes that seek to reduce poverty and attain food security. Agricultural lands have been largely degraded in quality due to poor soil management. Other factors associated with declining productivity of the Nigerian agricultural sector include poorly developed irrigation potentials, poor production infrastructure, inadequate funding for agricultural research and extension, inadequate provision and distribution of key inputs such as fertilizers, chemicals, machinery and improved seeds, poor access to livestock inputs, fishery technology and veterinary services, poor or lack of access to credit facilities for the procurement of needed inputs and services: processing, storage and transportation (FMANR,1997; Nwosu,2005).

Jibowo (2005) stated that the programmes adopted so far by the Federal Government included National Accelerated Food Production Project (NAFPP) 1972, Agricultural Development Projects (ADPs) 1975, the Accelerated Development Area Project (ADAP) 1982, and the Multi-state Agricultural Development Projects (MSADP) 1986. Other programmes included Operation Feed the Nation (OFN) 1976, the River Basin Development Authority (RBDA) 1973, the Green Revolution Programme 1980, the Directorate of Foods Roads and Rural Infrastructure (DFRRI) 1986, the National Directorate of Employment (NDE) 1986, the Nigerian Agricultural Insurance Scheme (NAIS) 1987, the National Fadama Development Project (NFDP) 1992, the Poverty Alleviation Programme (PAP) 2000, National Economic Empowerment and Development Strategy (NEEDS) 2004, and the National Special Programme for Food Security (NSPFS) 2003.

Apart from these programmes, the Federal Government has also established programmes which focused on the empowerment of women involved in agricultural production. These programmes included the Better Life for Rural Women 1986, Women in-Agriculture 1991, Family Support Programme 1994 and Family Economic Advancement Programme 1999 (Adisa and Okunade, 2005). Some of these programmes were replicated at the state and Local Government levels. Besides some State Governments had their Special Agricultural Development Scheme (SADS) independent agricultural development programmes, for example, the Rapid Food Production Programme, and the Live and Own a Farm Programme in Delta State.

Presently, the Federal Government of Nigeria, the World Bank and State Governments are implementing Phase III of the National Fadama Development Project. The National Fadama Development Project is an agricultural development intervention designed primarily to supply

the small scale farmers with inputs and assets needed to boost food production with the overall purpose of enhancing rural livelihood. The project started in 1993 where low-cost petrol driven pumps were used to extract shallow ground water for purpose of irrigation in the Fadama. The word "*Fadama*" is a Hausa word which connotes low lying flood plains along Nigeria's major river systems (Idoge and Ovwigho, 2003; Ingawa, Oredipe, Idefor and Okafor, 2004). Fadama also refers to a seasonally flooded area used for farming during the dry season. It is defined as alluvial, lowland formed by erosion and depositional actions of the rivers and streams (Qureshi, 1989). Fadama, although a Hausa word, has become accepted in the Nigerian Agricultural Vocabulary to the extent that Donor Agencies now use it as title of project that bear relevance to artificial supply of water for agricultural purposes and especially during dry season farming. The names Fadama I, II, and now Fadama III are used to denote the various phases of the Fadama projects. Fadama I (1993 - 1999), Fadama II (2003 -2007) and Fadama III (2008 - 2014)

1.2 Statement of the Problem

The Federal Government of Nigeria has adopted a number of agricultural development policies and programmes yet food production remains inadequate to the populace. Aderibigbe (2001) stated that before the discovery of crude oil and military incursion into Nigeria politics in 1966, the nation flourished on agriculture. He opined that proceeds from cocoa, oil palm, rubber and groundnut which were produced in the western, eastern, mid-west and northern regions respectively were used to build physical infrastructure and boost foreign earnings. He argued that instead of taking discovery of crude oil as an additional source of income, agriculture and other natural resources were relegated to the background.Igbokwe and Ajala (1995) noted that community participation was an active process whereby beneficiaries influenced the direction and execution of development projects rather than being mere recipients of project benefits.

Farming problems according to Ugboma (2009) are further compounded by the short fall of agricultural extension officers who would serve as interpreters of what is in the information bulletins and practical instructors on the field for the farmers; extension contact is inadequate.

Although Fadama intervention since 1993 till date had contributed to some farmers' livelihoods improvement, it is still characterized by deficiencies in human, material and environmental resources management. Limitations exist in agri-business relationship of internal and external stakeholders in meeting desired objectives, positive harnessing of available material inputs for optimal production outputs and sustenance of the natural resources for future investment. Other problems militating against agricultural development in Nigeria include poor monitoring and evaluation of agricultural development intervention programme. It is important to monitor and evaluate all stages of a programme in order to present a holistic view of the outcomes of the programme implementation process. Inadequate extension services and illiteracy of the farmers have also constituted hindrances to the expansion and modernization of agriculture (Olaolu, 2011). The World Bank designed Fadama projects to reduce poverty status in Nigeria. A critical survey of the past Fadama Agricultural projects revealed that they have contributed significantly to poverty alleviation and improvement in the standard of living among the rural populace (Olaolu, 2011). Agricultural project problems are numerous. Fadama III is poised to resolve some of these issues relating to income generation, livelihood well being, capacity building, local governance, communication and information support, small-scale community owned infrastructure; advisory services and input support; support to ADPs-sponsored research and on-farm demonstrations; asset acquisition for individual FUGs/EIGs and project management, monitoring and evaluation and environmental management plan compliance (NFDP, 2009b). Views expressed by NPDF (2009b), Olaolu (2011) and other

scholars who evaluated Fadama I and II agricultural projects connote that there are fears that Fadama III may not fully achieve its objectives. In order to critically examine the expressed fears on Fadama III, this study sort to evaluate the performance of Fadama III in light of its impact.

This research is set out to provide answers to the following research questions:

What is the current status of adoption of Fadama III agricultural techniques and selected production recommendations? What is the perception of beneficiaries about achievement of project's objectives in three states of the Niger Delta? Does a significant difference exist in performance between before and during Fadama III intervention projects? Has Fadama III achieved the targets earmarked for selected agricultural activities in the project document? What are the constraints facing the implementation of Fadama III agricultural projects and those facing farmers?

1.3 Objectives of the Study

The overall objective of this study was to evaluate the performance of Fadama III agricultural projects in the Niger Delta Area. The specific objectives were to:

i. describe the socio-economic characteristics of the beneficiaries of Fadama III project;
ii. ascertain the level of adoption of agricultural technologies by Fadama III beneficiaries;
iii. assess the perception on Fadama III activities by the beneficiaries;
iv. ascertain whether significant difference exists in performance between before and during Fadama III agricultural project;
v. compute achievement index of Fadama III project activities using actual/target proportion; and
vi. identify the constraints to Fadama III Project.

1.4 Hypotheses

Ho_1: Farmers' socio-economic characteristics do not significantly contribute to their perception on achievement of Fadama III activities.

Ho_2: There is no significant variation in the perception of the Fadama III agricultural projects beneficiaries about achievement of project objectives among the selected Niger Delta States.

Ho_3: There is no significant difference in performance between before and during Fadama III.

Ho_4: There is no significant variation in the constraints facing Fadama III project and farmers among the selected Niger Delta States.

1.5 Justification for the Study

Agricultural projects of Fadama III are located in various rural communities of the Niger Delta States. Thus far, some efforts have been made by researchers and consultants to make available relevant information on performance of the on-going Fadama III project as documented in Fadama III midterm review. Some gaps were discovered such as knowledge in status of farmers' adoption level of recommended technologies by Fadama III, performance of farmers as a result of participation in Fadama III activities and achievement made so far since the inception of Fadama III. Against this backdrop, there is need to conduct an evaluation survey on the Fadama III project, particularly as the first and second phases of the project have ended. The evaluation of the project will reveal the performance of its activities against established targets and ascertain the extent to which Fadama III objectives have been achieved. The anticipated information that will be obtained from this study will be relevant and applicable to farmers, advisory service providers (extension workers/local facilitators/consultants), governmental and non-governmental organizations, agricultural stakeholders and donor agencies.

1.6 Scope of the Study

The study was carried out in the Niger Delta States: Bayelsa, Delta and Akwa Ibom. An effort was made to embark upon a pre-field visit to the three states; agricultural projects evidently prominent amongst them are cassava, poultry and fisheries enterprises baseline. Thus the research focused on these three agro-projects and three states of the Niger Delta.

CHAPTER TWO

THEORETICAL FRAMEWORK AND LITERATURE REVIEW

2.1 Theoretical Frameworkof the Study

The theoretical framework for this study is based on programme evaluation models. Ajayi (2005) identified some of these programme evaluation models in agricultural extension to include: (i) Project participants and Non-project Participants model (ii) Effectiveness Model (iii)Project Objectives, Inputs, Outputs, Effect, Impact and Beneficiary (POIOEIB) Model.

2.1.1 Project Participants and non-Project Participants model

Mabowonku (1986) and Ajayi (1996) opined that, one of the major conceptual issues in project evaluation is the comparative measurement of the effect of the project and the determination of the cause-and-effect relations. In scientific experimental design, subjects of a study may be divided into 2 groups: the first, called the experimental or treatment group is subjected to some causal stimulus generally referred to as "treatment". The second group often called the control group receives no treatment. The variables, which the stimulus is meant to change, are measured in the two groups before and after the treatment are applied. Changes in the level of variables in the treatment group are then compared with the corresponding change in the control variables. The issue of whether or not the changes in the control group are of the same magnitude and dimension as those in the treatment group, less treatment effect, appears to be one of the bottlenecks in applying this method of evaluation to project analysis. This is because; agricultural projects involve human beings, resources and environment.

2.1.2 Effectiveness model

One way of measuring the effectiveness of a project's input delivery system is to compare the achievement of the project's input delivery system with the non-project area achievement. If the project area performs better, it is regarded at being more effective than the non-project area approach and vice versa (Ajayi, 2005). Again, effectiveness can be measured in terms of knowledge gained by farmers, benefits derived and ability of farmers to transfer

technology to other farmers and the attainment of project objectives (Ebewore, 2012). Aja (1981) explained that the effectiveness model was measured by comparing achievement of the project input delivery system with the non project area achievement. It could also be measured by the timeliness for input supply. For an input like fertilizer, it assessed the distribution machinery during the project period. It is often defined as an index of availability or ratio of the quantity available in the project area by the end of the critical time over the fertilizer required by the farmer in the project area during the production season. This could be expressed mathematically as: IA = QA / QR; Where IA = Index of Availability, QA = Quantity of fertilizer available during the critical period of the production and QR = Quantity of fertilizer required during the critical period of the production (Aja, 1981).

2.1.3 Project Objectives, Inputs, Outputs, Effect, Impact and Beneficiary (POIOEIB) Model.

The impact of agricultural development/extension projects on the socioeconomic activities of the entire farm-families according to Ajayi (2005) could be evaluated through the application of POIOEIB model. He noted that the POIOEIB model is a simplified complete method of studying the socioeconomic impact of an extension programme on a given clientele. The model is adaptable to a wide variety of development interventions. It provides simple and valid method by which extension agent evaluate the socio-economic impact of a programme on the participant farm families.

The model assumed that before the intervention of a development programme in a given area, a base-line survey was carried out to discover the needs of the area and thereafter, some achievable objectives were developed. The intervention starts with the project inputs (PI). The PI are the resources needed for the implementation of the project, for example, capital, manpower,

goods and services, training, practices, systems and technologies to be developed by the project's management unit. The project inputs will generate certain project outputs (that is, the specific physical products which the project is expected to produce from its inputs in order to achieve the pre-determined objectives, for example, improved seeds, fertilizers, health facilities, tractor hiring services, irrigation facilities, road construction facilities, schools, rural banking system, marketing facilities and percentage of farmers who use or are to use these facilities).

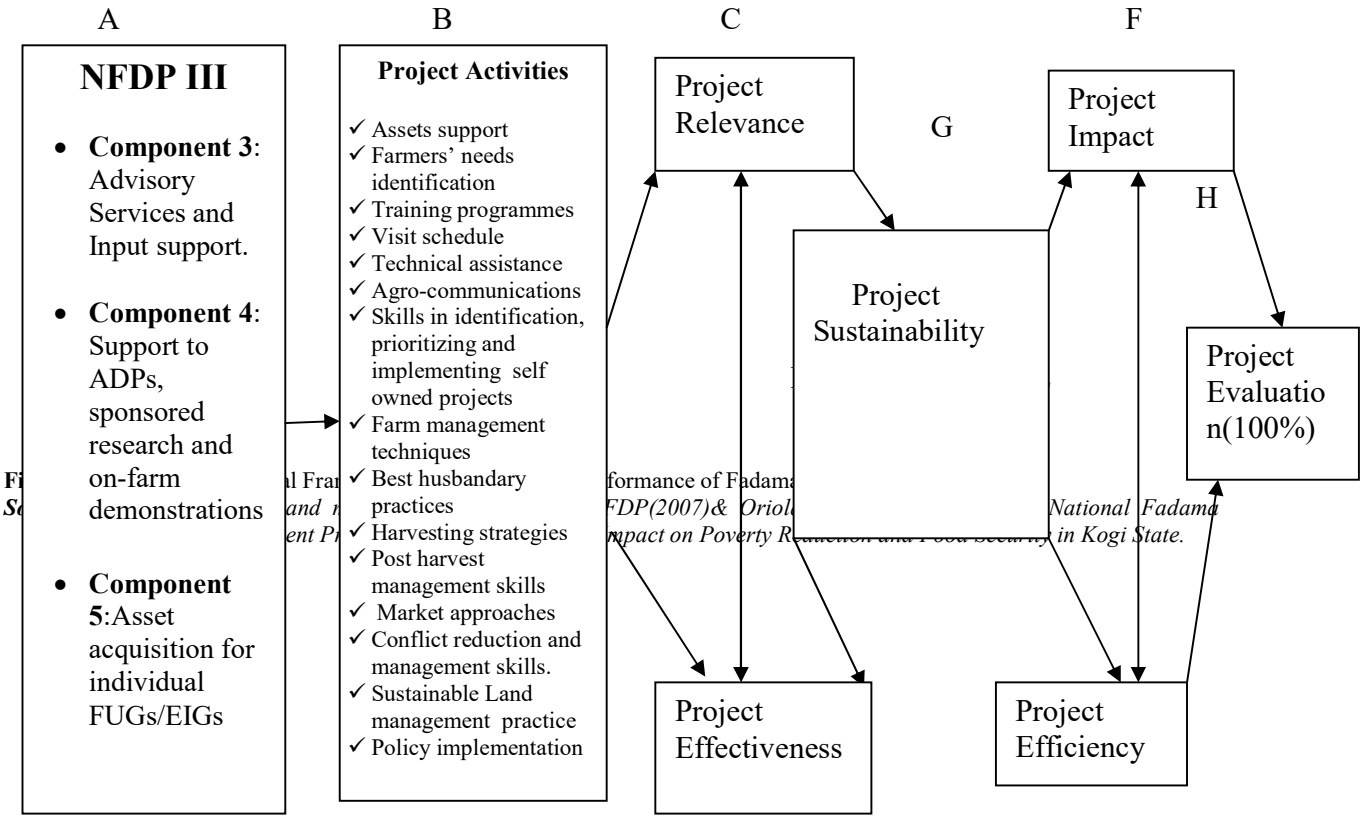
The use of project output (PO) by the farmers is expected to generate certain effects, called project effects (PE). That is, the outcome of the use of the project outputs over a period of time, for example, purchase of better seeds, increase in yield, purchasing of farm equipment/tools, increase in the use of health facilities, improve transportation and marketing activities etc. The adoption of the project outputs over a period of time will generate some types of socio-economic impact (PI) being outcomes of the project effect on the farmers (that is, the expressions of the results actually produced by the project, for example, high income, improved nutritional status, better housing, transportation and educational facilities, better marketing system, agricultural knowledge, skills and favourable attitude towards agriculture as a profession). The farm-families who are directly concerned with the extension activities of the project are called the project beneficiaries (PB). They are the project participant farmers who are expected to adopt the recommended improved systems, practices and technologies introduced by the project (Ajayi, 1996).

2.1.4 Project Relevance, Effectiveness, Efficiency, Impact and Sustainability (PREEIS) Model

World Bank,(2008); Bharat, (*2010);* OECD-DAC, (2002); UNICEF, (2004); UNGA, (2005), Gertler, Premand and Vermeersch (2011) *applied* Relevance, Effectiveness, Efficiency,

Impact and Sustainability (REEIS) model for projects evaluation. A combination of POIOEIB and PREEIS models will be adopted for this study.

The framework shows the NFDP-III comprising of three selected components in phase A: Component 3: Advisory Services and Input support, Component 4: Support to ADPs, sponsored research and on farm demonstrations, and Component 5: Asset acquisition for individual FUGs/EIGs. Phase B encompasses project activities; phases C to G consist of Project Relevance, Project Effectiveness, Project Efficiency, Project Impact and Project Sustainability respectively. Finally phase H covers the holistic Project Evaluation scheme (Figure 2.1).



2.2 Conceptual Framework of the Study

The conceptual framework (Figure 2.2) consists of independent and dependent variables. The independent variables are made up of socio-economic characteristics of the respondent and variables/statements that determine or influence the performance of Fadama III agricultural projects. The socio-economic characteristics are age, marital status and educational level, farming experience, farm size, farm income and gender (sex). Variables that will be considered to influence performance of Fadama III agricultural projects are farmers' capacity to adapt and develop appropriate recommended technologies, farmers' participation in decision-making, local facilitators' visits, knowledge transfer from Fadama farmers to non-Fadama farmers, achievement by change in output and income.

The dependent variable for the study will be perceived performance of Fadama III agricultural projects. This will be measured through the assessment of perceived benefits to farmers. Such benefits may be attributed to the achievement of objectives of Fadama III agricultural projects which among others might improve farmers and rural peoples' lives and living conditions. The benefits include increased yield and productivity, improved income, reduction in the use of local varieties/ breeds, improved agro-ecosystem management, safe and responsible labour practice, farmer's competence in management of their farms and ability to transfer knowledge to other farmers, thus ensuring sustainability of the programme.

Other variables which are not measured in the study but are considered important include government policies, and physical environment conditions. These variables are likely to affect the performance of Fadama III agricultural projects.

The Project Performance level is affected by increase or decrease in farmers' Knowledge, Aspirations, Skills and Attitude (KASA); Poverty Reduction Level; Innovation Adoption Level; Objective Achievement; Farmers' constraints; Government Policy implementation and Natural

environment sustainability. The high or low performance level of the Fadama III agricultural projects is associated with performance indicators standing between before and during/after Fadama III project.

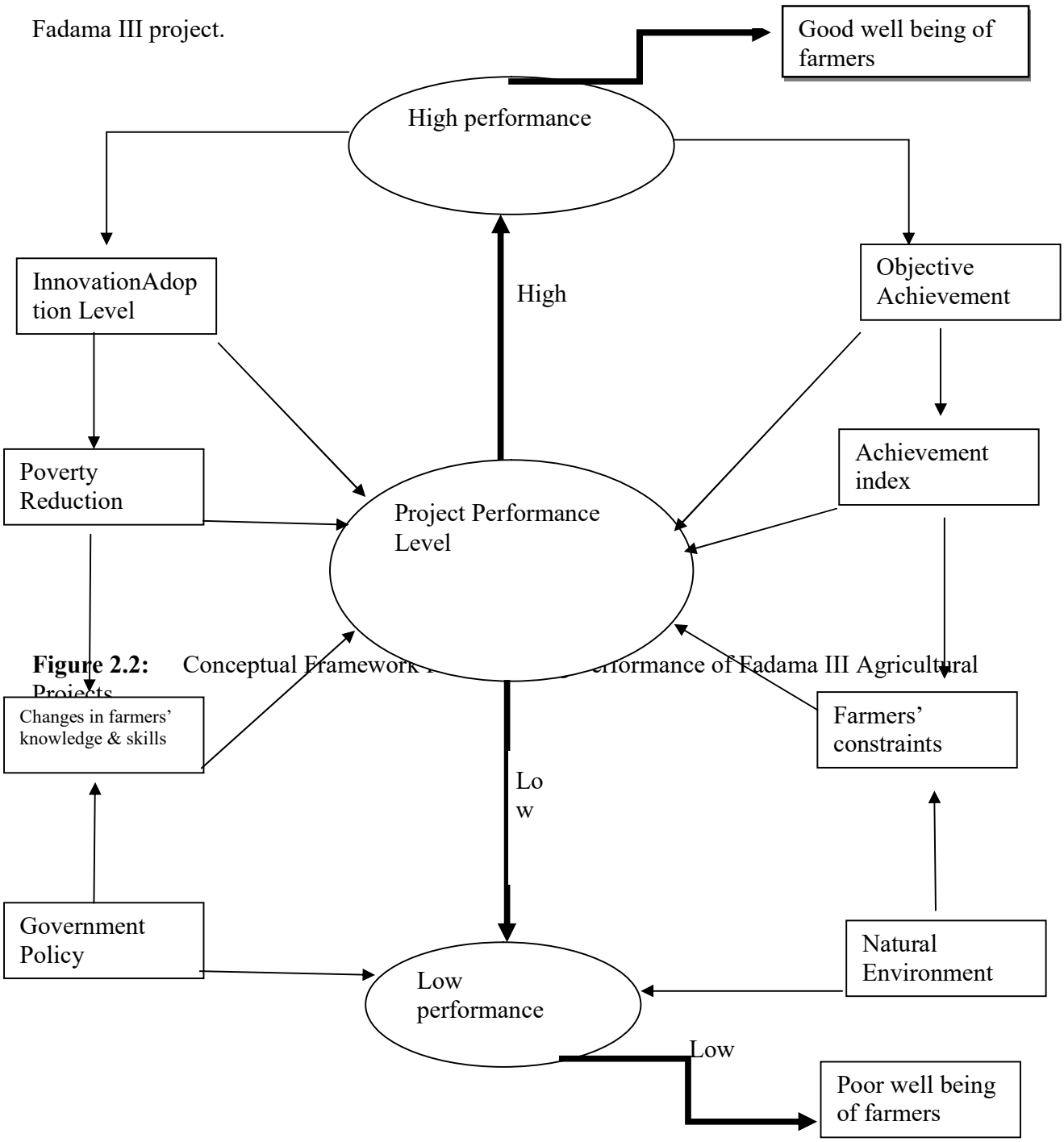


Figure 2.2: Conceptual Framework [illegible] Performance of Fadama III Agricultural Projects

2.3 Literature Review

2.3.1 The Agricultural Sector in Nigeria

The history of agriculture dates back thousands of years, and its development has been driven and defined by greatly different climates, cultures, and technologies. Agriculture (also called farming or husbandry) is the cultivation of animals, plants, fungi, and other life forms for food, fiber, and other products used to sustain life. Agriculture was the key development in the rise of sedentary humancivilization, whereby farming of domesticated species created food surpluses that nurtured the development of civilization. The study of agriculture is known as agricultural science. Agriculture generally speaking refers to human activities, although it is also observed in certain species of ant and termite. However, all farming generally relies on techniques to expand and maintain the lands suitable for raising domesticated species. For plants, this usually requires some form of irrigation, although there are methods of dry land farming; pastoral herding on rangeland is still the most common means of raising livestock (Hölldobler and Wilson, 1990). In this present age, Agriculture depicts the art and science of crop and livestock production. In its broadest sense, agriculture comprises the entire range of technologies associated with the production of useful products from plants and animals, including soil cultivation, crop and livestock management, and the activities of processing and marketing (International Labour Office, 1999). The term agribusiness has been coined to include all the technologies that mesh in the total inputs and outputs of the farming sector. In this light, agriculture encompasses the whole range of economic activities involved in manufacturing and distributing the industrial inputs used in farming; the farm production of crops, animals, and animal products; the processing of these materials into finished products; and the provision of products at a time and place demanded by consumers (McGraw, 2005).

Agriculture in Nigeria is a major branch of the economy in Nigeria, providing employment for 70% of the population. The sector is being transformed by commercialization at the small, medium and large-scale enterprise levels. Major crops include beans, sesame, cashew nuts, cassava, cocoa beans, groundnuts, gum arabic, kola nut, maize (corn), melon, millet, palm kernels, palm oil, plantains, rice, rubber, sorghum, soybeans and yams. In 1990, 82 million hectares out of Nigeria's total land area of about 91 million hectares were found to be arable, although only 42 percent of the cultivable area was farmed. Much of this land was farmed under the bush fallow system, whereby land is left idle for a period of time to allow natural regeneration of soil fertility. 18 million hectares were classified as permanent pasture, but had the potential to support crops. Most of the 20 million hectares covered by forests and woodlands are believed to have agricultural potential. Agricultural holdings are small and scattered, and farming is carried out with simple tools. Large-scale agriculture is not common (FAO, 2007; World Bank, 2010) The country's agricultural products fall into two main groups: food crops produced for home consumption and exports. Prior to the Nigerian civil war, the country was self-sufficient in food, but increased steeply after 1973. Bread made from American wheat replaced domestic crops as the cheapest staple food. The most important food crops are yams and cassava in the south and sorghum and millet in the north. Cocoa is the leading non-oil foreign exchange earner but the dominance of smallholders and lack of farm labor due to urbanization hold back production. In 1999, Nigeria produced 145,000 tons of cocoa beans, but has the potential for over 300,000 per year. Rubber is the second-largest non-oil foreign exchange earner (Oriola, 2009).

The major agricultural products can be broadly grouped into foods, fibers, fuels, and raw materials. In the 21st century, plants have been used to grow bio-fuels, bio-pharmaceuticals, bio-

plastics, and pharmaceuticals. Specific foods include cereals, vegetables, fruits, and meat. Fibers include cotton, wool, hemp, silk and flax. Raw materials include lumber and bamboo. Other useful materials are produced by plants, such as resins. Bio-fuels include methane from biomass, ethanol and biodiesel. Cut flowers, nursery plants, tropical fish and birds for the pet trade are some of the ornamental products. Regarding food production, the World Bank targets agricultural food production and water management as an increasingly global issue that is fostering an important and growing debate (Onwueme and Sinha, 1991)

Vansthi (1990) revealed that soil erosion caused by water and wind is one of the main problems of agriculture in Nigeria. The lack of development in low-lying flood plains also hinders the development of agriculture in Nigeria. In addition, the dependence on imported foods has discouraged investment in local farming.

2.3.2 The Niger Delta Economy

The Niger Delta Area (see Figure 3.1 on page 84) is one of the largest wetlands in the world (NNPC, 2008). This ecological zone is occupied mainly by the Southern Nigeria which currently comprises the six states of Akwa Ibom, Bayelsa, Cross River, Delta, Akwa Ibom and Rivers. With time, the area has been redefined to encompass the contiguous three other oil-producing states; Abia, Imo and Ondo, in addition to the original six; comprising a total of nine states. Nigeria has become Africa's biggest producer of petroleum, including many oil wells in the Oil Rivers. Some 2 million barrels (320,000 m^3) a day are extracted in the Niger Delta. First oil operations in the region originated in 1950s and were undertaken by Multinational Corporations, which provided Nigeria with necessary technological and financial resources to extract oil (Pearson, 1970). Since 1975, the region has accounted for more than 75% of Nigeria's

export earnings. Together oil and natural gas extraction comprise "97 per cent of Nigeria's foreign exchange revenues". Much of the natural gas extracted in oil wells in the Delta is immediately burned, or flared, into the air at a rate of approximately 70 million m³per day. This is equivalent to 41% of African natural gas consumption, and forms the largest single source of greenhouse gas emissions on the planet (Amnesty International, 2009). In 2003, about 99% of excess gas was flared in the Niger Delta (UNFCC, 2003).The biggest gas flaring company is the Shell Petroleum Development Company of Nigeria Ltd, a joint venture that is majority owned by the Nigerian government. In Nigeria, "... despite regulations introduced 20 years ago to outlaw the practice, most associated gas is flared, causing local pollution and contributing to climate change." (Friends of Earth, 2004). The environmental devastation associated with the industry and the lack of distribution of oil wealth have been the source and/or key aggravating factors of numerous environmental movements and inter-ethnic conflicts in the region, including recent guerilla activity by the Movement for the Emancipation of the Niger Delta (MEND) (Wikipedia, 2012). Agricultural enterprises in various forms are found in this area as asserted by Aweto, (1981a, 1981b, 1987b and 2001) based on findings from soil fertility and vegetation composition of the Niger Delta.

2.3.3 The Agricultural Sector in Niger Delta

The Niger Delta Area covers about 70,000 square kilometers and makes up 7.5% of Nigeria's land mass, with sandy coastal ridge barriers, brackish or saline mangroves, permanent and seasonal swamp forests as well as low land rain forest with the entire area trace-crossed by a large number of rivers rivulets, streams, canals and creeks (NNPC, 2005). Bayelsa and Delta States are at the centre of the Niger Delta Region. Akwa Ibom state land occurs in the drier landward part of the Niger Delta where crop farming assumes considerable importance. In

contrast, the seaward part of the Niger Delta which is inhabited by Delta and Bayelsa states characterized by uplands, lowlands, extensive creeks and volumes of sea water. As with most parts of Nigeria, agriculture is the dominant aspect of the rural economy. About 70% of the population is engaged in farming. Given the heavy annual rainfall that exceeds 2500 mm average, the main crops grown are root crops such as yams and cassava and tree crops, especially rubber and oil palm. In this regard, the agricultural economy sharply contrasts that of the drier savanna lands of Nigeria where the cereals such as guinea corn and millet are the dominant crops produced. Akwa Ibom, Delta and Bayelsa states are homes of aquaculture and artisanal fishing. Agriculture is the most dominant economic activity in the three states with crop framing and fishing activities accounting for about 80% of all forms of agricultural activity (MEP, 2008).The states are rich in petroleum and gas resources, and at present produce the biggest proportion of crude petroleum and gas in Nigeria. These states are endowed with many rivers and waterways. Among the varieties of agricultural practices is fish farming which is prominent in the coastal states of Nigeria. Currently, there is observed increase in the population of fish farms and farmers. Fishing is no longer restricted to the wild alone; fish farms can be found around towns and villages even behind people's homes. To sustain this development, it becomes imperative that information on and for them be provided. This is because information is the driving and sustaining force behind any development strategy (Ugboma, 2009).

Agro-forestry is the practice of integrating trees into farmland in order to help maintain soil fertility and possibly help to raise the level of agricultural productivity. Trees help to maintain soil fertility by adding litter to the soil, improving soil physical status while their roots absorb nutrients from the subsoil and from the weathering zone of rocks below the ground and subsequently recycle such nutrients to the topsoil (Young 1997). Presently, the only tree that

some farmers selectively protect and integrate into their farms is the oil palm (*Elaeisguineensis*) which is the main source of vegetable oil in the forest zone of West Africa. The oil palm is selectively retained on the farm because of its economic importance, a practice which has led to the emergence of oil palm groves. Oil palms also feature prominently in cultivated plots of cassava, maize, cocoyam and other field crops. Although, the retention of oil palms in some cultivated arable land is agro-forestry, the beneficial value of the tree is largely restricted to protecting the soil against erosion as observed by Aweto&Ekiugbo (1994). Cassava is now the main crop produced. Yams, cassava, maize, okra and pepper are usually intercropped on cultivated plots which rarely exceed 0.5 hectare (Aweto, 2002).

Although, the Niger Delta is characterized by youth disturbances, Aweto (2002) asserted that the problem of youth restiveness in the Niger Delta cannot be solved by the deployment of troops by government to the area. Unemployed youths, who periodically disrupt oil production in the Niger delta, should be gainfully employed through the development of fishing industry, agriculture, establishment of agro-based industries and petrochemical industries. The need to provide gainful employment for unemployed youths, and hopefully, reduce the problem of youth restiveness in the Niger Delta, underscores the imperative of developing agriculture and industries in the region

There should be greater investment in agriculture and the economic and industrial infrastructure in the Niger Delta. Specifically, the fishing industry, which is the mainstay of the economy of the region, should be developed with appropriate technology. Modern fishing ports and terminal among other structures should be established to facilitate large-scale commercial fishing, storage and marketing. Manufacturing, petro-chemical, food processing and computer

industries as well as food, cash crop and livestock production should be given priority (Dafinone, 2000).

2.3.4 The Concept of Agricultural Project

The word project comes from the Latin word *projectum*from the Latin verb *proicere,* "to throw something forward" which in turn comes from pro-, which denotes something that precedes the action of the next part of the word in time (paralleling the Greek*πρό*) and *iacere*, "to throw". The word "project" thus actually originally meant "something that comes before anything else happens". A project in business and science is typically defined as a collaborative enterprise, frequently involving research or design that is carefully planned to achieve a particular aim. Projects can be further defined as temporary rather than permanent social systems that are constituted by teams within or across organizations to accomplish particular tasks under time constraints (Wikipedia, 2010). Again, a further definition of project is seen as an individual or collaborative enterprise planned and designed to achieve an aim. In Nigeria, the Agricultural Development Projects later developed into Agricultural Development Programmes (ADPs).

The Agricultural Development Programmes (ADPs) were designed in response to a fall in agricultural productivity, and hence a concern to sustain domestic food supplies, as labor had moved out of agriculture into more remunerative activities that were benefitting from the oil boom. Conversely, domestic recycling of oil income provided the opportunity for the Government, with World Bank (external stakeholders) support, to develop the ADPs. The projects provided agricultural investment and services, rural roads, and village water supplies. The Nigerian Government's adoption of the ADP concept put the smallholder sector at the center of the agricultural development strategy, and marked a clear shift away from capital-intensive investment projects for selected areas of high agricultural potential.

Agricultural Project Development: The World Bank Experience in Nigeria. The World Bank has committed $1.2 billion for Agricultural Development Projects (ADPs) to increase farm production and welfare among smallholders in Nigeria since 1974. The agricultural components of the projects were designed around systems for developing technology and transferring it to farmers, distributing modern inputs, and land development including small-scale irrigation of Fadama areas and land clearing. To support its agricultural development goals, the Federal Government introduced controls on food imports and continued its substantial subsidies on farm inputs, particularly fertilizer. The technical assistance project was designed to support the ADPs and strengthen the capacity of the Department of Rural Development in the Federal Ministry of Agriculture to plan and coordinate agricultural production programs. The project was executed through an existing Agricultural Project Monitoring and Evaluation Unit (APMEU) which assisted monitoring and evaluation units in the ADPs, and through Federal Agricultural Coordinating Unit (FACU) provided technical assistance to the ADPs in agriculture and infrastructure, undertook studies, and prepared new projects. FACU was later renamed Project Coordinating Unit (PCU) in year 2000.

Farming systems: The emphasis on modern technology in the ADPs led their agricultural research and extension services to focus on relatively high-input technology for sole cropping systems. These systems were not used by the majority of smallholders. Most smallholders, especially in the semi-arid north, used mixed/relay cropping systems as a rational strategy to reduce risks. They were also conservative in their use of cash inputs, even though such items as fertilizer were heavily subsidized.

Extension methods: An extension approach already in useTraining and Demonstrationwhich concentrated on a small number of cooperators using high-input technology on large

demonstration plots, was replaced by the T&V method, which promised much wider coverage of farmers. The changeover was slow and T&V was only used significantly after 1985. Input supplies. There are programmes for multiplication of improved seeds and cuttings supplies of fertilizer to farmers and farmers' needs capacity building. In the technical assistance project, the designs of the APMEU components are to address concerns in the project.

Expatriate Involvement: The expatriates working on the projects played a useful role in assisting implementation, they acted largely as implementers, rather than training Nigerian personnel on the job.

***Institutional Aspects and Sustainability*:** At project closure, most of the ADPs had a weak and uncertain funding structure, and were providing poorer services than should be expected of such semi-autonomous development institutions. Though they were developed to perform a temporary role, in providing investments and services in lieu of relatively ineffective line agencies, the ADPs have nonetheless assumed a permanent status--which supports the contention that this type of agency was needed to implement the development envisaged under the projects. They are now recognized as the major agricultural development institutions in the states, but difficulties persist with their funding (as with other government agencies and departments).

***Subsidies*:** The pervasive subsidies in the agricultural sector and in the ADPs created many inequities and distortions. Most important were the effects of the government's monopoly in procuring and distributing subsidized fertilizer (World Bank, 1990).

Agricultural projects are embedded in Agricultural Programmes. The Federal and state governments have introduced a number of agricultural programmes geared towards agricultural development. Jibowo (2005) and Adisa and Okunade (2005) mentioned scores of agricultural projects embedded in the FGN multiple programmes over the years. Some of these programmes

were replicated at the States and Local Government levels. Aweto, (2002), confirmed that though the Niger Delta is a natural rain forest vegetation, livestock production is relatively unimportant compared to crop farming. A few poultry are usually kept in rural areas as sources of meat. The keeping of poultry for the production of eggs is unimportant in rural areas. This gap has been bridged by Fadama III. For fish farmers, they would need information on fish farming technologies, construction and management, breeds and spawning, processing, storage and marketing (Ofuoku, Emuh, and Itedjere, 2008) and financing. Access to agricultural information is very essential for increased productivity by farmers (Adomi, Ogbomo and Inoni, 2003). Many previous studies agree that the problem of farmers is access to agricultural information; and that even with the advent of information technologies which has succeeded in eliminating bottlenecks in information dissemination; constraints to access to information is still a real experience (Ekoja, 2003 and Oladele, 2006).Project M&E systems are a requirement of most major funding agencies and result from a concern that many projects fail because they are badly managed (Coleman, 2006).

2.3.5 The Concept of Fadama in Agricultural Development

In Nigeria, the word Fadama is a Hausa word which connotes low lying flood plains along Nigeria's major river systems (Idoge and Ovwigho, 2003; Ingawa, Oredipe, Idefor and Okafor 2004). Fadama also refers to a seasonally flooded area used for farming during the dry season. It is defined as alluvial, lowland formed by erosion and depositional actions of the rivers and streams (Qureshi, 1989). They encompass land and water resources that could easily be developed for irrigation agriculture (World Bank, 1994). Fadama are typically waterlogged during the rainy season but retain moisture during the dry season. The areas are considered to have high potential for economic development through appropriate investments in infrastructure,

household assets and technical assistance. When Fadama spread out over a large area, they are often called 'Wetlands' (Blench and Ingawa, 2004; Nkonya, Philip, Mogues, Pander, Yahaya, Adebowale, Arokoyo and Kato, 2008). The way the word is now being used in the context of World Bank assisted project (i.e. Fadama I, II and III) is more like an agricultural diversification programme. The World Bank has adopted the word 'Fadama' as a concept for agricultural project interventions in the rural communities. The Fadama project is in three phases using the non-oil sector of the economy. The World Bank assisted Fadama III project is a follow-up to the Fadama II project which impacted the lives of rural farmers, raising their incomes by 63 percent (World Bank, 2008). Fadama III is showing early results in 36 Nigerian states and the Federal Capital Territory (FCT). The US$450 million Fadama III project is being implemented in 35 states, and in Nigeria's Federal Capital Territory. The financing comprises of US$250 million from International Development Agency (IDA) credits and $200 million counterpart contributions from Nigeria's Federal, State and Local Governments and beneficiaries (World Bank, 2011). The National Fadama Development Project is a development intervention programme designed primarily to supply the small scale farmers with those inputs and assets needed to boost food production with the overall purpose of enhancing rural livelihood.

Fadama I (1993 - 1999) was essentially a donor support project for short season crop production in the flood plains and dry season periods using surface and underground water sources. It covered nine states. ***Fadama II (2003 -2007)*** became expanded in scope to include non-crop sectors such as animal husbandry and rural infrastructures. It covered twelve states. ***Fadama III (2008 - 2014)*** was to replicate the Fadama II concept in the remaining States of the Federation. It is covering thirty six states and the Federal Capital Territory, Abuja. It is a poverty alleviation and economic empowerment programme designed to meet a wide array of needs which the

beneficiary communities identified as critical to their welfare. It is non discriminatory in terms of gender, age, social class, occupation, physical disability and religion (NFDP, 2009a).

At the Federal level, there exists the National Fadama Development Project which coordinates the States. There are three levels of coordination of the project in all the States and Federal Capital Territory: these are Community, Local and State Governments levels. At the community level, beneficiaries determine what activities they are to embark upon, according to their needs, and in order of priority. The beneficiaries in a community for a given community usually form a Fadama User Group and function as an Economic Interest Group (EIG) for the realization of individual members and collective well being. Usually, a maximum of 10 groups in the community will come together to form a Fadama Community Association (FCA). Each Fadama User Group (FUG) contributes between 20% -25% of the total cost of any project to guarantee the community's interest and commitment.

At Local Government Level, there are Local Fadama Desk Officer and Local Fadama Development Committee (LFDC). The LFDC oversees the activities of Fadama III at the Local Government level. The composition of the committee is based on one third women, and more than one third Government representatives (to leave enough room for community and private sector representations); its members are normally 12 which are drawn from Government representatives, Traditional Rulers/Community Leaders, civil society, private and women groups. It is the approving authority at this level. The chairman of the Local Government or his representative chairs the committee.

At the State level, coordination is carried out by the State Fadama Coordinating Office (SFCO), while over sight, policy and strategic functions are performed by the State Fadama Technical Committee (SFTC) which is a sub-committee of the State Agricultural Development

Programme. The SFTC is chaired by the Permanent Secretary, Ministry of Agriculture (National Fadama Development Office, 2008).

Fadama agricultural projects are enterprise-based. Farmers or beneficiaries of a scheme are grouped on the basis of group dynamics and are called Fadama User Groups (FUGs). The various FUGs in the Niger Delta cut across the following: cassava, yam, maize, vegetables, plantains, potato, pineapple, oil palm; poultry, piggery, sheep/goat, grass cutter, snail, aquaculture, artisanal fisheries; and apiculture. The agricultural projects in post-harvest management include processing mills, storage techniques and marketing (Pre-entry/Field visit, 2011). Up to a minimum of ten FUGs in a typical area or community form the Fadama Community Association (FCA). The FUGs are similar to cooperatives while the FCAs are similar to cooperative unions; both groups are registered with the government.

A survey of the Fadama III situation analysis revealed that among the food crops produced in Delta States, cassava is by far the most important because Nigeria is currently the largest producer of cassava in the world. Delta State accounts for 60% of the total cassava output in Nigeria which stands at 65,243.39 metric tonnes per annum (MANR, 2011). Average yield per hectare though relatively low, has been increasing steadily over the years. From an estimated average yield of 11.58 metric tonnes per hectare in 2003, average yield went up to about 14 metric tonnes in 2007, and climbing up marginally to 15 metric tonnes per hectare in 2008. This relatively low yield results largely from farmers' limited access to improved planting materials and small/fragmented farm sizes that are generally unsuitable for mechanized operations. Current estimate by the Delta State Ministry of Agriculture and Natural Resources (2011) puts the area of land cultivated for cassava at about 94,000 hectares. Cassava is a major food crop with multiple uses which include garri, edible starch, industrial starch, fufu, tapioca,

chips for livestock feeds, and flour. It is also a basic raw material for cassava fuel called methanol (MANR, 2011).

The poultry sub-sector in the Niger Delta States is generally private sector driven and has significant wealth creating potentials. The sector also has the potentials of providing the much needed animal protein and employment for the citizenry. However, the current average poultry population of 2,300,000 falls short of the projected target of 10,000,000 poultry bird's production level per annum. This low level of production is as a result of high cost of feeds which accounts for about 70% of the total production cost. This is in addition to the poor state of poultry infrastructure and inadequate supply of high quality day-old chicks. Recently, the State Government entered into partnership with Obasanjo Farms Limited in order to boost activities in the poultry sector. It is expected that in the near future poultry output in the State would increase enough to fill a substantial part of the demand gap that currently exists (Ministry of Economic Planning, Delta State, 2007).

In the fishery sub-sector, Delta State is one of the maritime states in the country endowed with numerous water bodies, ponds, lakes, creeks, estuaries and a wide array of fish species. Artisanal fishing is very common in the state. However, due to obnoxious fishing practices and uncontrolled dredging activities in rivers, and other water courses as well as the pollution of water bodies by crude oil and industrial activities in the State, artisanal fisheries stock has depleted tremendously in recent years. This has made aquaculture (the practice of rearing both fishes and shrimps in ponds and artificial tanks) a very common fish farming option in the State. The practice of aquaculture has continued to grow over the years with sophisticated technologies. The output level of this method of fish production has been relatively high with current annual production level estimated at 15,000 metric tonnes. Deep sea fishing is also becoming popular in

the State. The gross output of fish has however, been declining over the years in the State particularly due to the crisis which has bedeviled the riverine communities since early 2000s. For instance, total recorded output of fish in the State was estimated at about 122,102 metric tonnes in 2003. This declined to 37, 265 metric tonnes in 2005, managed to move up to 45,3i5 metric tonnes in 2007 (Ministry of Economic Planning, Delta State, 2007).

Fadama III extension activities are mostly carried out by local facilitators (LF) and service providers (SP). Their activities include special communication strategies in crop production, livestock management, fisheries technology. use of organic and inorganic fertilizers, agricultural products processing/storage, use of indigenous technology, market strategies, business management, human resources management, infrastructure/amenities maintenance, linkage to sources of credit facilities and partnership systems with external stakeholders NFDP (2009a).

A collection of Fadama III inputs and assets to assist agricultural projects implementation include varieties of cassava, yam, maize, vegetables, potatoes, pineapples, plantain/banana; agro-chemicals such as fertilizers, herbicides, pesticides; farm tool and implements such as cutlasses, wheel barrows. files, spades/shovels, axes, rakes, hoes, head pans, knapsack sprayers, bicycle, pumping machines, dug-out wells, bore-hole, reticulated tank stand, generators, farm stores and safety kits including coverall, rain boot, hand gloves, nose masks and rain coat provided to all members of concerned FUGs. For livestock and fisheries FUGs, the following farm inputs and assets were provided: proven breeds of poultry, piglets, sheep, goats, grass cutters, snails, fingerlings; feeds, pelleting machines, ponds (concrete, earthen and tarpaulin), housing pens; poultry equipment including cages, wire gauze, feeders, lightings, drinkers; dug-out wells, bore-hole, reticulated tank stand, generators, farm stores, plastic basins/drums, out board engines,

boats, dragging nets, aerators, weighing scale, pH meter and safety kits, graters, hydraulic presses, grinding machines, diesel-lister engines, drums, tank/tank stands, wheel barrows, sieves, clarifiers, separators, tables and mono pumps.

Performance in agricultural projects is critical to improvement of farm outcome and standard of living. High performance of agricultural projects could invariable lead to poverty reduction and *vice versa*. "Though the country is rich in human and material resources, yet poverty is pervasive". Poverty is not only a state of existence but also a process with many dimensions and complexities (Khan, 2000). According to a survey conducted in 2004 by National Living Standards Survey, reported by the National Bureau of Statistics NBS (2007), about 69 million people were living in poverty, which represents 54.4 percent of the Nigerian population

The first National Fadama Development Project (Fadama I) was implemented during the period 1993-1999. Fadama I focused mainly on crop production and largely neglected support of production activities such as commodity processing, storage and marketing. The emphasis of Fadama I was on providing boreholes and pumps to arable farmers through simple credit arrangements aimed at boosting aggregate crop output. Fadama I worked with Fadama User Associations (FUAs) which the states used mainly to recover loans and to decide on water infrastructure locations. The design of Fadama I did not support rural infrastructure development and did not consider other resource users such as livestock producers, fisher folks, pastoralists, and hunters among others. The focus on crop producers contributed to increased conflicts among the users of Fadama resources. Increased crop production increased the surplus, but the project did not support postharvest technology, contributing to reduced crop prices and increase storage losses. The second National Fadama Development Project (Fadama II) was implemented from

2003 – 2007. It operated in 12 states, 9 of which were Fadama I states. Fadama II sought to address the shortcomings of Fadama I by shifting from a top-down and supply-driven public sector development programme to the community-driven development approach (Phillip *et al*, 2009). It supported rural infrastructure development, livestock producers, fisher folks, pastoralists, and hunters among others. Fadama II also included other Fadama resource users that the first project had ignored. The third National Fadama Development Project started 2008 – 2013. It is a collaboration effort of the Federation Government with the World Bank to address re-occurring national economic challenges of low productivity, poverty, food insecurity and low income in rural areas thus, reinforcing the previous Fadama phases. The Project Development Objective (PDO) of Fadama III is to increase the incomes of rural land and water resources on a sustainable basis. The key indicators and targets of the PDO are:

- attain a 40% increase in income for 75% of the beneficiaries by close of project,
- attain a 20% increase in yield of primary agriculture produce (disaggregated by crops, livestock and fisheries etc),
- savings participating groups: 10 percent of net earnings from income-generating activities of the FUGs is saved annually (with effect from year 2). This type of saving is referred to as Fadama Users Equity Fund (FUEF),
- physical verification of operations, maintenance utilization of assets at mid-term and at project closing by surveys of random selected sites and
- surveys at mid-term and at project closing to show that at least 75 percent of Fadama users are satisfied with operations, maintenance and utilization of community owned infrastructure and capital assets acquired through the project.

Fadama III focuses on six project components:

i. Capacity building, communication and information support,

ii. Small-scale community owned infrastructure,

iii. Advisory services and input support,

iv. Support to ADPs-sponsored research and on-farm demonstrations,

v. Asset acquisition for individual FUGs/EIGs and

vi. Project management, Monitoring and Evaluation and Environmental Management plan compliance.

In Fadama III, all the components are concerned with agricultural development projects. In this study, efforts will be focused on components three, four and five: Advisory services and input support; Support to ADPs-sponsored research and on farm demonstrations, and Asset acquisition for individual FUGs/EIGs.

Component 3: Advisory Services and Input support. Under this component the project finances: (a) delivery of advisory services responsive to the needs of Fadama users in production, processing, marketing and supply chain management; and

(b) input support, including training and technical assistance to promote savings schemes within FUGs and to develop linkage between farmers' organizations and financial institutions. This support will also include capacity strengthening for advisory services in the area of sustainable land management.

Advisoryservices: The project provides support to empower Fadama users, farmers/pastoralists and other EIGs working within their organizations and through their LGAs, to obtain advisory services from both public and private sources. Grants are channeled from the state level of government through the SFCUs to the FCAs for use in financing advisory service contracts. Advisory services is concerned with mainly diversified problem-solving research and extension services that are responsive to production, processing, marketing and supply chain management needs of Fadama users. It also deals with input support; strengthening the extension system of the participating states; and participatory and farmer-oriented adaptive research trials and

demonstrations, which respond to farmer concerns, and promote diversification. The scope of the component includes technical and management training, market and business development.

Input Support: The project will continue the matching grant arrangement successfully tested under the Fadama II project. This facility shares the risks involved in the adoption of a new technology by the farmers to enhance their financial capacity to purchase farm inputs (mainly seeds, fertilizers and agro-chemicals) and to build savings from incremental earnings to finance future purchases. Farmers receive a grant equivalent to 50 percent of the purchase price of the input per FUG, with the remaining 50 percent due as the FUG-beneficiary –counterpart contribution. The private service providers, NGOs and other rural stakeholders will be encourage to facilitate the link between financial institutions and the farmer groups (FCAs) graduating after two years of project support (NFDP, 2009a).

Component 4: Support to ADPs, sponsored research and on farm demonstrations to carry out the following specific functions:

Support to Advisory Service Providers: The project will provide specialized technical assistance and training to services providers with emphasis on improving the quality, effectiveness, availability, affordability and timeliness of advisory services. The training menu will include specific agricultural technologies, such as, new varieties and cultivation methods, participatory methods, participatory methodologies and facilitation skills, marketing and enterprise management, improved cultural practices, rational water management and sustainable pasture management as well as sustainable ecosystem management.

Quality Assurance of Advisory Services: The project will fund the incremental operating costs to allow the ADPs to certify service providers and provide technical quality control to ensure that

the advisory services delivered to project beneficiaries meet established quality standards. The supports to Advisory Services include:

i. **Training of Facilitators:** The project will provide periodic support to the facilitators, including training, workshops, on formation of demand for advisory services, and participatory implementation and supervision of such activities as well as to perform quality control functions in order to ensure that the subprojects emanating from the FCAs meet minimum technical standards.

ii. **Sponsored Research and On–Farm Demonstration:** The project will undertake sponsored research; develop technical propositions/recommendations on crop, livestock and other activities. Research institutions will be encouraged to form partnerships in order to bid for these contracts. The research centers will team up with the ADP extension agents to conduct on-farm demonstrations. The main objectives of this activity are to test new crop varieties and management methods for crops, agro-forestry, livestock and fisheries.

iii. **Training of Extension Staff**: The project will fund focused training of extension staff. This activity will be contracted out by the National Fadama Development Plan (NFDP) to public/private research/extension centers and/or specialized institutions under a performance-based contract level capitalization as well as to ensure sustainability of the investment activities funded through this component (NFDP, 2009b).

Component 5: Asset acquisition for individual FUGs/EIGs.

Under the asset acquisition component, the project will scale-up the matching grant approach that was successfully piloted under Fadama II, to support Fadama user groups/economic interest groups (FUGs/EIGs) and their apex Fadama Community Associations (FCAs). By this means the project seeks to:

i. Provide seed money to empower smallholder and poor Fadama users (who will be assisted to form viable economic interest groups) to acquire capital assets which they would use to undertake a wide range of small-scale income generating activities.
ii. Mobilize Economic Interest Groups (EIGs) who were unorganized and widely dispersed across rural communities to form organized community groups.
iii. Provide a mechanism through which individual beneficiaries are mobilized and formed into community groups to enable them gain practical financial experience as well as revenue from small income-generating activities thereby making them more attractive to be financed as a group by financial institutions.
iv. Contribute positively to the development of rural financial intermediation.
v. Provide appropriate training to build a savings culture among FUGs and enhance the capacity of participating MFIs to deliver products to beneficiaries (NFDP, 2009d)

Assets include: Tube wells, pumps, pipes, watering cans and sprinklers for irrigation, hunting equipment and traps, fishing traps, nets and canoes, agricultural machines such as power tillers and equipment, processing equipment and installations for local products such as maize shellers, oil presses, rice threshers, drying platforms, garri processing set-ups, fruit processing equipment and fish smoking installations, cattle herding installations and equipment, local storage structures including sheds and milk cooling equipment, milk processing equipment, honey collection and processing equipment, Local transport equipment such as hand carts, ox carts, trailers for power tillers, wheel barrows, bicycles, and tools and equipment for building or servicing any of the above (NFDP, 2009d)

Targetgroups :The target groups are the rural poor (farmers, pastoralists, fisher folk, traders, processors, gathers, as well as other economic interest groups); disadvantaged groups (widows, the handicapped, the unemployed youths, people living with HIV), and service providers including government agencies, private operators and professional/ semi professional associations operating in the project areas.

***Modusoperandi* of Fadama III at Local Government Level**

The Local Government is key to effective implementation of the Fadama project. At the local Government level, the Local Fadama Desk Office (LFDO) which is domiciled at the local Government Council serves as the secretariat of the project while the Local Fadama Development Committee (LFDC) made up of persons drawn from within the Local Government representatives as the approving authority of sub projects. At the grassroots level, the Local Fadama Desk Office and Local Fadama Development Committee are established in the participating states by the project. The LFDC and its secretariat, and the LFDO are responsible for local level review and approval of the LDPs and associated subprojects emanating from the communities. The LFDO will comprise one or two civil servants seconded to the project to play the role of a clearing house for LDPs. The LFDOs roles and responsibilities are collection of LDPs submitted by the FCAs, screening of the LDPs to ensure they conform to the criteria specified in PIM and submitting those which conform to the PIM, returning rejected LDPs to the FCAs with recommendations on how they can be improved with a view to resubmit, convening meetings of the LFDC to review and approve plans, monitoring of community mobilization efforts, ensuring that FCA priorities are reflected in the LDPs, screen subproject proposals emerging from the LDPs, undertake Desk Appraisal using checklist ,undertake field appraisal to confirm information provided in the LDPs. The LFDC Composition and Responsibilities:

- The LFDC will be chaired by the chairperson of the local government council or his/her representative; a traditional or community leader will serve as the deputy chairperson.
- At least one-third of the total membership of the LFDC shall be women.
- Government representation in the LFDC will be limited to one-third of the committee's total membership in order to ensure a majority representation of the stakeholder-beneficiary groups-the FCAs, civil society and the private sector groups.
- Membership of the LFDC is not to exceed twelve (12) persons.

- The LFDC will also be responsible for reviewing and approving subproject and advisory service activity proposals.
- The LFDC will also be responsible for monitoring community mobilization efforts and ensuring that the needs and priorities of Fadama resource users are reflected in the LDPS.
- The LFDC discusses and seeks to build consensus on priorities and approves community proposals in the context of an indicative annual budget determined by the state.
    - Specifically, the responsibilities of the LFDC are as follows:

Fadama expected outcomes/benefits to LGAsinclude: innovations in local planning at community level, integration of community plans in LG planning programme to ensure sustainability, 20% partnership with Local Governments by integrating the concept of local development plans in their annual work plan and behavioral change and a number of local government authority staff would be trained on project management skills (planning, cost implementation strategies etc (NFDP, 2009d).

Administrative Structure of Fadama III from National to Local Government levels

The **a**dministrative structure of Fadama III at National level constitutes the National Fadama Coordinating Office (NFCO) which carries out the National Fadama Development Plan (NFDP) for the States to execute activities (Figure 2.3). The States constitute State Fadama Coordinating Office (SFCO), State Fadama Coordinating Committee (SFCC), Zonal Office, Procurement Officer (PO), Technical Training Officer (TTO), Community Development Officer (CDO), Project Monitoring and Evaluation (M&E) units. The Local Government levels constitute the Local Fadama Desk Officer (LFDO), Local Fadama Desk Committee (LFDC), Local Facilitators (LFs) Local Development Plans (LDPs), Fadama Community Associations (FCAs) and Fadama User Group (FUGs)

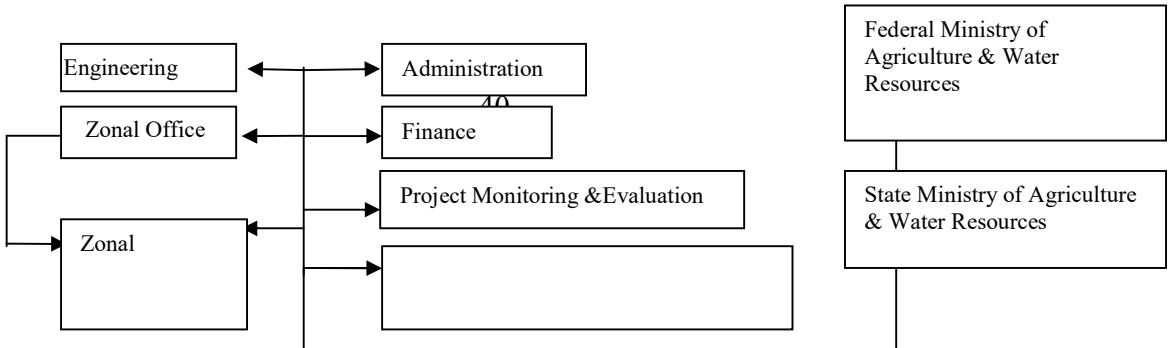


Figure 2.3: Fadama III Organogram
***Source**: State Fadama Coordinating Office, Asaba, Delta State*

Benefits of Fadama III to Local Governments

The benefits include: Capacity Building Support to Local Government, finance of technical assistance, training, equipment and other institutional support to LGs. Staff, promotion of good governance, rural infrastructural development provision through implementation of FCA /cross FCA project e.g. building of markets, installation of water project, construction of rural roads, culverts, bridges etc; better living standard, improved livelihoods of the rural populace, reduction of rural-urban drift and youth restiveness. The Fadama land resources are vastly suited for crop production, fishing as well as provision of water and feed for livestock. Fadama II and III projects have been designed to use community driven approaches to maximize the benefits inherent in Nigerian Fadama resources.

As stated in the Project Appraisal Document (PAD) for Fadama III, the project "will support the financing and implementation of five main components designed to transfer financial and technical resources to the beneficiary groups in:(i) institutional and social development;(ii) physical infrastructure for productive use; (iii) transfer and adoption of technology to expand productivity, improve value-added.and conserve land quality;(iv) support extension and applied research; and (v) provide matching grants to access assets for income-generation, livelihood improvements and contribute to the achievement of a key millennium development goal (MDG)" (NFDP,2009d) The main paradigm shift under this project is a change from the supply driven (top-down) approach to a demand driven (bottom-up) approach. It is also hinged on the Community Driven Development (CDD) approach which empowers the beneficiaries/communities/LGAs with inputs, assets and capabilities to participate in, negotiate with, influence, control, monitor and hold accountable, institutions that affect their lives, and production of Local Development Plan (LDP) (NFDP, 2009d).

The low-lying flood plains according to Vasanth (1990) are very fertile during the rainy season, but the lack of rain during the dry season hinders agricultural development. The lack of water management systems in these areas is a concern for many farmers. By adding irrigation canals and access roads to these areas, yearly production yields are expected to increase.

2.3.6 The Concept of Project Evaluation in Agriculture

Ordinarily, the term Evaluation can be defined as to consider or examine something in order to judge its value, quality, importance, extent, or condition; also means to assess, estimate, appraise; put value on something: to estimate the monetary value of something (Encarta, 2009). Evaluation is the methodical review, appraisal and assessment of the benefits, quality and value of a programme or activity (Ajayi, 2005). Scriven (1996) stated that, evaluation is about determining the merit or worth of object being evaluated. The object can be a programme, a project, a product, a policy, mission or a one-off event. Evaluation of an extension program can be defined as a systematic application of scientific methods to assess the design, implementation, improvement or outcomes of an educational programme. Petheram (1998) viewed evaluation of agricultural extension programmes as the systematic collection of information about activities, characteristics, and outcomes of a programme to make judgments about the programme, improve its effectiveness, and/or inform decisions about future programming.

Challenges in Evaluating Agricultural Projects were viewed by Winters, Salazar and Maffioli (2010) saying: “The standard challenge of any impact evaluation is determining what would have happened in the absence of the project. To truly understand the impact of a project on a given indicator, information would ideally be available on project beneficiaries with the project and those same beneficiaries without the project. The indicator could then be compared between these two states to see if the project had an impact. Of course, beneficiary farmers

cannot be simultaneously in the project and out of the project making it necessary to find a substitute group of farmers to act as the counterfactual; that is, what would happen in the absence of the project. To be a legitimate counterfactual, this counterfactual, or control group would need to be exactly like the project beneficiaries, or treatment group, except they would have not received the project. Thus, any differences in the indicator could be attributed to the project". Similarly, Akinnagbe and Ajayi (2012) conducted a study on Impact of Olam organization extension programme on socio-economic life of cocoa farmers in Ondo State, Nigeria. The result showed that there was no significant difference between the farm input and basic assets possessed by Olam farmers and non-Olam farmers. The reason to evaluate projects can be categorized either to prove something (accountability) or to improve something. Evaluations that are focused on accountability are defined as summative evaluations, while evaluations that focus on improving something are called formative evaluations (Seevers, Graham, Gamon, & Conklin, 1997).

Various attempts have been made to classify evaluation per se, some by categorizing forms of evaluation by purpose (Owen, 1993), others by methodology (Stake 1973), and others by the position of the major audience (Worthen , Sanders and Fitzpatrick, 1997). Owen's meta-model (a framework for describing or categorizing different approaches of evaluation) identify five different form of evaluation that occur in programme evaluation based on purpose, these are:

i. Evaluation for impact assessment
ii. Evaluation for programme management
iii. Process evaluation
iv. Evaluation for design clarification
v. Evaluation for programme development (needs or situational analysis)

Williams (1984) classified evaluation in agricultural extension into (i) on-going (ii) terminal evaluation; and (iii) ex-post evaluation. On-going evaluation refers to the type of evaluation that is carried out at the implementation phase of a programme. It provides decision makers with the necessary information about the needed adjustment in the objectives, policies and implementation strategies of the programme. Besides, it provides information for future planning. Terminal evaluation is the type of evaluation that is carried out from 6-12 months after the completion of the programme, while ex-post evaluation is an evaluation that is undertaken some years after the completion of the programme, when the programme is expected to have reached its full development and its impacts have been felt (Ajayi, 1996). Furthermore, Taylor (1976) provided definition for two types of evaluations namely, formative and summative evaluations: 'formative evaluation attempts to identify and remedy shortcomings during the developmental state of a programme. Summative evaluation assesses the worth of the final version when it is offered as an alternative to other programmes'.

Ekpere in Ajayi (2005) also identified four types of evaluation. They are (i) snap evaluation (ii) casual evaluation (iii) semi-systematic evaluation and (iv) systematic evaluation. Snap evaluation is the type of evaluation that is done almost unconsciously, while casuals evaluation is the type of evaluation done after a conscious receipt of the information readily available in enhancing and fitting into the general descriptive framework that allows the agricultural extension administration to pass judgment on the utility and impact of an agricultural extension programme. Semi-systematic evaluation is the type of evaluation in which a great deal of attention is given to the collection of information for programme description and for analyzing and trying to extract facts or meanings from that set of information. Systematic evaluation on the other hand, requires the best possible basic data and programme description as well as acts of

judgment. It is sometimes referred to as an evaluative research. Systematic evaluation of agricultural extension programmes is a relatively recent development. Currently, evaluative research (systematic evaluation) is a robust area of activity devoted to collecting and interpreting information on the need, implementation and impact of intervention efforts to better the lot of human-kind, improve socio-economic conditions and community life.

Thus, evaluation, whether done during project implementation or project completion, is done in terms of its relevance, effectiveness, efficiency, impact and sustainability. Relevance refers to the appropriateness and importance of goal and objectives in relation to assessed needs. Effectiveness refers to the degree to which goals have been achieved. Efficiency refers to the cost-benefit effectiveness of activities and impact refers to the broad long-term effects of the programme on the target client (Horton *et al*, 1993). Impact studies aim to measure not only the reactions of the beneficiaries and the outputs generated by them, but also the proportion of any discernible change attributable to the project. In any project, and throughout the project cycle, there is need not only for routine collection of data through monitoring or continuous assessment, but also for evaluation and assessment of impact. Assessment requires a longer time span, larger population, and use of comparative analytical techniques

2.3.6.1 The Determinants of Evaluation in Agriculture.

Determinants otherwise known as indicators are signs, markers, pointers and gauges showing the directions of purpose(s). Several authors and researchers focused on different types of project. World Bank (2010); Bharat (*2010);* OECD-DAC (2002); UNICEF (2004); UNGA (2005), Gertler, Premand and Vermeersch (2011) *applied* Relevance, Effectiveness, Efficiency, Impactand Sustainability as determinants/indicators for evaluating various projects which are

also applicable to Agriculture. The key concepts of Relevance, Effectiveness, Efficiency, Impact and Sustainability can be explained as follows:

2.3.6.1.1 Project Relevance

Project Relevance relates to the importance of the problems to be addressed by the project, and starts with determining for whom the project is relevant. At the project purpose level, the project should address the specific problems of the target group (for example, declining revenues of small scale agricultural producers). At the overall objectives level the project should address the related but wider problems of society as a whole (for example, declining standards of living in rural areas) (World Bank, 2005). In agriculture most projects and technologies that are relevant are shown adoptable by users.. For an agricultural project to have relevance, it might have undergone the adoption process stages with an end result of acceptance or adoption.

2.3.6.1.2 Project Effectiveness

Effectiveness of the project is a measure of how well or complete a project task was carried. A project can be described as effective if it meets with established objectives including the required needs of the user producing quality standards that have been specified to satisfy the needs. Furthermore, a project can be considered effective if it is able to integrate within the existing organizational system structures and processes with sufficient flexibility; in addition, if it is capable of responding to the changes in the environment in which the system will operate accordingly to the change in the requirement of the user (Bharat, *2010).*Effectiveness on the other hand is act of producing the desired result(s) (Hornby, 2000). An extension approach or system is thus said to be effective if it produces the result that it was intended to achieve (Ebewore, 2012).

2.3.6.1.3 Project Efficiency

Efficiency of the project is the determinant or a ratio of the outputs from a process activity in relation to the resource inputs, as measured by the volume of output achieved for the input used. The project can be described as efficient if all stages, maturity, delivery, initiation and implementation are accomplished within the constrains identified at its beginning, in terms of workforce, cost, time and objectives. Success: If the project is able to exploit the resources of the members of the project group and the user time to the fullest, avoiding unnecessary idle time, delays or wasted time brought about by undertaking tasks or activities.

Furthermore, the project will be effective if integration of activities of the members of the project team, and the interaction with dependences through other parties outside the project team are capable of apt delivery of resources including hardware, software services and training. Besides, proper time management of resources also signifies efficiency of the project, as resources arrive before they are required, this may lead to problems, deterioration, unexpected fluctuation in planned cash flows and a proportion of the warranty period elapsing before equipment has been used (Bharat, *2010)*. The two primary objectives of project management are that the project should be effective and efficient. Most projects confound effectiveness, efficiency and effort to create a more efficient task, ignoring effectiveness, resulting in project breakdown. Projects being successful imply projects to produce effective effects, but at other end being efficient implies producing consequences with minimum effort or the caliber to carry out actions promptly. Two terms can occur, effectiveness in subjective concept and efficiency in objective impression, in brief; project efficiency is the ratio of the resource inputs and the outputs, while effectiveness can be gauged with objective achievements of the project (Bharat, *2010).*

Efficiency versus effectiveness: Effectiveness is also a measure of the quality of attainment in meeting objectives (resource effectiveness or team effectiveness). Effectiveness is to be distinguished from efficiency, which is measured by the volume of output achieved for the input used and hence, it is closely related to productivity and performance of projects (Bharat, *2010).*

2.3.6.1.4 Project Impact

Some Common definitions of 'impact' used in evaluation generally refer to the totality of longer-term consequences associated with an intervention on quality-of-life outcomes. For example, the Organization for Economic Cooperation and Development's Development Assistance Committee (OECD-DAC) defines impact as the "positive and negative, primary and secondary long-term effects produced by a development intervention, directly or indirectly, intended or unintended" OECD-DAC (2002). A number of international agencies have also adopted this definition of impact. For example, UNICEF defines impact as "The longer term results of a program – technical, economic, socio-cultural, institutional, environmental or other – whether intended or unintended. The intended impact should correspond to the program goal" (UNICEF, 2004). Impact evaluation assesses the changes that can be attributed to a particular intervention, such as a project, program or policy, both the intended ones, as well as ideally the unintended ones (World Bank, 2008). In contrast to outcome monitoring, which examines whether targets have been achieved, impact evaluation is structured to answer the question: how would outcomes such as participants' well-being have changed if the intervention had not been undertaken? This involves counterfactual analysis, that is, "a comparison between what actually happened and what would have happened in the absence of the intervention" (White, 2006). He

furthermore, viewed Impact evaluations as seeking to answer cause-and-effect questions. In other words, they look for the changes in outcome that are directly attributable to a program.

The International Initiative for Impact Evaluation (IIIE) defines rigorous Impact Evaluations as: “analyses that measure the net change in outcomes for a particular group of people that can be attributed to a specific program using the best methodology available, feasible and appropriate to the evaluation question that is being investigated and to the specific context” (IIIE, 2008)

Other interpretations of Impact Evaluation include:

- An evaluation which looks at the impact of an intervention on final welfare outcomes, rather than only at project outputs, or a process evaluation which focuses on implementation;
- An evaluation carried out some time (five to ten years) after the intervention has been completed so as to allow time for impact to appear; and
- An evaluation considering all interventions within a given sector or geographical area.

Fadama III conducts project evaluation using consultants in multidisciplinary fields.

2.3.6.1.5 Project Sustainability

Dictionaries provide more than ten meanings for sustain, the main ones being to “maintain", "support", or "endure” (Encanta, 2010). Scott Cato (2009) and Adams (2006) view sustainability as the ability of maintaining the present environment for future socio-economic activities. However, since the 1980s, sustainability has been used more in the sense of human sustainability on planet Earth and this has resulted in the most widely quoted definition of sustainability and sustainable development, that of the Brundtland Commission of the United Nations on March 20, 1987: “sustainable development is development that meets the needs of

the present without compromising the ability of future generations to meet their own needs"(United Nations General Assembly, 1987).

At the 2005 World Summit it was noted that this requires the reconciliation of environmental, social equity and economic demands - the "three pillars" of sustainability or (the 3 E's). This view has been expressed as an illustration using three overlapping ellipses indicating that the three pillars of sustainability are not mutually exclusive and can be mutually inclusive (UNGA, 1987). The three pillars - or the "triple bottom line" - have served as a common ground for numerous sustainability standards and certification systems in recent years, in particular in the food industry. Furthermore, "the term sustainable agriculture means an integrated system of plant and animal production practices having a site-specific application that will, over the long term:

- satisfy human food and fiber needs;
- enhance environmental quality and the natural resource base upon which the agricultural economy depends;
- make the most efficient use of nonrenewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls;
- sustain the economic viability of farm operations; and
- enhance the quality of life for farmers and society as a whole (Gold, 2007).

Human Sustainability interfaces with economics through the voluntary trade consequences of economic activity. Moving towards sustainability is also a social challenge that entails, among other factors, international and national law, urban planning and transport, local and individual lifestyles and ethical consumerism. Ways of living more sustainably can take many forms from

controlling living conditions (e.g., eco-villages, eco-municipalities and sustainable cities), to reappraising work practices (e.g., using permaculture, green building, sustainable agriculture), or developing new technologies that reduce the consumption of resources (Bookchin, 2007 and Blewitt, 2008).

Project Sustainability relates to whether project benefits will continue to flow after the period of external assistance has ended. Although actual sustainability cannot be assessed ex ante, prospects for sustainability can be assessed by determining the extent to which mechanisms have been incorporated into project design to address the key factors which have influenced sustainability in the past (World Bank, 2005).

SustainableAgriculture: The term "Sustainable agriculture" as it pertains to agriculture, describes farming systems that are "capable of maintaining their productivity and usefulness to society indefinitely. Such systems... must be resource-conserving, socially supportive, commercially competitive, and environmentally sound" (Ikerd, 1990).

Best agricultural practices (BAPs), project ownership, usage, maintenances and future plans are features of sustainability.In order to ensure the long term sustainability of plantations in the Niger Delta, it would be necessary to establish the plantation tree species between strips or stands of other forest trees in order to enhance biodiversity and make nutrient cycling more efficient (Aweto, 2002). Rural development researchers have identified a number of factors that affect sustainable development among the rural community. A study was conducted to investigate on the constructs that affect sustainable development among members of Village Development and Security Committee (VDSC) under the Vision Village Movement (VVM). The final model derived from the study showed that four pertinent constructs fit into the sustainable

development model: spirituality (beliefs and values), leadership, beautification (community participation in sanitation), and education. The findings contributed to a new perspective in understanding the complexities associated with sustainable development among the rural community in Malaysia (Bahaman, Jeffrey, Lawrence, and Hayrol, 2009). In a conclusive research report, Ogunsumi (2010) revealed that sustainable use of technology requires understanding better the socio-economic constraints of farmers as well as policy implications to encourage the sustained use of adopted technologies.

Sustainability measurement is a term that denotes the measurements used as the quantitative basis for the informed management of sustainability. The metrics used for the measurement of sustainability (involving the sustainability of environmental, social and economic domains, both individually and in various combinations) are evolving: they include indicators, benchmarks, audits, sustainability standards and certification systems like Fair-trade and Organic, indexes and accounting, as well as assessment, appraisal and other reporting systems. They are applied over a wide range of spatial and temporal scales (SAI Platform, 2010; Reinecke, Manning, and Von Hagen 2011).

2.3.6.2 The Logical Framework of Monitoring and Evaluation Model

The logical framework technique is an exercise in structuring the component elements of a project (or single programme) and analyzing the internal and external coherence of the project. The product of the technique, the logical framework is a formal matrix presentation of the internal functioning of the project, of the means for verifying the achievement of the goal, and of the internal and external factors conditioning its process (Sawadogo and Dunlop, 2000).

In most agricultural establishment, it was usually on-going evaluation that was used and it focused in most cases on number of contact farmers reached by Village Extension Worker (VEW) and number of visit made by VEW instead of focusing on the changes on the beneficiaries socio-economic status which has to do with ex-post evaluation that relate to impact of a programme as a basis for future policy formulation and project design (Campton, 1984).

The logical framework model is a simplified chain of relationships that portrays the logic and assumptions underlying a programme or intervention and how it intends to achieve its expected results. According to Campton (1984), the logic of the programme, identifies the assumptions on which it was based, and outlines the logical connections among:

i. The activities undertaken based on the objectives,
ii. The output to be produced in relation to performance,
iii. The intermediate or short-term outcomes that are expected and
iv. The ultimate or long-term impacts the programme was design to achieve.

According to Williams *et al* (1984) project inputs were resources needed for the project like capital, technology, while outputs were physical outcome of the project input such as quantity of seeds, fertilizer used and the percentage of farmers who used these inputs. On the other hand, impacts were the changes that have resulted from the project inputs and outputs such as increases in farmers income, status, attitudes and habits, and effects is the outcome of the use of project like purchases of better seed as a result of credit facilities.

The logic model is important to select the right tool for the job which is most appropriate. One of the most important uses of the logic model is for programme planning. It was also used for performance evaluation as it provided indicators in terms of output and outcome measure of performance.

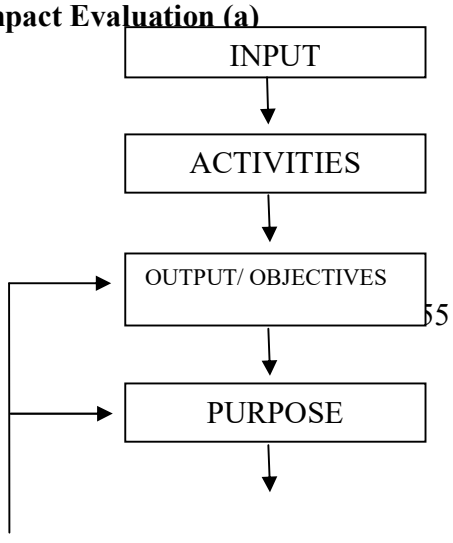
The essential characteristics of the system were:

i. The Village Extension Workers (VEWs) were assigned purely educational responsibilities.
ii. The total number of farm families to be visited by each VEW were clearly defined.
iii. At each level in the extension organization, the span of control allows close guidance and supervision of the level below.
iv. Extension programme concentrate on the most important crops and improving farming practices which have the greater potential for increasing yields and which do not involve large cash inputs.
v. Specific recommendations for improving farming practices were carried to selected contact framers, who would assist in spreading the new practices to surrounding farmers.
vi. The contact farmers were visited every fortnight at a set date and time.

In collecting evidence for the evaluation, Bennett (1977) in analyzing impact of extension programme specified areas to be assesses as: Inputs, Activities, People Involvement, Reactions, Knowledge, Attitude, Skills and Aspirations, Practice Change, and the End Results. Horton *et al* (2003) also offered three basic steps for evaluating capacity development namely: preparing for the evaluation, developing principles for assuring the quality and use of the evaluation and doing the evaluation by answering methodological questions ceded in designing and carrying out evaluation.

Consequently, these generated information that was used for Impact Assessment of the programme being evaluated as given in the Hierarchy for Impact Assessment flowchart.

Model for Impact Evaluation (a)



Model for Impact Evaluation (b)

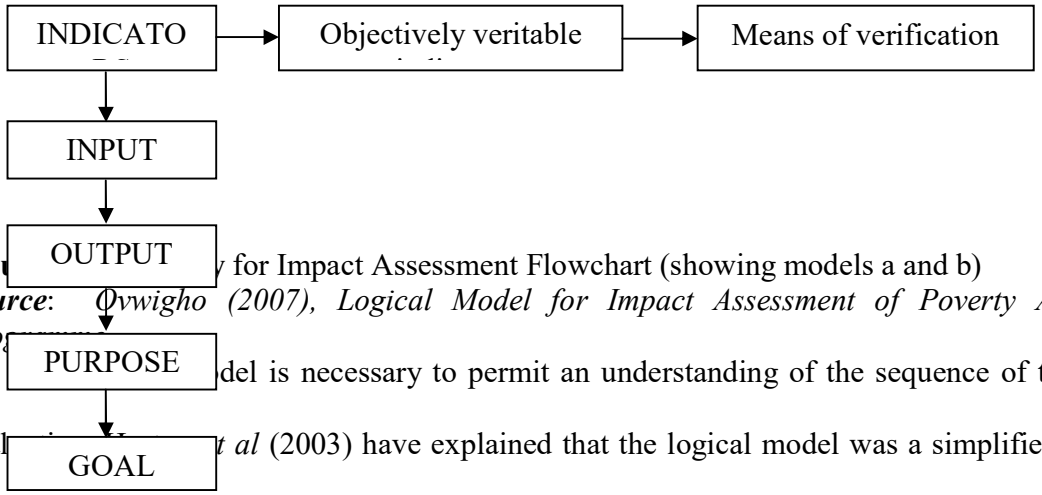


Fig for Impact Assessment Flowchart (showing models a and b)

Source: *Ovwigho (2007), Logical Model for Impact Assessment of Poverty Alleviation Pro*

del is necessary to permit an understanding of the sequence of the impact eval*t al* (2003) have explained that the logical model was a simplified chain of relationship that portrays the logic and assumptions underlying a programme or intervention and how it intended to achieve its expected results in a flowchart, they stated that the logic of the programme identified the assumptions on which it was activities undertaken, the outputs to be produced, the intermediate or short term outcomes that were expected, and the ultimate or long-term impact which the programme was design to achieve.

Widely used by US Agency for International Development (USAID) and by the Swedish International Development Authority (SIDA), the logical framework approach according to (Imbaden, 1978) is basically a tracer study of a project (target) to the intermediate (sector objectives) and to the final contribution of the project to developments goals, but also specifies under what conditions and how the project contributes to the development goal.

The method consists of establishment of a logical framework for a projects which defines project inputs, outputs, purpose, and the higher goals in measurable or objectively verifiable terms, hypothesizes the causal means end, linkage between inputs, output, purpose and goal; articulate the assumptions (external influences and factors) which will affect the causal linkages and

establishing the indicators which will permit subsequent measures or verification of achievement of the defined outputs, purpose, and goal.

The core of the logical framework is the temporary logic model that runs through the matrix which takes the form of a series of connected prepositions:

i. If these activities are implemented, *and this assumption holds*, then these outputs will be delivered.
ii. If these outputs are delivered, *and this assumption holds*, then this purpose will be achieved.
iii. If this purpose is achieved, *and this assumption holds*, then this goal will be achieved (Coleman 1987).

The choice of the logical framework approach is based on the impact approach that makes the project appraisal transparent by explicitly stating the assumptions underlying the analysis and by allowing a check on the proposed hypothesis and expected results in an ex-post analysis:

i. It deals explicitly with a multitude of social goals and does not require the reduction of the benefits into one figure;
ii. It can be used as a tool to clarify the trade-off among objectives and thus to ameliorate the decision making process;
iii. It is flexible with regard to information skills requirement;
iv. It can incorporate social cost-benefit analysis, use inputs-output table and partial models.

The impact approach provides the necessary framework to analyze the effects of a project on various development goals.

2.3.7 Fadama Advisory and Support Services

The term "Extension" was first used to describe adult education programmes in England in the second half of the 19th century; these programmes helped to expand or extend the work of universities beyond the campus and into the neighbouring community. The term "Extension" was later adopted in the United States of America, while in Britain it was replaced with

"advisory service" in the 20th century. A number of other terms are used in different parts of the world to describe the same or a similar concept:

- Arabic: Al-Ershad (“Guidance”)
- Dutch: Voorlichting (“lighting the path”)
- German: Beratung (“advisory work”)
- French: Vulgarisation (“popularisation”)
- Spanish: Capacitación (“Training”/"Capacity Building")
- Thai, Lao: Song-Suem (“to promote”)
- Persian: Tarvij & Gostaresh (“to promote and to extend”) (Wikipedia,2010).

In the US, an extension agent is a university employee who develops and delivers educational programs to assist people in economic and community development, leadership, family issues, agriculture and environment (Wikipedia, 2011). Katz (2002) viewed ‘Extension’ as the provision of ‘advisory and other services’ that help rural families to make the best possible use of the productive resources at their disposal. Swanson (2008) stated that the term agricultural extension has changed over time. It was no longer restricted to the emphasis on technology transfer reflected by the Training and Visit System but has moved towards broader concepts which include developing the skills and management capacities of farming families. Agricultural advisory services are back on the development agenda (Nagel, 2003). In the 1960s and 70s, the development of agricultural advisory services – also referred to as agricultural extension - was seen as a major factor in promoting agricultural development. It is widely recognized that agricultural advisory services played an important role in launching the Green Revolution in Asia. However, the disenchantment with agriculture, especially in sub-Saharan Africa, and the structural adjustment policies of the 1980s and 90s led to a decline in national and international support for agricultural advisory services. Except for cases of highly-commercialized agriculture, where advisory services were often financed by farmers or farmers’ groups, output buyers and

input suppliers, advisory services for smallholders were almost exclusively a public sector activity. After the time of the Green Revolution, public sector advisory services suffered from a loss in stature caused by the widespread perception that they had become ineffective, inefficient and fiscally unsustainable. In part, this loss of stature was related to a change of paradigm regarding the role of the state in development, which characterized the structural adjustment era. In part, the loss of stature of agricultural advisory services may also have resulted from the promotion of a rather uniform model— the Training and Visit (T&V) system (Anderson, Feder and Ganguly, 2006). WB (2010), USAID (2011) and CTA (2011) maintained that extension and/or advisory services were designed and intended to help farmers boost crops and livestock production. The availability of these services enables farmers to adopt new technologies for increase production and profitability. According to them the specific objectives of agricultural extension and advisory services were to:

i. provide advice to farmers on problems or opportunities in agricultural production, marketing, conservation and family livelihood;
ii. facilitate development of local skills and organizations, and to serve as links with other programmes and institutions;
iii. transfer new technologies to farmers and rural people; and
iv. address public interest issues in rural areas, resource conservation, health and food security, monitoring agricultural production, monitoring food safety, nutrition and family education as well as youth development.

Agricultural Extension is a vital element of the array of market and non-market entities and agents that provide critical flows of information that can improve farmers' and other rural peoples' welfare. After a period of neglect, agricultural advisory services have returned strongly to the international development agenda. Apart from their conventional function of providing knowledge for improved agricultural productivity, agricultural advisory services are expected to

fulfill a variety of new functions, such as linking smallholder farmers to high-value and export markets, promoting environmentally sustainable production techniques, and coping with the effects of HIV/AIDS and other health challenges that affect agriculture (Anderson, 2008).

There is a general consensus in literature that well designed and implemented extension services will lead to significant improvement in agricultural productivity (Romani, 2003; Evenson and Mwabu, 1998; Bindlish and Evenson, 1993; Birkhaeuser, Evenson and Feder, 1991). In fact, Benor and Baxter (1984) earlier argued that sustained high levels of agricultural production and income are not possible without an effective agricultural extension service supported by agricultural research that is relevant to farmers' needs. Thus, an effective and efficient agricultural extension service supported by a dynamic agricultural research programme is the basic prerequisite to a sustained high level of agricultural production which ensures a reasonable standard of living (Arokoyo, 1990).

However, the findings of Ammani, Sani, Kuraand Hussaini (2011) on the study of "an assessment of agricultural extension services in irrigation schemes under RBDAs' control in Nigeria: The case of Kano River irrigation project" indicated that the majority of the respondents find the extension services in the study area unavailable as neither the River Basin Development Authorities (RBDA), the Local Government Authorities (LGA), the Agricultural Development Projects (ADP) nor the Non-Governmental Organizations (NGOs) played significant extension delivery function in the area. Furthermore, most of the respondents do not belong to any farmer association or cooperative society. This research is set out to evaluate activities of local facilitator in Fadama III. Have they contributed positively or negatively to agricultural projects development in the Niger Delta?Many administrative and design failures have proved problematic in public extension effort in the past, most notably those associated with the scale

and complexity of extension operations; the dependence of success in extension on the broader policy environment; the problems that stem from the less than ideal interaction of extension with the knowledge generation system; the difficulties inherent in tracing extension impact; the profound problems of accountability; the oftentimes weak political commitment and support for public extension; the frequent encumbrance with public duties in addition to those related to knowledge transfer (Anderson, 2008).

Fadama Advisory Services

An Advisory Service Activity (ASA) is a service that provides Fadama Users with advice on the how, when and why of an agro- technology with its associated input, production and markets. It is designed to guide and persuade farmers to adopt more productive and profitable practices in their income generating activities using educational means. The goal of advisory service is to enable Fadama User Groups participating in the project to adopt productivity-enhancing technique in order to overcome major constraints on increased productivity of their Fadama enterprises and increased income. This will be achieved through demand – responsive advisory services provided by a wide range of private and public service providers. The achievement of the output objective will be measured by the percentage of Fadama users who succeed in improving their production and marketing practices as a result of the advisory services utilized under the Project. Advisory Service Activities are carried out by local facilitators (LF), service providers (SP), ad hoc NGO personnel and consultants (NFDP 2009e). The LFs are similar to the Extension Agents of the ADPs.

Role of Advisory Service Providers in Fadama III

Service providers are one of the important stakeholders in a Fadama III implementation. They are a category of stakeholders that render services to primary stakeholders (FUGs/FCAs) in areas like advisory service in related agricultural enterprises, Capacity building, performance,

small scale owned infrastructure, agri-business management, human, material and environmental resources management. An additional essence of the Fadama agricultural project is to encourage private/community driven development where the community with the assistance of technical expertise (i.e. Service Providers) will take lead of development (NFDP 2009e).

2.3.8 Input/Asset Support in Agriculture

The resources that are used in farm production, such as chemicals, equipment, feed, seed, and energy. Most farm inputs are purchased (a change from the days when animals powered most operations), making production costs susceptible to nonfarm economic conditions. (Webster, 2010) CTA (2011) suggested that small scale farmers must buy inputs such as fertilizers and farm machineries in order to scale up production. The low agricultural production problem among the small scale farmers has been exacerbated by their inability to procure modern inputs necessary for increase in production. Assets - The items and property owned or controlled by an individual or business that have commercial or exchange value. Items may also include claims against others. All assets are reported on a balance sheet at market or cost value less accumulated depreciation. Assets are normally divided into categories based on their useful life:

- Current assets - Assets that will be used or converted into cash within one year. Also called liquid assets.
- Intermediate assets - Assets with useful lives of one to ten years. Their sale will affect the future income potential of the business.
- Long-term assets - Permanent assets with useful lives in excess of 10 years. Also called fixed assets. Sometimes both intermediate and long term assets are called fixed assets.
- Financial assets - Intangible assets such as cash and savings.
- Real assets - Asset that are tangible or physical in nature such as land, machinery, and livestock *(Hofstrand, 2006)*.

2.3.9 Agricultural Best Practices.

Best Practice is a method or technique that has consistently shown results superior to those achieved with other means, and that is used as a benchmark. In addition, a "best" practice can evolve to become better as improvements are discovered. Best practice is considered by some as a business buzzword, used to describe the process of developing and following a standard way of doing things that multiple organizations can use. Best practices are used to maintain quality as an alternative to mandatory legislated standards and can be based on self-assessment or benchmarking. Best practice is a feature of accredited management standards such as ISO 9000 and ISO 14001 (Nash and Ehrenfeld, 1997). Documenting and charting procedures and practices is a complicated and time-consuming process often skipped by companies, even though they may practice the proper processes consistently. Some consulting firms specialize in the area of Best Practice and offer pre-made 'templates' to standardize business process documentation. Sometimes a "best practice" is not applicable or is inappropriate for a particular organization's needs. A key strategic talent required when applying best practice to organizations is the ability to balance the unique qualities of an organization with the practices that it has in common with others (Bogan and English, 1994). Good operating practice is a strategic managementterm. More specific uses of the term include good agricultural practices, good manufacturing practice, good laboratory practice, good clinical practice and good distribution practice.

Best Practices are similar to Good Agricultural Practices (GAPs). Good Agricultural Practices are a collection of principles to apply for on-farm production and post-production processes, resulting in safe and healthy food and non-food agricultural products, while taking into account economical, social and environmental sustainability. GAPs may be applied to a wide range of farming systems and at different scales. They are applied through sustainable

agricultural methods, such as integrated pest management, integrated fertilizer management and conservation agriculture. They rely on four principles:

- Food Security, food safety and food quality;
- Sustain and enhance natural resources;
- Maintain viable farming enterprises and contribute to sustainable livelihoods;
- Meet cultural and social demands of society (Johnson, 2000).

Good Agricultural Practices employ a combination of Integrated Pest Management (IPM) and Integrated Vector Management (IVM) to achieve farming concerns. Integrated Pest Management is the careful integration of a number of available pest control techniques that discourages pest population development and keep pesticides and other interventions to levels that are economically justified and safe for human health and the environment. IPM emphasises the growth of a healthy crop with the least disruption of agro-ecosystems, thereby encouraging natural pest control mechanism. Promoting IPM would be one way of reducing chemical pesticide use, but there is still no universally accepted definition of IPM. It is probable that the forms of IPM that will be encouraged will rely on biological approaches with the judicious use of some chemical pesticides. IPM strategy is non-debatable most appropriate and sustainable approach for the control and management of ever-growing pest population (GPA 2001).

Principles of Integrated Pest Management: Integrated Pest Management as a corner stone of sustainable agriculture, seeks to improve farmer practices in order to crate higher profiles while improving environmental quality and community health. In order
to do this, IPM implementation is based on four practical principles: grow a healthy crop, conserve natural enemies, observe field regularly and farmers become experts (GPA 2001).

Integrated Vector Management uses the same concepts as IPM of combining methods/products and strategies with an optimal mix adapted to the local situation. However introduction of IVM is at a very early stage compared to IPM activities.

Principles of Integrated Vector Management include: to strengthen knowledge base on local vector ecology, transition vertical vector control programmes to community based vector control programmes, capacity building in cost effectiveness analysis of vector control and coordination with integrated disease management (GPA 2001). Fadama 111 builds the capacity of their farmers to ensure best farming practices that are environmentally friendly.

2.3.9.1 Land Use

Loss of biodiversity stems largely from the habitat loss and fragmentation produced by the human appropriation of land for development, forestry and agriculture as natural capital is progressively converted to man-made capital. Land use change is fundamental to the operations of the biosphere because alterations in the relative proportions of land dedicated to urbanization, agriculture, forest, woodland, grassland and pasture have a marked effect on the global water, carbon and nitrogen biogeochemical cycles and this can impact negatively on both natural and human systems. At the local human scale, major sustainability benefits accrue from sustainable parks and gardens and green cities (Brower and Leon, 1999 and Krebs, 2001).

In agriculture, the most important target of land consolidation projects are reducing expenses generation and increasing farmers' income generation (Ebrahimi, Kalantri, Asadi, and Mohammed, 2011). In communities where land is insufficient for crop projects, Fadama III has encouraged the use of livestock and fisheries projects which portrayed minimal land utilization for maximum output actualization. **Integrated approach to the planning and management of**

land resources. Governments at the appropriate levels, in collaboration with national organizations, and with support of regional and international organizations, should establish innovative procedures, programs, projects and services that facilitate and encourage the active participation of those affected in the decision making and implementation process, especially of groups that hitherto often been excluded, such as women, youth, indigenous people and their communities and other local communities. Provide the appropriate technical information necessary for informed decision making on land use and management in an accessible form to all sectors of the population, especially to local communities and women; Support low cost, community managed systems for the collection of comparable information on the status and process of change of land resources, including soils, forest cover, wildlife, climate and other elements.By the same reasoning, the land to be used for an agricultural project will not be difficult to identify. It generally is not difficult to determine where the land necessary for the project will be located and how much will be used. Yet problems may arise in valuing land because of the very special kind of market conditions that exist when land is transferred from one owner to another (Edmund, 2011). Technological advancements help provide farmers with tools and resources to make farming more sustainable. New technologies have given rise to innovations like conservation tillage, a farming process which helps prevent land loss to erosion, water pollution and enhances carbon sequestration (Blewitt, 2008).

2.3.9.2 Labour Use

Community participation is a forum where people in the society take role in planning and management of their society (Fadama III approach). It aims at attracting coordination and promoting wellness of the people in the society. People can participate through the following ways:-

- Directly by engaging in community project like in water supply and distribution, road construction etc
- Holding discussion and coming up with a project or a decision to uplift their way of living and
- gives information about their culture to the planers therefore planners comes up with projects that adapt to the way of living hence promoting their wellness. (World Bank, 2014).

Neither will the labor component of agricultural projects be difficult to identify. From the highly skilled project manager to the farmer maintaining his orchard while it is coming into production, the labor inputs raise less a question of what than of how much and when. Labor may, however, raise special valuation problems that call for the use of a shadow price. Confusion may also arise on occasion in valuing family labour (Edmund, 2011).

2.3.9.3 Production Standard

Agricultural productivity is measured as the ratio of agricultural outputs to agricultural inputs. While individual products are usually measured by weight, their varying densities make measuring overall agricultural output difficult. Therefore, output is usually measured as the market value of final output, which excludes intermediate products such as corn feed used in the meat industry. This output value may be compared to many different types of inputs such as labour and land (yield). These are called partial measures of productivity. Agricultural productivity may also be measured by what is termed total factor productivity (TFP). This method of calculating agricultural productivity compares an index of agricultural inputs to an index of outputs. This measure of agricultural productivity was established to remedy the shortcomings of the partial measures of productivity; notably that it is often hard to identify the factors that cause them to change. Changes in TFP are usually attributed to technological improvements (FAO, 2007).Increased physical production is the most common benefit of

agricultural projects. An irrigation project permits better water control so that farmers can obtain higher yields. Young trees are planted on cleared jungle land to increase the area devoted to growing oil palm. A credit project makes resources available for farmers to increase both their operating expenditures for current production-for fertilizers, seeds, or pesticides-and their investment-for a tube well or a power thresher. The benefit is the increased production from the farm. In a large proportion of agricultural projects the increased production will be marketed through commercial channels. In that case identifying the benefit and finding a market price will probably not prove too difficult, although there may be a problem in determining the correct value to use in the economic analysis. In many agricultural projects, however, the benefits may well include increased production consumed by the farm family itself. Such is the case in irrigation rehabilitation projects along the north coast of Java. The home-consumed production from the projects increased the farm families' net benefit and the national income just as much as if it had been sold in the market. Indeed, we could think of the hypothetical case of a farmer selling his output and then buying it back. Since home-consumed production contributes to project objectives in the same way as marketed production, it is clearly part of the project benefits in both financial and economic analysis. Omitting home-consumed production will tend to make projects that produce commercial crops seem relatively high-yielding, and it could lead to a poor choice among alternative projects. Failure to include home-consumed production will also mean underestimating the return to agricultural investments relative to investments in other sectors of the economy.

When home-consumed crops will figure prominently in a project, the importance of careful financial analysis is increased. In this case, it is necessary to estimate not only the incremental net benefit-including the value of home-consumed production and money from off-

farm sales-but also the cash available to the farmer. From the analysis of cash income and costs, one can determine if farmers will have the cash in hand to purchase modern inputs or to pay their credit obligations. It is possible to have a project in which home-consumed output increases enough for the return to the economy as a whole to be quite attractive, but in which so little of the increased production is sold that farmers will not have the cash to repay their loans (Edmund, 2011).

2.3.9.4 Post Harvest Management

Projects involving agricultural processing industries expect benefits to arise from a change in the form of the agricultural product. Farmers sell paddy rice to millers who, in turn, sell polished rice. The benefit to the millers arises from the change in form. Canners preserve fruit, changing its form and making it possible at a lower cost to change its time or location of sale. Even a simple processing facility such as a grading shed gives rise to a benefit through changing the form of the product from run-of-the-orchard to sorted fruit. In the Himachal Pradesh Apple Marketing Project in northern India, the value of the apples farmers produce is increased by sorting; the best fruit is sold for fresh consumption while fruit of poorer quality is used to make a soft drink concentrate. Post harvest management include: Quality improvement in various processes.In some instances, the benefit from an agricultural project may take the form of an improvement in the quality of the product. For example, the analysis for the Livestock Development Project in Ecuador, which was to extend loans to producers of beef cattle, assumed that ranchers would be able not only to increase their cattle production but also to improve the quality of their animals so that the average live price of steers per kilogram would rise. Loans to small dairy farmers in the Rajasthan Smallholder Dairy Improvement Project in India are intended to enable farmers not only to increase output but also to improve the quality of their

product. Instead of selling their milk to make ghee (cooking oil from clarified butter), farmers will be able to sell it for a higher price in the Jaipur fluid milk market. As in these examples, both increased production and quality improvement are most often expected in agricultural projects, although both may not always be expected. One word of warning: both the rate and the extent of the benefit from quality improvement can easily be overestimated (Anon., 2011).

Sahr (2010)emphasized on the role of poverty reduction strategy paper (PRSP) in Sierra Leon, a WB assisted project, which is designed to promote agriculture by creating an enabling environment that is attractive for the private sector to invest; through provision of post harvest storage facilities in form of silos, drying floors, threshers, animal feed mills and abattoirs.

The establishment of cassava-processing and starch manufacturing factories could further enhance the development of arable agriculture and possibly the export of cassava products, if the policy of cassava development is vigorously pursued at the national level (Aweto, 2002).

2.3.9.5 Market Strategies

Agricultural marketing covers the services involved in moving an agricultural product from the farm to the consumer. Numerous interconnected activities are involved in doing this, such as planning production, growing and harvesting, grading, packing, transport, storage, agro- and food processing, distribution, advertising and sale. Some definitions would even include “the acts of buying supplies, renting equipment, and paying labor", arguing that marketing is everything a business does. Such activities cannot take place without the exchange of information and are often heavily dependent on the availability of suitable finance (Shepherd, 2007). Marketing systems are dynamic; they are competitive and involve continuous change and improvement. Businesses that have lower costs, are more efficient, and can deliver quality products, are those that prosper. Those that have high costs, fail to adapt to changes in market

demand and provide poorer quality is often forced out of business. Marketing has to be customer-oriented and has to provide the farmer, transporter, trader, processor, etc. with a profit. This requires those involved in marketing chains to understand buyer requirements, both in terms of product and business conditions (Marocchino, 2009). Promoting market orientation in agricultural advisory services aims to provide for the sustainable enhancement of the capabilities of the rural poor to enable them to benefit from agricultural markets and help them to adapt to factors which impact upon these. As a study by the Overseas Development Institute demonstrates, a value chain approach to advisory services indicates that the range of clients serviced should go beyond farmers to include input providers, producers, producer organizations and processors and traders (Anon., 2008).

Efficient market information can be shown to have positive benefits for farmers and traders. Up-to-date information on prices and other market factors enables farmers to negotiate with traders and also facilitates spatial distribution of products from rural areas to towns and between markets. Most governments in developing countries have tried to provide market information services to farmers, but these have tended to experience problems of sustainability. Moreover, even when they function, the service provided is often insufficient to allow commercial decisions to be made because of time lags between data collection and dissemination. Modern communications technologies open up the possibility for market information services to improve information delivery through SMS on cell phones and the rapid growth of FM radio stations in many developing countries offers the possibility of more localized information services. In the longer run, the internet may become an effective way of delivering information to farmers.

However, problems associated with the cost and accuracy of data collection still remain to be addressed. Even when they have access to market information, farmers often require assistance in interpreting that information. For example, the market price quoted on the radio may refer to a wholesale selling price and farmers may have difficulty in translating this into a realistic price at their local assembly market(Shepherd, 2000). Various attempts have been made in developing countries to introduce commercial market information services but these have largely been targeted at traders, commercial farmers or exporters. It is not easy to see how small, poor farmers can generate sufficient income for a commercial service to be profitable although in India a new service introduced by Thompson Reuters was reportedly used by over 100,000 farmers in its first year of operation. Esoko in West Africa attempts to subsidize the cost of such services to farmers by charging access to a more advanced feature set of mobile-based tools to businesses (Goyal, 2010).

Farmers frequently consider marketing as being their major problem. However, while they are able to identify such problems as poor prices, lack of transport and high post-harvest losses, they are often poorly equipped to identify potential solutions. Successful marketing requires learning new skills, new techniques and new ways of obtaining information. Extension officers working with ministries of agriculture or NGOs are often well-trained in horticultural production techniques but usually lack knowledge of marketing or post-harvest handling. Ways of helping them develop their knowledge of these areas, in order to be better able to advise farmers about market-oriented horticulture, need to be explored. While there is a range of generic guides and other training materials available from FAO and others, these should ideally be tailored to national circumstances to have maximum effect (Dixie, 2007). Those in business cannot function if their trading activities are hampered by excessive bureaucracy. Inappropriate

law can distort and reduce the efficiency of the market, increase the costs of doing business and retard the development of a competitive private sector. Poor support institutions, such as agricultural extension services, municipalities that operate markets inefficiently and export promotion bodies, can be particularly damaging. Poor roads increase the cost of doing business, reduce payments to farmers and increase prices to consumers. Finally, the ever-present problem of corruption can seriously impact on agricultural marketing efficiency in many countries by increasing the transaction costs faced by those in the marketing chain(Reardon Timmer, Barrett and Berdegue, 2003).

To address constraints of output management which are common to several user groups or which cut across a number of Fadama Development Areas, the Component will also finance cross – FCA advisory service activities which may include activities to identify new or improved marketing opportunities (SFCO,2010).

In some agricultural projects, benefits will arise from improved marketing facilities that allow the product to be sold at a time when prices are more favorable. A grain storage project may make it possible to hold grain from the harvest period, when the price is at its seasonal low, until later in the year when the price has risen. The benefit of the storage investment arises out of this change in "temporal value."

Other projects may include investment in trucks and other transport equipment to carry products from the local area where prices are low to distant markets where prices are higher. For example, the Fruit and Vegetable Export Project in Turkey included provision for trucks and ferries to transport fresh produce from southeastern Turkey to outlets in the European Common Market. The benefits of such projects arise from the change in "location value." In most cases the

increased value arising from marketing projects will be split between farmers and marketing firms as the forces of supply and demand increase the price at which the farmer can sell in the harvest season and reduce the monopolistic power of the marketing firm or agency. Many projects are structured to ensure that farmers receive a larger part of the benefit by making it possible for them to build storage facilities on their farms or to band together into cooperatives, but an agricultural project could also involve a private marketing firm or a government agency, in which case much of the benefit could accrue to someone other than farmers (Anon, 2011).

In Sierra Leon, agricultural projects have been supported through creation of feeder roads and community markets being rehabilitated or constructed to facilitate movement of goods to market places (Sahr, 2010). This has contributed to better standard of living in Kono community in Sierra Leon.

2.3.10 Group Dynamics

Group dynamics refers to a system of behaviors and psychological processes occurring within a social group (intragroup dynamics), or between social groups (intergroup dynamics). The study of group dynamics can be useful in understanding decision-making behavior, tracking the spread of diseases in society, creating effective therapy techniques, and following the emergence and popularity of new ideas and technologies. Group dynamics are at the core of understanding racism, sexism, and other forms of social prejudice and discrimination. These applications of the field are studied in psychology, sociology, anthropology, political science, epidemiology, education, social work, business, and communication studies (Backstrom, Huttenlocher, Kleinberg and Lan, 2006).

The FUGs and FCAs are formed on the basis of cooperative management and community participation. This is a demonstration of group dynamics. The role of a leader is very keen to the success of any group hence Curtis (1995) revealed that an effective group

- Has a clear understanding of its goals: overall and immediate.
- Is flexible in selecting its procedure as it works toward its goals.
- Has achieved a high degree of communication and understanding among its members. Communication of personal feelings and attitudes as well as ideas occurs in direct and open fashion because it is considered important to the work of the group.
- Is able to initiate and carry out an effective decision-making, carefully considering minority viewpoints and securing the commitment of all members to important decisions and making good group decisions involves a process, which the leaders may have to state or model as a norm for the group to follow.
- Achieves an appropriate balance between group productivity and the satisfaction of individual needs.
- Provides for sharing of leadership responsibilities.
- Has a high degree of cohesiveness (attractiveness to its members).
- Makes intelligent use of the differing abilities if its members.
- Can be objective about reviewing its own processes.
- Can face problems and adjust to needed modification.
- Maintains a balance between emotional and rational behavior, channeling emotionally into productive group effort.

While in achieving a cooperative group structure, members must interact, give and receive help from one another, and share ideas, information, and resources to help accomplish the group's goals. The group goal of getting the task done at the highest level possible must be accepted by everyone, and members need to develop commitment to the group goal. because the possibility exists of different group members doing different sub-tasks, groups may divide the

labor in various ways to accomplish their goals and rewards, if any, must be based upon the quality and quantity of group performance, not individual performance (Curtis, 1995).

In a survey conducted byAli-Olubandwal, Kathuri, Timothy and Wesonga (2011) on Effective extension methods for increased food production in Kakamega District in Kenya, the research revealed that group demonstrations were the most cost effective extension methods with the least constraints when compared to other extension methods. The study therefore recommended that group demonstrations and a combination of group demonstration and individual farmer follow-up be used to pass extension methods in Kakamega district. The findings of this research are mirrored in the application of FUGs/FCAs as group approach to agricultural projects management by Fadama III.

2.3.11 Agricultural Project Constraints

Constraints to agricultural productivity in Nigeria according to Dayo, Nkonya, Pender and Oni (2009) include: poor agricultural pricing policies, low fertilizer use, low use Improved crop varieties exist, poverty and women's limited access to inputs/assets, low access to agricultural credit, low public expenditure on agricultural research, poor funding of agricultural technologies, poor funding and coordination of Agricultural Extension. Other problems are land tenure system and land degradation, poor post harvest management system, poor market access/marketing efficiency and poor road conditions. Ajieh and Uzokwe (2007) in a study on Adoption of Cassava Production Technologies among Women Farmers identified 5 important constraints to the adoption of cassava production technologies. These are: inadequate fund, high cost of technologies, inadequate land space, lack of appropriate technologies and poor extension contact. Based on the findings of the study, they recommended an increased extension campaign in the area of study to create more awareness among the farmers.

Decline in soil fertility in Niger Delta is partly due to neglect of the cultivation of leguminous crops, especially cowpea and groundnuts. Both crops are good cover crops and also serve as green manure. In addition to reducing soil erosion, they help to replenish soil nitrogen as confirmed by Irvine (1969), Onwueme and Sinha (1991). Flooding during the wet season appears to be a major constraint hindering the utilization of the savanna vegetation of Urhobo land for grazing. Presently, the savanna areas are used for grazing cattle from the drier savanna lands of northern Nigeria during the dry season. Also, on account of their proneness to flooding, the heavier textured soils are unsuitable for growing the main staple crops of the Urhobo land and Niger Delta people, especially yam and cassava. Such clayey soils are however, used for growing oil palm and rubber which appear to tolerate waterlogged soils. It is not clear however, whether prolonged water logging and the attendant problem of poor soil aeration substantially reduce the productivity of the tree crops (Aweto, 2002). Another problem associated with agriculture is frequent flooding. The ground water table is high, rising to or near the ground surface during the wet season. This usually leads to flooding, especially after a spell of intense and heavy downpours. Crops such as cassava and guinea yam have to be harvested before maturation as a result of flooding (Aweto, 2002). Vasanth (1990) noted that soil infertility, irrigation problems food processing issues and food Importation and lack of investment are some of The problems of agriculture in Nigeria. Most of the farmable land in Nigeria contains soil that is low to medium in productivity. According to the Food and Agriculture Organization (FAO) with proper management, the soil can achieve medium to good productivity. The main problem that affects soil fertility is soil erosion. Wind erosion, in particular, is quite damaging. Overtime, strong winds expose seedlings and crop root systems by blowing away loose, fine grain soil particles. Another effect is the accumulation of soil particles in drifts, which can cover

crops. Also, wind erosion changes the texture of the soil. The particles responsible for water retention and fertility, such as clay, silt, and organic matter are generally lost, leaving behind a sandy soil. Wind erosion can be greatly reduced by planting trees near farming areas. The trees will absorb most of the wind, which will prevent the loss of soil particles. Another type of erosion that affects fertility is water erosion. There are two types of water erosion: splash erosion and rill erosion. Splash erosion occurs when rain drops impact the soil, and rill erosion occurs when channels of water carry soil downstream. Water erosion is reduced when the soil is covered with a canopy. Also, improving the soil structure by adding organic matter greatly reduces water erosion. It is estimated that about 20-40% of the yearly harvest is lost during processing. The primary cause is the lack of efficient harvesting techniques. Most farmers harvest crops by hand, instead of using machines. Storage methods also, are not generally up to standards. Most of the crops are lost to physical damage caused by insects, bacteria, or fungus.

Impact of the situation: Nigeria does not produce enough food to meet the demand of its people. This produces a lot of problems with regard to agricultural development. Generally, there is less incentive for local farmers to grow local foods, when cheaper, more palatable foods are imported. This forces local farmers to reduce prices, which reduces the income generated by the farm. The consequence is decreased farm production. To combat the effects of imported food on development, several initiatives are suggested, including providing farmers with micro-credit that is subsidized and increasing tariffs on imported food. The problems of agriculture in Nigeria are also caused by a lack of investment. The government budget for agriculture is not enough to meet the challenges. International aid groups have supplemented the funding of the government, but most of the funds don’t reach the local farmer.

A major constraint in agricultural communication is lack of relevant materials in agricultural offices and libraries. Most farmers pointed out that when they bother to visit the above mentioned places, they left disappointed because of lack of relevant and out of date materials which cluster the shelves of these offices. These farmers also assert that where they got information i.e. workshop and seminars attended, the cost is a major constraint. Another constraint was in the format and language of presentation of information they consider relevant to them. The combination of these constraints above, conspire to impede access to agricultural information in fish farming (Ugboma, 2009).

Fadama III partners with research organizations, for example the International Institute for Tropical Agriculture (IITA), in order to give farmers the best starter stocks. In some Niger Delta communities, improved animal breeds and cultivars introduced by extension workers are often rejected because of the performance of the existing local stock. Some cassava farmers rejected TMS 30555, improved cassava cultivar because of its poor performance in yield when compared to Ogbeku, a local cultivar. “Ogbeku as a local cultivar has high starch and gari content with good taste and has tubers that stay longer in the soil without getting rotten” (Agbamu and Esegbue, 2007). This setback has reduced the propagation of such cultivars by farmers.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 The Study Area

The study was conducted in Niger Delta. This area comprises the nine states of Akwa Ibom, Bayelsa, Cross River, Delta, Akwa Ibom, Rivers, Ondo, Imo and Abia States. The Niger Delta Area covers about 70,000 square kilometers and makes up 7.5% of Nigeria's land mass, with sandy coastal ridge barriers, brackish or saline mangroves, permanent and seasonal swamp forests as well as low land rain forest with the entire area trace-crossed by a large number of rivers rivulets, streams, canals and creeks (NNPC, 2005). Bayelsa and Delta States are at the centre of the Niger Delta Region. Akwa Ibom State land occurs in the drier landward parts of the Niger Delta where crop farming assumes considerable importance. In contrast, the seaward parts of the Niger Delta, which are inhabited by Delta and Bayelsa States are characterized by uplands, lowlands, extensive creeks and volumes of sea water. As with most parts of Nigeria, agriculture is the dominant aspect of the rural economy. About 70% of the population is engaged in farming.

The map of Niger Delta State is shown in Figure 3.1. Akwa Ibom, Bayelsa and Delta States lie within the equatorial hot/wet climatic belt except for the Northern part of these states

where the derived savanna climate is experienced. The rainfall is high; the mean annual rainfall varies from 2600mm in the coastal area of these three states to nearly 1200mm in their northern extremes. During the raining season, the mean monthly temperature ranges from 18^0C to 35^0C and during the dry season it ranges from 30^0C to 35^0C. The climate experienced in these three states is favourable to agriculture, which is the dominant occupation of people of Akwa Ibom, Bayelsa and Delta States. The high rainfall is favourable for the cultivation of tree crops like cocoa, oil palm, kola nut and rubber. Other crops grown include cocoyam, yam, cassava, plantain/banana and pineapple. Livestock that is mostly favourable is poultry while aquaculture and artisanal fisheries activities are also prevalent in the coastal areas of these three Niger Delta States. Three states of the Niger Delta comprised the study area:Akwa Ibom, Delta and Bayelsa States.

3.2 Brief Geographical Description of Akwa Ibom State

Akwa Ibom is a statein Nigeria named after the Qua Iboe River. It is located in the coastal South-Southern part of the country, lying between latitudes 4°321 and 5°331 North, and longitudes 7°251 and 8°251 East. The State is bordered on the east by Cross River State, on the west by Rivers State and Abia State, and on the South by the Atlantic Ocean and the southernmost tip of Cross River State. Akwa Ibom is one of Nigeria's 36 states with a population of over 5 million people and more than 10 million people in diaspora. It was created in 1987 from the former Cross River State and is currently the highest oil and gas producing state in the country. The state's capital is Uyo with over 500,000 inhabitants. Akwa Ibom has an airport (Akwa Ibom International Airport) and two major sea ports on the Atlantic Ocean with a proposed construction of a world class seaport Ibaka Seaport at Oron. Along with English, the main spoken languages are Ibibio, Annang, Eket, Igbo and Oron languages. The map of Bayelsa

State is shown in Figure 3.2. The state has 6 agricultural zones. Each Senatorial District is having 2 agricultural zones Viz: Akwa Ibom North East: Etinan and Uyo; Akwa Ibom South: Eket and Oron, Akwa Ibom North West: Abak, and Ikot Ekpene. Fadama III has over 1,920 Fadama User Groups and 120 Fadama Community Associations in the State. (SFCO, 2012).

3.3 Brief Geographical Description of Bayelsa State

Bayelsa State was created in 1996 from part of Rivers State. It is a state in Southern Nigeriain the core Niger Delta area lying between Delta and Rivers States.Its capital is Yenagoa metropolis. It is bounded in the South-West by Delta State/River Focardos and in the South-East by River State. Bayelsa State consists of 8 Local Government Areas: Brass, Ekeremor, Kolokuma/Opokuma, Nembe, Ogbia, Sagbama, Southern Ijaw, Yenagoa. Bayelsa State Its capital is Yenagoa. The state land area is10,773 km², ranked 27th out of the 36 states. The map of Bayelsa State is shown in Figure 3.3 According to the National Population Commission (2006), Bayelsa State has a population 2,048,308 ranked 35th out of the 36 states. The Global Position System (GPS) coordinates are between4°45′N 6°05′E and 4.75°N 6.083°E(C-GIDD,2008). Bayelsa State has one of the largest crude oil and natural gas deposits in Nigeria. As a result, petroleum production is extensive in the state .The local population engage in agriculture and fishing on a subsistence and commercial level. The eight LGAs are participants of Fadama 111 consisting of agricultural enterprise amounting to 96 FCAs and 1,156 FUGs.Bayelsa State government has contributed to the counterpart security for farmers in the State.

3.4 Brief Geographical Description of Delta State

Delta State was created on August 27, 1991 out of the defunct Bendel State. Delta State is in the south-south of Nigeria. Its capital is Asaba metropolis. It is bounded in the North by Edo State and South-East by Anambra State/ River Niger and in the South-West by Bayelsa State. Delta State consists of 25 Local Government Areas: Bomadi, Burutu, Isoko South, Isoko North, Warri North, Warri South, Warri South West and Patani, Ughelli South, Ughelli North, Ethiope East, Ethiope West, Sapele, Uvwie, Udu, Okpe, Ukwuani, Ndokwa West, Ndokwa East, Aniocha South, Aniocha North, Ika North East, Ika South, Oshimili South, and Oshimili. The Global Position System (GPS) 6.5; 6 coordinates are between5°30′N 6°00′E and5°30′N 6°00′E. The land area is 17,698 km^2 (6,833 sq.m), area rank 23rd out of 36 states. According to the National Population Commission (2006), Delta State has a population of 4,098,291 ranks9th out of 36 states. Population Density is 150/km^2 (380/sq. m) (C-GIDD, 2008). The map of Delta State is shown in Figure 3.4. It is situated on the south-south geopolitical zone of the country. The State is endowed with abundant human and natural resources. The natural resources include crude oil, gas, fertile soils, abundant waters/rivers for fishery and navigational purposes. The State is often referred to as 'mini Nigeria' because of the diverse ethnic groups cum cultural heritage. The State has three senatorial districts namely Delta south, Delta central and Delta north. It has a total of twenty five (25) Local Governments Areas. There are 20 participating LGAs by the State Fadama III Project which constituted the partial focus of the study. They are Warri North, Warri South West, Patani, Isoko North, Isoko South, Ughelli South, Ughelli North, Ethiope West, Ethiope East, Uvwie, Okpe, Aniocha South, Aniocha North, Ukwuani, Ika North East, Ika South, Oshimili North, Oshimili South, Ndokwa West and Ndokwa East.The twenty LGAs participating in Fadama III consisting of agricultural enterprises amounting to 124 FCAs and 1,585 FUGs.

Delta State government has contributed to the counterpart security for farmers in the State (SFCO, 2012 and MANR, 2012).

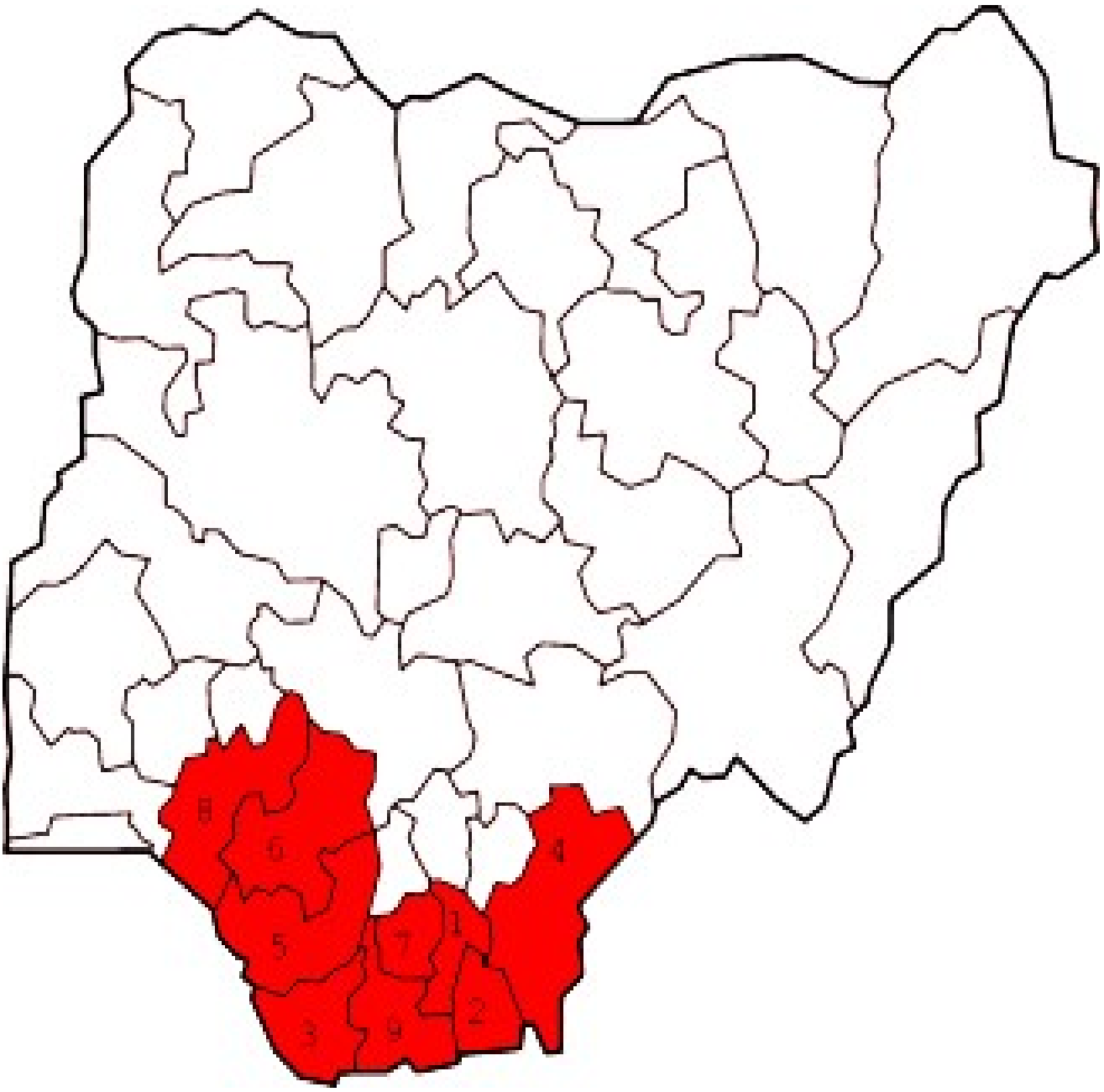


Figure 3.1: Map of Nigeria showing the Niger Delta States.
Numerically showing states typically considered part of the Niger Delta Area:
1. Abia, 2. Akwa Ibom, 3. Bayelsa, 4. Cross River, 5. Delta, 6. Edo, 7. Imo, 8. Ondo, 9. Rivers

Source: *Federal Republic of Nigeria (2013).*

Figure 3.2: Map of Akwa Ibom State showing LGAs.
Source: *Federal Republic of Nigeria (2013).*

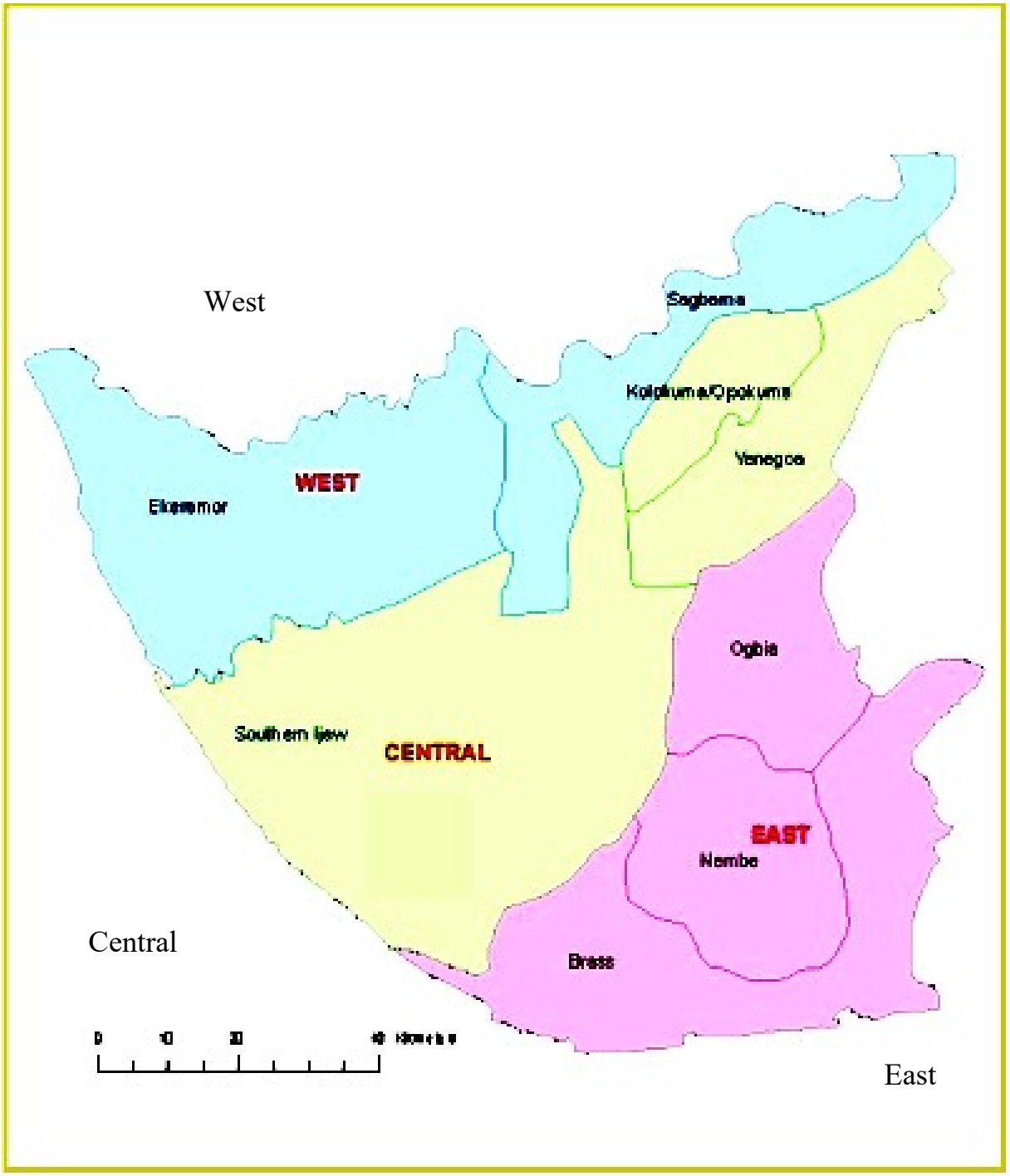


Figure 3.3: Map of Bayelsa State showing LGAs.
Source: *Federal Republic of Nigeria (2013).*

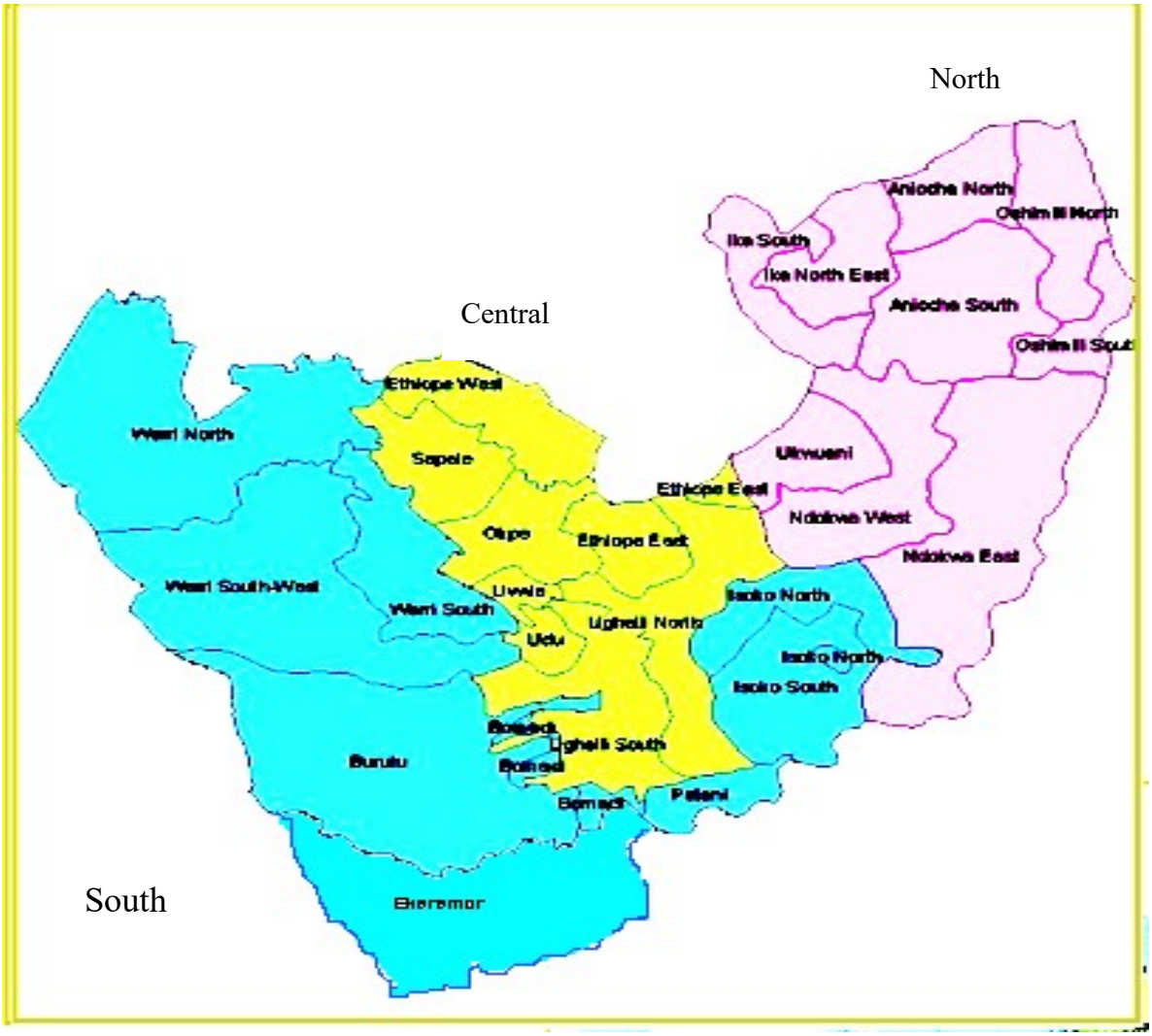


Figure 3.4: Map of Delta State showing LGAs [and partial Bayelsa State Western boundary (Ekeremor LGA).

Source: *Federal Republic of Nigeria (2013).*

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3.5 Sampling Techniques and Sample Size

3.5.1 Selection of States

Three States were randomly selected out of the nine States in the Niger Delta Area. The population of the study comprised all Fadama III farmers involved in cassava, poultry and fisheries production in Akwa Ibom, Bayelsa and Delta States of Nigeria. The lists of cassava, poultry and fisheries FCAs and FUGs were obtained from the State Fadama Coordinating Offices (SFCOs) and the ADP offices of the three states. Akwa Ibom, Delta and Bayelsa StatesAgricultural Zones/ Local Government Areas are shown in Table 3.1.

Table 3.1: **Distribution of Agricultural Zones and Local Government Areas in the three States of the Niger Delta**

S/N	States	Agricultural Zones/ Local Government Areas
1	**Akwa Ibom**	*Akwa Ibom North East*: Etinan, Ibesikpo Asutan, Ibiono Ibom, Itu, Nsit Atai, Nsit Ibom, Nsit Ubium, Uruan and Uyo. *Akwa Ibom South*: Eastern Obolo, Eket, Esit Eket, Ibone, Ikot Abasi, Mkpa Enin, Okobo, Onna, Udung Uko, Oron and Urue Offiong / Oruko. *Akwa Ibom North West*: Abak, Essien Udim, Etim Ekpo, Ikot Ekpene, Ika, Ikono, Ini, Obot Akara, Oruk Anam and Ukanafun.
2	**Bayelsa**	*Bayelsa West*: Ekeremor and Sagbama. *Bayelsa Central*: Southern Ijaw, Yenagoa and Kolokuma/Opokuma. *Bayelsa East*: Brass, Nembe and Ogbia LGAs.
3	**Delta**	*Delta South*: Bomadi, Burutu, Isoko South, Isoko North, Warri North, Warri South, Warri South West and Patani. *Delta Central*: Ughelli South, Ughelli North, Ethiope East, Ethiope West, Sapele, Uvwie, Udu, and Okpe. *Delta North* : Ukwuani, Ndokwa West, Ndokwa East, Aniocha South, Aniocha North, Ika North East, Ika South, Oshimili South, and Oshimili North.

Source: *Akwa Ibom, Bayelsa and Delta ADP Offices (2013)*

3.5.2 Selection of Local Government Areas

Stratified and Simple Random Techniqueswere used in selecting the Local Government Areas, Fadama Users' Groups (FUGs) and farmers for the study. In stage 1, the three agricultural

zones each were involved from Akwa Ibom, Bayelsa and Delta States. The agricultural zones in Akwa Ibom State are Akwa Ibom North East, Akwa Ibom South and Akwa Ibom North West while those of Delta State are Delta North, Delta Central and Delta South, and Bayelsa State are Bayelsa West, Bayelsa Central and Bayelsa East.

In stage 2, two Local Government Areas from each of these zones were randomly selected to reflect the various cassava, poultry and fisheries FUGs in the area (as shown in Table 3.2). Thus, the proportion becomes 6 LGAs per State which constituted a sample size of 18 LGAs for the study. The following Local Government Areas were selected from each of the three agricultural zones of the three States respectively:

Akwa Ibom: Etinan, Uyo, Eket, Oron,Abak and Ikot Ekpene,

Bayelsa: Sagbama, Ekeremor,Yenagoa, Kolokuma/Opokuma, Nembe and Ogbia.

Delta: Patani, Isoko North, Ughelli North, Sapele, Ukwuani and Ndokwa East

Table 3.2: **Selectionof States, Zones,LGAs and Selected Enterprises**

S/N	State	Zone	LGAs	Selected Enterprises
1	Akwa Ibom	North East	Etinan, Uyo	Cassava, Poultry, Fisheries
		South	Eket, Onna	Cassava, Poultry, Fisheries
		North East	Abak, Ikot	Cassava, Poultry, Fisheries

2	Bayelsa	West	Ekpene Sagbama, Ekeremor	Cassava, Poultry,	Fisheries
		Central	Yenagoa Kolokuma/ Opokuma,	Cassava, Poultry,	Fisheries
		East	Ogbia, Nembe	Cassava, Poultry,	Fisheries
3	Delta	North	Ukwuani Ndokwa East,	Cassava, Poultry,	Fisheries
		Central	Ughelli North Ughelli South	Cassava, Poultry,	Fisheries
		South	Patani, Isoko North,	Cassava, Poultry,	Fisheries

Source: *Field Survey (2013)*

3.5.3 Selection of Farmers

Fadama farmers were randomly selected using Simple Random Techniques based on the numbers from the list of FCAs/FUGs at State Fadama Coordinating Office (SFCO) in the 18 LGAs. A random sampling size of 2 cassava, 1 poultry and 1 aquaculture FUGs per LGA (i.e. 4 FUGs/LGA were selected corresponding to 72 farmers' group, FUGs). The total number of the selected 72 FUGs comprises of 36 cassava users groups, 18 poultry users groups, and 18 aquaculture users groups. Five farmers were selected per FUG. Thus, five farmers multiplied by each selected FUG summing up to 10 cassava, 5 poultry and 5 fisheries farmers respectively; amounting to 20 farmers per LGA. Eventually, the study sample size of 18 LGAs constitute 18 by 20 equals 360 farmers (or 5 selected farmers multiplied by 72 FUGs corresponds to 360 farmers sample size as shown in Table 3.3). Based on this statistical stratification, the grand sample size became 360 Fadama farmers. The sampling technique towards achieving a sample size in the study area is similar to a research work on cooperatives activities by Alufohai and Okorosobo (2011).

Table 3.3: Distribution of Sample Size by Stage of Sampling

S/N	State Stage 1	LGAs Stage 2	FUGs Stage 3	5 Farmers/ Group	Total

A	Akwa Ibom	6	12C 6P 6F	60C 30P 30F	120
B	Bayelsa	6	12C 6P 6F	60C 30P 30F	120
C	Delta	6	12C 6P 6F	60C 30P 30F	120
Grand Total	3	18	72	360	360 respondents

Note: C = Cassava; P= Poultry; F= Fisheries enterprises

3.6 Method of Data Collection

The objectives of the study guided the development of questionnaire schedule which was the main test instrument used for primary data collection. The use of questionnaire assisted the judgment of respondents' views on various Fadama III activities. The questionnaire comprised both open and closed ended questions. Secondary information was obtained from Fadama III offices in the various states.

3.6.1 Data Collection (Segments of Questionnaire)

The questionnaire consists of six sections: A – F.

Section A (Socio-economic Characteristics): This section was designed to elicit information from the respondents (Fadama III farmers) on socio-economic characteristics such as their age, gender, level of education, farming experience, farm size, farm Income and household size.

Section B (Adoption level of technologies in Fadama III): This section was intended to ascertain the level of technology utilization/ adoption by Fadama III beneficiaries. Data were collected from cassava, poultry and aquaculture farmers as follow:

Cassava Production Technologies: Minimum tillage (30cm – 40cm), ridges preparation (4m × 1m), beds preparation (3m × 1m) length of cassava cuttings (25cm – 30cm), planting

distance (1m × 1m), fertilizer application (NPK 15:15:15), stem storage techniques, cassava processing techniques and record keeping techniques.

Poultry (Broilers/Layers) Technologies: Intensive management system techniques, semi-intensive management system techniques, extensive management system techniques, housing construction techniques (east – west orientation) , brooding techniques, stocking density (5 – 8m^2), feed formulation techniques, processing techniques, and record keeping.

Fisheries Technologies (Aquaculture): Earthen ponds preparation, concrete ponds preparation, plastic ponds preparation, pond treatment techniques, water treatment techniques, breeding techniques, stocking techniques (4 – 6m^2), feed formulation techniques, maggot breeding techniques and integrated fish-farming techniques.

Section C (Perception of Fadama III activities): This section assessed current perception on Fadama III activities by the beneficiaries in Niger Delta Area. Data were collected based on the level of satisfaction of project implementation in agreement with Fadama III objectives over a given period of time.

Section D (Farmers' Performance): This section determined whether significant difference exists In performance before and during Fadama III intervention projects. Data were collected based on the project inputs, assets and outcomes. This helped to gauge poverty reduction level on given performance indicators.

Section E (Project Achievement Index): This section identified selected agricultural activities of Fadama III project, ascertain the targets on each activity and determine the actual achievement on each target. Thereafter, an Achievement Index was computed on each activity and that of the overall Achievement Index in each of the three States**.**

Section F (Fadama III Project Constraints): This section identified the constraints facing the Fadama III farmers in the Fadama III project implementation. This section was used to extract information from respondents using 25 statements which the farmer will respond to. Farmers will indicate their opinions on the constraints in terms of the level of seriousness of each constraint.

3.6.2 Measurement of Variables

The variables of the study range from socio-economic characteristics of respondents to constraints being faced by farmers in Fadama III agricultural projects.

(1) Socio- economic characteristics

The socio- economic characteristics are integrated in the followings:

Age: Chronological age was measured in years. The data generated were used statistically. Frequency count and percentages were used to generate the data.

Gender: Only male or female options were available. Frequency count and percentages were used to interpret the data produced

Educational Level: The options available wereNo Formal Education, Primary School, Secondary School, OND/NCE, HND/First Degree and Post Graduatecategories. Frequency counts and percentages were used to generate data on educational level.

Farming Experience: This was considered in number of years the respondent has spent in farming. Respondents were categorized into different classes. Frequency counts and percentages were involved in data computation.

Farm Size: This was calculated in hectares. Respondents were categorized into different classes based on their farm sizes. Frequency counts and percentages were employed to compute data.

Farm Income: This was calculated in Naira. This was obtained using Level of Income per annum of respondents. Fadama III Beneficiaries provided information on income level.

Household Size: This was the number of persons in a household. Frequency counts and percentages were employed to calculate data.

(2) Technology utilization/adoption

The adoption of agricultural techniques and recommendations by Fadama III beneficiaries was assessed using a dichotomous scale of 'yes' or 'no' to elicit information from respondents. In measuring the adoption level, the Sigma method was employed as used by Agbamu (2006). For instance, if 35% of farmers adopted mechanical tillage, the adoption score is calculated as follows: 100% - 35/2 = 82.5. Next, using the statistical table of normal deviate, 82 in the vertical row under column 5 gives 0.935. A constant, 2, is added to this result and multiplied by the same constant in order to increase the magnitude of the value from the table of normal deviates. In other words, the sigma score for the adoption of mechanical tillage is (0.935 +2)2 = 5.87. Since the sigma method of scoring assigns weights in a reverse relation on a 10 point scale, the actual mechanical tillage adoption score will be 10 - 5.87 which is 4.13. In this study, a score ranging from 5.5 – 10 will be considered as high level of adoption; 4.1 - 5.4 is medium level of adoption and 0.0 – 4.0 is low level of adoption.

(3) Perception of beneficiaries on Fadama III activities

Farmers' perception on Fadama III activities in relation to project objectives was measured using a rating scale. A Likert-type scale was used to measure farmers' perception of satisfaction. Various perceptual statements were associated with the following responses: Strongly Agree (4), Agree (3), Disagree (2) and Strongly Disagree (1). A mean cut off mark of 2.5 was used to determine level of satisfaction as employed by Allagenyi *etal* (2009). Mean score of 2.5 and above was considered as satisfactory while below 2.5 was considered as unsatisfactory. The perceptual statements and associated rating scale are shown in Table 3.4. The

perception scores was first disaggregated by agricultural enterprises (cassava, poultry and fisheries) before obtaining a pooled mean perception score as applied by Agbamu and Esegbue (2007). Again, this was done on the basis of sampled States (Bayelsa, Delta and Akwa Ibom) before obtaining pooled mean for perception score in respect of Niger Delta Area.

Table 3.4: Perception of Beneficiaries on Fadama III Activities for Delta State

S/N	Project's objectives /activities	Responses			
		Strongly agree (4)	Agree (3)	Disagree (2)	Strongly disagree (1)
1	The Fadama III Operation is gender inclusive.				
2	The Local Facilitators are of good commitment.				
3	The Service Providers are competent in their operations.				
4	Fadama III officers conducted good Training sessions.				
5	FUGs actively participated in project activities.				
6	Provision of variable and fixed Inputs in terms of quantity has been satisfactory.				
7	Provision of variable and fixed Inputs in terms of quality has been satisfactory.				
8	Local facilitators have been able to galvanize FUGs to ensure high utilization rate of farm inputs provided.				
9	Fadama III officers conducted quarterly M&E activities.				
10	Regular field days activities have been operational.				
11	Farmers' increased farm harvest over the 3 years has				

	been due to Fadama III assistance.
12	Farmers' incomes have over the last 4 years increased by about 40%.
13	There has been rapid response to farmers' problems by Fadama III officers.
14	The project witnessed slight improvements in living conditions by farmers because of participation.

Note: *In Bayelsa and Akwa Ibom States, these Perceptions of Beneficiaries on Fadama III Activities varied from State to State and they were reported in the findings.*

(4) The differences in performance before and during Fadama III intervention

The changes in performance indicators before and during Fadama III intervention were measured by obtaining values on a number of assets, farm inputs utilized, yield obtained and financial issues. These productive inputs/assets are identified as indicators and disaggregated on basis of specific enterprise groups. A numerical count was used to ascertain the quantity of household and farm assets and inputs, farm yield for cassava, fisheries and poultry, financial capital and land purchase in hectares. The difference in value between before and during Fadama III was then determined. A summary of the performance indicators are shown in Table 3.7.

(5) The Comparison of Targets with Achievements for Selected Project Activities

The data relating to physical achievement of Fadama III projects were compared with the set annual targets. The targets for various activities are shown inTable 3.5 and include the following:

a. *Capacity Building*:The number of FCAs and FUGs registered; FCAs and FUGs trained; LDPs prepared; FCAs and FUGs fully implemented subprojects prepared, and Monitoring visits to sub projects.

b. *Number of FUGs reached with Advisory Services/ Input Supporton*:crop based activities, livestock based, fisheries based, agro-processing based, storage based and marketing based.

c. *Number of productive assets acquisition for Individual FUGs:* crop based activities, livestock based, fisheries based, agro-processing based, marketing equipment, irrigation and drainage equipment, storage facilities, percentage increase in income and contribution into Fadama Users' Equity Fund (FUEF) in naira.

Table 3.5: Fadama III Facilitators/FUGs Annual Targets of Activities for Delta State

S/N	Activities	Project Targets Level per year (T) (2010-2013)	Project Achievements Level per year (A)	Project Performance Index (A/T X 100)
A	**Capacity Building number of:**			
1	FCAs registered	200		
2	FUGs registered	3000		
3	FCAs trained	200		
4	FUGs trained	3000		
5	LDPs prepared	200		
6	LDPs approved	200		
7	LGA Staff trained	80		
8	FCAs fully implemented subprojects prepared	200		
9	FUGs fully implemented subprojects prepared	3000		
10	Monitoring visits to sub projects	120		
B	**Number of FUGs reached with Advisory Services/ Input Support**			
1	Crop Based activities	3000		
2	Livestock based	3000		
3	Fisheries based	3000		
4	Agro-processing based	3000		
5	Storage	3000		
6	Marketing	3000		
C	**Number of productive assets acquisition for member FUGs**			
1	Crop Based activities	3000		
2	Livestock based	3000		
3	Fisheries based	3000		
4	Agro-processing based	3000		
5	Marketing equipment	3000		
6	Irrigation & drainage equipment	3000		
7	Storage facilities	3000		
8	Percentage increase in income	40%		
9	Contribution into Fadama Users' Equity Fund (FUEF) (₦)	11,250,000		

***Sources**: Akwa Ibom, Bayelsa and Delta States Fadama III Coordinators' Offices*

Note: *In Bayelsa and Akwa Ibom States, these project targets are same as Delta State, but project achievements varied from State to State and were reported in the findings. The average for the four years was used.* FUEF = Fadama Users' Equity Fund

(6) The Constraints facing Fadama III Project

The instrument designed measured a list of twenty five major factors as constraints. These were participants' interest, group registration mode, administrative cost, land acquisition problems, training needs provision, communication system, timely inputs supply, timely assets supply, adoption rate, local facilitators availability, service providers support, storage facilities provision, market outlets, transport provision, feeder roads situation, saving system, and ADP extension workers support. Respondents will be asked to specify any other constraint(s) not provided.

The Likert-type Scale was used to gauge each of the constraints; a score of 4 = very serious; 3 = serious; 2 = fairly serious; 1 = not serious. A mean score of 2.5 and above was regarded as important constraints, while mean score below that is 2.5 will be regarded unimportant constraints. This is similar to measurement of constraints by Akwiwu *et al* (2000).

3.6.3 Instrument Validation and Reliability

The instrument validation was subjected to face and content types of validity. This accounted for the degree of accuracy of the instrument items. The reliability test of the instrument was subjected to test retest type of reliability. This accounted for the degree of consistency of the instrument items. The test retest method was conducted by administering a specific number of questionnaires (n=60) on the same item and under the same conditions over a given period repeatedly (Odili and Ajua, 1995). The Pearson Product Moment Correlation coefficient (r) was used in calculating the relationship between the two variables represented by first and second administration of questionnaires.

The correlation formula used for test retest:

$$r = \frac{N\sum xy - (\sum x)(\sum y)}{\sqrt{\quad\quad}}$$

$$N\sum x^2 - (\sum x)^2] [N\sum y^2 - (\sum y)^2]$$

Where:

r = correlation coefficient,
x = first administration
y = second administration
N = sampled number of respondents
∑ = summation

3.6.4 Results on Test Retest Using Pearson Correlation

There was a positive and significant correlation between the two variables (X and Y), r = 0.719, $p = \leq .001$, n = 60 (Table 3.6).There is a high degree of relationship between the first administration of questionnaire (X) and the second administration of questionnaire (Y) after an interval of two weeks.

Table 3.6: Correlation Results on Questionnaire Administration

	Variables	X	Y
X	Pearson Correlation	1	0.719*
	Sig. (2-tailed)		0.000
	N	60	60
Y	Pearson Correlation	0.719*	1
	Sig. (2-tailed)	0.000	
	N	60	60

Note: Correlation is significant at $p \leq .001$

3.7 Method of Data Analysis

Data was analyzed using the Statistical Package for Social Sciences (SPSS). Both descriptive and inferential statistics were used for the analysis of the data generated. Descriptive statistics included frequency counts, means and percentages which will be used to realize the objectives including the socio-economic characteristics of respondents and to measure other variables of interest in the study. Inferential statistical tools were used in testing stated hypotheses:

Ho_1: Farmers' socio-economic characteristics do not significantly contribute to their perception on achievement of Fadama III activities. *Regression Analysis was used to test this hypothesis.*

Ho_2: There is no significant variation in the perception of the Fadama III agricultural projects beneficiaries about achievement of project objectives among the selected Niger Delta States. *Analysis of Variance (ANOVA) was used to test this hypothesis.*

Ho_3: There is no significant difference in performance between before and during Fadama III. *Wilcoxon Test was used to assess the impact of Fadama III.*

Ho_4: There is no significant variation in the constraints facing Fadama III project and farmers among the selected Niger Delta States. *Analysis of Variance (ANOVA) was used to test Hypothesis 4.*

The various statistical approaches for the research data analyses are stated below:

3.7.1 Mean Calculation

$$X = \frac{\sum f_i (A_i)}{n}$$

Where:

X = mean score
F_i = frequency or number of respondents that choose a particular option.
A_i = value assigned to a particular option
n = sample size
∑ = summation

3.7.2 Regression Analysis

Multiple regression was used to analyze hypothesis one;

Ho_1: Farmers' socio-economic characteristics do not significantly contribute to their perception on achievement of project's activities.

Linear, semi-log and double log forms of regression were used in the analysis. A lead equation was chosen to make conclusion based on (a) the relative magnitude of the R^2, (b) relative F_{cal} value of the models, (c) the function that showed more statistical significance.

Linear Regression equation

$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 \ldots + b_9 X_9 + e$

Where,

Y	=	Farmers' perception score.
b_0	=	A constant
b_1 to b_9	=	regression coefficient of nine variables.
X_1	=	Age of farmers.
X_2	=	Sex of farmers.
X_3	=	Level of education of farmers.
X_4	=	Farming experience.
X_5	=	Farm size.
X_6	=	Income level.
X_7	=	Household size.
X_8	=	Frequency of contact with local facilitators.
X_9	=	Frequency of contact with extension workers
e	=	random error.

Semi–log functional form of regression

$Y = \log b_o + b_1 \log X_1 + b_2 \log X_2 + b_3 \log X_3 \ldots + b_8 \log X_8 + e$

Double log functional form of regression

$\text{Log}Y = \log b_o + b_1 \log x1 + b_2 \log X_2 + b_3 \log X_3 \ldots .. + b_8 \log X_8 + e$

The multiple regression analysis will be engaged for this research.

3.7.3 Analysis of Variance (ANOVA)

ANOVA **was** used to test hypotheses two and four:

Ho_2: There is no significant variation in the perception of Fadama III agricultural projects beneficiaries on achievement of projects objectives among the selected Niger Delta States, and

Ho_4: There is no significant variation in the constraints facing Fadama III farmers among the Niger Delta States.

The Analysis of Variance (ANOVA) and LSD equations mathematically involve the following stages:

a. $\sum X^2_{ij}$ = summation of the square of the individual values
b. $\sum \sum X^2_{ij} - T^2/rk$ = Total Sum of Squares (TSS) (where r = number of rows and k = number of columns), T^2 = Square of the Grand Total
c. $\sum_k X^2$ = Sum of Square Column (SSC)
d. SSE = Sum of Square Error = TSS - SSC
e. MSC = Mean Square Column = SSC /df_{column} (where df = degree of freedom)
f. MSE = Mean Square Error = SSE /df_{error}
g. LSD = Least Significant Difference = $t_{\alpha/2}(df_{error}) \sqrt{2MSE}/r$ (where r = degree of freedom column, and α = interval level of the t-test).

3.7.4 Wilcoxon Test

Wilcoxon Test was used to deal with hypothesis three as Agbamu and Okagbare (2005) did.

Ho_3: There is no significant difference in performance between before and during Fadama III agricultural project.

This was analyzed using Wilcoxon Test as stated below and laid out in Table 3.7 on a hypothetical basis.

Thus, Wilcoxon Test is

$$Z = \frac{T - \frac{N(N+1)}{4}}{\sqrt{\frac{N(N+1)(2N+1)}{24}}}$$

Where T = Absolute sum of the negative ranks.

N = number of performance indicators

Table 3.7: Performance Indicators for before and during Execution of Fadama III Agricultural Project (Data were collected for each of the three States)

S/N		Performance Indicators	Before Fadama III (2004 to 2007)	During Fadama III (2010 to 2013)	Difference (d)	Rank of d	Absolute Sum of Negative Ranks (T)
A		**Household equipment purchased (item count)**					
	1	Number of houses					
	2	Number of ceiling or standing fans					
	3	Number of television sets					
	4	Number of computers					
	5	Number of telephones (mobile)					
B		**Mobility purchased (item count)**					
	6	Number of bicycles					
	7	Number of tricycles					

	8	Number of motorcycles
	9	Number of cars
	10	Number of engine boats
	11	Number of canoes
C		**Farm assets acquired (item count)**
	12	Number of wheel barrows
	13	Number of cutlasses
	14	Number of spades
	15	Number of axes
	16	Number of rakes
	17	Number of knapsack sprayers
	18	Number of head pans
	19	Number of pumping machines
D		**Farm inputs acquired**
	20	Total bags of fertilizer
	21	Total bags of feeds
	22	Total farm size (in hectare) per cassava/ poultry/fish farmer
E		**Farm yield**
	23	Total quantity of cassava tubers produced(kg)
	24	Total poultry herd (number) per poultry farmer
	25	Total fish population per fish farmer
F		**Financial Capital**
	26	Average income per annum (₦)
G		**Real Capital**
	27	Land purchased (in hectare)

Note: *In Bayelsa, Delta and Akwa Ibom States, these performance indicators varied from State to State and they were reported in the findings.*

Note: d = Positive or Negative value

3.7.5 Project Performance Index

The Performance Index as shown in Table 3.8 will be determined using the formula applied by Ogunbameru, Sabo and Gwary (2005)

$$PI = \frac{A}{T} \times 100$$

Where PI = Performance Index; A = Project Achievement and = Project Target

Table 3.8: Performance Index for Fadama III Activities in each State

S/N	Activities	Project Targets Level per year (T)(2010-2013)	Project Achievements Level per year (A)	Project Performance Index (A/T X 100)
A	**Capacity Building number of:**			
1	FCAs registered	200		
2	FUGs registered	3000		

3	FCAs trained	200
4	FUGs trained	3000
5	LDPs prepared	200
6	LDPs approved	200
7	LGA Staff trained	80
8	FCAs fully implemented subprojects prepared	200
9	FUGs fully implemented subprojects prepared	3000
10	Monitoring visits to sub projects	120
B	**Number of FUGs reached with Advisory Services/ Input Support**	
1	Crop Based activities	3000
2	Livestock based	3000
3	Fisheries based	3000
4	Agro-processing based	3000
5	Storage	3000
6	Marketing	3000
C	**Number of productive assets acquisition for member FUGs**	
1	Crop Based activities	3000
2	Livestock based	3000
3	Fisheries based	3000
4	Agro-processing based	3000
5	Marketing equipment	3000
6	Irrigation & drainage equipment	3000
7	Storage facilities	3000
8	Percentage increase in income	40%
9	Contribution into Fadama Users' Equity Fund (FUEF) (₦)	11,250,000

Source: *SFCOs: Akwa Ibom, Bayelsa and Delta States*

CHAPTER FOUR
RESULTS AND DISCUSSION

4.1 Socio-economic Characteristics of Project Beneficiaries

The socio-economic characteristics of the beneficiaries of Fadama III project were captured under the following sub-headings: age, gender, educational level, farming experience, farm size, farm income, household size, contact with local facilitator and contact with other extension agents (Table 4.1)

The results revealed that the average age of respondents in Akwa Ibom State was 51 years; 48 years Bayelsa State, and 55 years Delta State. The average age of respondents in the Niger Delta was 51.33 years. This result is similar to the findings of Ovwigho (2014) who found that the average age of Fadama III participants in Delta State was 50.6 years.

Respondents' disaggregation by gender showed that male respondents were 57% and female respondents were 43%. Ike (2012) and Ovharhe (2014) asserted that males participated more in Fadama III agricultural activities than females.

On educational level, it was found that 50.3% of the respondents in the Niger Delta had secondary education. All the respondents had formal education as shown in Table 4.1.

On farming experience,respondents from Akwa Ibom, Bayelsa and Delta States had averages of11, 15 and 16years respectively. The average years of experience on farming in the Niger Delta were 14years. Thisfinding is not in agreement with that of Ovwigho (2014) who found an average of 11years on farming experience.

Majority of respondents, 68.1% possessed farm sizes less than two hectares in the study area. Individual State analysis portrayed that all respondents in Aqua Ibom (63.3%) Bayelsa (86.7%) and Delta (54.2%) were found highest in usage of farm land between one and two hectares. Furthermore, the farm size means of the separate States, Aqua Ibom, Bayelsa and Delta respondents recorded 1.7, 1.1 and 2.0 hectares respectively. The Niger Delta Fadama III farmers had average farm sizes of 1.6 hectares. This correlated with the findings of Ike (2012), Ovharhe (2014) and Ovwigho (2014).

About one-third of respondents (30%) earned annual farm income of less than one hundred and twenty thousand naira in the study area. Individual State breakdown exposed that both Aqua Ibom and Delta respondents (68.3%) ranked highest in farm income between one hundred and twenty thousand naira (₦120,000.00) and two hundred and eleven thousand naira (₦211,000.00), while Bayelsa respondents (43.3%) ranked highest in farm income of less than one hundred and twenty thousand naira (₦120,000.00). An outlook of respondents' farm income means on state yardstick signified that Akwa Ibom respondents' mean income was ₦173,108.00;

Bayelsa had ₦137,225.00,and Delta had ₦192,342.00. Ike (2012) and Faden and Nweze (2012) found that annual income by Fadama III household beneficiaries ranged between ₦151,000.00 and ₦200,000.00 annually in Delta State. This finding is in tandem with this study's annual farm income mean of ₦167,558.00.

This study also found that 48% of the respondents possessed between five and eight persons per household. This is comparable to the findings of Faden and Nweze (2012). The household size on the average per state is 6 persons per household.

The researched clarified the fact that respondents' contacts with Fadama local facilitators across the selected Niger Delta States were highest with monthly outreach (48%). On state platform, both Aqua Ibom (55%).and Bayelsa respondents (59.2%) had highest quarterly contacts with the Fadama local facilitators followed by Delta respondents (57.5%) which recorded highest monthly contacts

Table 4.1: Socio-economic characteristics of respondents, n = 360

S/№	Parameters	Akwa Ibom Freq. (%)	Bayelsa Freq. (%)	Delta Freq. (%)	Total	Pooled Mean
1	**Age (Yrs)**					
	26 – 35	2 (1.6)	9 (7.5)	0 (0)	11 (3.06)	
	36 – 45	27 (22.5)	40 (33.3)	23 (19.2)	90 (25.0)	
	46 – 55	62 (51.7)	40 (33.3)	36 (30.0)	138 (38.3)	
	56 – 65	23 (19.2)	24 (20.0)	39 (32.5)	86 (23.9)	
	66 – 75	6 (5.0)	7 (5.8)	22 (18.3)	35 (9.72)	
	Mean Age	**51**	**48**	**55**	**360 (100)**	**51.33 years**
2	**Sex**					
	Male	72 (60.0)	69 (57.0)	65 (54.0)	206 (57.0)	
	Female	48 (40.0)	51 (43.0)	55 (46.0)	154 (43.0)	
					360 (100)	
3	**Educational Level**					
	No Formal Educ.	0	0	0	0	
	PrimaryEduc.	14 (12.0)	16(13.0)	1(0.8)	31 (8.7)	
	Secondary Educ.	76(63.0)	56(47.0)	49(40.8)	181 (50.3)	
	OND/NCE	30(25.0)	44(37.0)	51(42.5)	125 (35.0)	
	HND/First Degree	0	4(3.0)	18(15.0)	22 (6.0)	
	Higher Degree	0	0	1(0.8)	1 (0.3)	
					360 (100)	

4	**Farming Experience (Yrs)**					
	1 – 5	23 (19.1)	7 (5.8)	7 (5.8)	37 (10.0)	
	6 –10	54 (45.1)	41 (34.2)	37 (30.9)	132 (37.0)	
	11 –15	24 (20.0)	11 (9.2)	21 (17.5)	56 (16.0)	
	16 –20	9 (7.4)	24 (19.9)	8 (6.6)	41 (11.0)	
	21 –25	10 (8.4)	37 (30.7)	47 (39.1)	94 (26.0)	
	Mean	**11**	**15**	**16**	**360 (100)**	**14years**
5	**Farm Size (Ha)**					
	0.1 – 2.0	76 (63.3)	104 (86.7)	65 (54.2)	245 (68.1)	
	2.1 – 4.0	31 (25.8)	16 (13.0)	45 (37.5)	92 (25.6)	
	4.1 – 6.0	13 (11.0)	0	10 (8.3)	23 (6.3)	
	Mean	**1.7**	**1.1**	**2.0**	**360 (100)**	**1.6ha**
6	**Farm Income per annum (₦)**					
	30,000 – 120,000	12 (10.0)	52 (43.3)	44 (36.7)	108 (30.0)	
	121,000 – 211,000	82 (68.3)	27 (22.5)	45 (37.5)	154 (42.7)	
	212,000 – 302,000	26 (21.7)	41 (34.2)	31 (25.8)	98 (27.2)	
	Mean	**₦173,108.00**	**₦137,225.00**	**₦192,342.00**	**360 (100)**	**₦167,558**

Table 4.1: Socio-economic characteristics of respondents (contd.)

S/№	Parameters	Akwa Ibom Freq. (%)	Bayelsa Freq. (%)	Delta Freq. (%)	Total	Pooled Mean
7	**Household Size (№s of persons)**					
	1 – 4	60 (50.0)	58 (48.3)	21(17.5)	139 (39.0)	
	5 – 8	48 (40.0)	43 (35.9)	81 (67.5)	172 (48.0)	
	9 – 11	12 (10.0)	17 (14.2)	18 (15.0)	47 (13.0)	
	11 – 14	0 (0)	2 (1.6)	0 (0)	2 (1.0)	
	Mean	**6**	**6**	**7**	**360 (100)**	**6 persons**
8	**Contact with Local Facilitators**					
	Weekly	0 (0)	0 (0)	0 (0)	0 (0)	
	Fortnightly	0 (0)	0 (0)	18 (15.0)	18 (5.0)	
	Monthly	49 (40.8)	54 (45.0)	69 (57.5)	172 (48.0)	
	Quarterly	71 (59.2)	66 (55.0)	33 (27.5)	170 (47.0)	
	Yearly	0 (0)	0 (0)	0 (0)	0 (0)	
	Bi-annually	0 (0)	0 (0)	0 (0)	0 (0)	
					360 (100)	
9	**Contact with other Extension Workers**					
	Weekly	0 (0)	0 (0)	0 (0)	0 (0)	
	Fortnightly	0 (0)	0 (0)	0 (0)	0 (0)	

Monthly	0 (0)	0 (0)	0 (0)	0 (0)
Quarterly	0 (0)	0 (0)	4 (3.3)	4 (1.1)
Bi-annually	65 (54.0)	78 (65.0)	63 (52.5)	206 (57.0)
Yearly	55 (46.0)	42 (35.0)	53 (44.2)	150 (41.9)
				360 (100)

***Note**: Figures in parentheses imply percentages. Abbreviations: Freq. = frequency, % = percentage, Educ. = education.*

Furthermore, Table 4.1 shows respondents' contacts with other extension agents across the selected Niger Delta States were of poor rating at 41.9% of yearly contact. Aphunu and Ajayi (2013) reported similar findings. As regards the States comparison, Akwa Ibom recorded 36% yearly contact, Bayelsa (35%) and Delta (44.2%)

4.2 Level of Adoption of Agricultural Technologies by Project Beneficiaries

The adoption rates of agricultural techniques and selected production recommendations by Fadama III beneficiaries were assessed using dichotomous scale of yes or no responses. The responses from respondents were initially calculated in percentages and finally transposed to adoption scores using the Sigma method (Agbamu, 2006). It should be noted that in the methodology, it has been earlier stated that scores which range from *5.5 – 10* are categorized as high adoption level; *4.1 - 5.4* is medium adoption level and *0.0 – 4.0* is low adoption level.

4.2.1 Adoption Level of Cassava-based Technologies by Project Beneficiaries

Cassava beneficiaries were given options to respond to adoption of the below-listed agricultural techniques or selected production recommendations communicated by Fadama III extension activities (Table 4.2). In all the agronomic practices, Akwa Ibom cassava farmers

(80%) and Delta State cassava farmers (98.3%) recorded highest adoption levels in use of standard cassava cuttings. Cassava farmers (16.7%) in Akwa Ibom recorded lowest adoption level in tuber storage techniques, while those in Delta States (8.3%) recorded lowest adoption level in heaps preparation. In BayelsaState,cassava farmers (80%) exhibited highest adoption level in minimum tillage, while 13.3% of the farmers recorded lowest adoption level in tuber storage techniques.

4.2.2 Fadama III poultry farmers' adoption means in selected Niger Delta States

The findings in Table 4.3 revealed that majority of Fadama III poultry farmers across the Niger Delta Area adopted recommended poultry-based technologies at medium levels. The most notable of the poultry based practices that have medium level of adoption were intensive management system techniques (5.29), record keeping (5.29), provision of medication (5.17), mixed farming (4.54) and feed formulation (4.31).

4.2.3 Fadama III aquaculture farmers' adoption means in selected Niger Delta States

Results in Table 4.4 showed that Fadama III farmers had high adoption levels of aquaculture practices as in earthen ponds preparation (78.9%) with adoption score of 5.46. Some technologies with medium adoption levels were processing techniques (5.30), record keeping (5.12) and water treatment techniques (4.40). Technologies with low adoption levels were maggot breeding techniques (3.48) and stocking techniques (3.13) Adoption is higher for farmers belonging to farmers' groups. (Adesope, Matthews-Njoku, Oguzor and Ugwuja, 2000)

Table 4.2: Respondents adoption level of cassava-based technologies in the Niger Delta States using Sigma Method of adoption scores, n=180

S/№	Cassava-based recommendation	Akwa Ibom (n=60)		Bayelsa (n=60)		Delta (n=60)		Total no. of adopters & its %	Pooled Adoption Score (n=180)	Adoption Level
		No. & % of adopters	Adoption Score	No. & % of adopters	Adoption Score	No. & % of adopters	Adoption Score			
1	Stem cuttings (25 – 30)cm	48 (80.0)	5.49	46 (76.7)	5.4	59 (98.3)	5.95	153 (85.0)	5.61	High
2	Minimum tillage (30 – 40)cm	41 (68.3)	5.18	48 (80.0)	5.49	55 (91.7)	5.95	144 (80.0)	5.54	High
3	Planting distance (1 by 1)m	47 (78.3)	5.75	46 (76.7)	5.40	41 (68.3)	5.40	134 (74.4)	5.52	High
4	Mulching	55 (91.7)	5.70	37 (61.7)	5.00	48 (80.0)	5.49	140 (77.8)	5.40	Medium
5	Record keeping	42 (80.0)	5.49	40 (66.7)	5.14	50 (83.3)	5.58	132 (76.7)	5.40	Medium
6	Fertilizer application techniques (NPK 15:15:15)	41 (86.3)	5.65	38 (63.3)	5.04	42 (70.0)	5.23	121 (67.2)	5.31	Medium
7	Mixed cropping techniques	24 (40.0)	4.32	22 (36.7)	4.19	46 (76.7)	5.40	92 (51.1)	4.64	Medium
8	Mixed farming techniques	24 (40.0)	4.32	19 (31.7)	4.14	37 (61.7)	5.00	80 (44.4)	4.49	Medium
9	Compost manure preparation	22 (36.7)	4.19	12 (20.0)	3.44	14 (23.3)	3.61	48 (26.7)	3.75	Low
10	Stem storage techniques (Tree shed method)	14 (23.3)	3.61	12 (20.0)	3.44	12 (20.0)	3.44	38 (21.1)	3.50	Low
11	Heaps preparation (50 – 70)cm	19 (31.7)	4.14	12 (20.0)	3.44	5 (8.3)	2.52	36 (20.0)	3.37	Low
12	Tuber storage techniques	10 (16.7)	3.23	8 (13.3)	2.99	13 (21.7)	3.53	31 (17.2)	3.25	Low
	Pooled means		**4.76**		**4.43**		**4.76**			
				Overall Adoption Level					**4.65**	

***Note*:** *Figures in parentheses imply percentages, Adoption scores were obtained by Sigma Method*

Table 4.3: Respondents adoption level of poultry-based technologies in the Niger Delta States using Sigma Method of adoption scores, n=90

S/№	Poultry-based recommendations	Akwa Ibom (n=30)		Bayelsa (n=30)		Delta (n=30)		Total no. of adopters & its %	Pooled Adoption Score (n=90)	Adoption Level
		No. & % of adopters	Adoption Score	No. & % of adopters	Adoption Score	No. & % of adopters	Adoption Score			
1	Intensive management techniques	21 (70.0)	5.23	20 (66.7)	5.14	24 (80.0)	5.49	65 (72.2)	5.29	Medium
2	Record keeping	22 (73.3)	5.32	20 (66.7)	5.14	23 (76.7)	5.40	65(72.2)	5.29	Medium
3	Medication provision	21 (70.0)	5.23	18 (60.0)	4.95	22(73.3)	5.32	61 (67.8)	5.17	Medium
4	Mixed farming	19 (63.3)	5.04	9 (30.0)	3.93	15 (50.0)	4.65	43 (47.8)	4.54	Medium
5	Feed formulation techniques (mash))	23 (76.7)	5.40	9 (30.0)	3.93	7 (23.3)	3.61	39 (43.3)	4.31	Medium
6	Carcass storage techniques	19 (63.3)	5.04	5 (16.7)	3.23	10 (33.3)	4.06	34 (37.8)	4.11	Medium
7	Stocking density (5 – 8 birds/m^2)	9 (30.0)	3.93	7 (23.3)	3.61	10 (33.3)	4.06	26 (28.9)	3.87	Low
8	Housing construction techniques (East – West orientation)	9 (30.0)	3.93	7 (23.3)	3.61	9 (30.0)	3.93	25 (27.8)	3.82	Low
9	Semi-Intensive management system techniques	9 (30.0)	3.93	10 (33.3)	4.06	6 (20.0)	3.44	25 (27.8)	3.81	Low
10	Brooding techniques	8 (26.7)	3.78	5 (16.7)	3.23	11 (36.7)	4.19	24 (26.7)	3.73	Low
	Pooled means		**4.68**		**4.08**		**4.42**			
					Overall Adoption Level				**4.39**	

***Note*:** *Figures in parentheses imply percentages, Adoption scores were obtained by Sigma Method*

Table 4.4: Respondents adoption level of aquaculture -based technologies in the Niger Delta States using Sigma Method of adoption scores, n=90

S/№	Aquaculture -based recommendation	Akwa Ibom (n=30)		Bayelsa (n=30)		Delta (n=30)		Total no. of adopters & its %	Pooled Adoption Score (n=180)	Adoption Level
		No. & % of adopters	Adoption Score	No. & % of adopters	Adoption Score	No. & % of adopters	Adoption Score			
1	Earthen ponds preparation	22 (73.3)	5.32	24 (80.0)	5.49	26 (88.3)	5.58	72 (78.9)	5.46	High
2	Processing techniques (smoking)	17 (53.3)	4.76	27 (90.0)	5.75	23 (76.7)	5.40	67 (71.1)	5.30	Medium
3	Record keeping	21 (70.0)	5.23	14 (46.7)	4.54	25 (83.3)	5.58	60 (68.9)	5.12	Medium
4	Storage techniques (tanks usage)	10 (33.3)	4.06	26 (83.3)	5.58	22 (73.3)	5.32	58 (63.3)	4.99	Medium
5	Integrated farming techniques	6(20.0)	3.44	17 (53.3)	4.76	24 (80.0)	5.49	47 (48.9)	4.56	Medium
6	Water treatment techniques	15 (50.0)	4.65	5 (16.7)	3.23	22 (73.3)	5.32	42 (46.7)	4.40	Medium
7	Pond treatment techniques	11 (36.7)	4.19	6 (20.0)	3.44	24 (80.0)	5.49	41 (45.6)	4.37	Medium
8	Harvesting techniques	5 (16.7)	3.23	9 (30.0)	3.93	20 (66.7)	5.14	34 (37.8)	4.10	Medium
9	Breeding techniques	5 (16.7)	3.23	8 (26.7)	3.78	8 (26.7)	3.78	21 (23.3)	3.60	Low
10	Feed formulation techniques (pellet)	9 (30.0)	3.93	6 (20.0)	3.44	5 (16.7)	3.23	20 (22.2)	3.50	Low
11	Concrete ponds preparation	8 (26.7)	3.78	6 (20.0)	3.44	5 (16.7)	3.23	19 (21.1)	3.48	Low
12	Maggot breeding techniques	8 (26.7)	3.78	5 (16.7)	3.23	6 (20.0)	3.44	19 (21.1)	3.48	Low
13	Stocking techniques ($4 – 6/m^2$)	3 (10.0)	2.71	5 (16.7)	3.23	6 (20.0)	3.44	14 (15.6)	3.13	Low
	Pooled means		**4.02**		**4.14**		**4.64**			
	Overall Adoption Level								**4.27**	

Note**:** *Figures in parentheses imply percentages, Adoption scores were obtained by Sigma Method*

4.2.4 Summary of Adoption Means for agricultural technologies in Niger Delta

The summary of means (Table 4.5) concerning the Fadama III recommended adopted agricultural practices in specific States indicated that Delta and Akwa Ibom States had the highest adoption mean score in cassava production (4.76). In poultry production, Akwa Ibom State had the highest in adoption mean score (4.68). In aquaculture, Delta State had the highest in adoption mean score (4.64). The overall adoption means of the various categories of farmers in the selected Niger Delta States revealed that cassava farmers exhibited the highest adoption level (4.65) followed by poultry farmers (4.39) and aquaculture farmers (4.27). The results on high adoption levels are similar to the findings of Ebewore, Emuh and Obiebi (2014) who found that cassava farmers exhibited highest adoption level on farming practices amongsmall scale farmers.

Table 4.5: Summary of adoption means concerning Fadama III agricultural practices among the selected Niger Delta States

Categories of farmers	Akwa Ibom	Bayelsa	Delta	Overall adoption means	Rank	Adoption Level
Cassava	4.76	4.43	4.76	4.65	1st	Medium
Poultry	4.68	4.08	4.42	4.39	2nd	Medium
Aquaculture	4.02	4.14	4.64	4.27	3rd	Medium

4.3 Beneficiaries' Perception on Fadama III activities

The Fadama III Project Document contains various agricultural activities which beneficiaries engaged in. During the field exercise, the Fadama III beneficiaries were allowed to express their views on the project activities based on the various options provided to guide the study. The outcomes of their responses from the various States in the Niger Delta are shown in Tables 4.6 – 4.9.

4.3.1 Beneficiaries' Perception on Fadama III activities (Akwa Ibom State)

The results shown in Table 4.6 revealed that beneficiaries' perception on Fadama III activities in Akwa Ibom State recorded slight improvement on living conditions had a perception mean score of 3.43 A perception mean scores of 3.42 was found on increased harvest over the last three years. The least perception mean score (1.66)was identified with regular field days activities which connoted a poor situation. This result agrees with the findings of Nlerum, 2010. He discovered a level of unsatisfactory status of extension workers' conduct of field days activities by the Green River Project in rural communities of the Niger Delta. The Akwa Ibom State Fadama III beneficiaries' perception on project activities recorded a pooled mean of 2.82 which indicates that beneficiaries of Fadama III project have a satisfactory perception.

4.3.2 Beneficiaries' Perception on Fadama III activities (Bayelsa State)

Results in Table 4.7 showed that showed that respondents found good training sessions by Fadama III officers as the activity they viewed most satisfactorily with a mean score perception of 3.38. The results also showed that farmers' incomes have over the last 3 years increased by about 40% with a mean value of 3.24, ranking the fifth position in the series of Fadama III project activities. On the whole, beneficiaries of Fadama III in Bayelsa State exhibited favourable perception towards the programme with pooled mean of 2.63

4.3.3 Beneficiaries' Perception on Fadama III activities (Delta State)

The results from the study as shown in Table 4.8 revealed that both male and female inclusion in Fadama III activities had a perception mean scores of 3.55 signifying that Fadama III operations are gender friendly. Conversely, among the least perception mean scores were the unsatisfactory provision of variable and fixed inputs in terms of quality ($\bar{x}$ =1.73) and poor observance of regular field days activities ($\bar{x}$= 1.63). The Delta State Fadama III beneficiaries' perception on project activities recorded a pooled mean of 2.70, which was above the earmarked point for assessment of the beneficiaries' perception scale designed for the study.

Table 4.6: Distribution of Beneficiaries' Perception on Fadama III Activities in Akwa Ibom State, n = 120

S/N	Project's objectives /activities	Responses: Strongly agree (4)	Agree (3)	Disagree (2)	Strongly disagree (1)	Total Score	Mean Score	Rank
1	The project witnessed slight improvements in living conditions by farmers because of participation.	52 (208)	68 (204)	0 (0)	0 (0)	412	3.43	1st
2	Fadama III officers conducted good training sessions.	56 (224)	58 (174)	6 (12)	0 (0)	410	3.42	2nd
3	Farmers' increased farm harvest over the last 3 years has been due to Fadama III assistance.	48 (192)	71 (213)	1 (2)	0 (0)	407	3.40	3rd
4	The Fadama III Operation is gender inclusive.	45 (180)	74 (222)	1(2)	0 (0)	404	3.37	4th
5	Farmers' incomes have over the last 3 years increased by about 40%.	39 (156)	80 (240)	1 (2)	0 (0)	398	3.32	5th
6	Provision of variable and fixed inputs in terms of quantity has been satisfactory.	60 (240)	29 (87)	26 (52)	5 (5)	384	3.19	6th
7	FUGs actively participated in project activities.	23 (92)	91(273)	6 (12)	0 (0)	377	3.14	7th
8	Provision of variable and fixed Inputs in terms of quality has been satisfactory.	50 (200)	25 (75)	33 (66)	12 (12)	353	2.94	8th
9	The Local Facilitators showed good commitment.	28 (112)	55 (165)	34 (68)	3 (3)	348	2.90	9th
10	Local facilitators have been able to galvanize FUGs to ensure high utilization rate of farm inputs provided.	30 (120)	33 (99)	42 (84)	15 (15)	318	2.65	10th
11	Fadama III officers conducted quarterly monitoring and evaluation activities	20 (80)	40 (120)	32 (64)	28 (28)	292	2.43	11th
12	The Service Providers are competent in their operations.	0 (0)	27 (81)	42 (84)	51 (51)	216	1.80	12th
13	There has been rapid response to farmers' problems by Fadama III officers.	0 (0)	11 (33)	72 (144)	37 (37)	214	1.78	13th
14	Regular field days activities have been operational.	0 (0)	0 (0)	79 (158)	41(41)	199	1.66	14th
	Pooled Mean						**2.82**	

***Note**: Figures in parentheses are scores from Likert-type scale. Mean cut-off point of 2.5 and above implies satisfactory, while a value below 2.5 implies unsatisfactory perception.*

Table 4.7: Distribution of Beneficiaries' Perception on Fadama III Activities in Bayelsa State, n = 120

S/N	Project's objectives /activities	Responses: Strongly agree (4)	Agree (3)	Disagree (2)	Strongly disagree (1)	Total	Mean	Rank
1	Fadama III officers conducted good training sessions.	46 (184)	74 (222)	0 (0)	0 (0)	406	3.38	1st
2	Farmers' increased farm harvest over the last 3 years has been due to Fadama III assistance.	41 (164)	79 (237)	0 (0)	0 (0)	401	3.34	2nd
3	The Fadama III Operation is gender inclusive.	41 (164)	78 (234)	0 (0)	1 (1)	399	3.33	3rd
4	FUGs actively participated in project activities.	34 (136)	86 (258)	0 (0)	0 (0)	394	3.28	4th
5	Farmers' incomes have over the last 3 years increased by about 40%.	30 (120)	89 (267)	1 (2)	0 (0)	389	3.24	5th
6	Local facilitators have been able to galvanize FUGs to ensure high utilization rate of farm inputs provided.	50 (200)	38 (114)	23 (46)	9 (9)	369	3.08	6th
7	The Local Facilitators showed good commitment.	30 (120)	55 (165)	35 (70)	0 (0)	355	2.96	7th
8	The project witnessed slight improvements in living conditions by farmers because of participation.	30 (120)	48 (144)	22 (44)	20 (20)	328	2.73	8th
9	There has been rapid response to farmers' problems by Fadama III officers.	15 (60)	17 (51)	78 (156)	10 (10)	277	2.31	9th
10	Fadama III officers conducted quarterly monitoring and evaluation activities.	10 (40)	40 (120)	43 (86)	27 (27)	273	2.28	10th
11	Provision of variable and fixed Inputs in terms of quantity has been satisfactory.	0 (0)	51 (153)	47 (94)	22 (22)	269	2.24	11th
12	The Service Providers are competent in their operations.	0 (0)	1 (3)	63 (126)	56 (56)	185	1.54	12th
13	Provision of variable and fixed Inputs in terms of quality has been satisfactory.	0 (0)	1(3)	63 (126)	56 (56)	185	1.54	12th
14	Regular field days activities have been operational.	0 (0)	0 (0)	62 (124)	58 (58)	182	1.52	14th
		Pooled Mean					**2.63**	

***Note**: Figures in parentheses are scores from Likert-type scale. Mean cut-off point of 2.5 and above implies satisfactory, while a value below 2.5 implies unsatisfactory perception.*

Table 4.8: Distribution of Beneficiaries' Perception on Fadama III

Activities in Delta State, n = 120

S/N	Project's objectives /activities	Responses: Strongly agree (4)	Agree (3)	Disagree (2)	Strongly disagree (1)	Total Score	Mean Score	Rank
1	The Fadama III Operation is gender inclusive.	65 (260)	55 (165)	0 (10)	0 (0)	425	**3.55**	**1st**
2	Farmers' incomes have over the last 3 years increased by about 40%.	59 (236)	49 (147)	12 (24)	0 (0)	407	**3.39**	**2nd**
3	The Local Facilitators showed good commitment.	60 (240)	44 (132)	16 (32)	0 (0)	404	**3.37**	**3rd**
4	Fadama III officers conducted good training sessions.	35 (140)	85 (255)	0 (0)	0 (0)	395	**3.29**	**4th**
5	FUGs actively participated in project activities.	20 (80)	88 (264)	12 (24)	0 (0)	368	**3.06**	**5th**
6	The project witnessed slight improvements in living conditions by farmers because of participation.	26 (104)	72 (216)	15 (30)	7 (7)	359	**2.99**	**6th**
7	Farmers' increased farm harvest over the last 3 years has been due to Fadama III assistance.	6 (24)	101 (303)	13 (26)	0 (0)	353	**2.94**	**7th**
8	Local facilitators have been able to galvanize FUGs to ensure high utilization rate of farm inputs provided.	30 (120)	41 (123)	44 (8)	5 (5)	336	**2.80**	**8th**
9	There has been rapid response to farmers' problems by Fadama III officers.	0 (0)	58 (174)	52 (104)	10 (10)	288	**2.40**	**9th**
10	Fadama III officers conducted quarterly monitoring and evaluation activities.	0 (0)	52 (156)	53 (106)	15 (15)	277	**2.31**	**10th**
11	Provision of variable and fixed Inputs in terms of quantity has been satisfactory.	0 (0)	44 (132)	62 (124)	14 (14)	270	**2.25**	**11th**
12	The Service Providers are competent in their operations.	0 (0)	31 (93)	61 (122)	2 8(28)	243	**2.03**	**12th**
13	Provision of variable and fixed Inputs in terms of quality has been satisfactory.	0 (0)	16 (48)	72 (144)	16 (16)	208	**1.73**	**13th**
14	Regular field days activities have been operational.	0 (0)	2 (6)	72 (144)	46 (46)	196	**1.63**	**14th**
	Pooled Mean						**2.70**	

***Note**: Figures in parentheses are scores from Likert-type scale. Mean cut-off point of 2.5 and above implies satisfactory, while a value below 2.5 implies unsatisfactory perception.*

4.3.4 Summary of Beneficiaries' Perception on Fadama III activities in Niger Delta States

Results in Table 4.9 pointed out that of the fourteen selected activities of Fadama III in Niger Delta, the farmers perceived three activities with highest satisfaction. They are gender

inclusiveness of the programme ($\bar{x}$ = 3.42), good commitment of facilitators ($\bar{x}$ = 3.36), and 40% increase in farmers' incomes over the last 3 years ($\bar{x}$ = 3.32) respectively. Among the lowest in the order of ranking were the incompetence noticed in service providers operations ($\bar{x}$ = 1.79) and poor regular field days activities by Fadama III officers ($\bar{x}$ = 1.6). The specific States attained the following perception pooled means successively: Akwa Ibom, 2.83; Delta, 2.68 and Bayelsa, 2.66. In general, the project evaluation on beneficiaries' perceptions on project objectives/activities achieved a grand mean of 2.72, which was satisfactory since it was above the earmarked point for assessment of the beneficiaries' perception scale designed for the study in the Niger Delta Area.These results obtained using the method of pooled means and categorization of means were deduced from a similar work by Agbamu and Esegbue (2007) on farmers' perception on improved and local cassava cultivars in Isoko North Local Government Area of Delta State, Nigeria. Ofuoku (2011) found that beneficiaries of water project executed by Micro Project Programme in Delta Central Agricultural Zone had similar level of satisfaction initially, but they could not sustain such water projects despite the fact that they participated meaningfully in the project.

Table 4.9: Beneficiaries' Perception on Fadama III activities using mean computation across the selected Niger Delta States, n = 360

S/N	Parameters	Akwa Ibom	Bayelsa	Delta	Total	Pooled mean	Rank	Remark
1	The Fadama III Operation is gender inclusive.	3.37	3.33	3.55	10.25	**3.42**	1st	Satisfactory

2	Fadama III officers conducted good training sessions.	3.42	3.38	3.29	10.09	**3.36**	2nd	Satisfactory
3	Farmers' incomes have over the last 3 years increased by about 40%.	3.32	3.24	3.39	9.95	**3.32**	3rd	Satisfactory
4	Farmers' increased farm harvest over the last 3 years has been due to Fadama III assistance.	3.40	3.34	2.94	9.68	**3.23**	4th	Satisfactory
5	FUGs actively participated in project activities.	3.14	3.28	3.06	9.48	**3.16**	5th	Satisfactory
6	The Local Facilitators showed good commitment.	2.90	2.96	3.37	9.23	**3.08**	6th	Satisfactory
7	The project witnessed slight improvements in living conditions by farmers because of participation.	3.43	2.73	2.99	9.15	**3.05**	7th	Satisfactory
8	Local facilitators have been able to galvanize FUGs to ensure high utilization rate of farm inputs provided.	2.65	3.08	2.80	8.53	**2.84**	8th	Satisfactory
9	Provision of variable and fixed Inputs in terms of quantity has been satisfactory.	3.19	2.24	2.25	7.68	**2.56**	9th	Satisfactory
10	Fadama III officers conducted quarterly monitoring and evaluation activities.	2.43	2.28	2.31	7.02	**2.34**	10th	Unsatisfactory
11	There has been rapid response to farmers' problems by Fadama III officers.	1.78	2.31	2.40	6.49	**2.16**	11th	Unsatisfactory
12	Provision of variable and fixed Inputs in terms of quality has been satisfactory.	2.94	1.54	1.73	6.21	**2.07**	12th	Unsatisfactory
13	The Service Providers are competent in their operations.	1.80	1.54	2.03	5.37	**1.79**	13th	Unsatisfactory
14	Regular field days activities have been operational.	1.66	1.52	1.63	4.81	**1.60**	14th	Unsatisfactory
	Pooled Mean for each State	**2.82**	**2.63**	**2.70**	**8.15**			
	Pooled Mean for Niger Delta					**2.72**		Satisfactory

***Note**: Cut off mean =2.5 (≥2.5 = satisfactory perception; <2.5= unsatisfactory perception)*

4.4 Fadama III Agricultural Project Performance

The Niger Delta Fadama III performance was assessed between before the project inception (2004 to 2007) and during the project occurrence (2010 to 2013). Duration of four years was used for the analytical comparison of the following possessions or assets used as performance indicators: household equipment purchased, mobility purchased, farm assetsacquired, farm inputs acquired, farm yield, financial capital and real capital possessions. In ascertaining whether significant difference existed in performance between before and during Fadama III agricultural project, the performance evaluation computation was done using the Wilcoxon Test (Z) as stated below:

$$T- \frac{N(N+1)}{}$$

$$Z = \frac{4}{\frac{\sqrt{N(N+1)(2N+1)}}{24}}$$

Where T = Absolute sum of the negative ranks.

N = number of performance indicators (27 items)

4.4.1 Performance between before and during Fadama III agricultural project in each State

The various performance indicators and computations of differences between before and during Fadama III agricultural project in three States are shown in Tables 4.10, 4.11 and 4.12. The differences (d) in indicators' performance between the two periods of before (2004 – 2007) and during (2010 – 2013) Fadama III were negative in value. This implies increase in the project performance. The parameters engaged were household equipment purchased, mobility items purchased, farm asset/inputs acquired, farm yield, financial and real capital. These increased upon the intervention of Fadama III project within the period under study. Furthermore, this good performance confirmedthe study of Ovwigho and Idoge (2006) on sustainability of the Fadama Farming System in Delta State that theindividual farmers made gains since the costs of fixed assets and inputs were not totally borne by them.

Results forAkwa Ibom Statein Table 4.10showed that the absolute sum of negative ranks, T = 338.5. The T value was substituted in the Wilcoxon formula to obtain a value for Z_{cal} = 4.51. The critical value for Z_{tab} at $p \leq 0.05$ is 1.65 thus rejecting the null hypothesis and conclude that significant difference exits in performance between before and during Fadama III implementation with better performance observed during Fadama III era. This result agrees with the findings of Agbamu and Okagbare (2005) that there were enough provision of motorcycles

and other farm utilities for agricultural extension work during the World Bank funding of Ogun State Agricultural Development Programme, hence better performance occurred during World Bank assistance era.

Results forBayelsa State in Table 4.11 showed that the absolute sum of negative ranks, T = 382.0. The Z_{cal} = 4.63, while Z_{tab} at $p \leq 0.05$is 1.65 thus rejecting the null hypothesis and conclude that significant difference exits in performance between before and during Fadama III implementation with better performance observed during Fadama III era.

Results forDelta State, in Table 4.12 showed that the absolute sum of negative ranks, T = 386.0. The Z_{cal} = 4.73, while Z_{tab} at $p \leq 0.05$ is 1.65 thus rejecting the null hypothesis and conclude that significant difference exits in performance between before and during Fadama III implementation with better performance observed during Fadama III in Delta State.

The project performance indicators in the Niger Delta between before and during Fadama III are shown on Table 4.24 (page 146) in respect of discussion on hypothesis number three (Ho_3)

Table 4.10: Analysis of Performance between before and during Fadama III Project in Akwa Ibom State

Performance Indicators			Before Fadama III (2004 to 2007)	During Fadama III (2010 to 2013)	Difference (d)	Rank of d	Absolute Sum of Negative Ranks (T)
A		**Household equipment purchased (item count)**					
	1	Number of houses	31	49	-18	-10.0	10.0
	2	Number of ceiling or standing fans	325	380	-55	-15.0	15.0
	3	Number of television sets	147	151	-4	-2.5	2.5
	4	Number of computers	0	3	-3	-1.0	1.0
	5	Number of telephones (mobile)	157	161	-4	-2.5	2.5
B		**Mobility items purchased (item count)**					
	6	Number of bicycles	0	12	-12	-5.5	5.5
	7	Number of tricycles	0	10	-10	-4.0	4.0
	8	Number of motorcycles	0	22	-22	-12	12
	9	Number of cars	10	12	-12	-5.5	5.5
	10	Number of engine boats	0	17	-17	-7.5	7.5
	11	Number of canoes	0	17	-17	-7.5	7.5
C		**Farm assets acquired (item count)**					
	12	Number of wheel barrows	120	188	-68	-18.0	18.0
	13	Number of cutlasses	813	1148	-335	-22.0	22.0
	14	Number of spades	396	445	-49	-15.0	15.0
	15	Number of axes	120	177	-57	-17.0	17.0
	16	Number of rakes	120	224	-104	-20.0	20.0
	17	Number of knapsack sprayers	30	57	-27	-13.0	13.0
	18	Number of head pans	76	166	-90	-19.0	19.0
	19	Number of pumping machines	17	35	-18	-10.0	10.0
D		**Farm inputs acquired**					
	20	Total bags of fertilizer	376	543	-167	-21.0	21.0
	21	Total bags of feeds	1980	3300	-1320	-24.0	24.0
	22	Total farm size (in hectare) per cassava/ poultry/fish farmer	160.5	208.4	-47.9	-14.0	14.0
E		**Farm yield**					
	23	Total quantity of cassava tubers produced(kg)	1280	1887	-607	-23.0	23.0
	24	Total poultry herd (number) per poultry farmer	5900	10260	-4360	-25.0	25.0
	25	Total fish population per fish farmer	19200	35100	-15900	-26.0	26.0
F		**Financial Capital**					
	26	Average income per annum (₦)	15115000	23081000	-7966000	-27.0	27.0
G		**Real Capital**					
	27	Land purchased (in hectare)	31	49	-18	-10.0	10.0
							T = 377.0

***Note**: Using Wilcoxon Test, Z_{cal} = 4.51, Z_{tab} @ 0.05 =1.65*

Table 4.11: Analysis of Performance between before and during Fadama III Project in Bayelsa State

		Performance Indicators	Before Fadama III (2004 to 2007)	During Fadama III (2010 to 2013)	Difference (d)	Rank of d	Absolute Sum of Negative Ranks (T)
A		**Household equipment purchased (item count)**					
	1	Number of houses	7	10	-3	-1.5	1.5
	2	Number of ceiling or standing fans	265	308	-43	-15.0	15.0
	3	Number of television sets	120	134	-14	-11.0	11.0
	4	Number of computers	0	6	-6	-8.0	8.0
	5	Number of telephones (mobile)	120	130	-10	-10.0	10.0
B		**Mobility items purchased (item count)**					
	6	Number of bicycles	2	5	-3	-1.5	1.5
	7	Number of tricycles	0	6	-6	-8.0	8.0
	8	Number of motorcycles	3	8	-5	-5.0	5.0
	9	Number of cars	9	16	-7	-9.0	9.0
	10	Number of engine boats	1	7	-6	-8.0	8.0
	11	Number of canoes	8	34	-26	-13.0	13.0
C		**Farm assets acquired (item count)**					
	12	Number of wheel barrows	17	105	-88	-17.0	17.0
	13	Number of cutlasses	730	1164	-434	-22.0	22.0
	14	Number of spades	403	898	-495	-24.0	24.0
	15	Number of axes	107	136	-29	-14.0	14.0
	16	Number of rakes	87	180	-93	-18.0	18.0
	17	Number of knapsack sprayers	80	106	-26	-12.0	12.0
	18	Number of head pans	71	260	-189	-19.0	19.0
	19	Number of pumping machines	10	15	-5	-5.0	5.0
D		**Farm inputs acquired**					
	20	Total bags of fertilizer	316	727	-411	-21.0	21.0
	21	Total bags of feeds	1,541	1,980	-439	-23.0	23.0
	22	Total farm size (in hectare) per cassava/ poultry/fish farmer	81.7	134	-52.3	-16.0	16.0
E		**Farm yield**					
	23	Total quantity of cassava tubers produced(kg)	893	1,222	-329	-20.0	20.0
	24	Total poultry herd (number) per poultry farmer	4,070	5,900	-1830	-25.0	25.0
	25	Total fish population per fish farmer	35,100	53,200	-18100	-26.0	26.0
F		**Financial Capital**					
	26	Average income per annum (₦)	10,154,000	16,486,000	-6332000	-27.0	27.0
G		**Real Capital**					
	27	Land purchased (in hectare)	7	11	-4	-3.0	3.0
							T =382.0

***Note**: Using Wilcoxon Test, Z_{cal} = 4.63, Z_{tab} @ 0.05 =1.65*

Table 4.12: Analysis of Performance between before and during Fadama III Project in Delta State

		Performance Indicators	Before Fadama III (2004 to 2007)	During Fadama III (2010 to 2013)	Difference (d)	Rank of d	Absolute Sum of Negative Ranks (T)
A		**Household equipment purchased (item count)**					
	1	Number of houses	30	44	-14	-10.0	10.0
	2	Number of ceiling or standing fans	391	409	-18	-11.5	11.5
	3	Number of television sets	150	154	-4	-3.5	3.5
	4	Number of computers	5	11	-6	-5.0	5.0
	5	Number of telephones (mobile)	139	147	-8	-8.0	8.0
B		**Mobility items purchased (item count)**					
	6	Number of bicycles	2	30	-28	-13.0	13.0
	7	Number of tricycles	0	20	-20	-12.0	12.0
	8	Number of motorcycles	4	33	-29	-14.0	14.0
	9	Number of cars	9	27	-18	-11.5	11.5
	10	Number of engine boats	0	2	-2	-1.0	1.0
	11	Number of canoes	2	5	-3	-2.0	2.0
C		**Farm assets acquired (item count)**					
	12	Number of wheel barrows	71	192	-121	-19.0	19.0
	13	Number of cutlasses	616	916	-300	-21.0	21.0
	14	Number of spades	363	655	-292	-20.0	20.0
	15	Number of axes	19	35	-16	-9.0	9.0
	16	Number of rakes	78	149	-71	-17.0	17.0
	17	Number of knapsack sprayers	46	92	-46	-16.0	16.0
	18	Number of head pans	87	184	-97	-18.0	18.0
	19	Number of pumping machines	5	9	-4	-3.5	3.50
D		**Farm inputs acquired**					
	20	Total bags of fertilizer	587	992	-405	-24.0	24.0
	21	Total bags of feeds	1,111	1,508	-397	-23.0	23.0
	22	Total farm size (in hectare) per cassava/ poultry/fish farmer	196.8	239.4	-42.6	-15.0	15.0
E		**Farm yield**					
	23	Total quantity of cassava tubers produced(kg)	982	1,356	-374	-22.0	22.0
	24	Total poultry herd (number) per poultry farmer	4010	6,000	-1990	-25.0	25.0
	25	Total fish population per fish farmer	35,700	65,000	-29300	-26.0	26.0
F		**Financial Capital**					
	26	Average income per annum (₦)	13,620,000	20,413,000	-6793000	-27.0	27.0
G		**Real Capital**					
	27	Land purchased (in hectare)	32	44	-12	-9.0	9.0
							T = 386.0

***Note**: Using Wilcoxon Test, Z_{cal} = 4.73, Z_{tab} @ 0.05 =1.65*

4.5 Achievement Index of Fadama III project activities in each of the three States

The variousactivities carried out by Fadama III officers in the Niger Delta were designed in specific deliverables of set tasks, targets and achievements per annum covering the project lifespan (2008 –2014). However, the implementation ofFadama III project commenced when various registered FCAs/FUGs were funded from 2009. Hence, the on-going evaluation for the study spanned the period 2010 to 2013. The broad based project activities were capacity building (or training) number administered, number of FUGs reached with advisory services/ input support and number of productive assets acquisition for member FUGs. The specific based project activities among others were number of FCAs/ FUGs registered and trained; number of FUGs reached with advisory services with respect to crop based, livestock based and fisheries based activities. In addition, input support and number of productive assets acquisition for member FUGs relating to agro-processing based and marketing equipment. Achievable proportions of respective tasks compared to given target (actual/target)was used to compute the Achievement Index (AI) of separate States as demonstrated in Tables 4.13, 4.14 and 4.15. It was observed that while given targets across the Niger Delta Area were fixed, achievabletasks (actual) varied from State to State. For instance, in achieving a set target of registering 200 Fadama Community Associations (FCAs), none of the States in the study area was able to accomplish it. Akwa Ibom registered 120 FCAs, Bayelsa registered 97 FCAs and Delta registered 157 FCAs amounting to Achievement Index (AI) of 60%, 49% and 79% respectively. Delta State had the highest rank in formation of FCAs followed by Akwa Ibom and Bayelsa States (Table 4.16).

Results in Table 4.13 showed that Fadama III project in **Akwa Ibom State** was able to exceed anticipated targets in project achievement on five activities, thus exceeding 100%

achievement. They are number of trained LGA staff, number of monitoring visits, number of productive assets acquired by FUGs, percentage increase in income and contribution into Fadama Users' Equity Fund.

Results for**Bayelsa State** Fadama III project**(**Table 4.14) recorded achievement in the following targets: good performance in number of LGA staff trained (160%), number of monitoring visits to sub projects (140%), number of productive assets acquisition for member FUGs (134%) and percentage increase in income (163%). In contribution into Fadama Users' Equity Fund, the project beneficiaries attained a weak achievement (75%). Among others, poor achievements were notable in reduced number of FUGs reached with Advisory Services/ Input Support for fisheries based beneficiaries (2%) and poor number of productive assets acquisition for member FUGs using irrigation & drainage equipment (2%).

Results for**Delta State**Fadama III project (Table 4.15)showed that there were achievement in number of LGA staff trained (175%), number of monitoring visits to sub projects (150%), number of productive assets acquisition for crop based member FUGs (154%), Fisheries based member FUGs (162%) and percentage increase in income (170%) contribution into Fadama Users' Equity Fund (232%). Conversely, meager achievements were recorded in number of FUGs reached with Advisory Services/ Input Support for FUGs in agro-processing (3%), storage based (2%) and Marketing (1%).

Table 4.13: Analysis of Achievement Index for Fadama III in Akwa Ibom State

	Activities/ Indicators	States Targets (2010 –2013) (T)	Akwa Ibom Actual (2010 – 2013) (A)	Akwa Ibom Achievement (A/T X 100/1) %
A	**Capacity Building**			
1	Number of FCAs registered	200	120	60
2	Number of FUGs registered	3000	1920	64
3	Number of FCAs trained	200	120	60
4	Number of FUGs trained	3000	1920	64
5	Number of LDPs prepared	200	83	42
6	Number of LDPs approved	200	80	40
7*	Number of LG Staff trained	80	120	150
8*	Number of Monitoring visits to sub projects	120	152	126
B	**Number of FUGs reached with Advisory Services & Input Support**			
1	Crop Based activities	3000	996	33
2	Livestock based	3000	199	7
3	Fisheries based	3000	76	2
4	Agro-processing based	3000	75	2
5	Storage	3000	97	3
6	Marketing	3000	42	1
C	**Number of productive assets acquired by FUGs**			
1*	Crop Based activities	3000	3200	107
2	Livestock based	3000	1855	62
3	Fisheries based	3000	1240	42
4	Agro-processing based	3000	385	13
5	Marketing equipment	3000	210	7
6	Irrigation equipment	3000	120	4
7	Storage facilities	3000	380	13
8*	Percentage increase in income	40%	62%	155
9*	Contribution into Fadama Users' Equity Fund (FUEF)	₦11,250,000	₦11,343,631	101

***Source**: State Fadama Coordinating Office, 2010 – 2013*

***Note**: Asterisked activities are those in which more than the set targets are achieved, exceeding 100% achievement.*

Table 4.14: Analysis of Achievement Index for Fadama III in Bayelsa State

	States Targets	Bayelsa State Actual	Bayelsa State

	Activities/ Indicators	(2010 –2013) (T)	(2010 – 2013) (A)	Achievement (A/T X 100/1) %
A	**Capacity Building**			
1	Number of FCAs registered	200	97	49
2	Number of FUGs registered	3000	1180	39
3	Number of FCAs trained	200	95	49
4	Number of FUGs trained	3000	1156	39
5	Number of LDPs prepared	200	97	49
6	Number of LDPs approved	200	95	48
7*	Number of LG Staff trained	80	128	160
9*	Number of Monitoring visits to sub projects	120	168	140
B	**Number of FUGs reached with Advisory Services & Input Support**			
1	Crop Based activities	3000	645	21
2	Livestock based	3000	96	3
3	Fisheries based	3000	61	2
4	Agro-processing based	3000	64	2
5	Storage	3000	62	2
6	Marketing	3000	79	2
C	**Number of productive assets acquired by FUGs**			
1*	Crop Based activities	3000	4011	134
2	Livestock based	3000	1400	47
3	Fisheries based	3000	3301	110
4	Agro-processing based	3000	387	13
5	Marketing equipment	3000	235	8
6	Irrigation & drainage equipment	3000	54	2
7	Storage facilities	3000	212	7
8*	Percentage increase in income	40%	65%	163
9	Contribution into Fadama Users' Equity Fund (FUEF)	₦11,250,000	₦8,477,070	75

***Source**: State Fadama Coordinating Office, 2010 – 2013*

***Note**: Asterisked activities are those in which more than the set targets are achieved, exceeding 100% achievement.*

Table 4.15: Analysis of Achievement Index for Fadama III in Delta State

	Activities/ Indicators	States Targets (2010 –2013) (T)	Delta State Actual (2010 – 2013) (A)	Delta State Achievement (A/T X 100/1) %
A	**Capacity Building**			
1	Number of FCAs registered	200	157	79
2	Number of FUGs registered	3000	1746	52
3	Number of FCAs trained	200	157	79
4	Number of FUGs trained	3000	1746	52
5	Number of LDPs prepared	200	130	65
6	Number of LDPs approved	200	130	65
7*	Number of LG Staff trained	80	140	175
9*	Number of Monitoring visits to sub projects	120	180	150
B	**Number of FUGs reached with Advisory Services & Input Support**			
1	Crop Based activities	3000	1150	38
2	Livestock based	3000	130	4
3	Fisheries based	3000	92	3
4	Agro-processing based	3000	96	3
5	Storage	3000	66	2
6	Marketing	3000	30	1
C	**Number of productive assets acquired by FUGs**			
1*	Crop Based activities	3000	4626	154
2	Livestock based	3000	1370	45
3	Fisheries based	3000	4870	162
4	Agro-processing based	3000	432	14
5	Marketing equipment	3000	224	7
6	Irrigation equipment	3000	65	2
7	Storage facilities	3000	315	11
8*	Percentage increase in income	40%	68%	170
9*	Contribution into Fadama Users' Equity Fund (FUEF)	₦11,250,000	₦26, 048,533	232

***Source**: State Fadama Coordinating Office, 2010 – 2013*

***Note**: Asterisked activities are those in which more than the set targets are achieved, exceeding 100% achievement.*

4.6 Achievement Index of Fadama III project activities in the Niger Delta Area

The ratings of achievement index of Fadama III project activities in the Niger Delta showed that some activities exceeded 100% set targets (Table 4.16). These activities are number of trained LGA Staff, number of monitoring visits, number of productive assets acquired byFUGs concerned with crop based activities and percentage increase in income of beneficiaries. Furthermore, upon contribution into Fadama Users' Equity Fund (FUEF), the following records were achieved: Akwa Ibom reached 101%, Bayelsa reached 75% and Delta reached 232%. Only Bayelsa State did not achieve the set target of getting up to 100% in FUEF contribution. The poor performance of Bayelsa State to meet set targets could be attributed to decrease in number of FUGs reached with advisory services and input support in the following sectors: crop based, livestock based, fisheries based, agro-processing basedactivities and storage (Table 4.14).The overall performance of Fadama III in the Niger Delta through the pooled mean of Achievement Index is56.33 percent (Table 4.16) .This is a good attempt.

The Performance ratingof Fadama III project in terms of financial contribution was gauged using its actual achievements against set targets; particularly the yardstick of percentage increase in income and contribution into Fadama Users' Equity Fund (FUEF) by members. The essence of FUEF contribution is to attain the status of a Micro-Finance bank ownership, which is a potential of project sustainability. The three States of Akwa Ibom, Bayelsa and Delta met the target of 40% increase in farmers' income by achieving far beyond the set target as shown in Table 4.16.

Poor performance was recorded in fewer number of FUGs reached with advisory services and input support (Table 4.21). Some of the reasons behind this were delay in provision of farm inputs and advisory services. In this sector (Table 4.16: $B_1 - B_6$), however, the Fadama III

project was able to reach the following FUGs accordingly: crop (30.67%), livestock (4.67%), fisheries (2.33%), agro-processing (2.33%), storage (2.33), and marketing (1.33%). Thus, failure of achieving the set targets in this sector resulted to a decline in the overall achievement index in the Niger Delta (56.33%).

Table 4.16: Summary of Achievement Index for Fadama III Project in the Niger Delta

	Activities/ Indicators	States Targets (2009 –2013) (T)	Akwa Ibom Achievement (A/T X 100/1) %	Bayelsa Achievement (A/T X 100/1) %	Delta Achievement (A/T X 100/1) %	Mean Achievement Index %
A	**Capacity Building**					
1	Number of FCAs registered	200	60	49	79	62.67
2	Number of FUGs registered	3000	64	39	52	51.67
3	Number of FCAs trained	200	60	49	79	62.67
4	Number of FUGs trained	3000	64	39	52	51.67
5	Number of LDPs prepared	200	42	49	65	52.00
6	Number of LDPs approved	200	40	48	65	51.00
7*	Number of LGA Staff trained	80	150	160	175	161.67
8*	Number of Monitoring visits to sub projects	120	126	140	150	138.67
B	**Number of FUGs reached with Advisory Services & Input Support**					
1	Crop Based activities	3000	33	21	38	30.67
2	Livestock based	3000	7	3	4	4.67
3	Fisheries based	3000	2	2	3	2.33
4	Agro-processing based	3000	2	2	3	2.33
5	Storage	3000	3	2	2	2.33
6	Marketing	3000	1	2	1	1.33
C	**Number of productive assets acquired by FUGs**					
1*	Crop Based activities	3000	107	134	154	131.67
2	Livestock based	3000	62	47	45	51.33
3	Fisheries based	3000	42	110	162	104.67
4	Agro-processing based	3000	13	13	14	13.33
5	Marketing equipment	3000	7	8	7	7.33
6	Irrigation & drainage equipment	3000	4	2	2	2.67
7	Storage facilities	3000	13	7	11	10.33
8*	Percentage increase in income	40%	155	163	170	162.67
9	Contribution into Fadama Users' Equity Fund (FUEF) (₦)	11,250,000	101	75	232	136.00
		Pooled Mean Achievement Index =				**56.33**

***Source**: State Fadama Coordinating Office, 2010 – 2013*
***Note**: Asterisked activities are those in which more than the set targets are achieved, exceeding 100% achievement.*

4.7 Fadama Users' Equity Fund (FUEF) Achievement

The target of FUEF was eleven million two hundred and fifty thousand naira (₦, 250,000). This target was achieved by Akwa Ibom State, thus attained 101% of the target, equivalent to eleven million three hundred and forty three thousand six hundred and thirty one naira (₦11,343,631). Delta State achieved 232% of the target which is equivalent to twenty six million forty eight thousand five hundred and thirty three naira (₦26,048,533.00). Bayelsa State had 75% of the targetwhich is equivalent to eight million four hundred and seventy seven thousand seventy naira (₦8, 477,070). In order of achievement, Delta ranked first, while Akwa Ibom and Bayelsa came second third respectively(Table 4.17). Based on these findings, the project is considered successful in the area of FUEF as Akwa Ibom and Delta States actually overshot the set targets. Farmers in Akwa Ibom and Delta States were more responsive in savings and contributedmore to FUEF than Bayelsa State farmers; hence, the better performance in Akwa Ibom and Delta States.

Table 4.17: Fadama III Fadama User Equity Fund Contribution in Akwa Ibom, Bayelsa and Delta States

	State	ProjectTarget (T)(₦)	Amount Achieved (A) in Savings (₦)	Achievement (%) (A/T x 100/1)	Rank
1	Delta	11,250,000.00	26, 048,533.00	232	1st
2	AkwaIbom	11,250,000.00	11,343,631.00	101	2nd
3	Bayelsa	11,250,000.00	8,477,070.00	75	3rd

Source: State Fadama Coordinating Offices (SFCOs) in Akwa Ibom, Bayelsa and Delta States

4.8 Constraints to Fadama III Project in the Niger Delta

The beneficiaries of Fadama III project were given opportunity to respond the various degrees of constraints facing theproject and farmers in the Niger Delta Area of study. A 24-item project activity in line with the objectives was tackled. An assortment of responses crosswise the study area are displayed in Tables 4.18 – 4.21.

Results in Table 4.18 showed that Fadama III beneficiaries in **Akwa Ibom State** recorded a very high degree of mean constraints in inadequate fund (3.80) and a very low degree of mean constraints in embezzlement of fund by members (1.0).

Results in Table 4.19 illustrated that Fadama III beneficiaries in **Bayelsa State**noted amongst others high constraint means with inadequate storage facilities provision ($\bar{x}$ =3.83), untimely delivery of inputs ($\bar{x}$ =3.70) and small constraint means with low adoption rate ($\bar{x}$ =1.48) and nonchalant attitude of local facilitators ($\bar{x}$ =1.36) respectively.

Results in Table 4.20 demonstrated that Fadama III beneficiaries in **Delta State** witnessed maximum constraint means with absence of ADP advisory services ($\bar{x}$ =3.70), high bureaucracy of donor agencies ($\bar{x}$ =3.32) and minimum constraint means with land acquisition problems ($\bar{x}$ =1.69) and poor communication system ($\bar{x}$ =1.86) respectively. Similar to these are the findings Ofuoku, Ugbomech, Uzokwe and Ideh (2006). They asserted that high cost of inputs, lack of credit facilities, inadequate extension services, high cost of equipment and ecological problems affect agricultural Production in Delta State.

Table 4.18: Extent of Constraints to Fadama III Project in Akwa Ibom State, n = 120

S/N	Parameters	Responses				Total score	Mean score	Rank
		Very serious (4)	Serious (3)	Fairly serious (2)	Not serious (1)			
1	Inadequate fund	100 (400)	20 (60)	0 (0)	0 (0)	460	3.83	1st
2	Inadequate storage facilities provision	90 (360)	30 (90)	0 (0)	0 (0)	450	3.75	2nd
3	Absence of ADP advisory services	76 (304)	44 (132)	0 (0)	0 (0)	436	3.63	3rd
4	Poor publicity	70 (280)	42 (126)	3 (6)	5 (5)	417	3.48	4th
5	Inadequate Inputs support	63 (252)	44 (132)	6 (12)	7(7)	403	3.36	5th
6	Inadequate Assets support	51 (204)	48 (144)	14 (28)	7(7)	383	3.19	6th
7	High bureaucracy of donor agencies	46 (184)	48 (144)	14 (28)	12 (12)	368	3.07	7th
8	Untimely delivery of inputs	18 (72)	92 (276)	4 (8)	6 (6)	362	3.01	8th
9	Poor feeder roads situation	18 (72)	30 (90)	22 (44)	50 (50)	256	2.13	9th
10	Nonchalant attitude of service providers (SP)	30 (120)	24 (72)	66 (132)	0 (0)	324	2.70	10th
11	Poor communication system	5 (20)	30 (90)	57 (114)	28 (28)	252	2.10	11th
12	Lack of technical know- how by group members	15 (60)	25 (75)	31 (62)	49 (49)	246	2.05	12th
13	Inadequate transport provision	10 (40)	15 (45)	35 (70)	60 (60)	215	1.79	13th
14	Lack of commitment by group members	5 (20)	7 (21)	62 (124)	46 (46)	211	1.76	14th
15	Inadequate market outlets	10 (40)	8 (24)	38 (76)	64 (64)	204	1.70	15th
16	Poor group registration mode	5 (20)	10 (30)	26 (52)	79 (79)	181	1.51	16th
17	Low adoption rate	3 (12)	4 (12)	43 (86)	70 (70)	180	1.50	17th
18	Leadership tussle/inefficiency	0 (0)	0 (0)	49 (98)	71 (71)	169	1.41	18th
19	Land acquisition problems,	6 (24)	7(21)	14 (28)	93 (93)	166	1.38	19th
20	Diverting group input to personal use	0 (0)	0 (0)	42 (84)	78 (78)	162	1.35	20th
21	Nonchalant attitude of local facilitators (LF)	0 (0)	0 (0)	14 (28)	106 (106)	134	1.11	21st
22	Embezzlement of fund	0 (0)	0 (0)	0 (0)	120	120	1.0	22nd

					(120)			
					Pooled Mean =	**2.31**		

***Note**: Figures in parentheses are scores from Likert-type scale. Cut off mean =2.5 (≥2.5 = important constraints; <2.5 unimportant constraints)*
SP = Service Providers. They are Fadama contractors at grassroots level.
LF = Local Facilitators. They are Fadama extension advisers.

Table 4.19: Extent of Constraints to Fadama III Project in Bayelsa State, n = 120

		Responses						
S/N	**Parameters**	**Very serious (4)**	**Serious (3)**	**Fairly serious (2)**	**Not serious (1)**	**Total score**	**Mean score**	**Rank**
1	Inadequate fund	102 (408)	18 (54)	0 (0)	0 (0)	462	3.85	1st
2	Inadequate storage facilities provision	99 (396)	21 (63)	0 (0)	0 (0)	459	3.83	2nd
3	Untimely delivery of inputs	91 (364)	24 (72)	3 (6)	2 (2)	444	3.70	3rd
4	Inadequate Assets support	76 (304)	44 (132)	0 (0)	0 (0)	436	3.63	4th
5	Inadequate Inputs support	72 (288)	48 (144)	0 (0)	0 (0)	432	3.60	5th
6	High bureaucracy of donor agencies	68 (272)	49 (147)	3 (6)	0 (0)	425	3.54	6th
7	Absence of ADP advisory services	67 (268)	36 (108)	17 (34)	0 (0)	410	3.42	7th
8	Nonchalant attitude of service providers(SP)	20 (80)	81 (243)	15 (30)	4 (4)	357	2.98	8th
9	Inadequate transport provision	36 (144)	44 (132)	34 (68)	6 (6)	350	2.92	9th
10	Poor feeder roads situation	36 (144)	50 (150)	17 (34)	17 (17)	345	2.88	10th
11	Poor publicity	8 (32)	52 (156)	60(120)	0 (0)	308	2.57	11th
12	Poor communication system	1 (4)	45	66	8 (8)	279	2.33	12th

			(135)	(132)				
13	Lack of technical know- how by group members	6 (24)	2 (6)	41 (82)	71 (71)	183	1.53	13th
14	Low adoption rate	3 (12)	4 (12)	40 (80)	73 (73)	177	1.48	14th
15	Lack of commitment by group members	2 (8)	4 (12)	40 (80)	74 (74)	174	1.45	15th
16	Inadequate market outlets	6 (24)	4 (12)	37 (74)	63 (63)	173	1.44	16th
17	Leadership tussle/inefficiency	7 (28)	6 (18)	20 (40)	87 (87)	173	1.44	16th
18	Land acquisition problems,	0 (0)	0 (0)	46 (92)	74 (74)	166	1.38	18th
19	Nonchalant attitude of local facilitators (LF)	6 (24)	7 (21)	11 (22)	96 (96)	163	1.36	19th
20	Poor group registration mode	3 (12)	4 (12)	24 (48)	89 (89)	161	1.34	20th
21	Diverting group input to personal use	3 (12)	4 (12)	13 (26)	100(100)	150	1.25	21st
22	Embezzlement of fund	0 (0)	0 (0)	0 (0)	120 (120)	120	1.00	22nd
					Pooled Mean =		**2.41**	

***Note**: Figures in parentheses are scores from Likert-type scale. Cut off mean =2.5 (≥2.5 = important constraints; <2.5 unimportant constraints)*
SP = Service Providers. They are Fadama contractors at grassroots level.
LF = Local Facilitators. They are Fadama extension advisers.

Table 4.20: Extent of Constraints to Fadama III Project in Delta State, n = 120

		Responses						
S/N	**Parameters**	**Very serious 4)**	**Serious (3)**	**Fairly serious (2)**	**Not serious (1)**	**Total score**	**Mean score**	**Rank**
1	Inadequate fund	84 (336)	36 (108)	0 (0)	0 (0)	444	3.70	1st
2	Absence of ADP advisory services	71 (284)	49 (147)	0(0)	0 (0)	431	3.60	2nd
3	Inadequate storage facilities provision	87 (348)	22 (66)	5 (10)	6 (6)	430	3.58	3rd
4	Untimely delivery of inputs	60 (240)	53 (159)	6 (12)	1 (1)	412	3.43	4th
5	High bureaucracy of donor agencies	46 (184)	67 (201)	7(14)	0 (0)	399	3.32	5th
6	Inadequate Assets support	40 (160)	58 (174)	21 (42)	1 (1)	377	3.14	6th
7	Poor publicity	42 (168)	58 (174)	12 (24)	8 (8)	374	3.12	7th
8	Inadequate Inputs support	48 (192)	44 (132)	18 (36)	10 (10)	370	3.08	8th
9	Nonchalant attitude of service providers(SP)	46 (184)	24 (72)	20 (40)	30 (30)	326	2.71	9th
10	Poor group registration mode	5 (20)	8 (24)	77 (154)	30 (30)	228	1.90	10th
11	Poor communication system	8 (32)	5 (15)	57 (114)	63 (63)	224	1.87	11th

12	Inadequate transport provision	12 (48)	3 (9)	61 (122)	44 (44)	223	1.86	12th
13	Poor feeder roads situation	6 (24)	14 (42)	56 (112)	44 (44)	222	1.85	13th
14	Land acquisition problems	10 (40)	20 (60)	14 (28)	76 (76)	204	1.69	14th
15	Low adoption rate	5 (20)	5 (15)	49 (98)	61 (61)	194	1.62	15th
16	Lack of technical know- how by group members	0 (0)	9 (27)	54 (108)	57 (57)	192	1.60	16th
17	Diverting group input to personal use	0(0)	0(0)	56 (112)	64 (64)	176	1.46	17th
18	Lack of commitment by group members	3 (12)	5 (15)	30 (60)	82 (82)	169	1.41	18th
19	Inadequate market outlets	3 (12)	7 (21)	36 (72)	64 (64)	169	1.41	18th
20	Leadership tussle/inefficiency	0(0)	0(0)	30 (60)	90 (90)	150	1.25	20th
21	Embezzlement of fund	0(0)	0(0)	12 (24)	108 (108)	132	1.10	21st
22	Nonchalant attitude of local facilitators (LF)	0(0)	0(0)	11(22)	109 (109)	131	1.09	2rnd
						Pooled mean =	**2.26**	

***Note**: Figures in parentheses are scores from Likert-type scale. Cut off mean =2.5 (≥2.5 = important constraints; <2.5 unimportant constraints)*
SP = Service Providers. They are Fadama contractors at grassroots level.
LF = Local Facilitators. They are Fadama extension advisers.

4.8.1 Constraints to Fadama III Project using mean computation across the selected Niger Delta States

The degree of constraints facing the Fadama III project and farmers in NigerDelta Area (Tables 4.21) were dichotomized into important and unimportant constraint means using a cut-off mean point of 2.5.The constraint means above 2.5 were considered important and those below 2.5 were considered unimportant. Some of the important constraint means were inadequate fund($\bar{x}$ =3.78), inadequate inputs support($\bar{x}$ =3.35), high bureaucracy of donor agencies($\bar{x}$ =3.31), untimely delivery of inputs($\bar{x}$ =3.38) and inadequate storage facilities provision($\bar{x}$ =3.72). Few other unimportant constraint means included poor group registration mode($\bar{x}$ =1.58), land acquisition problems for project implementation ($\bar{x}$ =1.49), low adoption rate of recommended practices ($\bar{x}$ =1.53), inadequate market outlets($\bar{x}$ =1.52) and lack of technical expertise by group members($\bar{x}$ =1.72). The pooled mean constraints of the respondents in the study area were Bayelsa, 2.40; Akwa Ibom, 2.32; and Delta, 2.24 accordingly. In the NigerDelta Area, the mean score for constraints to Fadama III was 2.32. This means that all the listed constraints put together connote constraints that are unimportant which are not strong

enough to hinder performance of Fadama III project.Dayo, Nkonya, Pender and Oni (2009); Ajieh and Uzokwe (2007) and Ugboma (2009) indentified similar constraints to agricultural projects implementation such as: low fertilizer use, low use of improved crop varieties exist, poverty and women's limited access to inputs/assets, low access to agricultural credit, low public expenditure on agricultural research, poor funding of agricultural technologies, poor funding and coordination of agricultural extension.

Table 4.21: Extent of Constraints to Fadama III Project across the selected Niger Delta States, n = 360

S/N	Parameters	Akwa Ibom	Bayelsa	Delta	Total	Pooled mean	Rank	Remark
1	Inadequate fund	3.83	3.85	3.70	11.38	3.79	1st	Important
2	Inadequate storage facilities provision	3.75	3.83	3.58	11.16	3.72	2nd	Important
3	Absence of ADP advisory services	3.63	3.42	3.60	10.65	3.55	3rd	Important
4	Untimely delivery of inputs	3.01	3.70	3.43	10.14	3.38	4th	Important
5	Inadequate Inputs support	3.36	3.60	3.08	10.04	3.35	5th	Important
6	Inadequate Assets support	3.19	3.63	3.14	9.96	3.32	6th	Important
7	High bureaucracy of Donor agencies	3.07	3.54	3.32	9.92	3.31	7th	Important
8	Poor publicity	3.48	2.57	3.12	9.17	3.06	8th	Important
9	Non-chalant attitude of service provider(SP)	2.7	2.98	2.71	8.39	2.80	9th	Important
10	Poor feeder roads situation	2.13	2.88	1.85	6.86	2.29	10th	Unimportant
11	Inadequate transport provision	1.79	2.92	1.86	6.57	2.19	11th	Unimportant
12	Poor communication system	2.10	2.33	1.87	6.30	2.10	12th	Unimportant
13	Lack of technical know-how by group members	2.05	1.53	1.6	5.18	1.73	13th	Unimportant
14	Poor group registration mode	1.51	1.34	1.90	4.75	1.58	14th	Unimportant
15	Lack of commitment by group members	1.76	1.45	1.41	4.62	1.54	15th	Unimportant
16	Low adoption rate	1.50	1.48	1.62	4.60	1.53	16th	Unimportant
17	Inadequate market outlets	1.70	1.44	1.41	4.55	1.52	17th	Unimportant
18	land acquisition problems	1.38	1.38	1.69	4.45	1.49	18th	Unimportant
19	Leadership tussle/inefficiency	1.41	1.44	1.25	4.10	1.37	19th	Unimportant
20	Diverting group input to personal use	1.35	1.25	1.46	4.06	1.35	20th	Unimportant
21	Non-chalant attitude of local facilitator (LF)	1.11	1.36	1.09	3.56	1.19	21st	Unimportant
22	Embezzlement of fund	1.0	1.00	1.10	3.10	1.03	22nd	Unimportant
	Total	55.75	56.88	53.81	166.44			
	Pooled Mean for each State	**2.32**	**2.37**	**2.24**				
				Pooled Mean for Niger Delta =		**2.33**		Unimportant

Note: Cut off mean =2.5 (≥2.5 = important constraints; <2.5 unimportant constraints)
SP = Service Providers. They are Fadama contractors at grassroots level.
LF = Local Facilitators. They are Fadama extension advisers.

4.9 Test of Hypotheses

Ho_1:*Farmers' socio-economic characteristics do not significantly contribute to their perception on achievement of Fadama III activities in the study area.*

The regressionresult in Table 4.22 indicates that some independent variables are significant at p = 0.05 with R^2 value of 0.813 implying that 81.3% of the parameter estimates are responsible for the results obtained. Out of nine variables, five made significant contributions to the achievement index. The significant variables include educational level, farming experience, farm size, contact with local facilitator and contact with extension workers in the study area.

Educational level has positive significant relationship with achievement level of Fadama III. This means that a unit increases in the level of education of the participants will lead to a unit increase in the achievement level of Fadama III. Education influences the attitude of people positively towards participation and performance in groups. This implies that formal education is a critical variable in the performance of groups. This is in consonance with the findings of Ofuoku and Chukwuji (2013) who revealed that level of formal education of group members contributed to the growth of farmers' groups in Delta State, Nigeria.

Farming experience positively influenced Fadama III achievement level. Experience, they say, is the best teacher. The various experiences members had, influenced their performances in their Fadama groups. People who had had negative experiences as a result of mistakes made in the past with respect to their farming engagements will not want a repeat of such experiences and so they are intrinsically motivated to become serious and work harder to see to the success of their engagements. Ofuoku *et al* (2008), Ofuoku and Chukwuji (2013) found similar relationship between farming experience and group cohesion. Group cohesion level is an index of group achievement level. Therefore, members' past experiences influences their current attitude to the various Fadama III groups.

Farm size also has positive significant relationship with Fadama III achievement. The implication is that the larger the size of the farm, the higher the achievement level of Fadama III. This is attributed to the fact that large farm size implies high level of investment. With such huge investment, members cannot afford not to be serious. According to Ofuoku and Urang (2013), members' farm sizes influence the farmers' cooperative group cohesion. Ofuoku *et al*(2008) found that fish farmers' group cohesion influenced the performance of the group.

Contact with facilitators and other extension agents had negative relationship with Fadama III achievement level. This implies that a unit decrease in frequency of contact with extension agents will lead to a unit decrease in the achievement level of Fadama III. Contact with extension agents influences subscription to farmers' groups and farmers' cooperative group cohesion (Ofuoku and Chukwuji, 2013), which is an index of group performance as afore mentioned.

Ho_2: *There is no significant variation in the perception of the Fadama III agricultural projects beneficiaries about achievement of project objectives among the selectedNiger Delta States*.

It should be recalled that Table 4.9 has the perception mean scores of perceptual statements which were used for Analysis of Variance (ANOVA) computation. The summary of the ANOVA showing the Perception for the three states are given in Table 4.23. Since the F_{cal} (-0.008) is less than the F_{tab} (3.23) at p = 0.05, the null hypothesis should be accepted that there is no significant variation in the perception of the Fadama III agricultural projects beneficiaries about achievement of project objectives among the threeNiger Delta States. This implies that there is no significant variation in the level of satisfaction on project objectives achievement as perceived by the beneficiaries of Fadama III agricultural project in the Niger Delta. Arubayi

(2010) obtained a similar finding on appraising the course objectives and contents in four tertiary institutions on the teaching of clothing and textiles using analysis of variance to compare means.

Ho_3: *There is no significant difference in performance between before and during Fadama III.*

This results in Table 4.24 showed that from the Wilcoxon test used to analyze 27 performance indicators for Fadama III project, Z_{cal} is 4.44, while Z_{tab} at p = 0.05 is 1.65; thus rejecting the null hypothesis. This implies that significant difference exists in performance between before and during Fadama III project implementation with better performance observed during Fadama III era across the three States. Contrary to this, the findings of Agbamu and Okagbare (2005) revealed that there were decreases in some performance indicators upon the withdrawal of World Bank as an external donor support to ADP farmers in Ogun State. Again, Agbamu (2015) found that there was better performance recorded in Kogi State Agricultural Development Programme (KADP) during World Bank involvement because of better funding and good technical staff support, with poor performance after cessation of World Bank's assistance.

Ho_4: *There is no significant variation in the constraints facing Fadama III project among the selected Niger Delta States*

It should be recalled that Table 4.21 has the constraint mean scores of various parameters which were used for Analysis of Variance (ANOVA) computation. The summary of the ANOVA showing the constraints for the three States are given in Table 4.25. Since the F_{cal} (0.05) is less than the F_{tab} (3.15) at p = 0.05, the null hypothesis should be accepted that there is no significant variation in the constraints facing Fadama III project among the selected Niger Delta States. The reason could be the closeness in values of the pooled means across the three States. This connotes that decision on management of constraints in the study area can be approached on similar basis in spite of the peculiarities among States. Some of these serious

constraints are similar to the findings of Ofuoku *et al* (2006). They found that constraints to small-scale fish farming in Delta State included inadequate extension services, high cost of equipment and ecological problems affect agricultural Production.

Table 4.22: Regression Results on Determinants of Farmers' Perception on Achievement level of Fadama III in Niger Delta State, n = 360

Variables/Predictors	Coefficients	Std. Error	T-value	Sig.
Constant	2.887	.330	8.744	.000
Age (Years)	.003	.003	.879	.380
Gender	-.029	.048	-.602	.548
Educational Level	.104	.031	3.373	.001*
Farming Experience (Years)	-.006	.005	3.290	.002*
Farm Size (Ha)	.041	.019	2.161	.003*
Farm Income (₦)	-3.50	.000	-.120	.905
Household Size (№s)	.015	.011	1.351	.178
Contact with Local Facilitators	-.170	.039	-4.351	.000*
Contact with other Extension Workers (№s)	-.101	.044	-2.291	.002*

F_{stat} = 5.968 and R^2 = 0.813 *= Significant @ 0.05

Table 4.23: Summary of ANOVA results on perceptionin the Niger Delta Area

Source of Variance	Sum of Squares	Degree of Freedom	Mean Squares	F_{cal}	$F_{tab.}$
Between Groups	-0.07	2	-0.035	-0.08**NS**	3.23
Within Groups	17.42	39	0.447		
Total	5923.597				

NS= Not Significant @ 0.05

Table 4.24: Analysis of Performance between before and during Fadama III Project in Niger Delta

	Performance Indicators	Before Fadama III (2004 to 2007)	During Fadama III (2010 to 2013)	Difference (d)	Rank of d	Absolute Sum of Negative Ranks (T)
A	**Household equipment purchased (item count)**					
1	Number of houses	68	103	-35	-7.0	7.0
2	Number of ceiling or standing fans	981	1097	-116	-15.0	15.0

	3	Number of television sets	417	439	-22	-2.5	2.5
	4	Number of computers	5	20	-15	-1.0	1.0
	5	Number of telephones (mobile)	416	438	-22	-2.5	2.5
B		**Mobility items purchased (item count)**					
	6	Number of bicycles	4	47	-43	-10.0	10.0
	7	Number of tricycles	0	36	-36	-8.0	8.0
	8	Number of motorcycles	7	63	-56	-12.0	12.0
	9	Number of cars	28	55	-37	-9.0	9.0
	10	Number of engine boats	1	26	-26	-4.0	4.0
	11	Number of canoes	10	56	-46	-11.0	11.0
C		**Farm assets acquired (item count)**					
	12	Number of wheel barrows	208	485	-227	-17.0	17.0
	13	Number of cutlasses	2159	3228	-1069	-21.0	21.0
	14	Number of spades	1162	1998	-836	-18.0	18.0
	15	Number of axes	246	348	-102	-14.0	14.0
	16	Number of rakes	285	553	-268	-18.0	18.0
	17	Number of knapsack sprayers	156	255	-99	-13.0	13.0
	18	Number of head pans	234	610	-376	-19.0	19.0
	19	Number of pumping machines	32	59	-27	-5.0	5.0
D		**Farm inputs acquired**					
	20	Total bags of fertilizer	1,279	2,262	-983	-20.0	20.0
	21	Total bags of feeds	4,632	6,788	-2,156	-25.0	25.0
	22	Total farm size (in hectare) per cassava/ poultry/fish farmer	439.0	581.8	-142.8	-16.0	16.0
E		**Farm yield**					
	23	Total quantity of cassava tubers produced(kg)	3,155	4,465	-1,310	-23.0	23.0
	24	Total poultry herd (number) per poultry farmer	13,980	21,160	-8,180	-24.0	24.0
	25	Total fish population per fish farmer	90,000	153,300	-63,300	-26.0	26.0
F		**Financial Capital**					
	26	Average income per annum (₦)	38,889,000	59,980,000	-21,091,000	-27.0	27.0
G		**Real Capital**					
	27	Land purchased (in hectare)	70	104	-34	-6.0	6.0
							T = 374.0

***Note**: Using Wilcoxon Test, Z_{cal} = 4.44, Z_{tab} @ 0.05 =1.65*

Table 4.25: Summary of ANOVA Results on Constraintsin the Niger Delta Area

Source of Variance	Sum of Squares	Degree of Freedom	Mean Squares	F_{cal}	$F_{tab.}$
Between Groups	0.2	2	0.1	0.05NS	3.15
Within Groups	131.17	69	1.90		
Total	131.37				

NS= Not Significant @ 0.05

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

The broad objective of the study was to evaluate the Fadama III Agricultural Project Performance in the Niger Delta Area of Nigeria. The specific objectives were to describe the socioeconomic characteristics of the beneficiaries of Fadama III project; ascertain the level of adoption of agricultural technologies by Fadama III beneficiaries; examine the perception of beneficiaries on Fadama III activities; investigate the difference in performance between before and during Fadama III agricultural project; compute the achievement index of Fadama III project activities using actual/target proportion, and identify the constraints to Fadama III Project. The study used 360 respondents made up of 5 farmers selected from72 Fadama Users' Groups (FUGs) per State. A structured questionnaire was used in data collection. Data collected were analyzed using percentages, mean scores, ranks, regression, analysis of variance (ANOVA) and Wilcoxon test.

The study revealed that the average ages of respondents in Akwa Ibom, Bayelsa and Delta States were 51, 48 and 55years respectively, with an overall average age of 51.33years for the Niger Delta. Respondents' disaggregation by sex showed that male respondents were 57% and female respondents were 43%. On educational level, it was found that 50.3% of the Fadama III beneficiaries had secondary education. The mean farming experiences in the States were Akwa Ibom (11 years), Bayelsa (15 years) and Delta (16 years). Fifty six percent respondents possessed farm sizes less than one hectare. About one-third of respondents (28%) earned annual farm income less than one hundred thousand naira (₦100,000). The study also revealed that Fadama III beneficiaries in the Niger Delta had an average of 6 persons per household.The predominant level of contact that local facilitators had with Fadama III beneficiaries was monthly contact compared to twice a year contact with other agricultural extension workers which 57% of the respondents alluded to. On adoption level of Fadama III recommended

agricultural practices and technologies in the Niger Delta States, cassava farmers ranked the highest (4.65), followed by poultry farmers (4.39), and aquaculture farmers (4.27).

On perceptions of Fadama III project activities, beneficiaries were satisfied with gender inclusiveness in project documentation and operation ($\bar{x}$ =3.42) which ranked first. The second and third ranks in perceptionscores were conduct of good training sessions by Fadama III officers ($\bar{x}$ =3.37), and increased in farmers' income over the last 4 years by about 40% ($\bar{x}$ = 3.35) respectively. Among the lowest in the order of ranking were the incompetence noticed in service providers' operations ($\bar{x}$ =1.79) andirregular field days activities by Fadama III officers ($\bar{x}$ =1.6).

The study revealed that there was increase in performance indicators and parameters reviewed within the periods of Fadama III implementation. The finding showed increase in household equipment, mobility items purchased, farm assets and inputs acquired, farm yield, financial capital and land area acquired.

In terms of financial performance rating, Akwa Ibom, Bayelsa and Delta met the target of 40% increase in farmers' income. The contribution into Fadama Users' Equity Fund (FUEF) by members was achieved by Delta and Akwa Ibom States thus exceeding 100%, while Bayelsa achieved 75% of the set target.

The major constraints across the states were inadequate fund($\bar{x}$ =3.78), inadequate inputs support($\bar{x}$ =3.35), high bureaucracy of donor agencies($\bar{x}$ =3.31), untimely delivery of inputs($\bar{x}$ =3.38) and inadequate storage facilities provision($\bar{x}$ =3.72). The following constraints were not serious: poor group registration mode($\bar{x}$ =1.58), land acquisition problems for project implementation ($\bar{x}$ =1.49), low adoption rate of recommended practices ($\bar{x}$ =1.53), inadequate market outlets($\bar{x}$ =1.52) and lack of technical expertise by group members($\bar{x}$ =1.72). The pooled

mean constraints of the respondents in the study area were 2.40,2.32 and 2.24 forBayelsa,Akwa Ibom and Delta respectively.

There was significant relationship ($p < 0.05$) between perception of Fadama III and some socioeconomic statuses (educational level, farming experience, farm size, contact with local facilitator and contact with other extension) with R^2 value of 0.813 implying that 81.3% of the parameter estimates are responsible for the results obtained. Invariably, farmers' socio-economic characteristics such as educational level, farming experience, farm size, contact with local facilitator and contact with other extension workers significantly contributed to the achievement of Fadama III activities in the study area. There was no significant variation among three States of the Niger Delta ($p > 0.05$) in the level of satisfaction on project objectives achievement as perceived by the beneficiaries. Significant difference ($p < 0.05$) was found in performance between before and during Fadama III implementation with better performance observed during Fadama III era. There was no significant variation ($p > 0.05$) in the constraints facing Fadama III project among the selected Niger Delta States.

5.2 Conclusion

Based on evidences from the study, the following conclusions were reached. The average age of respondents was 51 years. More males participated Fadama III than females. Majority of the respondents attained secondary education. Average age of farming experience was 14 years. Respondents possessed farm size of less than one hectare. About one third of the respondents earned annual farm income of less than one hundred thousand naira in the study area. Household

sizes ranged between five and eight members per household. Respondents had more contacts with Fadama local facilitators than they did with other extension workers.

Adoption of recommended agricultural practices washigher with cassava farmers than with poultry and aquaculture farmers. Beneficiaries were mostly satisfied with Fadama III gender inclusiveness in project documentation and operation, conduct of good training sessionsand over forty per cent increase in farmers' annual income with Fadama III intervention. However, the incompetence of service providers operationsand poor regular field days activities by Fadama III officers were among the problems noticed. There was high performance among respondents with increase in household equipment, mobility items purchased, farm assets and inputs acquired, farm yield, financial capital and land possession. Another performance of Fadama III project was in the contribution into Fadama Users' Equity Fund (FUEF) by members. While Delta and Akwa Ibom States exceeded the set targeton contribution toFUEF, Bayelsa was below the bench markon its contribution as at when the study was conducted.

The results from mean constraints showed that despite the huge funding of Fadama III project, some beneficiaries still had the challenges of inadequate fund, inadequate inputs support and inadequate storage facilities provision. High bureaucracy of donor agencies and untimely delivery of inputs were also seen as serious constraints. Lesser constraints were poor group registration mode, land acquisition problems for project implementation, low adoption rate of recommended practices, inadequate market outletsand lack of technical expertise by group members. It can be inferred that beneficiaries were capable of managing whatever constraints that faced in Fadama III project to achieve set goals and targets to a reasonable extent. It can be concluded that the Fadama III project has impacted positively on the standard of living of the beneficiaries.

5.3 Recommendations

Based on the conclusion of the study, the following recommendations are made:

1. Opportunities should be given to younger folks to participate in Fadama III agricultural projects. At the moment, more elderly folks mostly above fifty years are drivers of the Fadama III agricultural projects.
2. More females should be encouraged to participate in the Fadama III project activities. This will go a long way to increase household income since more participation will increase farm output.
3. Given that inadequate advisory services were prevalent, efforts should be made to increase provision of advisory services to farmers in the Niger Delta.
4. The better performance of Fadama III in the period under review can be attributed to close monitoring and evaluation of Fadama III activities by local facilitators through meeting majority of given tasks and targets. Thus, other extension workers of different organizations should be closely supervised and given regular training and provision of working materials.
5. More farm inputs and storage facilities should be supplied to reduce the constraints facing the beneficiaries.

5.4 Contributions to Knowledge

1. This study proved that cassava-based technologies have a higher propensity for adoption in comparison to poultry and aquaculture-based technologies in the Niger Delta.
2. Findings of this study have shown that an agricultural development intervention project is capable of exhibiting positive impact on the livelihood of its beneficiaries.

3. This work has demonstrated the workability of joint financial contributions by farmers and a development agency in executing a development programme.

5.5 Suggested Areas for Further Research

1.Evaluation of the Performance of Fadama III Rural Infrastructural Project in the Niger Delta Area of Nigeria

2.Evaluation of the Performance of Agricultural Transformation Agenda in the Niger Delta Area of Nigeria

3.Sustainability Strategies of Agricultural Programmes in Nigeria

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Appendices

Appendix 1: Time Series Data on Gross Domestic Product (GDP) and Agricultural Output in Nigeria (1970-2010)

S/N	Year	Agricultural Output (Billions of Naira)	GDP (Billions of Naira)	Percentage Contribution (%)
1.	1970	2,576.40	5,281.10	47.9
2.	1971	3,033.70	6,650.90	45.6
3.	1972	3,092.70	7,187.50	43.0
4.	1973	3,261.20	8,630.50	37.8
5.	1974	4,377.99	18,823.10	23.3
6.	1975	5,872.92	21,475.24	27.3
7.	1976	6,121.96	26,655.78	23.0
8.	1977	7,401.64	31,520.34	23.5
9.	1978	8,033.55	34,540.10	23.3
10.	1979	9,213.14	41,974.70	21.9
11.	1980	10,011.46	49,632.32	20.2
12.	1981	13,580.32	47,619.66	28.5
13.	1982	15,905.50	49,069.28	32.4
14.	1983	18,837.19	53,107.38	35.5
15.	1984	23,799.43	59,622.53	40.0
16.	1985	26,625.21	67,908.55	39.2
17.	1986	27,887.45	69,146.99	40.3
18.	1987	39,204.22	105,222.84	37.3
19.	1988	57,924.38	139,085.30	41.6
20.	1989	69,713.00	216,797.54	32.2
21.	1990	84,344.61	267,549.99	31.5
22.	1991	97,464.06	312,139.74	31.2
23.	1992	145,225.25	532,613.83	27.3
24.	1993	231,832.67	683,869.79	34.0
25.	1994	349,244.86	899,863.22	38.8
26.	1995	619,806.83	1,933,211.55	32.1
27.	1996	841,457.07	2,702,719.13	31.1
28.	1997	953,549.37	2,801,972.58	34.0
29.	1998	1,057,584.01	2,708,430.86	39.0
30.	1999	1,127,693.12	3,194,014.97	35.3
31.	2000	1,192,910.00	4,582,127.29	26.0
32.	2001	1,594,895.53	4,725,086.00	33.8
33.	2002	3,357,062.94	6,912,381.25	48.6

34.	2003	3,624,579.49	8,487,031.57	42.7
35.	2004	3,903,758.69	11,411,066.91	34.2
36.	2005	4,773,198.38	14,572,239.12	32.8
37.	2006	5,940,236.97	18,564,594.73	32.0
38.	2007	6,757,867.73	20,657,317.67	32.7
39.	2008	7,981,397.32	24,296,329.29	32.9
40.	2009	9,186,306.05	24,794,238.66	37.1
41.	2010	10,273,651.99	29,205,782.96	35.2

Source: *Emeka (2010), Central Bank of Nigeria Bullion*

APPENDIX 11
QUESTIONNAIRE

TOPIC: Evaluation of the Performance of Fadama III Agricultural Project in the Niger Delta Area of Nigeria

This is a research survey designed to elicit information from respondents on the Evaluation of Fadama III Agricultural Projects Performance in the Niger Delta Area of Nigeria. All information will remain confidential and will only be used for constructive purpose towards the achievement of the research objectives. We hereby humbly thank you in advance for all your cooperation.

Please indicate (x) where applicable and respond appropriately where necessary.

FUNDAMENTAL INFORMATION

Date of Interview …. / ……/ 2013
Questionnaire Number _ _ _
State ……
LGA……
Name of FCA……..
Name of FUG……
Name of Project/Enterprise:
FUG Type: Vulnerable Group [ ] Non Vulnerable Group [ ]
Name/Contact (Optional)……

SECTION A: Socio economics characteristic of respondents.

1 Age (in years): _____
2 Gender: Male [ ] Female [ ]
3 Educational Level: No Formal Education [ ] Primary School [ ] Secondary School [ ] OND/NCE [ ] HND/First Degree [ ] Post Graduate [ ]
4 Farming Experience (in years): _____
5 Farm Size (in Hectares): _____
6 Farm Income per annum (in Naira): _____
7 Household size (in Number) :_____
8 Contact with local facilitators: Weekly [ ] Fortnightly [ ] Monthly [ ] Quarterly [ ] Yearly [ ] Rarely [ ]
9 Contact with other extension agents: Weekly [ ] Fortnightly [ ] Monthly [ ] Quarterly [ ] Yearly [ ] Rarely [ ]

SECTION B: Adoption level of Fadama III agricultural techniques and selected production recommendations

This section is planned to assess current level of adoption achieved by beneficiaries as a result of Fadama III intervention. Please indicate accordingly.

S/N	Have you adopted any agricultural techniques or selected production recommendations communicated by Fadama III extension activities?	Option	
		Yes	No
	Agronomic practices (Cassava farmers only)		
1	Minimum tillage (30 – 40)cm		
2	Ridges preparation (4 by 1)m		
3	Beds preparation (3 by 1)m		
4	Heaps preparation (50 – 70)cm		
5	Cuttings length (25 – 30)cm		
6	Planting distance (1 by 1)m		
7	Mixed cropping techniques		
8	Mixed farming techniques		

9	Fertilizer application techniques (NPK 15:15:15)		
10	Compost manure preparation		
11	Mulching		
12	Stem storage techniques (Tree shed method)		
13	Tuber storage techniques		
14	Saving methods (Bank/FUEF)		
15	Record keeping		

Farm practices (Poultry (Broilers/Layers**)**

	Technologies	**Yes**	**No**
1	Intensive management system techniques		
2	Semi-Intensive management system techniques		
3	Extensive management system techniques		
4	Housing construction techniques (East – West orientation)		
5	Brooding techniques		
6	Stocking density (5 – 8/m^2)		
7	Feed formulation techniques (mash))		
8	Medication provision		
9	Mixed farming		
10	Carcass storage techniques		
11	Saving methods (Bank/FUEF)		
12	Record keeping		

Farm practices Fisheries (Aquaculture**)**

	Technologies	**Yes**	**No**
1	Earthen ponds preparation		
2	Concrete ponds preparation		
3	Tarpaulin ponds preparation		
4	Pond treatment techniques		
5	Water treatment techniques		
6	Breeding techniques		
7	Stocking techniques (4 – 6/m^2)		
8	Feed formulation techniques (pellet)		
9	Maggot breeding techniques		
10	Integrated farming techniques		
11	Harvesting techniques		
12	Storage techniques(tanks usage)		
13	Processing techniques (smoking)		
14	Saving methods (Bank/FUEF)		
15	Record keeping		

SECTION C:Perception of beneficiaries' satisfaction on Fadama III activities. Please indicate accordingly.

S/N	**Project's objectives /activities**	**Responses**			
		Strongly agree (4)	**Agree(3)**	**Disagree (2)**	**Strongly disagree (1)**
1	The Fadama III Operation is gender inclusive.				
2	The Local Facilitators are of good commitment.				
3	The Service Providers are competent in their operations.				
4	Fadama III officers conducted good Training sessions.				
5	FUGs actively participated in project activities.				
6	Provision of variable and fixed Inputs in terms of quantity has been satisfactory.				
7	Provision of variable and fixed Inputs in terms of quality has been satisfactory.				
8	Local facilitators have been able to galvanize FUGs to ensure high				

	utilization rate of farm inputs provided.				
9	Fadama III officers conducted quarterly M&E activities.				
10	Regular field days activities have been operational.				
11	Farmers' increased farm harvest over the 3 years has been due to Fadama III assistance.				
12	Farmers' incomes have over the last 4 years increased by about 40%.				
13	There has been rapid response to farmers' problems by Fadama III officers.				
14	The project witnessed slight improvements in living conditions by farmers because of participation.	**			

SECTION D: Fadama III Performance Before and During Fadama III Project

Which of these below listed materials/assets do you have? Please indicate accordingly

S/N		**Performance Indicators**	**Before Fadama III** (2004 to 2007)	**During Fadama III** (2010 to 2013)
A		**Household equipment purchased (item count)**		
	1	Number of houses		
	2	Number of ceiling or standing fans		
	3	Number of television sets		
	4	Number of computers		
	5	Number of telephones (mobile)		
B		**Mobility purchased (item count)**		
	6	Number of bicycles		
	7	Number of tricycles		
	8	Number of motorcycles		
	9	Number of cars		
	10	Number of engine boats		
	11	Number of canoes		
C		**Farm assets acquired (item count)**		
	12	Number of wheel barrows		
	13	Number of cutlasses		
	14	Number of spades		
	15	Number of axes		
	16	Number of rakes		
	17	Number of knapsack sprayers		
	18	Number of head pans		
	19	Number of pumping machines		
D		**Farm inputs acquired**		
	20	Total bags of fertilizer		
	21	Total bags of feeds		
	22	Total farm size (in hectare) per cassava/ poultry/fish farmer		
E		**Farm yield**		
	23	Total quantity of cassava tubers produced(kg)		
	24	Total poultry herd (number) per poultry farmer		
	25	Total fish population per fish farmer		
F		**Financial Capital**		

	26	Average income per annum (₦)		
G		**Real Capital**		
	27	Land purchased (in hectare)		

SECTION E: Fadama III Project Achievement Index for Selected Project Activities. (2010-2013). Secondary information will be gathered from Fadama III offices in each of the three States

S/N	Activities	Project Targets Level per year (T) (2010-2013)	Project Achievements Level per year (A)	Project Performance Index (A/T X 100)
A	**Capacity Building number of:**			
1	FCAs registered	200		
2	FUGs registered	3000		
3	FCAs trained	200		
4	FUGs trained	3000		
5	LDPs prepared	200		
6	LDPs approved	200		
7	LGA Staff trained	80		
8	FCAs fully implemented subprojects prepared	200		
9	FUGs fully implemented subprojects prepared	3000		
10	Monitoring visits to sub projects	120		
B	**Number of FUGs reached with Advisory Services/ Input Support**			
1	Crop Based activities	3000		
2	Livestock based	3000		
3	Fisheries based	3000		
4	Agro-processing based	3000		
5	Storage	3000		
6	Marketing	3000		
C	**Number of productive assets acquisition for member FUGs**			
1	Crop Based activities	3000		
2	Livestock based	3000		
3	Fisheries based	3000		
4	Agro-processing based	3000		
5	Marketing equipment	3000		
6	Irrigation & drainage equipment	3000		
7	Storage facilities	3000		
8	Percentage increase in income	40%		
9	Contribution into Fadama Users' Equity Fund (FUEF) (₦)	11,250,000		

Source: SFCO, Akwa Ibom, Bayelsa and Delta States

SECTION F: Fadama III Project and farmers' constraints. Please indicate your opinion on the following constraint factors.

S/N	Constraints	Responses			
		Very serious (4)	Serious (3)	Fairly serious (2)	Not serious (1)
1	High bureaucracy of Donor agencies				
2	Poor group registration mode				
3	land acquisition problems,				
4	Poor communication system				
5	Inadequate Inputs support				
6	Inadequate Assets support				
7	Low adoption rate				
8	Poor publicity				
9	Diverting group input to personal use				
10	Leadership tussle/inefficiency				
11	Embezzlement of fund				
12	Non-chalant attitude of local facilitator				
13	Non-chalant attitude of service provider				
14	Untimely delivery of inputs				
15	Inadequate storage facilities provision				
16	Inadequate market outlets				
17	Inadequate transport provision				
18	Poor feeder roads situation				
19	Inadequate fund				
20	Absence of ADP advisory services				
21	Lack of commitment by group members				
22	Lack of technical Know- how by group members				

Evaluation of the Performance of Fadama III Agricultural Projectin the Niger Delta Area of Nigeria

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Supervisors: Prof. Agbamu, J.U.
Dr. Ovwigho, B.O.

February, 2016.

CERTIFICATION

This is to certify that this Ph.D. Thesis was done by **OVHARHE, Oghenero Joseph** in the Department of Agricultural Economics and Extension, Delta State University, Abraka, in partial fulfillment of the requirements for the award of Doctor of Philosophy degree in Agricultural Extension and Rural Development.

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……
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Thesis Supervisor II

……
Dr. F.O. ACHOJA
(Ag.) Head of Department

DEDICATION

This Ph.D. Thesis is dedicated to my three daughters: El-Ginal, Gig and Jil OVHARHE and my three sons-in-law to be. I wish you all the climax of excellence in all things.

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ABSTRACT

The study evaluated the performance of Fadama III agricultural project (2010 – 2013) in the Niger Delta Area of Nigeria. It ascertained the difference in performance between before and during Fadama III project and computed the achievement index of Fadama III project activities.Stratified and simple random sampling techniques were used in the selection of 360 farmers from Akwa Ibom, Bayelsa and Delta States. Questionnaire was used for primary data collection. Data collected were analyzed by descriptive and inferential statistics. Results of the study revealed that the average age of respondents was 51 years, while they had an average farm size of 1.6ha.The study found out that cassava farmers exhibited the highest adoption score of 4.65, while poultry and aquaculture farmers had 4.39 and 4.27 respectively. Fadama III activities in which beneficiaries had the most favourable perception were gender inclusiveness of the project ($\bar{x}$ =3.42), training sessions conducted by Fadama III officers ($\bar{x}$ =3.36), and increased farmers' income by about 40% ($\bar{x}$ =3.32). Using Wilcoxon Test to analyze 27 performance indicators, it was found that significant difference existed between before and during Fadama III project implementation with better performance observed during Fadama III era in the Niger Delta (Z_{cal} = 4.44, Z_{tab}@ $p \leq 0.05$= 1.65).On achievement Index, Fadama III performed well in capacity building and productive assets acquired by Fadama Users' Groups, but did not performed well in number of groups reached with advisory services and input support. The overall achievement index was 56.33%. On farmers' contribution to Fadama Users' Equity Fund, Delta and Akwa Ibom States achieved 232% and 101% of the set targets respectively. It was found that Bayelsa State achieved 75% of the set targets for farmers' financial contributions, thus falling below the expected bench mark. Inadequacy of funds, storage facilities, advisory services and input support were the main constraints to Fadama III project. Regressionresult revealed that educational level, farming experience, farm size and contact with local facilitators made significant contributions to farmers' perceptions on achievement of Fadama III activities ($p < 0.05$). There was no significant variation in constraints that faced the project among the three States in the Niger Delta. Thisstudy recommended that opportunities should be given to younger folks to participate in the project and more female-oriented agricultural projects are needed to increase women participation inFadama III.This study has established the importance of the inclusion of beneficiaries in the planning and execution of developmental projects in communities.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

ACRONYMS AND ABBREVIATIONS

ADAP	Accelerated Development Area Project
ADPs	Agricultural Development Programmes
AGM	Annual General Meeting
APMEU	Agricultural Project Monitoring and Evaluation Unit
ANTs	Adoptable New Techniques
ASA	Advisory Services Activity
ASP	Advisory Service Providers
ATAP	Agricultural Transformation Action Plan
CADP	Commercial Agricultural Development Programme
CBN	Central Bank of Nigeria
CDD	Community Driven Development
CDO	Community Development Officer
CIA	Central Intelligence Agency
DFRRI	Directorate of Foods Roads and Rural Infrastructure
EIG	Economic Interest Group
EO	Extension Officer
FACU	Federal Agricultural Coordinating Unit
FAO	Food and Agriculture Organization
FCA	Fadama Community Association
FGN	Federal Government Nigeria
FMOA	Federal Ministry of Agriculture
FUEF	Fadama Users' Equity Fund
FUG	Fadama Users' Group
GDP	Gross Domestic Product
GPA	Glen Park Association
GPS	Global Positioning System
GR	Green Revolution
IIIE	International Initiative for Impact Evaluation
IDA	International Development Association
IITA	International Institute for Tropical Agriculture
IPM	Integrated Pest Management
IVM	Integrated Vector Management
LDP	Local Development Plan
LF	Local Facilitator
LFDC	Local Fadama Development Committee
LFDO	Local Fadama Desk Officer
LGA	Local Government Area
M&E	Monitoring and Evaluation
MDG	Millennium Development Goal
MSADP	Multi-state Agricultural Development Projects
NAFPP	National Accelerated Food Production Project
NAIS	Nigeria Agricultural Insurance Scheme
NBS	National Bureau of Statistics
NDE	National Directorate of Employment
NEEDS	National Economic Empowerment and Development Strategy

NGO	Non-Governmental Organizations
NFDO	National Fadama Development Office
NFDP	National Fadama Development Project
NNPC	Nigerian National Petroleum Corporation
NPC	National Population Commission
NSPFS	National Special Programme for Food Security
OFN	Operation Feed the Nation
PAD	Project Appraisal Document
PAP	Poverty Alleviation Programme
PDO	Project Development Objective
PREEIS	ProjectRelevance Effectiveness Efficiency Impact Sustainability
PRSP	Poverty Reduction Strategy Paper
RBDA	River Basin Development Authority
SFCO	State Fadama Coordinating Office
SFTC	State Fadama Technical Committee
SP	Service Providers
SPAT	Small Plot Adoption Technique
SPC	State Project Coordinator
STCP	Sustainable Tree Crops Program
SWOT	Strengths, Weaknesses, Opportunities, and Threats
T&V	Training and Visit
TTO	Training Technical Officer
UNGA	United Nations General Assembly
USAID	United States Agency for International Development
UNICEF	United Nation Children Education Fund
VEW	Village Extension Worker
WB	World Bank