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...Enhancing rice and cassava value chains for sustainable agricultural transformation.



**Effect of *Value Chain Development Programme (VCDP)* on Income and Food Security of Rice Farmers in Yewa North and Ijebu North-East, Ogun State, Nigeria**

**IFAD RESEARCH REPORT**

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## EXECUTIVE SUMMARY

The International Fund for Agricultural Development (IFAD) in partnership with the Federal Government of Nigeria (FGN) contrived the Value Chain the Development Programme (VCDP) to tackle the challenges facing agriculture in the country, knowing its potential if adequately harnessed. Agriculture contributed almost 40% to Nigeria's GDP in 2017. Smallholder farmers provide over 80% of the food consumed in the country, despite challenges. The farmers face the challenges of high cost of farm inputs, low productivity, poor access to market, poor processing technology, inadequate credit facilities and vicious cycle of poverty which has restrained them from increasing their income and an improved standard of living. IFAD and the Global Masters in Development Practice with its partner universities began a Win-Win field practicum grant for graduate students to conduct an assessment of its intervention in the host countries.

The broad aim of the intervention is to reduce rural poverty and achieve accelerated economic growth on a sustainable basis in the programme area. The research however had three objectives to assess the effect of the programme on the rice smallholder farmers. Since the Value Chain Development Programme (VCDP) was based on impact assessment, the objectives majorly focused on comparisons. The first objective assessed the level of income, physical and financial assets of the farming households. The intervention has greatly increased the income of the beneficiary as noticed in their farming occupation. the physical and financial assets of the farming households have increased and indicators are noticed by the significant improvements recorded in the size/number of landed properties owned 95%, hectares of land under management 98%, crops cultivation 98%, income 97% and profit making which stood at 99%. The second objective focused on the level of productivity of the farming households. The "mean and standard deviation of land cultivation for rice increase from 0.736ha and 0.4899ha to 2.071ha and 1.0688ha". This same increase was recorded for fertilizers used as the "mean and standard deviation increase from 98.3kg and 91.889kg to 323.31kg and 251.87". An increase was also noted in the pesticides used, as the "mean and standard deviation stood at 20.03trs and 81.965ltrs to 103.49ltrs and 302.513ltrs". The intervention brought an increase to herbicides used, with "mean and standard deviation of 12.85ltrs and 31.435ltrs before VCDP, and an increase in mean and standard deviation of 26.32ltrs and 12.915ltrs during the programme". Lastly, an increase was likewise noted in the labour usage, the "mean and standard deviation increase from 12.15 and 6.692(in man days) to 31.76 and 16.197(in man days)".

The third and last objective set out to the level of food security of the farming households. Using the USDA methodology for food security, 6.3 and 3.4% of the farming household without children and household with children respectively, are food secure; 11.0 and 7.7% of the farming household without children and household with children respectively, are food insecure without hunger and 26.5 and 46.6% of the farming household without children and household with children respectively, are food insecure with hunger. Binary logistic regression results reveal the variables that determined the level of food security status of the household respondents, variables assumed to have a positive relationship on household food security status in the model was; sex of the household heads ( $B = 1.724$ ).

The study was conducted in Yewa North and Ijebu North-East local government areas of Ogun state. A total of 300 rice smallholder farmers under IFAD VCDP were interviewed through well-structured questionnaire. Focused group discussion and key informant interviews were also conducted. The data gathered from respondents were analyzed through descriptive and inferential statistics.

Studies revealed mean age of the respondents as 44.3 years, the farmers are in their active and working age and there is less participation of youth in the occupation. It should be noted that, the partnership between the state programme coordinators and stakeholders helped to achieve many of the goals set by the organization. Policies and strategies that involve regulation of the trend of increase in the supply of agro-chemicals in the intervention programme vis-à-vis chemical fertilizer and introducing necessary adjustments are essential to sustain this positive effect.

# CHAPTER ONE

## INTRODUCTION

### 1.1 Background to the Study

Rice is critical for food security throughout Africa, and especially in Nigeria. For many decades, rice had the fastest growing consumption rate among all staple crops, determined in large part by huge growth in demand in urban centers (Africa Rice, 2011). Consumers are exhibiting a shift in preference from traditional staples (such as cassava, maize and yams) to rice (Nigerian National Food Reserve Agency, Federal Ministry of Agriculture and Water Resources, Japan International Cooperation Agency, 2009). There is a demand of 5 million MT of rice yearly in Nigeria. However, only about 3.2 million MT are produced locally (Federal Ministry of Agriculture and Rural Development, FMARD, 2012) with a demand gap of 1.8 million metric tons. The inability to meet rice consumption needs through local production makes the country import-dependent (Onyenweaku and Ohajianya 2008; Akinbile 2010). Nigeria spends about N356 billion annually for about 2 million MT of milled rice (FMARD, 2011).

There is a lot of evidence that agriculture can contribute to poverty reduction beyond a direct effect on farmer's incomes. Agricultural development can stimulate economic development outside of the agricultural sector, and lead to higher job and growth creation. Increased productivity of agriculture raises farm incomes, increases food supply, reduces food prices, and provides greater employment opportunities in both rural and urban areas. Higher incomes can increase the consumer demand for goods and services produced by sectors other than agriculture. Such linkages (or the 'multiplier effect') between growth in the agricultural sector and the wider economy has enabled developing countries to diversify to other sectors where growth is higher and wages are better (DFID 2014).

Diversification outside of agriculture is important to a country's development. This is particularly true in rural areas where about 70% of the world's poorest people live (IFAD, 2012). Haggblade *et al* (2002) estimate that across developing countries, as many as a quarter of the rural population is employed full time outside of agriculture, which constitutes 35-40% of rural incomes. This is not only a pattern amongst the wealthier rural population - the poorest 20% of the population earn an average of 30% of their incomes from non-farm sources (DFID, 2014).

### **1.1.1 Value Chain Development Programme**

The Value Chain Development Programme is a development initiative which is an approach to tackle the challenges faced by smallholder farmers. The six-year Programme is aimed at improving cassava and rice value chains in six states, namely; Anambra, Benue, Ebonyi, Niger, Ogun and Taraba by proffering solutions to low productivity, limited access to productive assets and inputs, paucity of opportunities for value addition, inadequate support services such as extension services and research, inability to access rural financial services, inadequate market and rural infrastructure. The IFAD/FGN adopted the value chain approach to enhance productivity, promote agro-processing, access to markets and opportunities to facilitate improved engagement of the private sector and farmers' organizations.

At present, IFAD-VCD Programme runs in five Local Government Areas – Obafemi-Owode, Yewa North, Ifo, Ijebu North-East and Ijebu East – of Ogun State. This research was conducted in 2 out of 5 implementing local government areas, these areas are Yewa North and Ijebu North-East in Ogun state and the aim will be to evaluate the effect of VCDP Programme on income and food security of rice farmers in Ogun State. During the preliminary investigation, IFAD-VCDP has contributed to the increased standard of living of rice farmers in the area as good number of them could attest to provision of farm inputs, improved market access and linkage to extension services, participation in trainings etc., which has increased their human capacity. For effective examination and monitoring of the intervention, the implementing state (Ogun State) ensured every farmer belonged to a farmer organization and existing ones were also recognized and adjusted to suit the *platform* on which the intervention rested upon.

Most of the world's 767 million poorest people live without reliable income, shelter or food. Saving or borrowing small amounts can make a huge difference to their lives. IFAD is one of the world's largest lenders supporting inclusive rural finance. Our projects help poor rural people gain access to financial services, including savings, loans, insurance and remittances (IFAD, 2017).

### **1.1.2 Food Insecurity in Nigeria**

With over 170 million people, Nigeria is the most populated country in Africa and represents about 47 percent of the population of the whole of West Africa. Agriculture is the major

occupation in Nigeria, employing almost two-thirds of the active work force and contributing 40 percent of the national GDP (Food Security Portal (2014)). However, based on data from U.S. Energy Information Administration (2015), Nigeria has the largest natural gas reserves in Africa and is the continent’s biggest oil exporter. This wealth of resources has helped it maintain Nigeria’s relatively steady economic growth even in the face of recent global financial meltdown. Nigeria leapfrogged South Africa as Africa’s largest economy in 2013 with Nigeria’s GDP growing from \$169.48 billion in 2010 to 522.64 billion in 2014 (Trading Economics, 2014). This development cushioned Nigeria’s economy to 24th largest in the world, behind Poland and Norway and leap-frogging of Belgium and Taiwan. It also means that Nigeria’s GDP per capita substantially rose to \$2689, up from a previous estimate of \$1555(Figure 1). Unfortunately, the new figures will not put more money in the pockets of the common man in Nigeria, where about 70% still live below \$1.25/day (Naisbitt and Naisbitt, 2016). The new figures according to Naisbitt and Naisbitt (2016) only emphasize the level of marginalization in a country in which a generation of multimillionaires and billionaires has emerged.

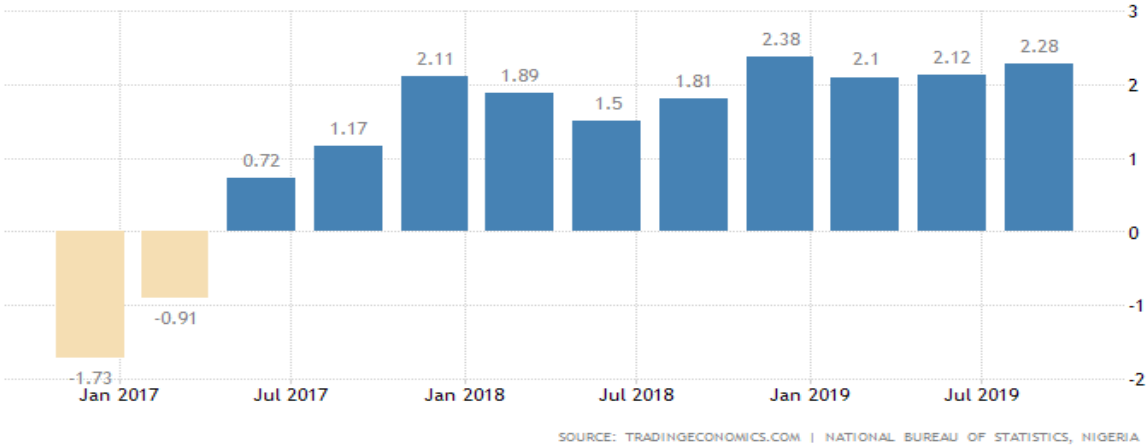


Figure 1. Current Growth in Nigeria’s GDP 2017-2019  
 Source: World Bank

The Food and Agriculture Organization of the United Nations (FAO) estimates that 854 million people in the world lack sufficient food for an active and healthy life, a number that has hardly changed since the early 1990s. The World Food Programme (WFP) provides emergency food aid to millions of people each year – 73 million in 2005 alone – and the number is rising rapidly with the increasing scale and frequency of natural and human-induced disasters (Table 1). Despite the magnitude of the global food security challenge, food aid is relatively small in relation to global



production and trade, averaging about 10 million tonnes per year. This amounts to less than 2 percent of global cereal exports and less than 0.5 percent of global production. Food aid has changed significantly in recent years. Until about a decade ago, most food aid was provided bilaterally on a government-to-government basis and was sold on the open market in recipient countries. But, currently, about 75 percent of all food aid is now targeted directly to hungry people through emergency operations or projects addressing chronic hunger.

**Table 1: Global Food Emergencies, 2005.**

<b>Dominant variable</b>	<b>Africa</b>	<b>Asia</b>	<b>Latin America</b>	<b>Europe</b>	<b>Total</b>
Human	10	3	1	1	15
Natural	8	7	1	0	16
Combined	7	1	0	0	8
<b>Total</b>	<b>25</b>	<b>11</b>	<b>2</b>	<b>1</b>	<b>39</b>

Source: FAO (2006a)

The International Fund for Agricultural Development (2012), rates Nigeria as the number one producer of yam, cassava and cowpea in the world; yet Nigeria remains a food insecure nation and relies heavily on importation of grains, livestock products, and including fish. As previously opined by Omorogiuwa, *et al*, (2014), Nigeria has about 75 percent of its land suitable for agriculture, but only 40 percent is actually cultivated. Majority of the rural populace engage on subsistent farming on small plots of land to feed their households and relying on seasonal rainfall. Lack of access to necessary infrastructures such as roads has further worsened the rural poverty situation by disconnecting the rural farmers from required inputs and the markets (IFAD (2012).

## **1.2 Problem Statement**

Rice grows across all agro-ecological zones (AEZ) in Nigeria (African Rice Centre (AfricaRice), 2011). Longtau (2003) classified six Rice-Growing Environments (RGEs) in Nigeria as; Upland, Hydromorphic, Rain-fed lowland, irrigated lowland, Deep inland water, and Mangrove swamps. Farmers adopt a particular rice production system based on the topography, input, expected output and returns. However, growth in rice production in Sub-Saharan Africa (SSA) has been due to an expansion of the area under cultivation rather than to an increase in yield (Stryker 2010). Imolehin and Wada (2000) put potential hectares of rice production at 4.6 - 4.9 million ha and actual production at 1.7 million ha. The difference between potential and actual yields is

very high. However, there is conflicting information on average yields from different sources. AfricaRice (2019) reports that in 2018 Nigeria had a decrease in rice production of 2.70% compare to 2017 figures (5.70%).

Relying on the import of expensive food on global markets not only stimulates domestic inflation, but also hurts Nigerian farmers, displacing local production and fueling rising unemployment (FMARD, 2012). In 2016, the price of rice doubled over 2015 prices, owing largely to foreign exchange rates and fluctuations in government policy on rice importation. Yet, domestic demand for rice is still high. United States Department of Agriculture (USDA) 2014/2015 estimates showed that of 6.4 million MT domestic demand of milled rice in Nigeria, only 2.84 million MT was produced locally (Live Rice Index [LRI], 2016).

Nigeria farmers have being described as been very poor with low income, especially in the rural area where the farmers are facing low agricultural production (Ijere, 1992). For this reason, they are unable to provide enough funds for agricultural activities. Welfare, though not observable, could be said to represent the people's standard of living. In theory, household's consumption expenditure on food and education is used as proxy for welfare indicators (Quartey, 2005). Many households in Nigeria especially in rural areas which cannot afford to purchase necessary farm inputs or implement such as fertilizers, pesticides and improved seeds, which bring about increases in productivity and hence, increases households income and which will proactively affect the socio-economic wellbeing of household positively (Ukohaet *al.* ,2007).

Low productivity undermines potential food production, food security and stifles income quality and keeps many farming families impoverished, hungry and undernourished. Inability to access capital to buy modern agriculture inputs reduces productivity yield of smallholder farmers. Knowing how much indigenous people rely on farm produce for daily consumption, and the process or efforts put into production, marketing and distribution; farmers' livelihood has not been improved evenly and therefore, some still leave below the poverty line and with little food to even sustain the family. Through value addition interventions, it seems promising for their livelihood to be improved and there is assurance of food security (Ukohaet *al.* ,2007).

Moreover, with the economic downturn experienced by the nation in recent years, there is a need to guide rice farmers on best production system to adopt for optimum yield, increased income and food security for their families, as well as, higher output for the market.

### **1.3 Justification of the Study**

Smallholder farmers, who account for 80% of the agricultural production in Nigeria, have low income and limited access to credit facilities. Hence, high acquisition and maintenance cost of agricultural machinery has limited their capacity for investment in agricultural machinery (Sims and Kienzle, 2016). Smallholder farmers are at higher risk of economic inequality, and generally represent the poorest segment of the population in developing countries, because they are at risk of environmental degradation, lack of access to input and market, technology and capital which has made it harder to lift the smallholder farmers out of poverty. With the increasing pressure on natural resources due to climate change and population growth, small-scale agriculture is one of the best tools to ensure global food security.

Feedback from beneficiaries is fundamental to any development initiative because an effectively implemented project may not have the desired impact on the intended beneficiaries. Impact Assessment serves two main purposes of lesson learning and accountability. There is need to know whether the project has achieved its intended outcomes. There is also the need to determine and learn from the aspect of the project that is working and to identify what is not working. The knowledge gained can provide critical input to the design of future programmes or projects.

### **1.4 Research Questions**

The study provides answers to the following research questions:

1. What is the level of income, physical and financial assets of the farming households?
2. What is the level of productivity of the farming households?
3. What is the level of food security of the farming households?

### **1.5 Objectives of the Study**

The general objective of the study is to evaluate the effect of VCDP Programme on income and food security of rice farmers in Ogun State, Nigeria. The specific objectives are to;

1. assess income, physical and financial assets of the farming households.
2. assess the level of productivity of the farming households.
3. assess the level of food security of the farming households.

## **1.6 Definition of Terms**

**Value Chain:** According to GTZ (German agency for Technical Cooperation) 2008, a value chain is an economic system around a particular commercial product with focus on the addition of value along a sequence of activities of providing inputs, producing, transforming, marketing and consumption, its focus could also be on the degree of coordination and collaboration between value chain operators or enterprises, or the business model for a particular commercial product.

**Income:** Income is money that an individual or business receives in exchange for providing a good or service or through investing capital. Income is used to fund day-to-day expenditures. People aged 65 and under typically receive the majority of their income from a salary or wages earned from a job

**Food Security:** Food security, as defined by the United Nations' Committee on World Food Security, is the condition in which all people, at all times, have physical, social and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life.

## CHAPTER TWO

### LITERATURE REVIEW

#### 2.1 Theoretical Framework

The basis for decision making in agricultural households was modelled by the agricultural household model of utility maximization (Singh, Squire and Strauss, 1986; Sadoulet and de Janvry, 1995). In the model, the agricultural household is seen as a production, consumption, and labour entity in a bid to maximize expected utility. According to Mendola (2007), farming household decisions can be explained in three theoretical models, the peasant profit-maximizing model, utility maximizing theory, and the risk-averse theory. While the profit maximizing theory examines peasant farmers production choices from the point of allocative efficiency of the farming household in the ‘small but efficient’ hypothesis of (Schultz, 1964). The utility maximizing theory explores decision making of the farming household as a family and a business. In effect, it examines how farming households make production and consumption decisions subject to some constraints. The risk-averse theory, on the other hand, encompasses the risk behavior of the farming households in decision making. The theory is related to the ‘safety first’ model in risk studies.

Although farming household decision could be modelled through the theory of profit maximization. The basis of the profit maximization theory rests solely on allocative efficiency, where only the profit outcome is modelled without the input of the farm household decision making process. In reality, this does not work for farming households, hence the need for alternative models where the decision process of the farm family is modelled along with the expected outcome. On this basis, farming households make production decisions, such as value addition, diversification of portfolio, off-farm work, cropping pattern etc. based on either expected utility of consumption/income streams (utility maximization theory) or expected utility in the face of risk as a means of self-preservation (risk-averse theory). In the utility maximization household decision-making theory, the farming households are seen as both household and enterprise. Hence, production and consumption (welfare) decisions are subsumed in the model. The theory postulates that households seek to maximize utility subject to a set of constraints. These constraints include income constraints, production constraints, and time constraints.

### **2.1.1 Theories of Agricultural Development**

The main aim of agricultural development is the improvement of material and social welfare of the people. Therefore, it is often seen as integrated approach to improving the environment and wellbeing of the people of the community (Nwachukwu, 2008).

The first step in the process of agricultural development is to abandon the view of agriculture in pre-modern or traditional societies as essential static. However, the problem of agricultural development is not that of transforming a static agricultural sector into a modern dynamic sector, but of accelerating the rate of growth of agricultural output and productivity consistent with the growth of other sectors of a modernizing economy. Therefore, any attempt to embrace a meaningful perspective on the process of agricultural development must abandon the view of agriculture in pre-modern or traditional society as essential static. Hence, a theory of agricultural development should provide insights into the dynamics of agricultural growth, either into the changing sources of growth, in economies ranging from those in which output is growing at a rate of 1.0% or less to those in which agricultural output is growing at an annual rate of 4.0% or more (European Commission, 2018).

## **2.2 Review of Concepts**

### **2.2.1 Concept of Food Security**

Household food security status has three levels (Nord, *et al*, 2005):

1. Food secure: These households had access, at all times, to enough food for an active, healthy life for all household members.
2. Food insecure: At times during the year, these households were uncertain of having, or unable to acquire, enough food to meet the needs of all their members because they had insufficient money or other resources for food. Food-insecure households include those with low food security and very low food security.
  - i. Low food security (without hunger): These food-insecure households obtained enough food to avoid substantially disrupting their eating patterns or reducing food intake by using a variety of coping strategies, such as eating less varied diets, participating in Federal food assistance programs, or getting emergency food from community food pantries.

- ii. Very low food insecurity (whit hunger): In these food-insecure households, normal eating patterns of one or more household members were disrupted and food intake was reduced at times during the year because they had insufficient money or other resources for food. In reports prior to 2006, these households described as “food insecure with hunger”. Food insecurity exists whenever the availability of nutritionally adequate and safe foods or the ability to acquire foods in socially acceptable ways is limited or uncertain. Globally the number of food-insecure people in the world rose from 849 million to 982 million between 2006 and 2007 (IFT, 2008). According reports 14.6 percent of American’s households were food insecure at least some time during 2008, including 5.7 percent with very low food security (Nord, *et al*, 2005). In spite of the dramatic progress in some areas of nutrition during recent years, FAO (2006a) estimates that 1.02 billion people undernourished worldwide in 2009. Hunger has long been a concern of world leaders, as evidenced by the 1948 Universal Declaration of Human Rights (All Human Rights for All, 1998), stating “everyone has the right to a standard of living adequate for the health and well-being of farming household, Including food” At the 1996 World Food Summit in Rome. Studies done indicate that household’s economic, social and cultural situation are important factors on household’s food security status.

## **2.3 Review of Empirical Studies**

### **2.3.1 Effort of Smallholder Farmers in Agricultural Productivity and Poverty Reduction**

The World Bank notes that the majority of the rural population produces 84 percent of agriculture value-added from 1.8 to 2 million smallholder farmers, who on average owned only 1 hectare of land. Recent estimates indicated that though 55 percent of smallholder farmers have less than 1 hectare of cultivatable land, there are about 30,000 estates cultivating between 10 to 500 hectares.

Department for International Development (DFID) (2004) examined the relationship between agriculture, growth and poverty reductions. It argued that links between agriculture and poverty reduction are forged through four ‘transition mechanisms’ (1) direct and relatively immediate impact of improved agricultural performance on rural income, (2) impact of cheaper food for both urban and rural poor; (3) agriculture’s contribution to growth and the generation of economic opportunity in the non- farm sector; and (4) agricultures fundamental in stimulating

and sustaining economic transition, as countries (and poor people's livelihoods) shift away from being primarily agricultural towards a broader base of manufacturing and services. The study however asserted that the potential for further poverty reduction through these transmission mechanisms depends on the extent to which agricultural productivity can be increased where it is most needed.

In China, agricultural and rural development fueled its economic development and contributed significantly to hunger and poverty reductions. Within a space of 30 years, the incidence of poverty in China fell from 31 percent in 1978 to 9.5 percent in 1990 and then to 2.5 percent in 2008. The possession of food crops per capita increased from 285kg in 1978 to around 400kg in 2008. Among the factors that contributed to the successful agricultural and rural development in China include land reform, agro-market reform, technological innovation, effective agricultural policies, and increased investment. (China – DAC Study Group, 2010). Results from cross-country regressions among developing countries show that \$1 increase in GDP results is significantly more poverty-reduction, when the growth is in agriculture rather than other sectors (Lipton, 2012).

Diao *et al* (2010) examined the relative contribution of agriculture to poverty reduction and growth in six low-income Sub-Saharan African Countries – Ethiopia, Ghana, Kenya, Rwanda, Uganda and Zambia – using economy-wide simulation models. Bearing in mind that an important factor determining the contribution of agriculture to economic growth is the linkages between agriculture and the rest of the economy, the models captured three important areas: (1) disaggregated growth across regions and sectors; (2) employment effects through factor markets and price effects through commodity markets within countries and through foreign trade and (3) household level income and poverty effects according to either income sources or expenditure patterns. The models' results reveal high poverty-growth elasticity with agricultural growth than non-agricultural growth. For example, in the model, a 1% annual increase in Ethiopia's per capita GDP driven by agricultural growth leads to a 1.7% reduction in the country's poverty headcount rate per year. By contrast, a 1% annual increase in per capita GDP driven by non-agricultural growth in the country leads to only a 0.7% reduction in the poverty rate. Overtime, these deviations in the poverty-growth elasticity can translate into significantly different poverty



outcomes. The study concludes that agricultural growth is more pro-poor, primarily because it allows for greater participation of the poor in the growth process (Ibid).

## CHAPTER THREE

### METHODOLOGY

#### 3.1 Study Area

**Ogun** state, western Nigeria, created in 1976 and comprising former Abeokuta and Ijebu provinces of former Western state, the latter carved out of former Western region in 1967. Ogun is bounded by Oyo and Osun states to the north, Lagos state to the south, Ondo state to the east, and the Republic of Benin to the west. It is covered predominantly by tropical rain forest and has wooded savanna in the northwest. Agriculture, the economic mainstay of Ogun, produces rice, corn (maize), cassava (manioc), yams, plantains, and bananas. Cocoa, kola nuts, rubber, palm oil and palm kernels, tobacco, cotton, and timber are the main cash crops. The Agro granite quarries near Abeokuta, the state capital, provide building material for much of southern Nigeria. Mineral resources include limestone, chalk, phosphates, and clay. Industries produce cement, canned foods, foam rubber, paint, tires, carpets, aluminum products, and plastics (Pop, 2006).

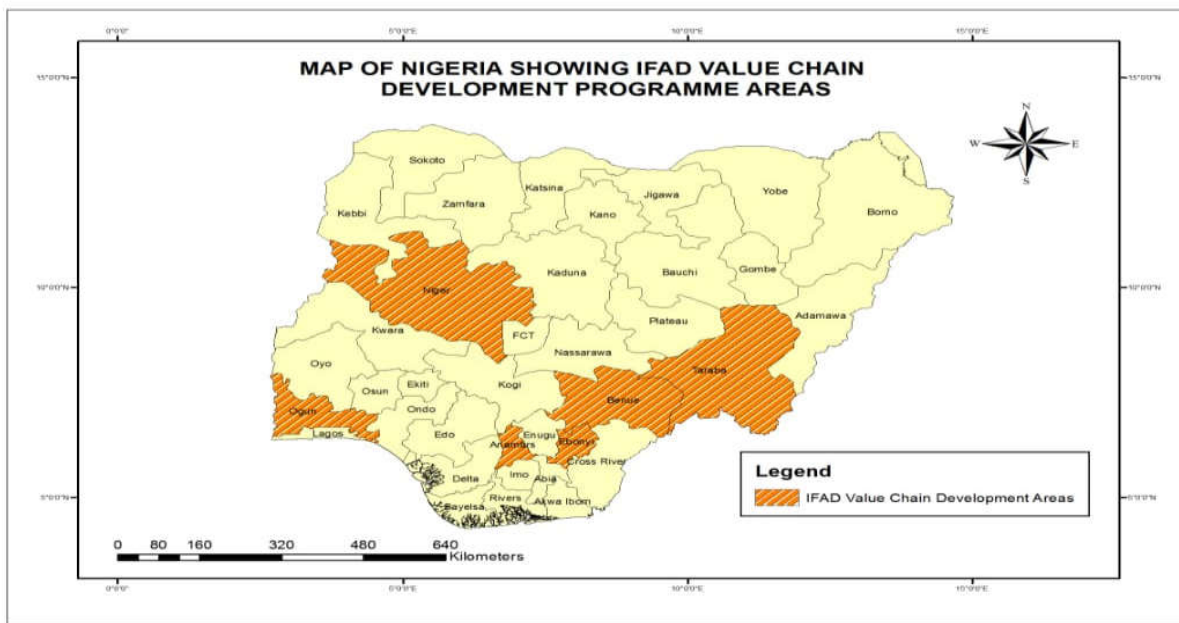
In recent times, rice has been identified as one of the six major cash crops that Ogun State has comparative advantage in producing, and therefore has started drawing attention. The other cash crops apart from rice are: cassava, cocoa, cotton, kola-nut, and oil palm. In spite of the preparation and adoption of Ogun State's document on cash crop policy, there have not been significant improvements in the level of rice production in the State. Current estimates suggest that Ogun State's rice output revolves between 15,000 and 20,000 tons per annum. The area under cultivation is about 12,000 hectares which accounts for a share of 0.7% of national area cultivated to rice (Onabanjo, 2011).

Some of the rice farmers come together to form clusters with a view to creating a kind of self-assistance and boost their production level. Each farmer within these rice farmers' clusters usually cultivates an average of 2 hectares of farmland per planting season. The major reason behind this idea is traceable to the capital-intensive nature of cultivating large hectares of rice farm which is beyond the reach of many small-scale farmers. Hence, they make effort to pool resources such as renting tractors together to during land preparation.

The above necessitates the essence of embarking on a research of this nature, given the vast amount of resources and opportunities Ogun State has for rice production. These opportunities

include: huge ready market for rice paddy; growing market for *OFADA* rice, available land for lowland rice cultivation; availability of land for expansion of upland rice cultivation; rich human resource; high yielding rice varieties; and increasing numbers of agricultural service providers.

Rice can be said to be an increasingly important crop in Ogun State (as in other rice producing States such as: Ebonyi, Osun and Niger: Figure 2) as it has become part of the staple food items that people consume as daily diet. In some areas such as Yewa North and Ijebu North-East LGA as shown in Figure 3, in Ogun State, there is a long tradition of rice cultivation. Regarding the rice varieties grown in Ogun State, some of them are considered traditional varieties, others are recently introduced two decades ago usually grown in paddies or on upland fields, depending on the particular variety.

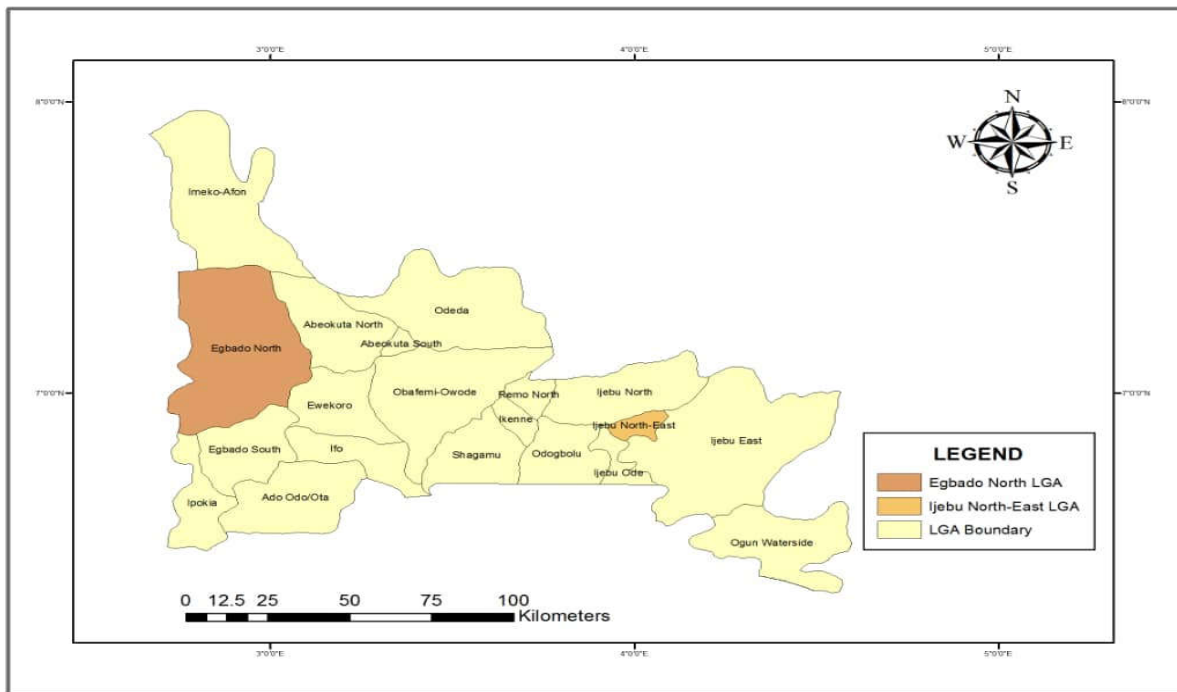


**Figure 2: Map of Nigeria showing the states under IFAD Value Chain Development**

Source: State Socio-Economic Data (<http://yeso.ogunstate.gov.ng/news/Govspeech.pdf>) (NBS)

At present, IFAD-VCDP Programme runs in five Local Government Areas – Obafemi-Owode, Ifo, Ijebu East, Ijebu North-East and Yewa North – of Ogun State (Figure 3). During the preliminary investigation, IFAD-VCDP has contributed to the increased standard of living of rice farmers in the area as good number of them could attest to provision of farm inputs, improved market access and linkage to extension services, participation in trainings etc., which has

increased their human capacity. For effective examination and monitoring of the intervention, the implementing state (Ogun state) ensured every farmer belonged to a farmer organization and existing ones were also recognized and adjusted to suit the *platform* on which the intervention rested upon.



**Figure 3: Map of Ogun State showing the Study Area;Yewa North (Egbado) and Ijebu North-EastLGA**  
**Source: State Socio-Economic Data (<http://yeso.ogunstate.gov.ng/news/Govspeech.pdf>) (NBS)**

### 3.2 Type and Sources of Data

This study employed qualitative survey method through Focus Group Discussions (FDGs), In-depth Interview (IDI) and Key Informant Interviews (KII) and quantitative survey were carried out through administering of questionnaires. Data collected through questionnaire were analyzed using the Statistical Package for Social-Sciences (SPSS) suite. Questionnaires was administered through enumerators after the objectives of the survey have been properly explained and they were properly trained on the questions. Testing of the questionnaires was done in the survey areas after which the answers were reviewed and necessary correction were done to the questions and more explanation were given to the enumerators where necessary.

### 3.3 Sample size determination

Table 2 represents the breakdown of the rice farmers' organizations where the beneficiaries in the different enterprise units were interviewed. Data collected includes; socio-economic data; income, physical and financial assets; productivity level and food security level of the farming households. Besides primary data that were used for the research and secondary data were also used such as the baseline study and mid-term review conducted by the FG/IFAD. The choice of sample selection was informed based on Qualtrics online sample size calculator, with 95% confidence level and margin error (confidence interval) of +/-5% (www.qualtrics.com).

**Table 2: Sample Frame for the Local Government Areas**

LGA	Enterprise Unit	Population Size	Sample Size
Yewa North	Rice Farmers	963	150
	Processors	125	20
	Marketers	15	5
Ijebu North-East	Rice Farmers	258	125
<b>Total</b>		<b>1361</b>	<b>300</b>

Population size total (N) = 1361

Confidence interval = 95%

Margin error = 5%

Ideal sample size (n) = 300

### 3.4 Analytical Methods/Techniques

Data were analyzed applying descriptive statistics, income, estimation of food security index and binary logistic regression analysis. Firstly, a set of brief descriptive statistics that summarize a given data set, were presented. Measures of central tendency and measures of variability or dispersion were used to describe the data set. Measures of central tendency include the mean, median and mode, while measures of variability include the standard deviation and variance.

#### 3.4.1 Analysis of Food Security

This study employed questions in the original USDA Methodology "Guide to Measuring Household Food Security" to analyse rice farming household food security. The methodology was expanded and modified from 18 to 24 questions for easy coding in SPSS. For the questions in

the original scale that included more than two options (such as those with Never true, Sometimes and Often), they were modified and recorded as “YES”. Similarly, questions that included follow up questions like “almost every month, some months but not every month, or in only one or two months” was simplified into often and sometimes, again for easy coding in SPSS (Appendix 1). There were twenty-four (24) questions after the modification, and the scale of analysis was changed. The new scale developed is shown in Box 1.

**Box 1: Modified categorization of food security**

**Categorization of Food Security Status of Households According to the Number of Affirmed Items on the Food Security Scale (Modified)**

*1. Households without children (based on responses to the 11 adult and household items):*

Food secure = households that denied all items or affirmed 1 or 3 items

Food insecure without hunger = households that affirmed 4 to 67 items

Food insecure with hunger = households that affirmed 7 or more items

*2. Households with children (based on responses to all 24 items):*

Food secure = households that denied all items or affirmed 1 or 4 items

Food insecure without hunger = households that affirmed 5

Source: Adapted from USDA (2000); Nord *et al*, (2005)

**CHAPTER FOUR**  
**RESULTS AND DISCUSSION**

**4.1 Socio-economic Characteristics of the Respondents**

A total of three hundred (300) questionnaires were administered to rice farmers using a well-structured questionnaire (Appendix 1) while 266 questionnaires were properly filled and returned representing a return rate of 89.0%. Out of these rice farmers, 47.9% were from Ijebu North-East and the rest 52.1% were from Yewa North (See Figure 4). Table 3 shows that overall, Men are still involved more than women in rice farming in agriculture sector (65.2%), while women stood at (34.8%), this percent of women in rice farming was encouraging and confirmed the findings of ECOWAS/FAO (2018), who stressed that women produce 60 to 80 per cent of food in rural areas in Nigeria. Agricultural interventions targeting women have a direct positive impact on local agricultural production and food security. Women are heavily involved in agricultural production (in particular food crops), but predominantly in post-harvest processing and marketing. Women dominate the buying and selling (retail, not wholesale) of agricultural products (ECOWAS/FAO, 2018). This shows that the VCDP is female gender inclusive (Table 3). More female participation in Agriculture have been encouraged. One of the main focus of VCDP is to empower poor rural people, especially women in all steps of the value chain.

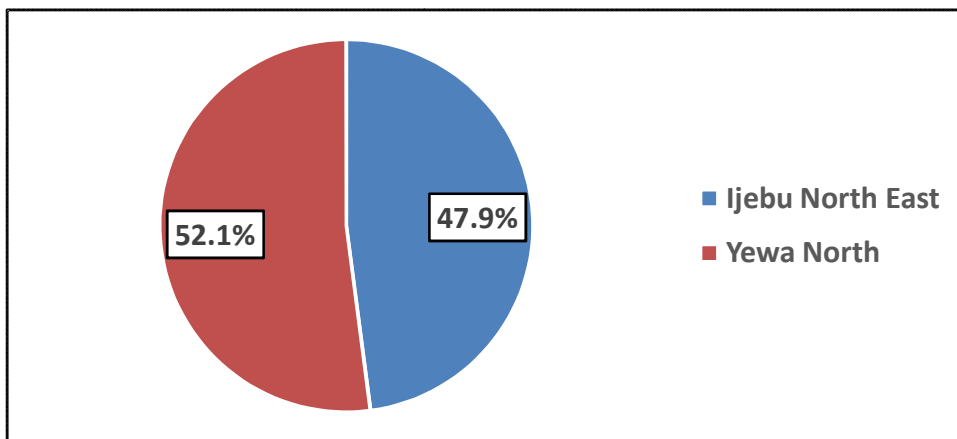


Figure 4: Respondents Disaggregate by Local Government Area of the Respondents  
Source: Field work, 2019

Furthermore, according to the primary occupation, there are more farmers in the value chain, 51.1% of them came from Yewa North while 35.0% came from Ijebu North East, in the processing unit, the percentage stand at respondents from Yewa North while 6.3% and Ijebu

North East stood at 4.2%, 2.4% of respondents on trading Occupation came from Yewa North while those that came from Ijebu North East stood at 0.6%. Lastly, 0.4% of the respondents from Yewa North are Marketers (Figure 5).

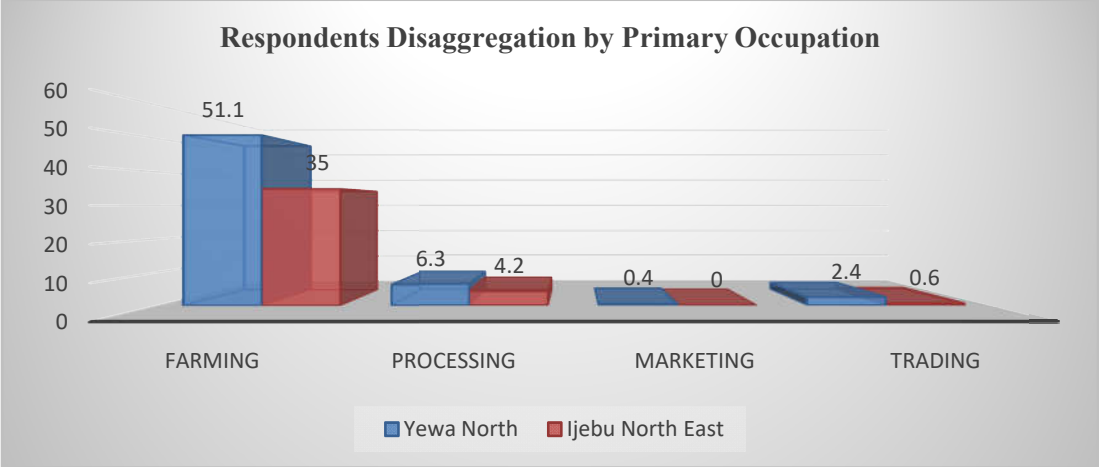


Figure 5: Primary Occupation of the Respondents

Table 3 further shows the mean ages of the respondents. The respondents’ mean age is 44.3 years and the standard deviation is 7.49. This implies that the respondents were in the active and productive age range. Age has been found to determine how active and productive the individual would be, which implies that majority of the beneficiaries in the studied area are energetic and still able to do manual work and it can be concluded that the beneficiaries are in their —working age. Moreover, the spread reveals that 92.5% of beneficiaries were married as at the time of survey, 6.7% of beneficiaries are widowed, 0.4% of beneficiaries had separated from their spouses, and 0.4% of beneficiaries are divorced. The programme has helped the family to bond more together through the regular income. There is very low record of divorced and separated beneficiaries which buttresses the point that marriage, in the African culture is a hallmark of responsibility.



**Table 3: Socio-economic distribution of the respondents**

Item	Result	Yewa N	Ijebu N/E	Pooled	Mean/Std	
Gender						
	(Male)	174 (65.2)	99 (56.9)	75 (43.1)	266 (100.0)	-
	(Female)	92 (34.5)	51 (55.4)	41 (44.5)		
Age						
	26-35	29 (11.6)	20 (68.9)	9 (31.1)	265 (100.0)	44.3/7.49 years
	36-45	125 (46.7)	85 (68.0)	40 (32.0)		
	46-55	84 (31.3)	52 (61.9)	32 (39.1)		
	Above 55 years	27(11.0)	18 (66.7)	9 (33.3)		
Marital status						
	Married	247 (92.5)	158 (639)	89 (36.1)	267 (100.0)	-
Seperated						
	1 (0.4)	1 (0.4)	0 (0.0)			
	Divorced	1 (0.4)	1 (0.4)	0 (0.0)		
	Widowed	18 (6.7)	11 (61.1)	7 (38.9)		
Education						
	No formal edu.	3 (1.1)	3 (100.0)	0 (0.0)	267 (100.0)	-
	Primary edu.	89 (33.3)	61 (68.5)	38 (31.5)		
	Secondary edu.	115 (43.1)	94 (81.7)	21 (18.3)		
	Tertiary edu.	60 (22.5)	44 (73.3)	16 (26.7)		
Household size						
	0-3	5 (1.9)	5 (100.0)	0 (0.0)		5.97/1.50 ppl.
	4-6	178 (67.5)	100 (56.2)	78 (43.8)		
	7-10	79 (29.9)	43 (54.4)	36 (45.6)		
	Above 10 ppl.	2 (0.9)	2 (100.0)	0 (0.0)		
Average Annual Income						
	Below 100,000	2 (0.8)	2 (100.0)	0 (0.0)	267 (100.0)	N460842.7/
	100,000-400,000	112 (42.0)	90 (80.4)	22 (19.6)		N191663.5
	410,000-800,000	147 (54.9)	77 (52.4)	70 (47.6)		
	Above 800,000 Naira	6 (2.2)	4 (66.7)	2 (33.3)		
Farm size						
	0.5-3.0	193 (73.5)	117 (60.6)	76 (39.4)	263 (100.0)	2.73/1.82ha
	3.1-6.0	58 (22.1)	32 (55.2)	26 (44.8)		
	61.-9.0	11 (4.1)	9 (81.8)	2 (18.2)		
	Above 9.0ha	1 (0.4)	1 (100.0)	0 (0.0)		
Year of Farming experience						
	1-10	56 (21.4)	33 (58.9)	23 (41.1)	263 (100.0)	16.7/5.95 years
	11-20	199 (58.9)	109 (54.8)	90 (44.2)		
	21-30	50 (19.0)	41 (82.0)	9 (18.0)		
	Above 31 years	2 (0.8)	2 (100.0)	0 (0.0)		

Source: Field work, 2019

Education distribution of the respondents reveals that a good number of the them have completed secondary (43.1%) and primary (33.3%) school education while 22.5% of the respondents had completed tertiary education. Only 1.1% of respondents have no formal, adult and Arabic education (Table 3). Education level plays an important role in agricultural growth and the studied area indicates a high literacy level among respondents. The level of education could determine the level of opportunities available to enhance food security and reduce the level of poverty. High education status of farmers will enable them acquire knowledge and skills, adopt new inputs such as high-yielding varieties, chemical fertilizers, pesticides and also embrace extension services such as technological advancement as Kareem (2016) pointed out that the major obstacle facing the attainment of the potential benefits of agricultural production in many African countries is inadequate science and technological advancement. The VCDP therefore, is a programme that is targeted at literate farmers.

The spread also reveals the household size and average monthly income of the respondents, with an average of 5.9 and standard deviation of 1.5, there was an increase from the report of Ogun State Government-OSG, (2016), that the number of farming households is about 360,000 persons, which comprises an average family size of 4.8 persons. The average annual income of the respondents' families (farming occupation) stood #490, 842 and the standard deviation stood at #608, 953 (Table 3). This implies that the respondents will have significant saving by end of every year as a result of VCDP programme. In addition, the farm size distribution of the respondents reveals the mean, which stood at 2.7ha and standard deviation at 1.8ha, this finding supports the report of Ogun State Government (2016) which affirmed the average farm size of the members to be 2 hectares. Thus, connoting that rice farming in Ogun State is dominated by small-scale farmers (OSG, 2016). The spread shows the respondent's years of farming experience; the mean value is 16.7 years and the standard deviation is 5.9. Farming experience is important to farmers' efficiency, successful succession planning and even for the competitiveness of the nation's farmers. This mean average of about 17 years farming experience implies that the respondents have the tendency of having a significant savings by end of every month as a result of VCDP Programme.

## 4.2 Income, Physical and Financial Assets of the Farming Households

This section explains the income, physical and financial assets of the respondents before and during the International Fund for Agricultural Development (IFAD-VCDP) intervention.

### 4.2.1 Average Annual Income of the Beneficiary

Table 4 reveals the average annual income of the rice farmers in both farming and secondary occupation before and during the IFAD-VCDP intervention. The percentage increase in annual income of the beneficiaries on their farming occupation before VCDP was 6718.18% and the “mean and standard deviation were 297826.92 and 133764.20”, during VCDP the “mean and standard deviation were 477230.77 and 288698.35”, the percentage increase was 133233.0%. On their secondary occupation, the percentage increase in annual income of the beneficiaries before VCDP was 900% and the “mean and standard deviation were 207688.07 and 93315.54”, during VCDP, the “mean and standard deviation were 308,548.62 and 131171.98”, the percentage increase was 44344.4%. These findings support the report of Food and Agricultural Organization (2017) that rice generates more income for Nigerian farmers than any other cash crop in the country. The implication of this is that, the IFAD-VCDP intervention has greatly increase the income of the beneficiary both in their farming occupation and secondary occupation. Their involvement in the programme as produced a tremendous change in their income.

**Table 4: Income of the Beneficiary of VCDP**

Occupation	Annual Income before VCDP			Annual Income During VCDP		
	% increase	Mean	Std. D	% increase	Mean	Std. D
Farming	6718.18	297826.92	133764.20	133233.0	477230.77	288698.35
Secondary	900.0	207688.07	93315.54	44344.4	308548.62	131171.98

Table 5 also reveals the results of the paired sample test for farming occupation. Decision:  $p$  is less than 0.05, therefore, the test is significant. There is a significant increase between average annual income before VCDP and average annual income during VCDP. This finding corroborates the assertion of Nwanzeet *al* (2006), that the increasing domestic demand for rice in Nigeria has been attributed to increasing incomes, consumer preferences, rising urban population, among others.

**Table 5: Paired Samples Test (Farming Occupation)**

		Paired Differences			95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1	AAI in Naira Before VCDP - AAI in Naira During VC DP	-179247.104	247843.116	15400.222	-209573.243	-148920.966	-11.639	258	.000

Note: AAI = Average Annual Income

#### 4.2.2 Physical and Financial Assets of the Beneficiaries

Table 6 reveals the improvement in ownership/access to physical and financial assets in the last year that is due to the beneficiaries' participation in the intervention Programme.

About 94.7% of the beneficiaries experienced an improvement in size/number of landed properties owned and 4.5% affirmed no changes. More than seventy-nine percent (79.8%) experienced improvement in size of dwelling unit and 20.3% affirmed no change. Seventy-one percent (71.9%) of the respondents affirmed improvement in quality of dwelling unit and 27.7% affirmed no change. Moreover, 36.7% of the respondents experienced an improvement in the means of transport management and 59.2% affirmed no change. Thirty-nine percent (39.3%) of the respondents affirmed an improvement in electrical appliances and 53.6% affirmed no change. Close to two percent (1.5%) of improvement in hectares of land under irrigation, 18.6% affirmed no change and 79.9% affirmed no applicable.

Furthermore, 97.74% of the respondents experienced an improvement in hectares of land under management and 1.1% affirmed no change. Ninety-eighty percent (98.1%) of the respondents affirmed improvement in crops cultivation and 1.1% affirmed no change. Nine percent of them affirmed improvement in livestock water point, 24.4% affirmed no change and 66.83% of them affirmed not applicable. More than forty percent (40.5%) of the respondents affirmed improvement in harvesting system and 56.4% affirmed no change. Likewise, 32.9% of them

experienced an improvement in farm machinery and 58.3% affirmed no change. The respondents the experienced improvement in income stood at 97.4% and just 1.5% of them affirmed no change in their income. More than seventy-three percent (73.7%) of them affirmed improvement in their access to credit and 15.4% affirmed no change. About seventy-nine (78.9%) of them experienced improvement in business assets and 21.1% affirmed no change. Lastly, 99.3% of the respondents experienced an improvement in profit making and just 0.4% affirmed no change. It is worthy of note that, there are five (5) physical/financial assets that have a very significant improvement due to the beneficiaries' participation in the intervention programme, these are; size/number of landed properties owned, hectares of land under management, crops cultivation, income and profit making with over 94% improvement respectively. These findings correlate with the observation of Adewumiet *al.*, (2007) that rice production and processing are profitable ventures in Nigeria and what is required is to encourage investment in rice processing activities.

**Table 6: Improvement in Ownership/Access to Physical and Financial Assets**

Variables	Improving		Worsened		No Change		Not Applicable	
Size/Number of Landed Property Owned	252	94.74%	2	0.75%	12	4.51%	0	0.00%
Size of Dwelling Unit	212	79.70%	0	0.00%	54	20.30%	0	0.00%
Quality of Dwelling Unit	192	71.91%	1	0.37%	74	27.72%	0	0.00%
Means of Transport Improved								
Management	98	36.70%	0	0.00%	158	59.18%	11	4.12%
Electrical Appliances	105	39.33%	1	0.37%	143	53.56%	18	6.74%
Hectares of Land Under Irrigation	3	1.51%	0	0.00%	37	18.59%	159	79.90%
Hectares of Land Under Improved Management	259	97.74%	0	0.00%	3	1.13%	3	1.13%
Crops Cultivated	260	98.11%	0	0.00%	3	1.13%	2	0.75%
Livestock Water Points	18	8.78%	0	0.00%	50	24.39%	137	66.83%
Harvesting System	107	40.53%	0	0.00%	149	56.44%	8	3.03%
Farm Machinery	87	32.95%	0	0.00%	154	58.33%	23	8.71%
Income	259	97.37%	0	0.00%	4	1.50%	3	1.13%

Access to Credit	196	73.68%	0	0.00%	41	15.41%	29	10.90%
Business Assets	210	78.95%	0	0.00%	56	21.05%	0	0.00%
Profit Making	264	99.25%	1	0.38%	1	0.38%	0	0.00%

Source: Field work, 2019

### 4.3 Productivity of the Farming Households

It was observed that due to the intervention (Table 7), the “mean and standard deviation of land cultivation for rice increase from 0.736ha and 0.4899ha to 2.071ha and 1.0688ha”. This same increase was recorded for fertilizers used as the “mean and standard deviation increase from 98.3kg and 91.889kg to 323.31kg and 251.87”. An increase was also noted in the pesticides used, as the “mean and standard deviation stood at 20.03trs and 81.965ltrs to 103.49ltrs and 302.513ltrs”. The intervention brought an increase to herbicides used, with “mean and standard deviation of 12.85ltrs and 31.435ltrs before VCDP, and an increase in mean and standard deviation of 26.32ltrs and 12.915ltrs during the programme”. Lastly, an increase was likewise noted in the labour usage, the “mean and standard deviation increase from 12.15 and 6.692(in man days) to 31.76 and 16.197(in man days)”.

The increased use and accessibility of production inputs resulted in the increased tonnage harvested by the rice farmers and it confirms the impact of the intervention. This increase definitely had a ripple effect on the quantity of rice produced for final consumption, generating more income across board the enterprise unit. As a result of the value addition right from planting, the consumers get to consume better food, fortified with increased nutrients. As Harold and Tabo (2015) also noted that rice is the single most important source of dietary energy in West Africa and third most important for Africa as a whole. Figure 6 revealed the mean difference of the input quantities of used before and during the intervention.

**Table 7: Farming Households Productivity**

Variables	Inputs Quantity (before VCDP)		Inputs Quantity (during VCDP)	
	Mean	Std. D	Mean	Std. D
Land cultivated Rice(ha)	0.736	0.4899	2.071	1.0688
Fertilizers used (kg)	98.34	91.889	323.31	251.87
Pesticides used (ltrs)	20.03	81.965	103.49	302.513
Herbicides used (ltrs)	12.85	31.435	26.32	12.915
Labour (in many days)	12.15	6.692	31.76	16.197

Source: Field work, 2019

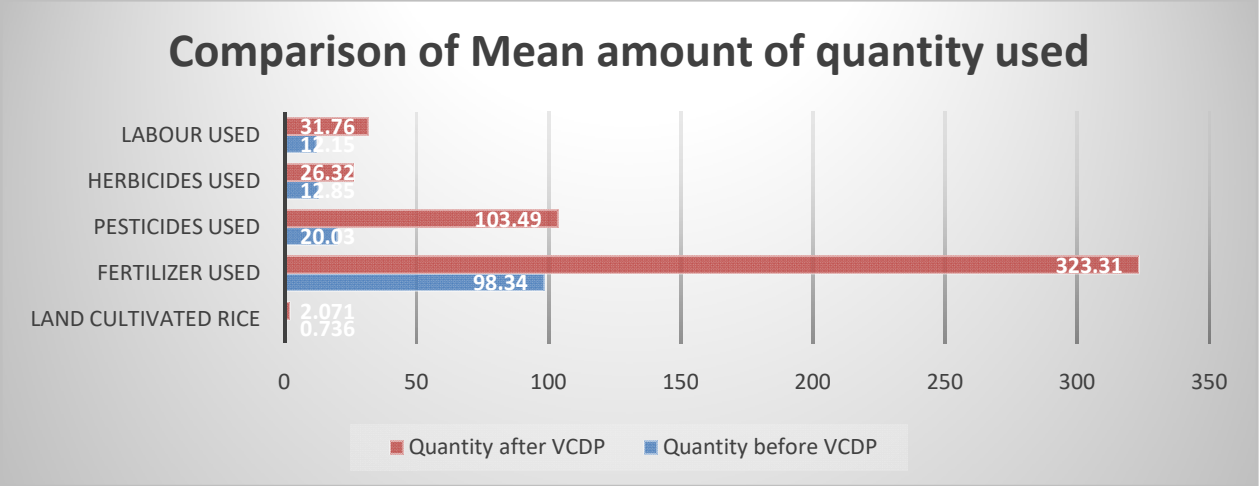


Figure 6: Mean difference of quantity used  
 Source: Field work, 2019

**4.4 Food Security of the Farming Households**

Using the USDA methodology for food security, 6.3 and 3.4% of the farming household without children and household with children respectively, are food secure; 11.0 and 7.7% of the farming household without children and household with children respectively, are food insecure without hunger and 26.5 and 46.6% of the farming household without children and household with children respectively, are food insecure with hunger (Figure 7).

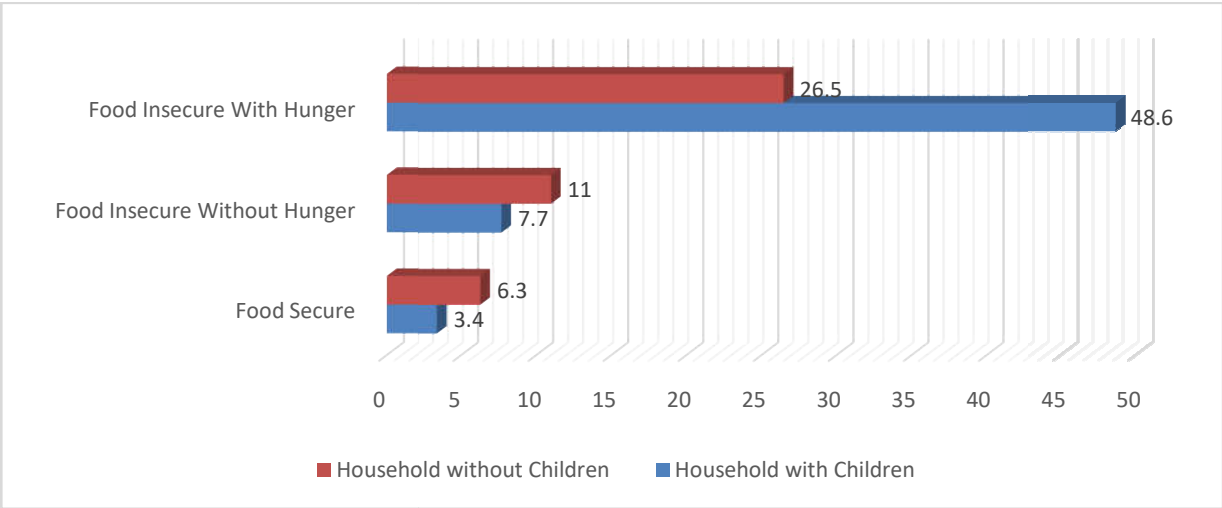


Figure 7: Food security status of the Respondents  
 Source: Field work, 2019

#### 4.4.1 Binary Logistic Regression Results

The result of the binary logistic regression (Table 9) reveals the variables that determined the level of food status of the households. Variables assumed to have influence on household food security in different contexts were tested in the model. The influence of each predictor variable on the response variable is determined by examining the coefficients of each covariate. Positive coefficients indicate positive relationships between variables in the equation and food security status. On the other hand, negative coefficients indicate negative relationships.

The results show that farming household food security status has a significant and negative relationship with High education (2) and (3), and positively but not statistically significant related with sex (Table 8).

Educational status:

The educational status of the household heads was found to be important in determining their food security situation. There was an evidently negative change in the coefficient as the level of education increased thus household heads with better educational status were more likely to be food secure.

Sex:

This variable has positive influence on food security status of farming households with a coefficient of 1.724. This implies that male headed households are 5.609 times more likely to be food insecure than female headed households. The variable has the expected sign and it has no statistically significant explanatory power in explaining the variations in food security status.

---

<b>Model Summary</b>			
Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	104.351 <sup>a</sup>	.193	.415

---

a. Estimation terminated at iteration number 20 because maximum iterations has been reached. Final solution cannot be found.

---



Classification Table <sup>a</sup>					
Observed			Predicted		
			Food Security Status		Percentage Correct
			Food Insecure	Food Secure	
Step 1	Food Security Status	Food Insecure	227	2	99.1
		Food Secure	21	3	12.5
	Overall Percentage				90.9

a. The cut value is .500

**Table 8: Binary Logistic Regression Result**

Variables in the Equation							95% C.I. for EXP(B)	
	B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Resp_Age	-.012	.053	.056	1	.813	.988	.890	1.095
Resp_Sex(1)	1.724	1.363	1.601	1	.206	5.609	.388	81.090
HH_Size	-.083	.222	.140	1	.708	.920	.595	1.423
AvgInc_FarmOcc	.000	.000	2.083	1	.149	1.000	1.000	1.000
High_Edu			14.732	3	.002			
High_Edu(1)	-19.897	22535.527	.000	1	.999	.000	0.000	
High_Edu(2)	-2.251	.895	6.324	1	.012	.105	.018	.609
High_Edu(3)	-2.713	.815	11.080	1	.001	.066	.013	.328
Farm_Size	-.151	.198	.581	1	.446	.860	.583	1.268
AvgIncFOcc_LYR	.000	.000	2.823	1	.093	1.000	1.000	1.000
Constant	-2.674	2.626	1.037	1	.308	.069		

a. Variable(s) entered on step 1: Resp\_Age, Resp\_Sex, HH\_Size, AvgInc\_FarmOcc, High\_Edu, Farm\_Size, AvgIncFOcc\_LYR.

## CHAPTER FIVE

### SUMMARY, CONCLUSION AND RECOMMENDATIONS

#### 5.1 Summary

This study investigated the effect of IFAD-VCDP intervention on the rice farmers and their household. No doubt, the programme has empowered these farmers and made unprecedented impact on Nigeria's agricultural productivity. Rice is critical for food security in Nigeria; hence, farmers need to make appropriate choices of rice production systems to optimize production and ensure an adequate domestic supply. It was revealed from the study that IFAD-VCDP intervention has greatly increase the income of the beneficiary as noticed in their farming occupation. Their involvement in the programme as produced a tremendous change in their income.

Moreover, the physical and financial assets of the farming households have increased and indicators are noticed by the significant improvements recorded in the size/number of landed properties owned 95%, hectares of land under management 98%, crops cultivation 98%, income 97% and profit making which stood at 99%. Other farming households' assets also witnessed some recognizable improvements through their participation in the programme. These improvements in hectares of land under management and crops cultivation earned these farmer households more income and the impact were revealed in their ability to own more assets and improvement in standard of living such as household income, business assets and quality of standard of living.

The level of productivity of farmer household also experience a notable improvement. The increased use and accessibility of production inputs resulted in improved tonnage harvested by the rice farmers and it confirms the impact of the intervention. This increase definitely had a ripple effect on the quantity of rice produced for final consumption, generating more income across board the enterprise unit. As a result of the value addition right from planting, the consumers get to consume better food, fortified with increased nutrients.

Lastly, binary logistic regression results reveal the variables that determined the level of food security status of the household respondents, variables assumed to have a positive relationship on household food security status in the model was; sex of the household heads. Other variable such

as financial capital, farm size, age of the household head and household size, these variables negatively affected households' food security status.

## **5.2 Conclusion**

This study evaluates the effect of IFA-VCDP programme on income and food security of rice farmers. Rice farmers in Ogun State were constrained by poor access to production credit, poor access to markets, low productivity and lack of timely access to improved rice seed and other inputs before the intervention programme. No doubt, the programme has empowered these farmers and made unprecedented impact on Nigeria's agricultural productivity. The findings clearly indicate the role of improved household assets and income in contributing to household food security. The crucial contribution of different forms of capital (financial and physical) to attaining food security can be indirect and direct because it depends on how farmers in the study area utilized the opportunity the intervention afforded them.

Moreover, the results also imply that availability of the supply of chemical fertilizer, pesticide and herbicides can immensely contribute to enhancing food security. Policies and strategies that involve regulation of the trend of increase in the supply of agro-chemicals in the intervention programme vis-à-vis chemical fertilizer and introducing necessary adjustments are essential to sustain this positive effect.

## **5.3 Recommendations**

Based on the findings from this study a set of recommendations for further research and policy Intervention is suggested by the researcher and presented below;

- i. The challenges encountered by farmers in rice production cuts across the value chain. However, the most outstanding challenge was finance for rice farming. In every segment of the rice production process, it has been observed that finance played a significant role in the development of rice processing in Ogun State. There should be an improved financial policy on credit disbursement to the farmer to enhance their level of productivity.
- ii. It was noted in this study as gather in one of the Focus Group Discussion (FDG) session that, the method of rice cultivation and harvesting mostly relied on labour intensive approach at the subsistence level in addition to low level of Agricultural extension

agencies. An alternative, however, to encouraging farmers to increase their production base is through agricultural extension services. Therefore, for the rice farmers to operate at mechanized level of rice production, more support from the VCDP programme is earnestly advocated for. For instance, information gathered from the interview conducted unveils that there is no adequate machine for rice planting which results to drudgery in the planting process.

- iii. In addressing the challenge of labour intensive harvesting and processing, the provision of modern threshing machine at the farmers' disposal through VCDP intervention will no doubt boost rice production and processing; reduce drudgery and time involved in the production process. This will further enhance the market potentials for the finished product. This is because evidences have shown that modern threshing machines significantly reduce the tedious and time-consuming nature of the traditional threshing method. The availability of modern processing machines will not only speed up rice production process but will further reduce the risk of exposure to whether due to moulding and shattering especially when the paddy rice is packed in the field to dry prior to the time of threshing. Most importantly, other losses arising from grain breakages could be controlled when the threshing duration is minimized. This consequently improves the quality and competitive nature of the rice in the international market. Timely delivery of inputs will also help increase productivity.

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## Appendix 1

### QUESTIONNAIRE ON EFFECT OF VCDP PROGRAMME ON INCOME AND FOOD SECURITY OF RICE FARMERS IN OGUN STATE

#### Introduction

This survey is aimed at evaluating the effect of VCDP programme on income and food security of rice farmers in two (2) implementing Local Government Areas of **Yewa North and Ijebu North-East** in Ogun State. This questionnaire is, therefore, designed to elicit information from beneficiaries (rice farmers) of the project on possible changes contributed by the IFAD supported Programme. Whatever information obtained from you will be treated with strict confidentiality. Thank you for your cooperation.

#### Household Questionnaire

##### Section A: General Information

##### A. Social-Economic and Demographic Characteristics of Respondents

Serial No.	Variables	Responses	Code
A1	Questionnaire ID	[ ]	
A2	Interviewer	Name	
A3	Village Saving & Credit Group, LGA and Community	Name	
A4	Age of respondent (years)		[ ]
A5	Sex of respondent	Male Female	[1] [2]
A6	Marital status	Single/never married Married Separated Divorced Widowed	[1] [2] [3] [4] [5]
A10	Household size	Number of people	[ ]
A11	Average monthly income	Amount N.....	
A12	Average monthly Expenditure	Amount N.....	
A12	Highest education attainment	No formal education Primary education not completed (years) Primary education completed Secondary school not completed (years) Secondary school completed Post-secondary education (years)	[1] [2] [3] [4] [5] [6]
A12	Physically challenged	Yes No	[1] [2]
A13	Type of dwelling unit	Self-owned Rented Live free of charge Nomadic/temporary	[1] [2] [3] [4]
A14	Farm size		
A15	Type of enterprise unit	Production (farming) Processing Marketing	[1] [2] [3]



A16	Years of experience in farming		[1] [2] [3] [4] [5]
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1. Which method do you use for land preparation?

Manual [ ], Mechanical [ ]

2. Source of water for total VCDP supported hectare under production?

Rain fed [ ], Irrigated [ ]

### Section B: Farmers' Income, Physical Assets and Financial Assets

B1. Kindly indicate your income due to your participation in IFAD value chain programme

Variable	Before VCDP	Last Year
Average Yearly Income in naira		

B2. Kindly rate the improvement in ownership/access to physical and financial assets as listed in the table below in the previous year that is due to your participation in IFAD value chain programme

Variable	Improving (3)	No change (2)	Worsened (1)	Not applicable (0)
1. Size/number of landed property owned				
2. Size of dwelling unit				
3. Quality of dwelling unit				
4. Means of transport improved management				
5. Electrical appliances				
6. Hectares of land under irrigation				
7. Hectares of land under improved management				
8. Crops cultivated				
9. Livestock water points				
10. Harvesting system				

11. Farm machinery				
12. Income				
14. Access to credit				
15. Business assets				
16. Profit making				

### Section C: Level of Household Productivity

#### C1: Inputs accessed

<b>Inputs accessed</b> Tick (Multiple Responses Allowed)	<b>Improve (3)</b>	<b>No Changes (2)</b>	<b>Worsen (1)</b>
1. Improved Seeds/ stems			
2. Fertilizers			
3. Pesticides			
4. Herbicides			
5. Machinery (threshers, tillers, etc.)			

#### C2: Input Quantity

<b>Inputs</b>	<b>Inputs Quantity (before VCDP)</b>	<b>Quantity (Last year)</b>
1. Land Cultivated Rice(ha)		
2. Land Cultivated Cassava(ha)		
3. Fertilizers used (kg)		
4. Pesticides used (ltrs)		
5. Herbicides used (ltrs)		
6. Labour (in man days)		

**SECTION D: FOOD SECURITY AT THE HOUSEHOLD LEVEL**

S/No	Questions/Statement	Response
1	Has the VCDP project influenced how much food you keep for household consumption?	Yes <input type="checkbox"/> No <input type="checkbox"/>
2	What quantity did you store for your household use? Maize Beans Milk	.....(kg) .....(kg) .....(litres)
3	“In the past twelve months, we worried that our food would finish before we got more or food to buy more.” This happened	Often <input type="checkbox"/> Sometimes <input type="checkbox"/> Never true <input type="checkbox"/>
4	“In the past twelve months, we couldn’t afford to eat balanced diet.” This happened	Often <input type="checkbox"/> Sometimes <input type="checkbox"/> Never true <input type="checkbox"/>
5	In the last 12 months, did you or other adults in the household ever cut the size of your meals or skip meals because there wasn’t enough food?	Yes <input type="checkbox"/> No <input type="checkbox"/>
6	(If yes to Question 4 above) How often did this happen?	Often <input type="checkbox"/> Sometime <input type="checkbox"/>
7	In the last 12 months, did anyone in your household ever eat less than they should because there wasn’t enough food or money for food?	Yes <input type="checkbox"/> No <input type="checkbox"/>
8	In the last 12 months, was anyone from your household ever hungry, but didn’t eat, because you couldn’t afford enough food?	Yes <input type="checkbox"/> No <input type="checkbox"/>
9	In the last 12 months, did you or anyone from your household lose weight because you didn’t have enough food or money for food?	Yes <input type="checkbox"/> No <input type="checkbox"/>
10	In the last 12 months did you or other adults in your household ever not eat for a whole day because there wasn’t enough money for food?	Yes <input type="checkbox"/> No <input type="checkbox"/>
11	(If yes to Question 9) How often did this happen?	Often <input type="checkbox"/> Sometime <input type="checkbox"/>
12	“In the last 12 months, we relied on only a few kinds of low-cost food to feed our children because we were running out of food or money to buy food.”	Often <input type="checkbox"/> Sometimes <input type="checkbox"/> Never true <input type="checkbox"/>
13	“In the last 12 months, we couldn’t feed our children a balanced meal because we couldn’t afford that.”	Often <input type="checkbox"/> Sometimes <input type="checkbox"/> Never true <input type="checkbox"/>
14	“In the last 12 months, the children were not eating enough because we just couldn’t afford enough food.”	Often <input type="checkbox"/> Sometimes <input type="checkbox"/> Never true <input type="checkbox"/>
15	In the last 12 months, did you ever cut the size of any of the children’s meals because there wasn’t enough money for food?	Yes <input type="checkbox"/> No <input type="checkbox"/>

16	In the last 12 months, were the children ever hungry but you just couldn't afford more food?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
17	In the last 12 months, did any of the children ever skip a meal because there wasn't enough money for food?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
18	(If yes to Question 16) How often did this happen?	Often	<input type="checkbox"/>	Sometimes	<input type="checkbox"/>
19	In the last 12 months, did any of the children ever not eat for a whole day because there wasn't enough money for food?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>

**SECTION E: HOSEHOLD ADAPTIVE CAPACITY**

1	Please indicate your number of years of education	.....years			
2	Total number of member(s) of household not working	.....			
3	Have you received training on agricultural practices (such as in crops, livestock, fisheries and forestry) before?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
4	Have you received training in any of these non-agricultural enterprises or those related (crafts, services, metal works, trade etc.) before?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
5	Have you received training on irrigation practices or natural resources management?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>

**Plates**



Plates 1: Researcher at IFAD-VCDP Rice Processing center in Yewa North, Ogun state



Plates 2: De-Stoning Machine used to remove stones from the rice at by IFAD-VCDP Rice Processing center in Yewa North, Ogun state



Plates 3: Researcher with a Rice Farmer at IFAD-VCDP Rice Processing center in Yewa North, Ogun state