UNIVERSITY OF IBADAN, NIGERIA

CENTRE FOR SUSTAINABLE DEVELOPMENT (CESDEV)

MASTERS IN SUSTAINABLE DEVELOPMENT PRACTICE (SDP)

ASSESSMENT OF AWARENESS AND ADOPTION OF IMPROVED CASSAVA PRODUCTION TECHNIQUES IN VALUE CHAIN DEVELOPMENT PROGRAMME BY SMALLHOLDER FARMERS IN BENUE STATE, NIGERIA

FINAL REPORT

BY

BLESSING OBIANUJU NNAMANI

Dr JIMOH SAKA (Academic Supervisor)

SANDRA AGBER (Field Practicum Supervisor)

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ABSTRACT

The Value Chain Development Programme (VCDP) is a six-year project of the government of Nigeria funded by the International Fund for Agricultural Development (IFAD). Benue State is one of the six (6) States in Nigeria participating in the VCDP. IFAD, through VCDP, is assisting smallholder farmers in Benue State to take away the stress of traditional cassava production techniques by using modern improved cassava production techniques while promoting farming as a form of business. It was hypothesized that availability of information and improved cassava production technologies through the VCDP would be very important to improving the level of awareness and adoption of the improved cassava production techniques by smallholder farmers. The main objective of this study was to assess the state of awareness and adoption of improved cassava production technique by smallholder farmers in the state.

Primary data were collected through structured questionnaires. A total of 339 respondents were randomly sampled and interviewed. Data analysis involved the use of descriptive statistics (means and frequencies) and inferential statistics (analysis of variance).

The results showed that VCDP has considerably led to increase in the state of awareness of the improved cassava production techniques through trainings by agricultural extension workers; although level of adoption is still moderate due to some limiting factors such as lack of market for cassava, lack of credit facilities and incessant farmers/Fulani herdsmen. Some of the benefits derived from using the improved techniques are: increase in production, yield and income. Various aspects of farmers' pecuniary wellbeing such as productivity, growth, income, physical and financial assets were also enhanced since their involvement in VCDP. Recommendations are made on the strategies for improvements of the VCDP in the study area.

Key Words: Adoption, Autonomy, Awareness, Production, Technique, Value Chain

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CHAPTER ONE

1.0 INTRODUCTION

1.1 Background of Study

The agricultural sector is the backbone of many economies in the developing countries. Cassava (*Manihot esculenta* Crantz) production is vital to the economy of Nigeria as the country is the world's largest producer of the commodity (FAOSTAT, 2016). In Nigeria, cassava production is well-developed as an important agricultural crop. It has well-established multiplication and processing techniques for food products, industrial starch and cattle feed. There are more than 40 cassava varieties in use. Though the crop is produced in 24 of the country's 36 states (USAID, 2013), cassava production dominates the southern part of the country, both in terms of area covered and number of farmers growing the crop. Benue and Kogi state in the North centrl Zone are the largest producers of cassava (IITA 2004), Cross River, Akwa Ibom, Rivers and Delta dominate state cassava production in the South South. Ogun, Ondo and Oyo dominate in the South West and Enugu and Imo dominate production in the South East.

In 1999, Nigeria produced 33 million tonnes, while a decade later, it produced approximately 45 million tonnes, which is almost 19% of production in the world (IITA, 2013). The average yield per hectare is 10.6 tonnes (IITA, 2013). Cassava production increased from 45,721, 000 tonnes in 2006 to 57,134,478 tonnes in 2016 with 6,261,047(ha) area harvested (FAOSTAT, 2016).

Cassava, which is rich in starch in the form of carbohydrate, has multiple uses. It is consumed in many processed forms, in the industry and also as livestock feed (Adeniji *et al*., 2005). Roots or leaves are made into flours. Flours are of three types, yellow gari, white gari, or intermediate colour, with yellow gari considered the best product in Nigeria. Its other products are as dry extraction of starch, glue or adhesives, modified starch in pharmaceutical as dextrines, as processing inputs, as industrial starch for drilling, and processed foods (Okogbenin *et al*., 2012).

Agricultural information is key to improving agricultural production in any country. Farmers need access to agricultural information if their efforts to improve agricultural production are to be realised (Adomi *et al*., 2003). It is also regarded as an important input in agriculture (Oguya,

2007). The information usually provided is reported to be focused mainly on policy makers, researchers, students and those who manage policy decisions with little or no attention paid to the information needs of farmers who are the targeted beneficiaries of the policy decisions (Omenesa, 2007). If provided with the right inputs, feasible technology and relevant information, small scale farmers are capable of transforming traditional agriculture (Tologbonse et al., 2008).

Information for agricultural and rural communities is a crucial tool in the battle to achieve food security and fight against poverty. Information helps to open up and provide opportunities for the poor to shape up their lives and reduce vulnerability (Ballantyne, 2005). Knowledge and information are basic components to food security.

Adoption (utilization) of innovations is a very important tool to measure the effectiveness and efficiency of agricultural extension (Adedoyin, 2005). A thorough knowledge of the target group and the participation of the target group in the development and dissemination of the technology is a pre-requisite to adoption of the technology in question (Adedoyin, 2005). The need to find out their adoption behaviour and perception of information sources is therefore pertinent.

Agricultural value chains encompass the flow of products, knowledge and information between smallholder farmers and consumers. They offer the opportunity to capture added value at each stage of the production, marketing and consumption process. (Conway, 2012). Smallholder farmers need to better engage with value chains in order to gain added value for improving their livelihoods, whilst reducing their risks and increasing their resilience (Agriculture for Impact, 2014).

As value chains differ considerably across countries and products, more research is needed to identify the optimal configuration enabling smallholder farmers to gain a greater share of their value and assume fewer risks. If agricultural value chains are to offer pro-poor opportunities for growth, then those markets in which smallholders can have a ‘comparative advantage’ need to be identified and the producers actively assisted. Smallholders with a strong social network can draw upon their social capital to strengthen their position within a value chain. (Trienekens, 2011). For example, an effective producer organization or cooperative can help smallholder farmers increase their bargaining power by helping them enter into high-value supply chains and provide support for acquiring information on market prices and requirements

In pursuit of strategic development planning for the agricultural sector the Federal Government of Nigeria and IFAD conducted a Country Programme Evaluation (CPE) in April 2009 which recommended that IFAD intervention be focused on agriculture using a value chain approach. The Value Chain Development Programme (VCDP) design which emerged from the IFAD Country Strategic Opportunities Programme (COSOP) covering the 2010-2015 period is consistent with the CPE recommendations and builds on other value chain (VC) interventions supported by Government, development partners (DPs) and the private sector in Nigeria. It focuses on enhancing market access and productivity increase along commodity chains.

The Value Chain Development Programme (VCDP) is a six- year project of the government of Nigeria funded by the International Funds for Agricultural Development (IFAD). The project aims to improve incomes and food security of poor rural households engaged in production, processing and marketing of rice and cassava on a sustainable basis. VCDP is implemented in six states of Anambra, Benue, Ebonyi, Ogun, Niger and Taraba.

The programme which is domiciled in the Federal Ministry of Agriculture and Rural Development is implemented through the following components:

- agricultural market development which includes (support to value addition and market linkages and support to market infrastructure);
- smallholder productivity enhancement which includes (support to farmers organisation and support to smallholder production); and
- programme management and coordination.

The programme has successfully enhanced the productivity and profitability of over 52,000 smallholder farmers and small/medium-scale agro-processors particularly women and youth by improving their access to markets and capacity to increase yields as well as add value to locally produced raw materials through improved processing and packaging.

1.2 Problem Statement

The government through the Value Chain Development Programme funded by the International Funds for Agricultural Development has made efforts on technology transfer sensitization. In spite of the latter efforts; and availability of information on supply of improved planting materials of cassava , the use of herbicides/pesticides, planting time, use of proper spacing, use of fertilizers, weed control, improved storage and planting methods, there is limited information on the level of adoption of the recommended technologies. An analysis of all available data proved that the primary constraint the cassava sector faces is low productivity due to Nigeria's subsistence cassava culture. The cassava industry is at a rudimentary stage, although large, it is underdeveloped, inefficient and uncompetitive.

Access to adequate information is very essential to increased agricultural productivity (Mgbada, 2006). Agricultural information is meant to get to rural farmers via extension workers, community libraries, radio, television, film shows, agricultural pamphlets, state government agricultural agencies. However, rural farmers in their efforts to access these agricultural knowledge and information from available sources for better farming system and improved agricultural yield are confronted with certain constraints.

Aina (2008) observed that the missing link between research and sustained productions is lack of effective service delivery. There is a wide gap between available knowledge of improved technology and actual practice and this has had a considerable effect on the attempt at increasing food production. Therefore this study is aimed at assessing the state of awareness and adoption of the improved cassava production techniques in VCDP by smallholder farmers in Benue State, Nigeria.

1.3 Justification of the study

As part of the IFAD comprehensive approach for cassava development, Nigeria has been selected to conduct a case study among other countries. The selection of Nigeria is mainly based on the significant level of experience in the growth, development and continued dominance in cassava production. These gains would need to be sustained, especially through a diversification of usage of cassava for industrial purposes, hence the results of this study have potential to provide in-depth information to key stakeholders such as farmers, policy makers, practitioners,

researchers and extension workers on cassava production which may be useful for future project interventions and development policy for cassava subsector.

1.4 Research Questions

What is the state of awareness of the improved cassava production techniques amongst smallholder farmers in Benue State?

What is the level of adoption of the improved production techniques?

What are the factors leading to the adoption of cassava production techniques?

What are the major constraints encountered in the adoption of cassava production techniques?

1.5 Objectives

The broad objective of this study is to assess the state of awareness and adoption of improved cassava production technique by smallholder farmers in order to improve on the project's delivery on proposed achievements.

Specific Objectives:

to assess the state of awareness of the improved cassava production techniques;

to examine the level of adoption of improved cassava production techniques;

to determine factors leading to adoption of improved cassava production techniques; and

to identify major constraints on the adoption of cassava production techniques by farmers in Benue State.

Analysis of Objectives

Breakdown of how the objectives were achieved, process of data collection such as the participatory tools and techniques used, data required to achieve each objective and the analytical techniques used is shown in table 1.1.1 below.

Table 1.1.1 Analysis of objectives of the study

S/No	Objectives	Data Collection	Data Required	Analytical Technique
i.	To assess the state of awareness of the improved cassava production techniques	Participatory tools and techniques for primary data collection, Use of structured questionnaires.	Information on the state of awareness of the improved cassava production techniques by the farmers	Frequencies and percentages, ranking index
ii.	To examine the level of adoption of improved cassava production techniques	Use of structured questionnaire and Focus group discussions	Information on access to and the types of techniques used by the farmers	Frequencies, percentages, charts and chi square.
iii.	To determine factors leading to adoption of improved cassava production techniques	Use of structured questionnaires, Key informant interview and focused group discussions	Information on reasons for, and benefits from the adoption of improved cassava production techniques	Frequencies, percentages, charts, Content analysis.
iv	To identify major constraints on the adoption of cassava production techniques by farmers in Benue State.	Use of structured questionnaire and Key informant interviews and focused group discussions.	Information on the major threats on the access to agricultural information and adoption of cassava production techniques.	Frequencies, percentages, charts, content analysis.

1.6 Research hypothesis

Hypothesis 1(i): Gender has no significant effect on farmers' awareness score

Hypothesis 1(ii): Years of farming experience with VCDP has no significant effect on farmers' awareness score.

Hypothesis 2: There is no association between farmers' level of awareness and production technique used.

Hypothesis 3: There is no difference in adoption score of farmers by gender

Hypothesis 4: Association between Levels of Awareness and Level of Adoption of the Improved Production Technique.

1.7 Scope

The scope of the study is rural residential areas three out of the five participating local government areas in Benue State, Nigeria. The study investigated the state of awareness and adoption of improved cassava production techniques in Value Chain Development Programme by smallholder farmers.

1.8 Definition of Terms

Value chain: describes the full range of value adding activities required to bring a product or service through the different phases of production, including procurement of raw materials and other inputs

In general, the value chain of most agribusinesses is illustrated as follows:

Smallholder farmers: refer to farming households with land holdings of less than ten acres.

Adoption: is the continued use of a recommended practice by individuals or groups over a reasonably long period.

Technique: a particular method of doing an activity, usually a method that involves practical skills.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Basic concepts and theoretical foundations of adoption analyses

Technologies play an important role in economic development. Adoption and diffusion of technology are two interrelated concepts describing the decision to use or not use and the spread of a given technology among economic units over a period of time. Adoption of any innovation is not a one step process as it takes time for adoption to complete. First time adopters may continue or cease to use the new technology. The duration of adoption of a technology vary among economic units, regions and attributes of the technology itself. Therefore, adequate understanding of the process of technology adoption and its diffusion is necessary for designing effective agricultural research and extension programmes. The following sections define basic concepts of technology adoption and diffusion and provide a theoretical background to adoption and diffusion processes.

Adoption and diffusion are distinct but interrelated concepts. Adoption commonly refers to the decision to use a new technology or practice by economic units on a regular basis.

Diffusion often refers to spatial and temporal spread of the new technology among different economic units. Many researchers belonging to different disciplines have defined the two concepts in relation to their own fields. Among others, the definition given by Rogers (1983) is widely used in several adoption and diffusion studies. Rogers (1983) made a distinction between adoption and diffusion. He defined diffusion (aggregate adoption) as the process by which a technology is communicated through certain channels over time among the members of a social system. This definition recognizes the following four elements: (1) the technology that represents the new idea, practice, or object being diffused; (2) communication channels which represent the way information about the new technology flows from change agents (extension, technology suppliers) to final users or adopters (e.g., farmers), (3) the time period over which a social system adopts a technology, and (4) the social system. Rogers (1983) then defined adoption as use or non-use of a new technology by a farmer at a given period of time. This definition can be extended to all economic units in the social system.

The adoption decision also involves the choice of how much resource (i.e. land) to be allocated to the new and the old technologies if the technology is not divisible (e.g. mechanization, irrigation). However, if the technology is divisible (e.g. improved seed, fertilizer and herbicide), the decision process involves area allocations as well as level of use or rate of application (Feder *et al.,* 1985). Thus, the process of adoption decision includes the simultaneous choice of whether to adopt a technology or not and the intensity of its use.

At the early stages of introduction of a new technology, only few farmers obtain full information about the potential economic benefits of the technology and hence the adoption speed is slow.

Individuals must be able not only to access that content, assess its relevance, and apply it to a specific decision, but ultimately to act upon the information. This requires further resources and capacity. For example, content may be available to a community, but it may not be accessed because of, for instance, low levels of literacy, or it may be accessed but not acted upon because of poor financial capacity to buy the necessary inputs. Some studies have shown that farmers who have access to information technology are more likely to participate in agricultural and rural development programmes and other political, social and cultural practices (Anastasios *et al*., 2010).

According to Coudel and Tonneau (2010), information may seem appropriate, usable, relevant, but it can only be useful if the actors have the capacity to use it and if their environment offers them the opportunity to use it.

2.2 Concept of Information

The concept of information needs was coined by an American information Scientist, Robert S. Taylor (1962) in his article "The Process of Asking Questions" published in American Documentation (Now Journal of the American Society of Information Science and Technology). In this paper, Taylor attempted to describe how an inquirer obtains an answer from an information system, by performing the process consciously or unconsciously. According to Taylor (1962), information need has four levels: 1.The conscious and unconscious need for information not existing in the remembered experience of the investigator. In terms of the query range, this level might be called "the ideal question"- the question which would bring from the ideal system exactly what the inquirer, if he could, state as his need. It is the actual, but

unexpressed, need for information. 2. The conscious mental description of an ill-defined area of indecision. In this level, the inquirer might talk to someone else in the field to get an answer. 3. A researcher forms a rational statement of his question. This statement is a rational and unambiguous description of the inquirer's doubts. 4. The question as presented to the information system.

According to Adebayo (2006), information has been identified as an important and crucial variable in the development process. Adebayo (2006) posited that agricultural information is central in enhancing agricultural productivity and facilitating poverty alleviation among rural farmers. Okwu and Umoru (2009) identified information needs of women farmers in Benue State to include the following: improved variety of crops, new cropping systems, new irrigation methods, fertilizer application, and pesticide application, better farm produce processing methods, improved marketing system and better storage system.

Information is regarded as one of the most valuable resources in agricultural and rural development programmes (Morrow *et al.,* 2002). It is also regarded as an important input in agriculture (Oguya, 2007). Nigerian farmers are reported not to feel the impact of agricultural innovation mainly because they have no access to such vital information or due to poor dissemination (Oguya, 2007). The information usually provided is reported to be focused mainly on policy makers, researchers, students and those who manage policy decisions with little or no attention paid to the information needs of farmers who are the targeted beneficiaries of the policy decisions (Omenesa, 2007). If provided with the right inputs, feasible technology and relevant information, small scale farmers are capable of transforming traditional agriculture (Tologbonse *et al*., 2008).

Small-scale farmers' decisions to adopt improved cassava varieties could be explained using a utility model. A typical smallholder-farming household will adopt improved cassava varieties in order to maximize a multidimensional objective function, while at the same time minimizing risks (Strauss *et a*l., 1989). When there is a change in the benefits accruing from adoption of improved varieties, the central question is related to how much compensation would make the decision maker uninterested about the change. Therefore, the change in gains associated with this development could provide a platform for the economic valuation process.

2.3 Adoption of Cassava Production Technologies in Nigeria

Adoption of agricultural technologies, such as the high yielding varieties could lead to significant increases in agricultural productivity and stimulate the transition from low productivity subsistence agriculture to a high productivity agro-industrial economy (Ojo and Ogunyemi, 2014). Azilah (2007) reported that, the adoption of cassava technologies is important in increasing household food security in Nigeria. Mtunda *et al.* (2002) reported the improved technologies in cassava production include proper spacing, land preparation, timely weeding, use of fertilizers/manure, use of improved planting materials, use of insecticides and use of herbicides.

Progress in agricultural development in Nigeria depends to some extent on the willingness and ability of farm families to adopt new farm technologies that are being popularized. Different cassava production techniques and processing have been developed and disseminated but farmers' responses have depended on their perception of benefits derivable from given varieties, socio-cultural suitability and profitability of the production and processing techniques. Despite the release of different cassava production techniques in Nigeria, cassava output per hectare of local farmers is still low (Chukwuji, 2006). This can partly be attributed to farmers continued use of local cassava cultivars or landraces based on known characteristics such as colour, texture, taste and adaptability to mixed cropping systems which form bottlenecks to adoption of improved cultivars.

According to Nwaogwugwu *et al.* (2006), by the nature of their assignment, extension agents are most of the time in the rural areas and secluded from the trend of events in the changing world. Such environments characterized by lack of power supply for simple gadgets such as radio, television sets, personal communication equipment etc. and lack of information service centre do not motivate information sourcing. Consequently, the crave for agricultural information is subjected to the obsolete and inadequate oral – face to face interaction during fortnightly training (FNT) meetings in the Agricultural Development Programmes in Nigeria. Factors that influence information search strategies are not common to all regions in a country. For example, Halakatti, *et a*l., (2010), in the Haveri District of Karnataka, India, examined farmers' use of mass media; television was most used followed by radio and then print media. Meitei and Devi (2009), in rural Manipur in India, found that farmers needed a variety of information related to seed

varieties, pesticides and fertilizer. The preferred medium was radio, followed by television and newspapers. Bhagat *et al.* (2004), interviewed 200 farmers in Jammu and Kashmir, where the most – used information source was contact farmers, followed by the State department of extension staff, and then television and radio. Singh *et al.* (2003) interviewed 80 farmers in Harayana and found that progressive farmers were the most frequently accessed information source. Small farmers cited market prices, weather information, information on diseases and plant protection, and seed information as their top needs (Mittal *et al.,* 2010). Using the Indian NSSO (2005) survey, Adhiguru *et al.* (2009), showed that small and marginal farmers accessed less information and from fewer sources than medium and large scale farmers.

The literature review shows that there are few farm level studies that have been done regarding farmers' access to agricultural information and especially smallholder farmers in different states in Nigeria.

These studies provided information on the use of improved inputs including planting materials, fertilizer, herbicides, extent of adoption and factors that limit adoption decisions of smallholders in Nigeria. Although these studies provided useful information on the rate of adoption and factors influencing adoption, the intensity of adoption was not adequately addressed. In general, the adoption studies had some limitations in their analyses and, thus, did not adequately explain farmers' adoption decisions.

The above summary indicates that there are still research gaps that should be addressed in order to explain farmers' adoption decisions adequately. For instance, adoption is a dynamic process, which results from learning about the new technology overtime. To better understand farmers' adoption decisions, one needs to particularly study farmers who have used the new technology over time.

2.4. Conceptual Framework

The main dependent variable in this study was adoption of improved cassava production technologies, the independent variables included age, size of household, sex, labour availability, farming experience, farm size and education level. The institutional factors were availability of information, extension service and training. Rogers (2003) reported social scientists investigating farmers' adoption behaviour have accumulated considerable evidence showing that demographic

variables, technology characteristics, information sources, knowledge, awareness, attitude, and group influence adoption behaviour.

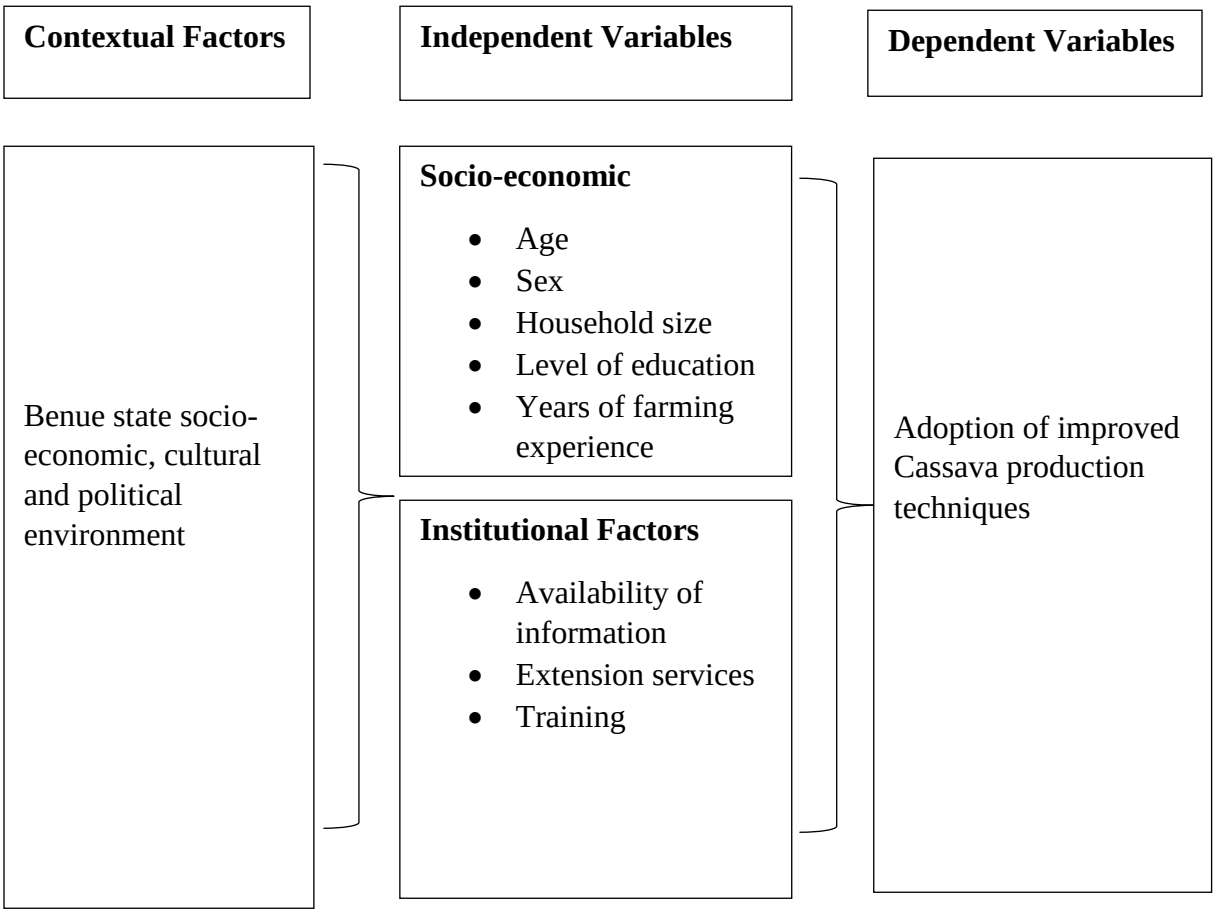

Fig 2.1: Conceptual framework of the study

CHAPTER THREE

3.0 METHODOLOGY

3.1 Timeframe of the Study

	APRIL				MAY				JUNE			
ACTIVITIES	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
Review of baseline study and formulation of research questionnaire and interview guide.												
Conduct of a pretest of the survey instrument.												
Data gathering exercise on the beneficiaries												
Data gathering exercise with the suppliers and markets actors.												
Revisit to the field for clarification.												
Data entry and processing.												
Data analysis.												
Evaluating research findings.												
Reporting result.												

3.2. Research Design

This section covers the description of the type of survey adopted in the study. It defines the population, the sample size as well as the sampling technique adopted in selecting the sample size. Sources of data collection, data analysis and data presentation are part of the research design. This research is designed to study the level of awareness and adoption of improved cassava production techniques by smallholder farmers. The purpose is to assess the role of VCDP in creating awareness and stimulating the use of improved techniques in cassava production. Gwer East, Ogbadigbo and Okpokwu Local Government Area of Benue State constitute scope of field survey. Questionnaire was administered among the benefitting smallholder farmers in the participating LGAs.

3.3. Study Area

The study was carried out in Benue State, Nigeria. Three villages of Gwer East, Ogbadigbo and Okpokwu were selected out of the five Local Government Areas of Intervention by IFAD as shown on the study area location map below (Fig 3.3.2).

Fig 3.3.1: Map of Nigeria showing Benue State

Fig 3.3.2: Map of Benue State showing participating Local Government Areas

3.4. Sources/Nature of Data

For this study, both primary and secondary data were used. The primary data were collected through key informant interviews, focus group discussions, observations, interviews and administration of questionnaires while secondary data were collected from project reports, government data, and newsletters.

3.5. Data Collection

3.5.1 Pre-testing of instruments

Before actual data collection, the questionnaires were pre-tested in one of the villages and administered to thirty four respondents. Pre-testing helped to check the validity and reliability of the questionnaire items. The respondents involved in the pre-test were not included in the actual total sample size of 339 farmers for interviewing. The results of the pre-testing were used to revise the instrument before it was administered to the research sample. Questions that were not clear, specific and pertinent to the study objectives were adjusted accordingly, before embarking on data collection exercise.

3.5.2 Primary data collection

Combinations of methods (triangulation) were used to collect primary data. Primary data were collected using structured questionnaires that were administered to 339 respondents. A checklist was used for Focus Group Discussion (FGD) and key informants' interviews. The questionnaires and checklist were used to obtain information on the level of adoption of improved cassava production technologies and determine the independent and intervening factors that influence the adoption of improved cassava production technologies in the selected villages in Benue State.

3.5.3 Focus group discussion

Focus Group Discussion (FGD) checklist was prepared for sixty cassava farmers. A total of three FGDs were held. The FGDs were important in obtaining information that could not be easily obtained through a questionnaire. A topic guide to aid discussion was prepared before hand and a range of aspects of the topic were explored. Brainstorming techniques were used to explore the topic.

3.5.4 Key informant interviews

In this study, six key informants who were village extension officers and progressive cassava farmers were asked questions on various aspects regarding cassava production including varieties grown, production constraint and priorities and available technologies among others. These people were interviewed to get their experiences on the issues to be researched by using brainstorming techniques.

3.6 Sample Size

A multi-stage random sampling method was employed to survey 339 beneficiaries of the IFAD Value Chain Development Programme in Benue State. The sample size was derived using the Cochran formula:

$$\text{Sample size} = n_o = \frac{Z^2 pq}{e^2}$$

Where:

- e is the desired level of precision (i.e. the margin of error),
- p is the (estimated) proportion of the population which has the attribute in question,
- q is 1-p.
- Z-score is (number of standard deviations a given proportion is away from the mean) at 95% confidence level. (the z-value is found in a Z table).

3.7 Data Analysis

3.7.1 Qualitative data analysis

Qualitative data were analysed by the use of content and structural functional analysis. Content analysis was used to analyse the components of verbal discussion held with different respondents. The basic idea was to summarize the total content of communication to some set of categories that represent some characteristics of research interest (Singleton et al., 1993). In this way, the recorded discussion with respondents was broken down into smallest meaningful units of information, values and attitudes of respondent.

3.7.2 Quantitative data analysis

Quantitative data analysis was done by using descriptive analysis mainly frequencies and percentage to answer the objectives and to summarize the characteristics of households and factors affecting cassava production techniques.

The data was analysed using the statistical package for social scientists (SPSS) version 14.0. Both descriptive and inferential statistics were derived. These were used to describe the study sample in terms of mean, median, mode and frequencies and also make conclusions about the sample population. A chi-square test was conducted to test the significance of the socio-economic factors such as: age, level of education, marital status, years of farming experience and income in determining the level of awareness and adoption of improved cassava production techniques by the smallholder farmers. The chi-square test was conducted using the Karl Pearson's formula.

Karl Pearson's Chi Square Formula is denoted by $X^2 = \sum \frac{(O-E)^2}{E}$

Where:

O = Observed Frequency

E= Expected Frequency

$\sum$= Summation

X^2= Chi Square Value

CHAPTER FOUR

4.0 RESULTS AND DISCUSSIONS

4.1 Socio-economic and Demographic Characteristics of Respondents

The socio-economic characteristics analyzed in this study were age of respondents, sex, marital status, education level, household size, years of farming experience with VCDP, etc.

4.1.1 Sex of the respondents

The study results showed that majority (53.4.%) of the respondents engaged in cassava cultivation were males and 46.6% were females (Table 4.1.1) and that males dominated cassava production in the study area. During the Focus Group Discussion (FGD) male participated more than female, probing on this it was observed that normally women are left at home as they are being involved in reproductive and income generating activities such as food vending, hair dressing, tailoring and petty trading (culture and customs of the region). According to Oladeji *et al.,* (2001) it is generally believed that males are often more energetic and could readily be available for energy demanding jobs like cassava farming. The result from this study relates to findings observed by Nweke *et al.*,(2001) who reported that women were found to contribute less than half of the total labour inputs in the cassava production system in five of the six Collaborative Studies of Cassava in Africa (COSCA) countries.

4.1.2 Age of respondents

According to the results, 46% of the respondents were aged 45 years and above, 27.10% aged between 35- 44 and 14.7% aged between 25-34years (Table 4. 1). This implied that majority of the respondents were above 45 years old. This is the group which owned farms and engaged in cassava production activities.

Table 4.1.1: Socio-Demographic Information of Farmers

Characteristics		Frequency	Percentage
Local Government Area	Gwer East	50	14.7
	Ogbadiagbo	136	40.1
	Okpokwu	153	45.1
Gender	Male	158	46.6
	Female	181	53.4
Marital Status	Single (Never Married)	25	7.4
	Married	294	86.7
	Separated/Divorced	5	1.5
	Widowed	15	4.4
Level of Education	No Formal Education	43	12.7
	Primary Education (not completed)	77	22.7
	Primary Education (completed)	94	27.7
	Secondary Education (not completed)	39	11.5
	Secondary Education (completed)	66	19.5
	Tertiary Education	20	5.9
Type of Association	Cooperative Association	42	12.4
	Processors' Association	5	1.5
	Producers' Association	286	84.4
	Marketers' Association	6	1.8

4.1.3 Marital status

Results show that 86.7% of the respondents who cultivated cassava were married, 4.4% were widowed, 7.4% were single, and only 1.5% were divorced (Table 4.1). During FGD, most of farmers who are married relied on cassava for several household needs such as food, source of income, payments for education and health services. This is due to the fact that these families have more responsibilities than unmarried. Also some of the married women revealed that cassava production is a source of food and that they sometimes exchange it for other crops such as maize and rice. All the farmers said that when they are in financial problems they sell part of cassava produce and get money for other domestic uses. It was also observed that youth, both

men and women were not interested in cassava farming and hence they engaged themselves in other activities like food vending, hair dressing, and fashion designing and petty trading. For Widowed women and single families, both male and female, were less productive due to the fact that they had insufficient labour supply from their families that they can engage in agricultural production. According to World Bank (2009), marital status is said to influence farm practices. Moreover, marital status has implication on social organization and economic activities such as agriculture and resource management as well as adoption of cassava techniques. According to Mende *et al, (*2015) married couples are likely to be more productive than single persons due to labour supply in farm activities and access to productive resources in agriculture.

4.1.4 Level of education

From the results, 27.7% of the respondents who cultivated cassava had primary school education, experience has indicated that they can easily learn and adopt new techniques; Furthermore, 12.7% of the respondents had no formal education implying that they tend to be conservative as they resist even to adopt new innovations. Contrarily, 19.5% had secondary education and 5.9% had college or university education; and they are more knowledgeable and may easily adopt new techniques. Oluwasola (2010), opined that low level of education among the respondents could have serious implications on their ability to access information, use new technological innovations and even access or get credit from formal financial institutions.

4.1.5 Household size

The results show that 60.50% of the respondents had family size ranging between 6-10, 14.20% had family size above 10 (Fig 4.1). Also, 25.40% had family size between1-5. This denotes that families that have more members are engaged in agricultural production particularly cassava production probably because they have more mouths to feed and since the large family size supply the required the labour farming activities. According to Asmelash (2014) the number of people in a household is the factor that influences the adoption of the technology, the bigger the size of the family in a household the higher the chance of adoption; as labour accessibility increases, adoption is also expected to increase.

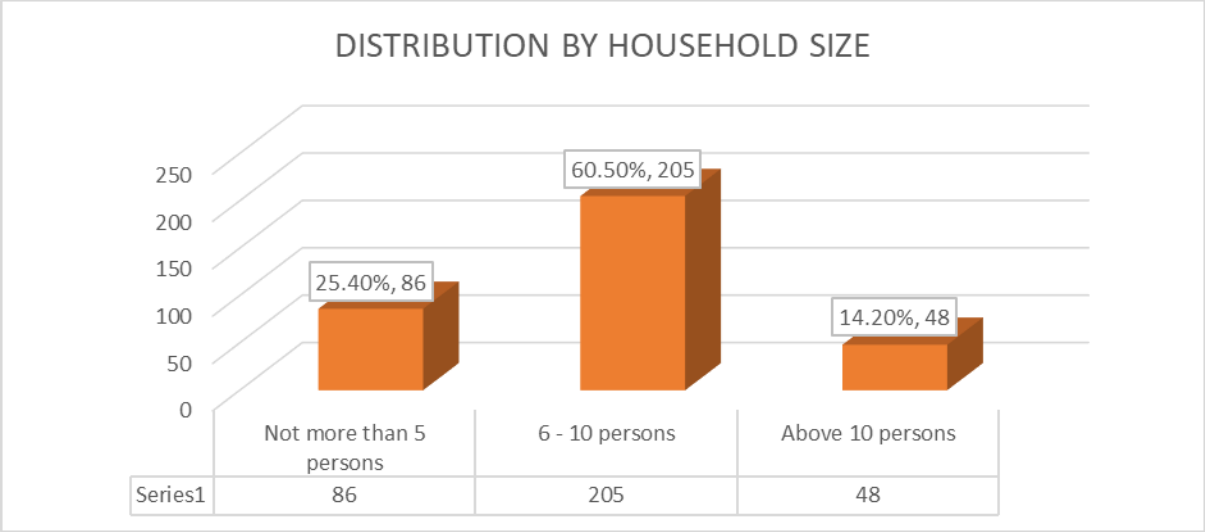

Fig 4.1.5: Distribution of Respondents by Household Size.

4.1.6 Average Income of Respondents

About 37% of the farmers earned between 20,000 (naira) and 39,000 (naira); about 26% earned between 40,000 (naira) and 59,000 (naira); about 14% have income level between "60,000 (naira) and 79,000 (naira); 11% earn "below 20,000 (naira); while about 12% earned 80,000 (naira) or more (Figure 4.1.6)

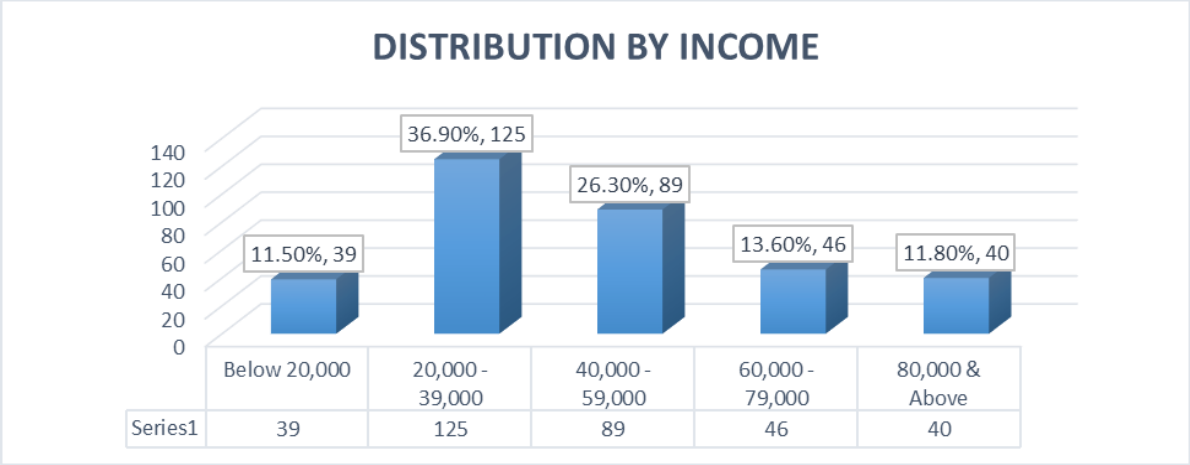

Fig 4.1.6: Average Income of Respondents

4.2. STATE OF AWARENESS OF THE IMPROVED CASSAVA PRODUCTION TECHNIQUES

The study enquired from the farmers their level of awareness on the improved cassava production technique. Table 4.2.1 shows that about 60% indicated they were only moderately aware of the improved technique; about 39% rated their awareness level to be high; while 1% rated their awareness level as low.

Table 4.2.1: Farmers' Self-Evaluation on Level of Awareness

	Frequency	Percentage
High	131	38.6
Moderate	205	60.5
Low	3	0.9
Total	**339**	**100.0**

Enquiry on the farmers' response towards type of production technique employed by the farmers. It was found that about 5% of them used the traditional technique, while about 95% of them used the modern/improved technique in their production technique.

Table 4.2.2: Farmers' Response on Type of Production Technique Used

	Frequency	Percentage
Traditional Technique	18	5.3
Modern/Improved Technique	321	94.7
Total	**339**	**100.0**

Further enquiry was made to find out the farmers' sources of information on the use of improved technique of cassava production. Up to 94% of them indicated they learnt about the improved technique through the Agricultural extension workers; about 57% indicated they learnt about the improved technique through Trainings/Workshops/Seminars; only about 37% indicated they

learnt about the modern techniques through Informal contacts; 43% and 16% stated they learnt about the modern techniques through Radio and TV Programmes respectively; only about 3% indicated they learnt about it through the internet. This result proves that agricultural extension workers, trainings and seminars and radio programmes are the major sources of information in the study areas.

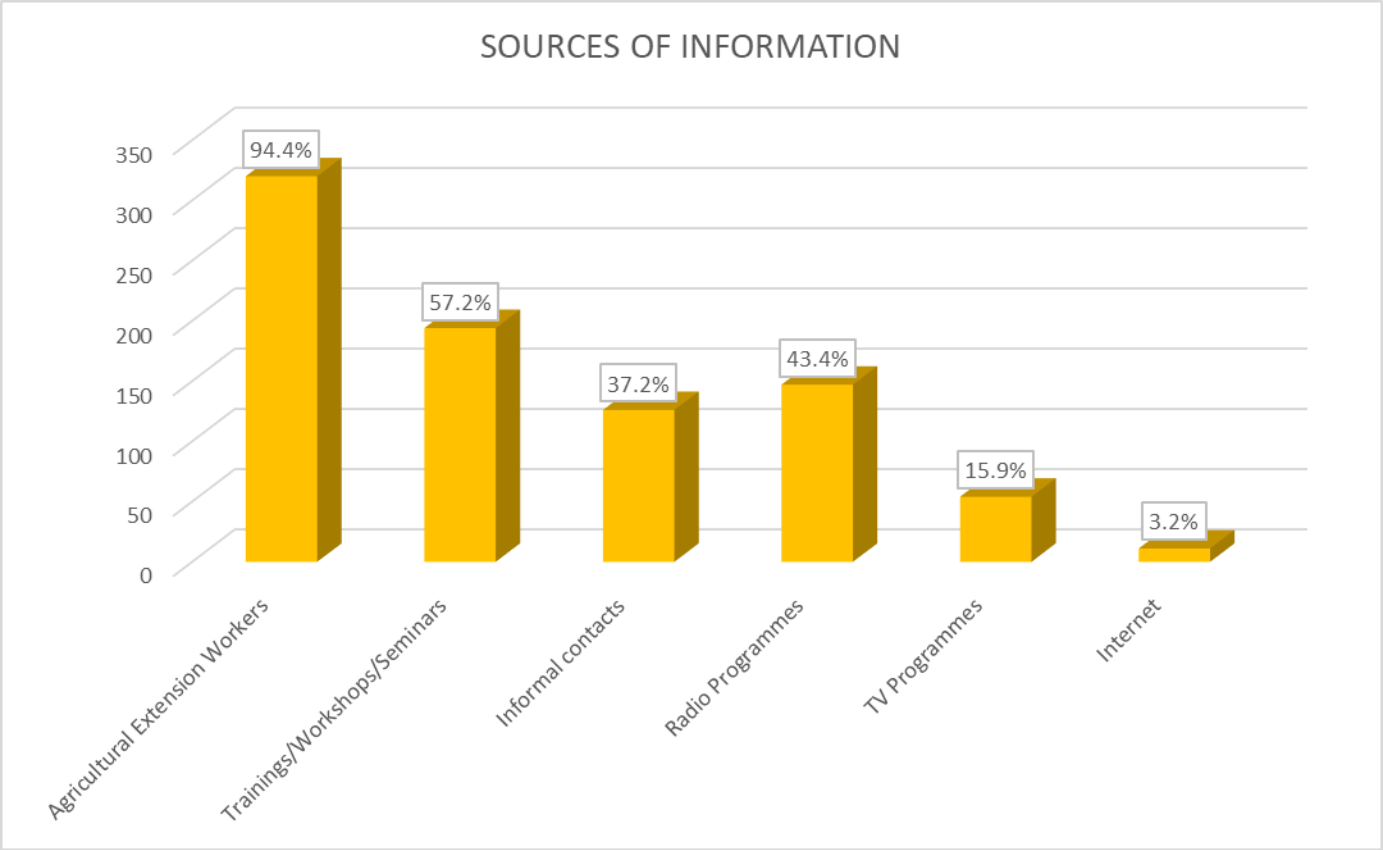

Fig 4.2.1: Distribution of respondents based on sources of information

The study also found out that among various factors that influence choice of channels, up to 39% of the farmers stated "Ability to understand the format" was the most prominent factor; "Accessibility/Distance to the source" was rated as the second mostly chosen factor, as indicated by 28% of the farmers; about 19% indicated "Ability to read" is their major factor to influence their choice of channels for information; the least, 14%, stated that "Affordability" is the major factor that influences their choice of channels.

Table 4.2.3: Response on Factors Influencing Choice of Channels

	Frequency	Percentage
Ability to understand the format	132	38.9
Ability to read	65	19.2
Accessibility/Distance	96	28.3
Affordability	46	13.6
Total	**339**	**100.0**

The study also found that approximately 99%, of the farmers had received training on the use of improved technique for cassava production.

Table 4.2.4: Farmers' Response on Training

	Frequency	Percentage
Received Training	337	99.4
Not Received Training	2	0.6
Total	**339**	**100.0**

EVALUATION OF FARMERS' LEVEL OF AWARENESS ON IMPROVED PRODUCTION TECHNIQUE

A scaled score of 1 to 20 was developed from appropriately selected observed responses in Section B of the research instrument. Details on the selected items, the scoring protocol and score classification criteria can be seen on Tables i and ii of the Appendix.

The obtained range in the score was 6 to 20, with an average score of approximately 13, and a standard deviation of 2.4 as seen on Table 4.2.5 below.

Table 4.2.5: Descriptive Statistics on Scaled Awareness Level among the Farmers

	Min.	Max.	Mean	Std. Dev.
Awareness Score	6	20	12.6	2.35

Based on the farmers' scores from the researchers' scaling, Table 4.2.6 shows that about 10% were observed to have a high level of awareness; up to 87% were classified to have a moderate level of awareness; while not more than 3% were classified to have a low level of awareness.

Table 4.2.6: Categories of farmers by scaled awareness level

	Frequency	Percentage
High	35	10.3
Moderate	295	87.0
Low	9	2.7
Total	**339**	**100.0**

Hypothesis 1(i): Gender has no significant effect on farmers' awareness score.

The independent samples t-test was used to test the hypothesis on difference in the estimated awareness level between male and female farmers, and also between farmers with more than 2 years of experience with VCDP and farmers with not more than 2 years of experience with VCDP at 5% level of significance. The average score among female and male farmers was approximately 12 and 13 respectively; the t-test value was 1.93, with a degree of freedom of 337, thus a p-value of 0.06. The p-value being greater than 0.05 implied that the statement of the null hypothesis was accepted. Conclusion was made that there is no difference in the awareness score of male and female farmers. By implication, it can be said that the awareness level of both female and male farmers are the same.

Table 4.2.7: Association between gender and farmers' awareness score.

	Awareness Score	Std. Dev.	t-value	DF	P-Value
Female	12.38	2.12	1.93	337	0.06
Male	12.87	2.57			

Hypothesis 1(ii): Years of farming experience with VCDP has no significant effect on farmers' awareness score.

Contrarily, the average score among farmers with more than 2 years and those with not more than 2 years was approximately 12.18 and 13.14 respectively; the t-test value was -3.79, with a degree of freedom of 337, thus a p-value of 0.00. The p-value being less than 0.05 implied that the statement of the null hypothesis was rejected. Conclusion was made that there is a statistically significant difference in the awareness score of farmers with more than 2 years and those with not more than 2 years. By implication, it can be said that the awareness level on improved technique of farmers with not more than 2 years of experience with VCDP was significantly lesser than those with more than 2 years of experience with VCDP. The implication of this is that farmers with greater years of experience are more aware about improved technique of cassava production. This might be attributed to past experiences of similar interventions which they might have benefited from.

Table 4.2.8: Association between years of farming experience with VCDP and farmers' awareness score.

	Awareness Score	Std. Dev.	t-value	DF	P-Value
Not more than 2 years	12.18	2.06	-3.79	337	0.00
More than 2 years	13.14	2.59			

Hypothesis 2: There is no association between farmers' level of awareness and the production technique used.

The Chi-square test statistic gave a value of 16.05, at 2 degrees of freedom, with a p-value of 0.00. The p-value being less than 5% implied the statement of the null hypothesis was rejected. Thus, it can be said that there is a significant association between level of awareness and the type of technique used by farmers in cassava production. This implies that the level of awareness contributes to the type of techniques adopted by the farmers for the production of cassava.

Table 4.2.9: Association between Farmers' Level of Awareness and the Production Technique Used

	Low	Moderate	High
Traditional Technique	3	15	0
Modern/Improved Technique	6	280	35
	Chi-square (2 d.f.)		16.05
	Pr.-value		0.00

4.3. LEVEL OF ADOPTION OF IMPROVED CASSAVA PRODUCTION TECHNIQUE

Table 4.3.1 shows the farmers' form of land ownership. About 77% inherited their farm lands; about 14% indicated rented their farm lands while about 9% purchased their farm lands.

Table 4.3.1: Farmers' Response on Land ownership

	Frequency	Percentage
Purchased	30	8.8
Rented	47	13.9
Inherited	262	77.3
Total	**339**	**100.0**

It was also revealed that about 95% of the farmers use the "1m by 1m" spacing technique; about 4% make use of the "1m by 1.5m" spacing technique; while 0.3% make use of the "1.5m by 1.5m" spacing technique as shown on table 4.3.2 below.

Table 4.3.2: Farmers' Response on Spacing Technique Used

	Frequency	Percentage
1m by 1m	323	95.3
1m by 1.5m	15	4.4
1.5m by 1.5m	1	0.3
Total	**339**	**100.0**

USE OF FERTILIZERS AMONG THE FARMERS

Table 4.3.3 shows that about 94% of the farmers used fertilizers in their cassava production, only about 6% of the farmers claimed not to use fertilizers. Among those who use fertilizers, 94%, use inorganic fertilizers; while 6% use organic fertilizers. During FGD farmers said that Inorganic fertilizers are expensive. A few number of farmers who applied organic fertilizer said that it is difficult to apply due to high labor requirements and limited availability.

Table 4.3.3: Farmers' Response on Use and Types of Fertilizers

	Frequency	Percentage
Used Fertilizers	317	93.8
Organic fertilizer	18	5.7
Inorganic fertilizer	299	94.3

USE OF FARM TOOLS AMONG RESPONDENTS

Hand hoes" were commonly used, by about 90% of the farmers; about 16% used of Motorized tools while about 4% use Animal power (Figure 3). During the FGD, farmers disclosed that motorized tools are either expensive to purchase or are not readily available.

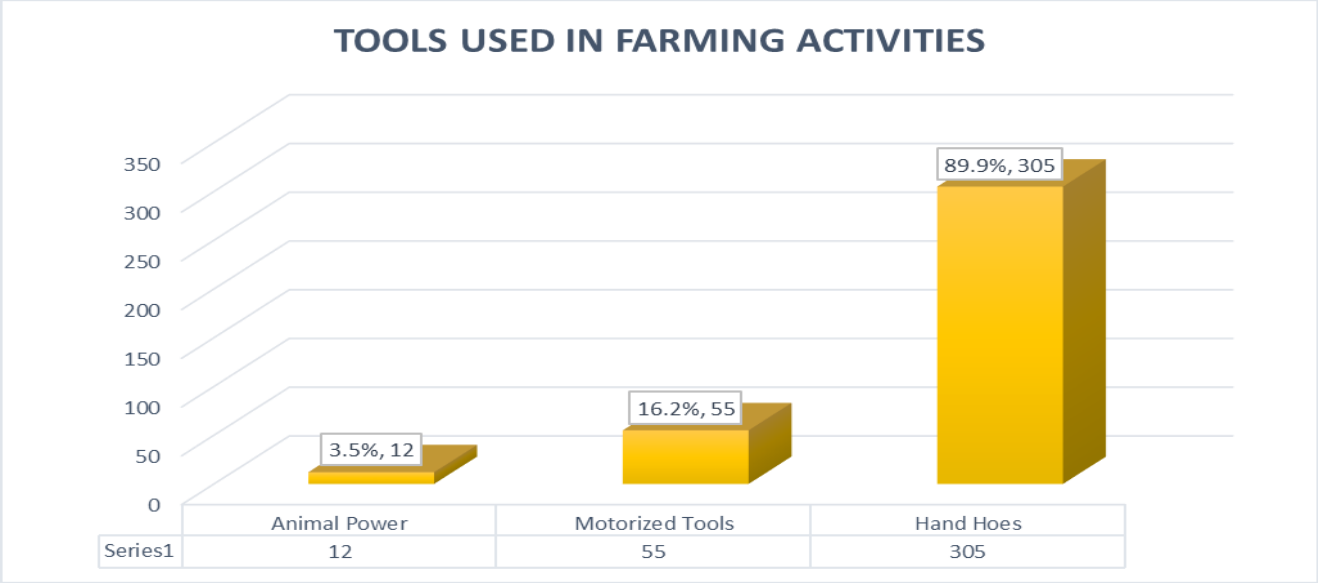

Fig 4.3.1: Tools used in by Farmers in the study area.

Farmers' Self-Evaluation on Level of adoption

Table 4.3.4 reveals that about 32% of the farmers rated their level of adoption of the improved technique to be high; about 66% rated their level of adoption of the improved technique as moderate; while about 2% rated their adoption level as low.

Table 4.3.4: Farmers' Self-Evaluation on Level of adoption

	Frequency	Percentage
High	110	32.4
Moderate	223	65.8
Low	6	1.8
Total	**339**	**100.0**

Hypothesis 3: There is no difference in adoption score of farmers by gender

The average score among female and male farmers was approximately 11 and 11 respectively; the t-test value was -1.66, with a degree of freedom of 337, thus a p-value of 0.09. The p-value being greater than 0.05 implied that the statement of the null hypothesis was accepted. Conclusion was made that there is no difference in the adoption score of male and female farmers. By implication, it can be said that the adoption level of both female and male farmers are equally likely. Therefore adoption level does not depend on gender. Future interventions should therefore give equal consideration to both male and female farmers.

Table 4.3.5: Relationship between Gender and Level of Adoption of the Improved Production Technique.

	Adoption Score	Std. Dev.	t-value	DF	P-Value
Female	10.71	2.28	-1.66	337	0.09
Male	11.12	2.21			

Hypothesis 4: Association between Levels of Awareness and Level of Adoption of the Improved Production Technique

To check the association between the farmers' level of awareness and their level of adoption of the improved production technique, the Chi-square test of independence was used.

The Chi-square test statistics gave a value of 47.63, at 4 degrees of freedom, with a p-value of 0.00. The p-value is less than 5%, hence the null hypothesis was rejected. Thus, it can be said that there is a significant association between level of awareness of the farmers and their level of adoption of the improved/modern production technique.

Table 4.3.6: Association between Level of Awareness and Level of Adoption of the Improved Cassava Production Technique

	Low Awareness	Moderate Awareness	High Awareness
Low Adoption Level	4	10	0
Moderate Adoption Level	4	134	25
High Adoption Level	1	151	10
	Chi-square (4 d.f.)		47.63
	Pr.-value		0.00

4.4. FACTORS INFLUENCING ADOPTION OF IMPROVED CASSAVA PRODUCTION TECHNIQUE

Table 4.4.1 shows that about 97% of the farmers used the improved production technique, while the remaining 3% did not use the improved production technique. Further enquiry among those who use the improved production technique, showed that the most prominent factor influencing adoption of the improved production technique is "high yield of food and cash", as indicated by about 46%. The second commonest influential factors was knowledge/skills on cassava farming, as stated by 38% of the farmers who have used the improved production technique. About 7% claimed that access to credit facilities is a major factor influencing adoption of the improved technique. 4% indicated availability of agricultural inputs as the major factor that influences their adoption of the new technique.

Table 4.4.1: Use of Improved Cassava Production Techniques and Factors Influencing Adoption of the Improved Production Technique

	Frequency	Percentage
Use Improved Production Technique	328	96.8
Knowledge/Skills on Cassava Farming	126	38.4
Access to Credit Facilities	22	6.7
High Yield of Food and Cash	150	45.7
Availability of Agricultural Inputs	12	3.7
Resistance to Diseases	18	5.5

Benefits Derived from Cassava Production

As indicated by 97% of the farmers, the major benefit derived from cassava production was increasing household income. About 95% indicated they had benefited by provision of food; about 27% indicated they had benefitted by availability of animal feed from the cassava production as shown on figure 4.4.1 below.

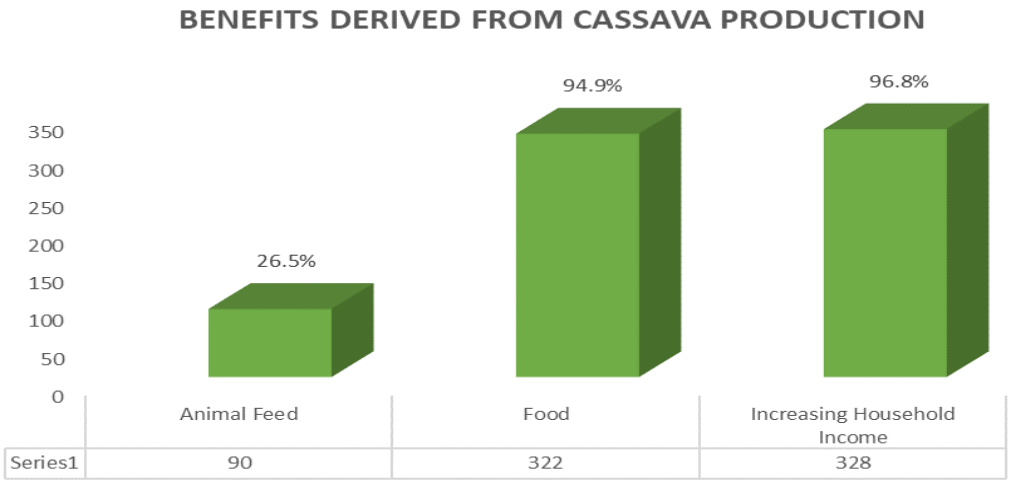

Fig 4.4.1: Distribution of respondents based on Benefits derived from Cassava Production

Benefits of Using Improved Cassava production Techniques

Seventy one percent of the respondents identified increased yield as the benefit derived from the Improved Production Technology. About 53% stated they had experienced increase in

production; 20% stated that they had benefitted by having significant reduction in labor, since the adoption of the new technique. About 12% stated they have benefited from the use of improved production through reduction in pests and diseases.

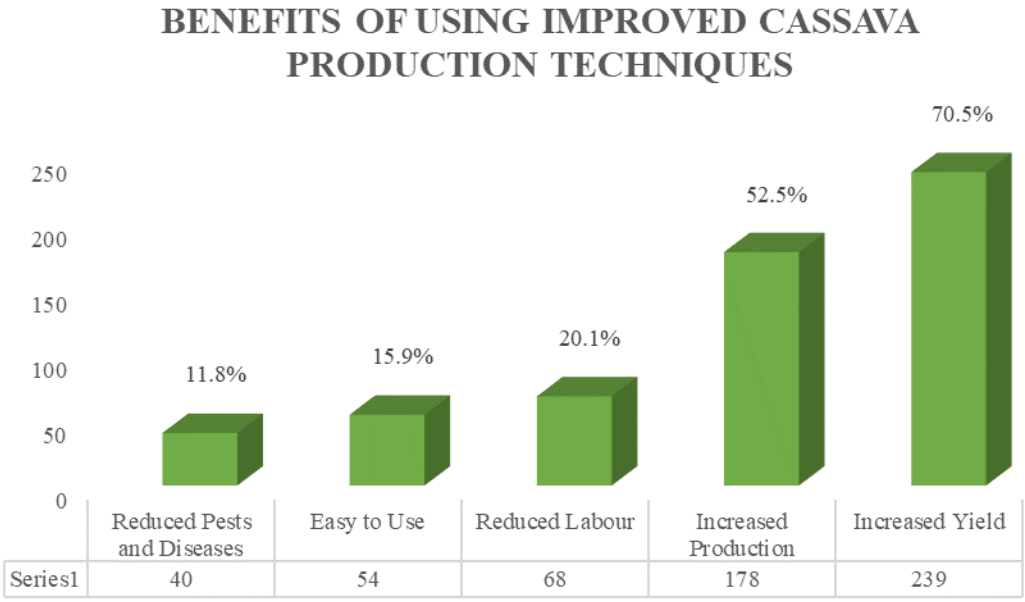

Fig 4.4.2: Distribution based on Benefits of Using Improved Cassava Production Techniques

4.5. MAJOR CONSTRAINTS IN ADOPTION OF THE IMPROVED CASSAVA PRODUCTION TECHNIQUES.

The study also sought to find out from the farmers the major barriers encountered in their quest to access information on improved production techniques. As revealed on figure 4.5.1 up to 81% of the farmers indicated that they had barriers in cost of accessing the needed information; about 48% identified lack of time as a barrier they encountered; about 17% stated that language was a major barrier in their access to information while only 10% indicated illiteracy as a barrier to their access to information.

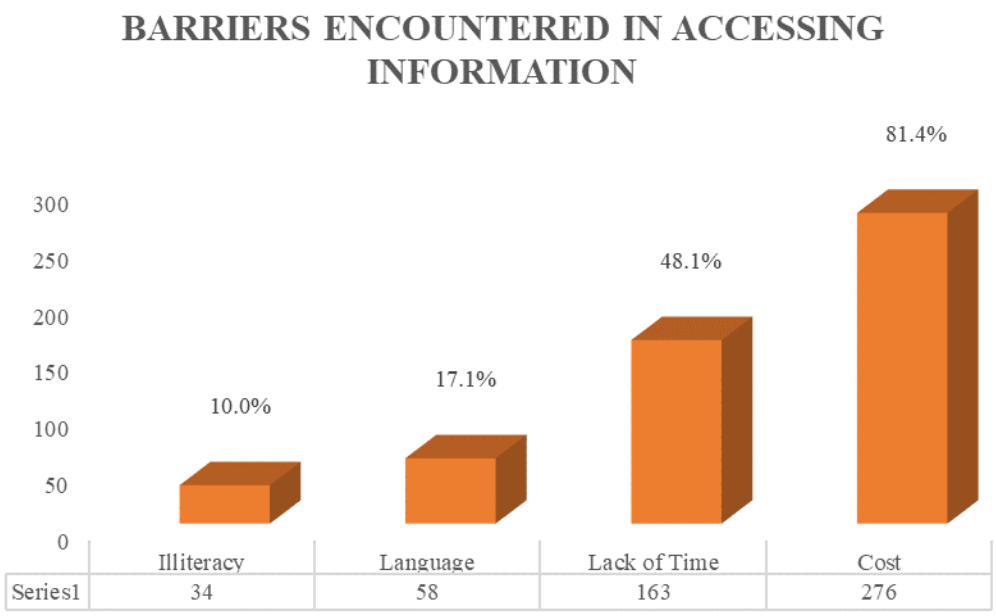

Fig 4.5.1: Distribution based on Barriers Encountered in Accessing Information

Constraints to Cassava Production

Figure 4.5.2 shows that lack of market for cassava is the constraint to 83% of the farmers. About 45% stated the conflict between the farmers and herdsmen was a major constraint they have faced in their cassava production. Other constraints stated were; inadequate planting materials (40%), ; poor soil fertility (34%); prevalence of pests and diseases (33%) ; poor quality of planting materials (16%), lack of access to land (15%), frequent violence (about 9%), ; and drought (about 8%).

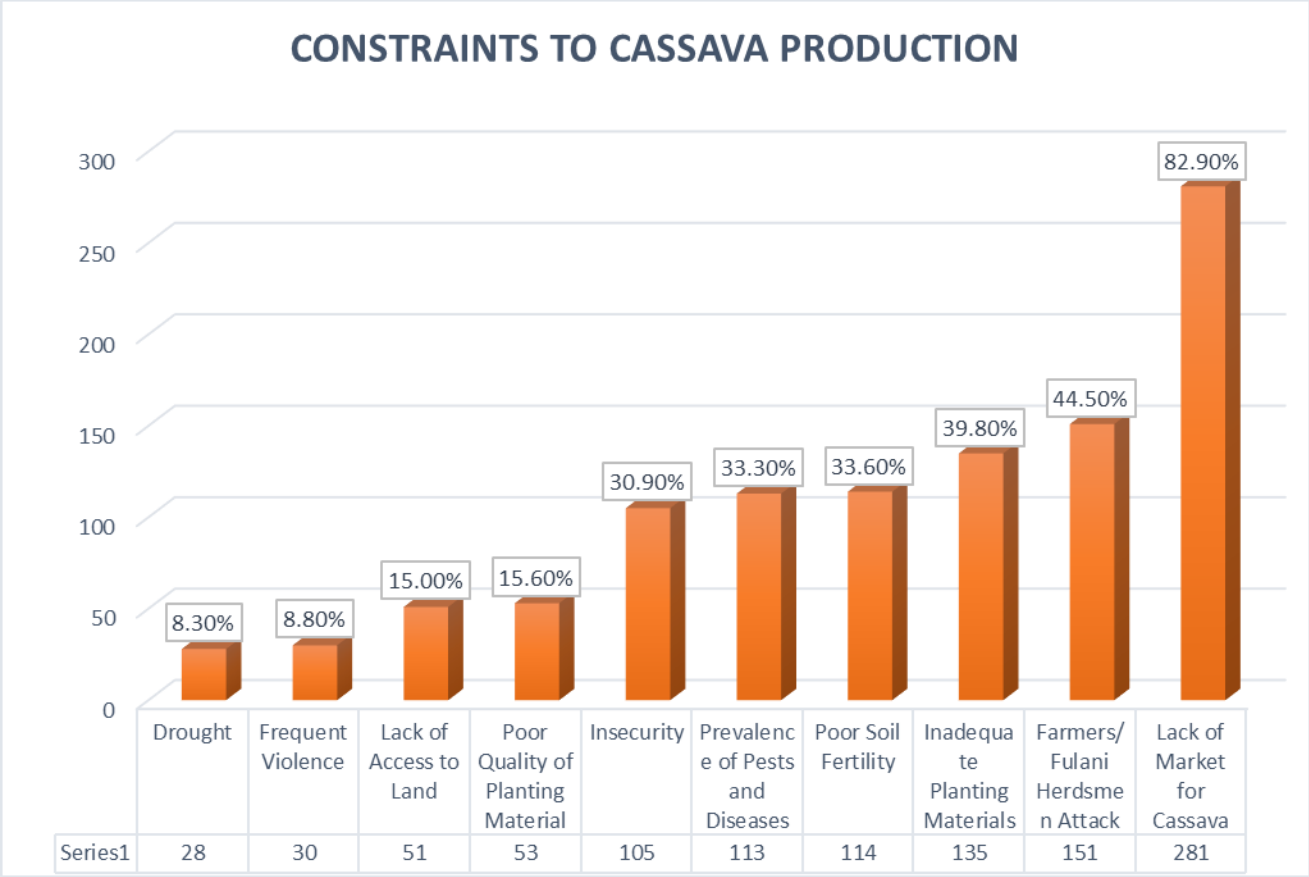

Fig 4.5.2: Distribution based on Constraints to Cassava Production

BARRIERS TO THE PRACTICE OF IMPROVED CASSAVA PRODUCTION TECHNIQUE IN THE STUDY AREA.

In conclusion, barriers experienced in practice of the improved production technique, as seen on figure 4.5.3 revealed that “lack of funds” was the most mentioned barrier the farmers had faced in their practice of the improved production technique, as indicated by 81% of the farmers; about 64% mentioned “lack of access to credit facilities” as their major barriers in practice of the improved production technique; 25% indicated “lack of training” has also been a barrier faced by the farmers.

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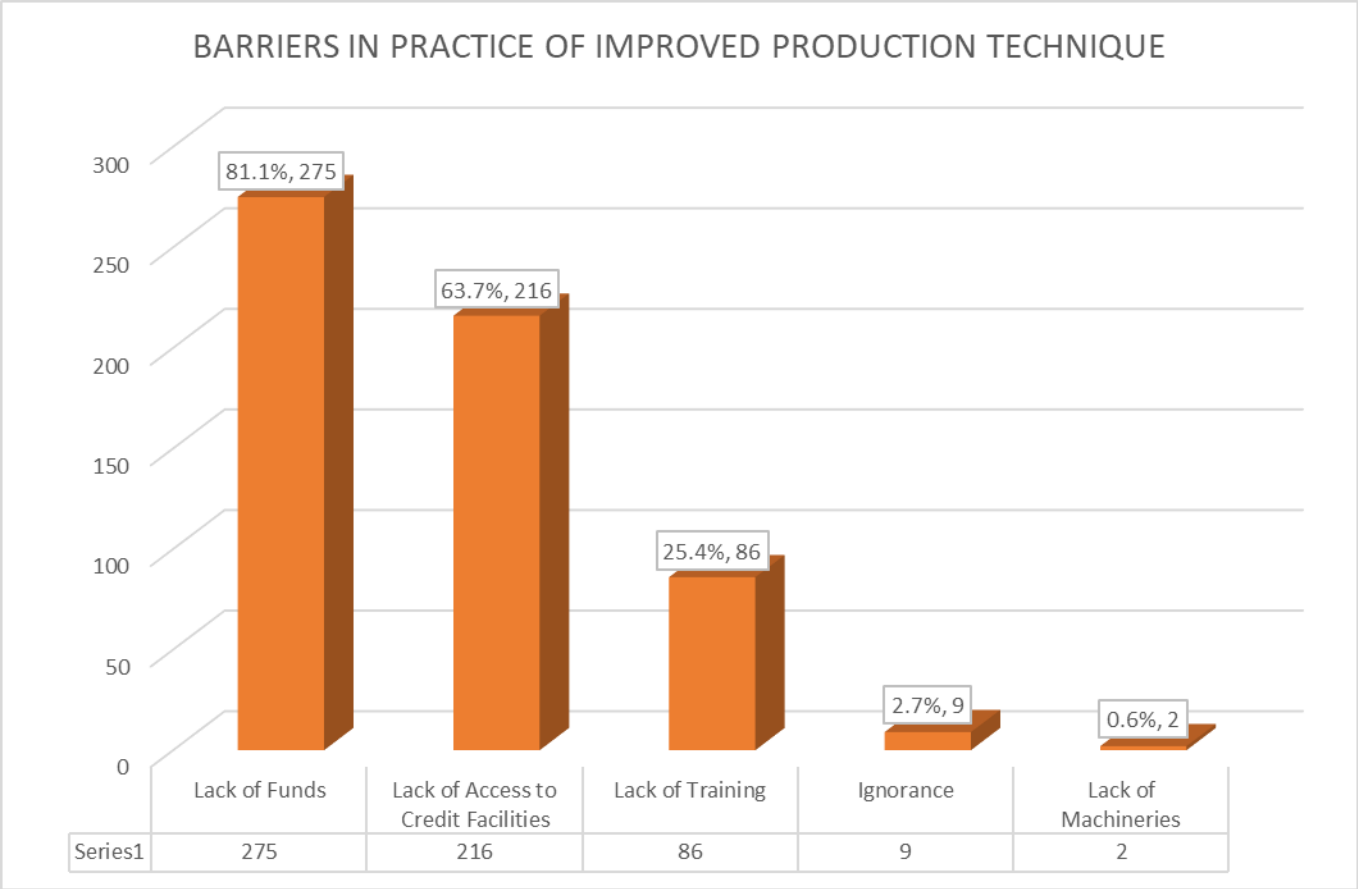

Fig 4.5.3: Distribution based on Barriers in Practice of Improved Cassava Production Techniques

CHAPTER FIVE

5.0. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The purpose of the study was to assess the level of awareness and adoption of improved cassava production techniques. The results have clearly shown the following:

Majority of the farmers were moderately aware of the improved cassava production techniques while a few percentage rated their level of awareness to be high, also most of the farmers indicated they learnt about the improved techniques through agricultural extension workers and trainings/seminar/workshops. Results also showed that there is no association between level of awareness and gender of farmers; this implies that awareness level of male and female are the same. Findings also shows that famers with more than two years of farming experience with VCDP are more aware about improved cassava production techniques.

Also, majority of the farmers indicated that high yield of food and cash was the most prominent factor influencing their adoption of the improved cassava production techniques.

Additionally, most of the farmers indicated that the major benefits of producing cassava was increasing yield and production.

Furthermore, majority of the farmers showed that cost of accessing needed information was the major barrier they had in accessing information followed by lack of time and language barrier. Also, most of the farmers mentioned lack of market for cassava as a major constraint in cassava production, another major constraint was the farmers/herdsmen conflicts which has led to displacement of some of the farmers. Lack of funds was the most mentioned barrier the farmers had faced in their practice of the improved cassava production technique.

VCDP has led to increase in household income and food. Also high yield and increased production through the use of improved cassava production techniques.

VCDP has also played an important role in providing information on the improved production techniques although more efforts need to be made to further enhance the adoption of these techniques.

5.2 Recommendations

- Financial institutions, both governmental and private should provide friendly conditions such that farmers can easily access soft loans with minimum interest rates.
- Ministry of agriculture through research centers should make efforts on availability of improved technologies to farmers such as use of improved variety, motorized tools, and planting methods to sensitize cassava farmers; hence adoption of cassava improved technologies.
- Government through extension workers should improve extension services delivery to farmers through the use of local language in radio and television on improved technologies for cassava production.
- The participating LGAs through agricultural extension officers should organize adequate seminars and workshops for farmers in order to improve production and productivity of cassava as well as adoption of techniques
- Government should facilitate support for smallholder farmers by linking them to viable cassava off takers to buy large quantities of cassava for commercial purposes thereby increasing cassava production and preventing glut.
- Enforcement of the anti-open grazing law passed by the State Government in order to reduce the farmers/herdsmen crisis.
- Promotion of industrial uses of cassava and diversification of processing options to encourage increased cassava production and enhance rural income.
- There is the need for applying organic fertilizers and bio-pesticides which are less costly, environmentally friendly and reduces the hazard inherent in the application of mineral fertilizers and synthetic agrochemicals.

These would undoubtedly increase the farmers' skills, knowledge and adoption of improved techniques in cassava production and hence increase production and productivity thereby improving the living standard of the farmers in the areas as well as contribute to arresting food insecurity in the country.

5.3 Challenges

- Farmers/ herdsmen conflicts which led to displacement of some of the farmers and also delay in data collection.
- Language barriers which was overwhelmed with the use of interpreters

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APPENDICES

Appendix 1: QUESSTIONNAIRE ON ASSESSMENT OF AWARENESS AND ADOPTION OF IMPROVED CASSAVA PRODUCTION TECHNIQUES IN VALUE CHAIN DEVELOPMENT PROGRAMME BY SMALLHOLDER FARMERS IN BENUE STATE, NIGERIA.

PREAMBLE

Dear Sir/Madam

My name is Blessing Obianuju Nnamani and I am studying for a master's degree at the University of Ibadan, Centre for Sustainable Development.

I would appreciate your contribution to this study on assessment of the impact of IFAD VCDP on awareness and adoption of improved cassava production techniques by smallholder farmers in Benue State. The objective of the study is to assess the state of awareness and adoption of improved cassava production technique by smallholder farmers in Benue State, Nigeria.

The information you provide will be confidential according to the research regulations of the University of Ibadan. Thank you for your co-operation.

Name of the Enumerator:
Miss/Mr..…….

Questionnaire No…….. Date …….. Time …… Mobile No.…….

Name of the respondent
(Optional)…….

Location: …….

Enumerator's Signature: …….

Instructions: Please tick in the appropriate box or write in the provided space.

Section A: Socio-Economic and Demographic Characteristics of Respondents

Serial No.	Variables	Responses	Code
1	Local Government Area	Gwer East Ogbadigbo Okpokwu	[1] [2] [3]
2	Age of respondent (years)	……..	
3	Sex of respondent	Female ( ) Male ( )	[1] [2]
4	Marital status	Single/never married ( ) Married ( ) Separated ( ) Divorced ( ) Widowed ( ) Cohabiting ( )	[1] [2] [3] [4] [5] [6]
5	Household size	……..	
6	Average monthly income	Amount ₦……..	
7	Highest education level attained	No formal education ( ) Primary education not completed ( ) Primary education completed ( ) Secondary school not completed ( ) Secondary school completed ( ) Tertiary ( )	[1] [2] [3] [4] [5] [6]
8	Do you grow cassava	Yes ( ) No ( )	[1] [2]
9	Farm size	…… (ha)	
10	Type of enterprise unit	……..	
11	Years of farming experience	…… (years)	
12	Years of Cassava Production experience with VCDP	…… (years)	
13	Type of association	Cooperative association ( ) Processors' association ( ) Producer's associations ( ) Marketers association ( ) Transporters association ( )	[1] [2] [3] [4] [5]

SECTION B: State of Awareness of the Improved Cassava Production Techniques

1. Are you aware of the improved cassava production techniques?
   1. Yes ( ) 2. No ( )

2. If yes, what is your level of awareness of the improved cassava production techniques?

   1. High ( ) 2. Moderate ( ) 3. Low ( )

3. What type of cassava production techniques do you use?

   1. Traditional Technique ( ) 2. Modern Improved Technique ( )

4. What are the main sources of information concerning the improved cassava production technique that you use? (You can tick more than one)

1	Agricultural extension workers	
2	Trainings/workshops/seminars	
3	Informal contacts(friends, neighbours, relatives, family)	
4	Radio programmes	
5	TV programmes	
6	Internet	

5. Indicate the factors that influence your choice of channels of information by ticking appropriate spaces provided in the table below.

1	Ability to understand the format	
2	Ability to read	
3	Affordability	
4	Accessibility/distance	

6. How do you rate the usefulness of the information you get in your adoption of improved cassava production techniques?

   1. Useful ( ) 2. Very useful ( ) 3. Extremely useful ( ) 4. Somewhat useful ( ) 5. Not useful ( )

7. Have you ever received training concerning improved cassava production technology?

   1. Yes ( ) 2. No ( )

8. If yes from where did you get the training (You can tick more than one)

1	Extension workers	
2	Research centres	
3	Neighbours	

9. How do you rate the usefulness of the training in your adoption of improved cassava production techniques?

1. Useful ( ) 2. Very useful ( ) 3. Extremely useful ( ) 4. Somewhat useful ( ) 5. Not useful ( )

10. What information on improved cassava production technique are you able to access (You can tick more than one)

1	Ploughing and Ridging before planting	
2	Planting on flat after ploughing	
3	Use of improved planting materials	
4	Proper Spacing	
5	Supply/Replacement	
6	Weeding at least twice a year	
7	Fertilizer application	
8	Use of Herbicides to Control Weeds	
9	Application of Insecticides	

11. Do you think information and abilities to access that information also have a role in adoption of improved cassava production techniques?

1. Yes ( ) 2. No ( )

SECTION C: Level of Adoption

1. Do you have access to land for cassava farming?

1. Yes ( ) 2. No ( )

2. Have you purchased, rented or inherited the land for cassava farming?

1	Purchased	
2	Rented	
3	Inherited	

3. What type of cultivation do you use in cassava production?

1. Ridge Cultivation ( ) 2. Flat Cultivation ( )

4. Do you use recommended spacing in cassava farming?

1. Yes ( ) 2. No ( )

5. If yes which spacing do you use?

1	1mx1m	
2	1mx1.5m	
3	1.5mx1.5m	

6. Do you apply fertilizers in your farm?

1. Yes ( ) 2. No ( )

7. If yes what type of fertilizer?

1	Organic	
2	Inorganic	

8. If no why …….

9. Do you use improved cassava planting materials?

1. Yes ( ) 2. No ( )

10. What tools do you use in doing farm activities?

1	Hand hoes	
2	Animal power	
3	Motorized tools	

11. Do you weed your farm?

1. Yes ( ) 2. No ( )

12. If yes, how many times do you weed your farm per season?

1	2 times	
2	3 times	
3	4 times	

13. Do you use fungicides/pesticides for preventing pests and diseases?

1. Yes ( ) 2. No ( )

14. If yes, what type of fungicides/pesticides do you use? (Tick one)

1. Locally made ( ) 2. From Industries ( ) 3. None ( )

15. What is your level of adoption based on the information you get?

1. High ( ) 2. Moderate ( ) 3. Low ( )

SECTION D: Factors Leading to Adoption of Improved Cassava Production Techniques

1. Do you use the improved cassava production techniques?

1. Yes ( ) 2. No ( )

2. If yes, what are the factors that lead to your adoption of the improved cassava production techniques? (Tick one)

1	Knowledge/skills on cassava farming	
2	Access to credit facilities	
3	High yield of food and cash	
4	Availability of agricultural inputs	
5	Resistance to diseases	
6	Market availability	

4. What benefits have you derived from producing cassava? (You can tick more than one)

1	Animal feed	
2	Food	
3	Increasing household income	

5. What benefits have you derived by using the improved cassava production techniques?

1	Easy to use	
2	Reduced labour	
3	Increases yield	
4	Increases production	
5	Reduced Pests and Diseases	

6. How efficient are the improved cassava production techniques?

1	Efficient	
2	Very efficient	
3	Highly efficient	
4	Fairly efficient	
5	Not efficient	

SECTION E: Constraints

1. What barriers/challenges do you encounter in accessing information concerning improved cassava production techniques?

1	Illiteracy	
2	Language in which information is usually presented	
3	Cost	
4	Lack of time	
5	Ignorant	
6	Others (specify)	

2. What cassava production constraints do you face? (You can tick more than one)

1	Prevalence of pests and diseases	
2	Inadequate planting materials	
3	Drought	
4	Poor soil fertility	
5	Poor quality of planting material	
6	Lack of access to land	
7	Lack of market for cassava	
8	Others (specify)	

3. What challenges do you encounter in accessing the improved cassava production technique?

1	Lack of Funds	
2	Lack of access to credit facilities	
3	Lack of training on how to use the improved cassava production techniques	
4	Lack of information on improved cassava production techniques	
5	Ignorant	
6	Others (Specify)	

4. In what way(s) can these constraints be addressed?

…….

…….

Thanks for your Cooperation

Signed

Nnamani

Appendix 2: Checklist for Focus Group Discussion

Dear Sir/Madam

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1. The benefits of cassava cultivation
2. Available channels of information on improved cassava techniques
3. The situation on adopting new technologies
4. Cassava production constrains farmers face
5. The solutions for the constraints faced in cassava production
6. Availability of cassava market in the study area
7. Factors leading to the adoption of cassava production technologies
8. Farmers suggestions about cassava farming

Fig 5: (Focus group discussion in Okpokwu LGA)

Fig 6: (Data collection in Okpokwu LGA)

Fig 7: (Cassava at sprouting stage with proper spacing of 1mx1m)

Fig 8: (Land Preparation using land tiller)

Fig 9: (Cassava planting using the cassava planter)