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UTILIZATION OF IMPROVED CASSAVA PRODUCTIONTECHNOLOGIES AMONG FARMERS IN OBUDU LOCAL GOVERNMENTAREA, CROSS RIVER STATE, NIGERIA

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Abstract

The study is on the utilization of improved cassava production technologies among farmers in Obudu Local Government Area of Cross River State, Nigeria. The specific objectives of the study were to; ascertain the socio-economic characteristics of the respondents, identify the types of improved cassava production technologies available to farmers in the area, determine the extent of utilization of improved cassava production technologies in the study area, the benefits derived from utilizing improved cassava production technologies and factors affecting the utilization. Data were collected through questionnaire from the 5 communities using random sampling technique. A total of 149 respondents were selected for the study. Descriptive statistics were used to analyze the data while inferential statistics such as logistic regression model was used to test the hypothesis. The result indicated that most of the respondents were male (70.5%) within the age bracket of 41.5% years (45.6%) and were married (84.6%). Most attended tertiary education (49.7%), had family sixes of less than 5 (42.3) and cultivated 2 hectares of land (60.4%), but earned between N51.000 – N6-,000 annually (50.3%) and had 5 – 10 years (46.5%) of farming experience. The result on the types of improved technologies available in the area review that technologies such as cassava cutting multiplication, planting distance, use of improved varieties, weeds control using herbicides, and use of machines to process cassava into flour will be available for use, while technologies like cassava breeding, cloning, use of biological weed control agents, mechanized tillage operations, and use of machines to store cassava were not utilized in the area. The result further shows that many benefits were derived from the utilization of improved cassava production technologies, such as increased yield/output (3.87), increase in income (3.58), expansion of farm

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holding (3.28) and improved social/economic status (2.84). The study indicates that various improved cassava production technologies were utilized varying extent. It was also found that a substantial proportion of the respondents had fortnightly (47.7%) contact with extension service or agents and cultivated a variety of crops (e.g. yam 82.6%, groundnut 71.8% and maize 66.4%) beside cassava. The result of hypothesis test showed that seven of the eight explanatory variables, ages, sex, marital status, educational level, family size, and income were significant at determining the utilization of improved cassava production technologies in the study area. In conclusion, the extent of utilization of improved cassava production technologies is very high due to high level of educated persons in the programme. Also, there is no significant difference in the relationship between the socio-economic characteristics and extent of utilization of improved cassava production technology among farmers in the study area. The finding was based on the data collected and analyzed. The result of the findings was disseminated through seminars, workshop and conference.

Keywords: Improved Cassava Production, Agricultural Technologies, Cassava Farming, Obudu Local Government Area, Cross River State

INTRODUCTION

Agriculture is the sector that supplies food needs and raw material for agro-allied industries in Nigeria. It creates job opportunities and income for the rural dwellers; thereby acting as a tool for improving the living standard of the people (www.rjoas.com) (Food and Agricultural Organization (FAO), 2001). Thus, higher agricultural productivity and sustainable economic growth in Nigeria therefore call for a sustainable use of new technologies and efficient production practices especially in cassava cultivation. Cassava (*Manihot esculenta*) is one of the famous root crops cultivated in Africa, particularly Nigeria. Ezedinma, Dixon, Saani, Okechukwu, Akorodu, Lemeli, Ogbe and Okoro (2006) opined that cassava is one food crop that helping in the food security of rural households because of its capacity to yield under marginal soil conditions and its tolerance to drought. Nweke and Akwibu (2005) affirmed that several soils are used for growing cassava but high tuber yields can be obtained in friable and light soils. The Food and Agriculture Organizations (FAO) (2003), noted that cassava is readily available for more than 700 million people in the developing world including Nigeria. The government of the federation emphasized on cassava production in several states of the nation because of its usefulness (Ajayi, 2002) and as a major root crop grown throughout Nigeria for cash, food, feed and raw material for agro-allied firms for the production of starch, alcohol, pharmaceuticals and confectioneries (Francisco, 2004; Onwumere, Nwajiuba and Asumgha, 2006).

Technology as a tool for rural empowerment has been widely acknowledged as a critical factor in agricultural development. According to Knipscheer, Zinnsh & Multimba (2003) technology is the process of applying the findings of science and other forms of enquiry to practical situation. Iweke (1987) in an unpublished Ph.D thesis submitted to the Department of Agricultural Extension, University of Nigeria, Nsukka defined agricultural technology as an innovation that is introduced for increase in agricultural output. Eze (2006), identified three aspect of technology used in agricultural production. These include biological technology (new improved breed of crops and animals), mechanical technology (machines such as tractors, harvester etc) and chemical technology (fertilizers, herbicides and pesticide). A wide range of new technologies that are being applied to improve cassava production according to Ajani and Onwubuya (2013) include ploughing, use of improved varieties,

supplying, weeding at least twice a year, use of chemical fertilizer, use of herbicides and use of pesticides.

The good of any economic and social development programme on utilization of technologies especially on cassava in Nigeria in general and specifically Obudu Local Government Area in Cross River State is primarily dependent upon the extent to which it contributes to the well-being of those living in the rural areas. This is because the main part of the country's population, resources particularly land, natural and mineral resources are in these areas. It is for this reasons that the principal strategy of Nigeria government of which Obudu Local Government Area in Cross River State is a part, try to promote agricultural development programmes aimed at increasing food production particularly in the rural areas in order to improve food self-sufficiency.

However, the acceptance and utilization of technologies by cassava farmers is highly influenced by a number of factors. Ajani and Onwubuya (2013) opined that high cost of fertilizer, high cost of agro-chemicals, poor market network, poor rural infrastructure, poor extension contacts, unavailability of improved planting materials, high cost of transportation, high cost of labor, changes in climate, inadequate planting techniques, inadequate funds, inadequate provision of farmland and Poor storage facilities are the factors that influence the utilization of cassava technologies. Igodan (2005) reported that farmers were better exposed to formal extension information and had a high propensity towards utilization than those with less exposure.

Statement of problem

Diseases and insect pests that usually disturbed cassava leading to economic losses include Cassava Mosaic Disease (CMD), Cassava Bacterial Blight (CBB), cassava mealy bug, green spider mite (GSM), and the large grain borer, which attacks dry chips of cassava in storage. Others are termites, anthracnose, root rot, rodents, and stem girdlers (www.cassavabiz.org). In the same manner, chemical controls are better-off; but the need for safe use and high costs restrict their use among many small farmers who practice mixed cropping (www.cassavbiz.org). In the same vein, the menace of rodents is a regular occurrence in the field. Root yield losses due to cassava mosaic disease are as high as 70% on susceptible genotypes in Nigeria (FAO, 2001). The production loss due to CMD in Nigeria has been more realistically estimated at 6.78 – 9.69 million tons in 1998 when the total harvest for the country was 33.56 million tons (Udo, 2003), translating to nearly US$65 million direct loss to the Nigerian economy.

In 2019 to 2020, a study was conducted at Benin in Nigeria and the result shows that CMD is widespread in all regions of Benin and that it continues to spread to new cassava-growing areas of the country. The prevalence have reached 100% in some districts or areas. Plants showing very severe mosaic symptoms were observed in most of the growers' fields, leading to the risk of high yield losses. The incidence and high severity of CMD recorded during the survey are also of concern. It is therefore necessary that awareness-raising and training campaigns be carried out by agricultural extension agents, non-governmental organizations and research institutions on the use of healthy improved cassava production planting material and adoption of improved cassava varieties or resistant cultivars. Nigeria produced about 60 million tonnes of cassava every year according to Food and Agricultural Organization Statistical Database (FAOSTAT, 2019). FAOSTAST is maintained by the Statistics Division of the Food and Agriculture Organization of the United Nations. In working directly with the countries, the Statistic Division supports the development of national statistical strategies, the strengthening of institution and technical capacities and the

improvement of statistical systems. It is the major components of FAO's information systems, contributing to the organizations strategic objective of collecting, analyzing, interpreting, and disseminating information relating to nutrition, food and agriculture for development and the fight against global hunger and malnutrition. It is at the core of the World Agricultural Information Centre (WAICENT). WAUCENT gives access to FAO's vast store of information on agricultural and food related topics (FAO, 2014).

Several initiatives were enacted to address the critical threat of low yield, pest and disease outbreak in Nigeria. Among those efforts was that of International Institute of Tropical Agriculture (IITA) and national partners which developed and disseminated high yield Cassava Mosaic Disease (CMD) resistant varieties. Between 2002 and 2010, IITA implemented a research for development project called Integrated Cassava Project (ICP) to support the Presidential Initiative (PI) for cassava launched in 2002 to boost cassava production and processing. Through this project, IITA successfully introduced and promoted cassava varieties via the National Agricultural Research Services (NAR) and Agricultural Development Programs (ADPs) but there is need to understand whether farmers are aware of and are utilizing the cassava production technologies available. This underpins farmers' reluctance to adopt technologies because they fear they could suffer significant economic losses due to disease and pest should they invest in such technologies. They instead prefer to continue with the traditional ways of farming, which though inefficient are cheap (often cost–free) and less risky. This is the knowledge gap that this study intends to fill by assessing the utilization of improved cassava production technologies among farmers in Obudu Local Government Area of Cross River State, Nigeria.

Objectives of the study

The general objective of this study is to analyze the utilization of improved cassava production technologies among farmers in Obudu Local Government Area, Cross River State, Nigeria.

The specific objectives were to:

1. Ascertain the socio-economic characteristics of the respondents.
2. Identify the types of improved cassava production technologies;
3. Determine the extent of utilization of improved cassava production technologies;
4. Identify the benefits derived from utilizing improved cassava production technologies;
5. Ascertain the factors affecting the utilization of improved cassava production technologies

Research questions

The following research questions will guide the study:

1. What are the socio-economic characteristics of the respondents?
2. What types of improved cassava production technologies are adopted by respondents?
3. What is the extent of utilization of improved cassava production technologies?
4. What are the benefits derived from utilizing improved cassava technologies?
5. What are the factors affecting the utilization of improved cassava technologies?

Hypothesis

The study was based on this hypothesis:

Ho_1: There is no significant relationship between the selected socio-economic characteristics of respondents and utilization of improved cassava production technologies

Significance of the study

This study is motivated by the desire to analyses the utilization of improved cassava production technologies among cassava farmers in Obudu Local Government Area, Cross River State. The major objective of utilizing improved cassava production technologies is to boost production. The study will publicize and expose the effect of utilization of improved cassava production technologies among farmers in Obudu, Cross River State It will inform the rural farmers that adopting improved technologies will enable them to increase their production capacity resulting to better standard of living.

To the government and policy makers, it will identify and reveal the success, failure and prospects of utilizing improved cassava production technologies thereby serving as a basis for policy formulation while to the researchers. It will also contribute to existing literature in Obudu, Cross River State.

Scope of the study

This research work is focus on the utilization of Improved Cassava Production Technologies among farmers in Obudu, Cross River State. The study will be conducted in Obudu Local Government Area. The study is restricted to five major communities; these include Obudu urban, Kakum, Ohong, Ukpe and Utugwang.

Limitations of the study

The unwillingness of some of the respondents to supply answers/responses to the questions or issues raise in the questionnaires will be a great challenge to the research work. The study will also be constrained by language barriers as some of the respondents who may not be able to speak and understand English Language, thus making it imperative for paid translator to be used.

Definition of terms

- Technology: This is a tool for rural farmer's empowerment which has been widely acknowledged as a critical factor in agricultural development. It is also a process of applying the findings of science and other forms of enquiry to applied situation.
- Adoption is a mental process of deciding whether to continue full use or not of an innovation or technology.
- Diffusion: The process by which new ideas (innovation) spread from one place to another or within a social system.
- Innovation: Any idea, technique or object perceived as new by members of a social system.
- Utilization of improved cassava: This simply refers to the ability of the rural dwellers to accept and use improved cassava available.

LITERATURE REVIEW

Theoretical Framework

This work is based on diffusion and innovation theories. The diffusion and innovation theories attempt to explain how, why and at what rate new ideas and technology or innovations spread through a social system and how these innovations are adopted. Adebayo and Oladele (2012) affirmed that farmers might likely need to perceive at least some control in order for them to move ahead with technology decisions. In the same vein, Sinkaiye, (2011) found out that persuasion to promote changes in beliefs and appraisals may also be the one and only way to technology adoption. The theoretical framework of this study relies on

these theories since it deals with adoption of innovation in agriculture that will result in sustainable agricultural development.

Diffusion Theory

Diffusion of innovations theory according to Rogers (2003) is the most appropriate for investigating the adoption of technology. The diffusion theory was developed by Rogers in 1962 and it is one of the oldest Social Science theories. Leeuwis (2004) also affirmed that diffusion theory had been primarily developed to explain the farmers' adoption of innovations (www.sciencepub.net). The adoption of an innovation as view by Rogers follows five main phases which are:

(1) Knowledge about the innovation: In this phase, an individual learns about the existence of innovation and seeks information about the innovation. What? how?, and why? are the critical questions in the knowledge phase. During this phase, the individual attempts to determine what the innovation is and how and why it works (Rogers, 2003). In this phase, mass media plays an important role as a source of information (www.sciencepub.net).

(2) Persuasion phase: The persuasion phase occurs when the individual has a negative or positive attitude toward the innovation, but the formation of a favourable or unfavourable attitude toward an innovation does not always lead directly or indirectly to an adoption or rejection' (Rogers, 2003). The individual decides whether he or she knows about the innovation, so the persuasion stage follows the knowledge stage.

(3) Decision to adopt the innovation or not: Here, information is actively sought for and processed in this phase, the aim being to reduce uncertainty about the advantages and disadvantages of the innovation from friends and Neighbours (www.sciencepub.net)

(4) Implementation of the innovation; this is a critical stage where adaptation of the innovation to the own farm environment may be needed with personal experience– already made decision.

(5) Confirmation: Having tried the innovation and seen the result, the farmers will not only adopt but use the innovation in order to reinforce his/her commitment to the innovation decision already made. According to Rogers (2003), this decision can be reversed if the individual is exposed to conflicting messages about the innovation. However, the individual tends to stay away from these messages and seeks supportive messages that confirm his or her decision. Thus, attitudes become more crucial at the confirmation stage. Depending on the support for adoption of the innovation and the attitude of the individual, later adoption or discontinuance happened during this stage. This theory shows the potential adopters of an innovation must learn about the innovation, be persuaded as to the merits of the innovation, decide to adopt, implement the innovation, and confirm (reaffirm or reject) the decision to adopt the innovation (Rogers, 2003). Therefore, for this study it is expected that cassava farmers in Obudu Local Government Area who have knowledge and are persuaded to take decision regarding the utilization of improved cassava production technologies will have higher output resulting to better living condition.

Innovation Theory

According to Rogers (2003), the adoption of an innovation depends on the attributes of the innovation such as social norms and communication channels which are used as information sources to reduce uncertainty about the innovation. The attributes of the innovations are the relative advantages, the compatibility, the complexity, the trialability and the observability. Indecision about an innovation exists because not everybody has the same information or understanding of the innovation. Mass media channel are more efficient in

bringing about overall knowledge of an innovation (www.sciencepub.net). However, interpersonal channels are also efficient in changing attitudes towards the innovation thereby influencing the decision to adopt or reject an innovation.

This theory further indicates that adoption and utilization of improved cassava production technologies among farmers have the following characteristics relative advantages, compatibility, complexity, trialability etc., especially when the relative advantages are better understood. The whole community may reject an innovation just because of the influence of the communication channels on the community, they may decide to reject or adopt the innovation. This is because mass media channel provides overall knowledge, while interpersonal channels provide knowledge for changing attitudes and may influence the decision to adopt or reject the innovation (www.sciencepub.net, Adebayo and Oladele, 2012).

Concept of innovation and adoption

The competitiveness of organizational environments can lead to an increase in population evaluating and adopting an innovation, this is critical to determining organizational productivity (www.gcbe.us). Rogers (1962) conceptualized diffusion of innovation as an adoption process which has to do with awareness to interest, then evaluation to trial and finally adoption. Based on these statements it can be concluding that innovation adoption equals decision process to acquire innovation. Damanpour and Schneider (2006) stated that even though the process of adoption has been conceptualized as a multiphase process most large sample empirical studies of organizational innovation have operationalized adoption as a dichotomous decision of adoption or rejection. They further defined innovation adoption as a means of creating change in the organization to ensure adaptive behavior and intended to change the organization so that it maintains or improves its level of performance and effectiveness. On both organizational and individual level, innovation adoption is mostly based on communication. According to Rogers (2003) innovation adoption is an information seeking and information processing activity. According to stimulus-reaction philosophy of innovation diffusion tradition, the adoption process is a reaction to a new innovation. The adopter categories recognized that innovation exposed as it becomes aware of it. In this sense the awareness of innovation shows the need for it as the potential benefits of innovation exceed the benefits the old product provides (www.gcbe.us).

Factors affecting the utilization of improved cassava production technologies by farmers

Cassava has always been used as a famine reserve and food security crop cultivate solely through small scale subsistence farming systems where input use is low, rudimentary technology is low, large post-harvest losses and minimal processing characterized these farming activities. Constraints in adoption of extension technologies by cassava farmers include pests and diseases, agronomic technologies, land degradation and ownership, shortage of planting materials, food policy changes, access to markets, limited processing options and inefficient/ineffective extension delivery system of technologies (www.fao.org, FMANR, 2009). Agronomic problems include both biotic constraints and abiotic constraints. The former include destruction of cassava farms while the later include low soil fertility which affects many cassava growing areas. This is due to the fact that the fallow periods are shorter as the pressure on arable land near homestead is increasing as the direct use of soil amendments in cassava cultivation is low and the yield potentials of the various varieties of the planted cassava crop are not often attained. In most circumstances of cassava farmers, the

use of organic manure could not improve soil properties because the technical fact seems not to be economically feasible (Wilcox, 2003).

Ineffective/inefficient extension delivery system has remained a major constrain in the adoption of improved cassava technologies. Lavallee, Oliver, Doumer and Robiliard (2010), sizeable progress from the national agricultural research and extension systems reflect more in the adoption of some improved varieties of cassava, development of technologies for various farm operations, improved management practices and improved linkage between research, extension and farmers. However, there are still some constraints with the extension programming and delivery system and strategy. However, the Unified Agricultural Extension System (UAES) which ensures a single line of command in the dissemination of technologies to the farmer has not been fully implemented due to funding and technical reasons (Lavallee *et al.,* 2010).

In another development, the shortage of human resources required to implement the training and visit extension management system had a negative impact on the effectiveness of extension technologies or with the implication of having low adoption rate leading to the recommendation by Tafida and Danwakan (2008) in the use of contact farmers. In principle, contact farmers were expected to have multiplier effects on the adjacent farmer but that has not been the case. However, there is lack of formal feedback to the ADPs and limited spread of extension technologies or outside the contact farmers (Adebayo and Oladele, 2012). Furthermore, recent economic changes making input prices to rise more rapidly than product prices, reducing profit margins for small-scale processors of cassava products. Another fundamental problem with extension strategy is the irrelevant nature of some of the extension technologies or quite often the technological options offered by extension do not fit into the farming system and the socio-economic conditions under which the rural people are operating. For example, a broader range of new varieties that match different ecologies and end-user requirements should be developed and released to farmers (Tafia and Danwakan, 2008).

Again, Alao (2009) reports that lack of or poor access to market is a serious challenge to extension technology or adoption. Marketing can be a problem for poor farmers who may not have resources to transport their commodities to the market, especially those living in villages with poor feeder and inaccessible roads. Typically, farmers transport their farm produce to the market on heads as head loads, on bicycles or in Lorries. Because of poor market access, marketing of cassava can be problematic especially due to its bulky nature when not processed. It therefore, makes no sense to farmers to adoption new extension programmes or technologies when there is no guarantee that they would market their products. Shortage of planting materials has been one of the constraints to extension technology adoption among farmers. The cultivars released for cultivation in Nigeria have not all been made available to farmers. Although several species have been released, only very few have been made available to farmers whereas those released are yet to be multiplied on a large–scale and made available. Shortage of planting materials is also compounded by farmers' inability to preserve planting materials.

Ajah (2012) observed that land ownership and degradation is affecting extension technologies adoption among cassava farmers. The root causes of land degradation include soil erosion, deforestation and oil spillage, while erosion is a general problem all over the country especially in the South-Eastern zone. Desertification resulting from deforestation is peculiar to central, north eastern and northwestern zones, while oil spillage occurs essentially in the oil-producing zones. Each of these processes tends to reduce the productive potential of

land and to impair the sustainability of soil fertility – a situation which characteristically discourages farmers from adoption extension technologies. The problem of food policy changes, in terms of food security and food production incentives as there has been no policy consistency. Initially, the availability of oil revenue made it possible for the government to respond to food shortages with large-sale importation but later on the resources from oil dried up (www.fao.org). The petroleum income also raised a demand for food as well as encouraging rural-urban migration which resulted in farm labour shortage (Akinwmi & Nnadi, 2002).

The dramatic increase in prices of most tradable agricultural exports that accompanied the devaluation of the naira and the liberalization of exports were not applicable to cassava and cassava products to any significant extent because as a non-tradable staple food product, prices were not directly influenced by world market developments. This trend discouraged most farmers from accepting extension interventions in cassava production because of fears of economic insecurity.

Review from related studies

In another development, Eze *et al.,* (2006) researched on the determinants of improved cassava production technologies among farmers in Enugu State, Nigeria (www.ajol.info). Primary data were obtained from a sample of 250 farmers in 10 local government areas of Enugu State. The data were analyzed using descriptive statistics and multiple regression analysis and the results showed that cassava production technologies were at various stages of adoption, improved cassava stem cuttings, use of herbicides/pesticides, alternate row/crop geometry in cassava maize intercrop, planting distance, use of fertilizers, machinery, improved storage and processing, and planting angle. The low adoption rate can be attributed to the cost of the technologies, their appropriateness, as well as scarcity or non-availability of the extension agents in the study area. The result revealed that level of education, age of farmers, farm size, farm income and extension visits were major determinants of adoption of improved cassava production technologies.

Awotide *et al.,* (2014) study on assessing the extent and determinants of adoption of improved cassava varieties using logit model revealed that adoption increases with the age of the household head and is influenced by the gender of the household head, hired labour, cultivated land, and access to credit (www.biblio.iita.org). The results further indicated that the intensity of adoption is influenced by hired labour and farm size; access to information and other variables. The study by Nsoanya and Nnenna (2011) on adoption of improved cassava production technologies in Anambra East Local Government Area of Anambra State adopted percentages and mean scores to summarize the data collected (www.agrifoodecon.com). The result from the findings shows that respondents were young experienced, with high level of education and high social participation amongst members, which is an advantage for innovation adoption and transfer. Majority inherited their cassava farms and financed them mainly through personal savings. The result also records that extension agent 45.0% were the major source of information on improved cassava production technologies and most of them (35.0%) gave high yield as their major reason for growing improved cassava varieties. The findings further showed that some yield increasing technologies such as application of fertilizer, use of herbicides and insecticides had not been appreciably adopted by the farmers in the area. The major constraints to the adoption of improved cassava production technologies according to the authors are high cost of fertilizer, agro-chemicals and unavailability of market.

Okolo (2007) conducted a study on adoption of improved cassava production technologies among farmers in Ankpa LGA shows that the most (52%) of the respondent are within the age range 31-40years, while (65%) of respondents were male. Also, most of the respondents were medium adopters of the technologies (44%) (www.agrifoodecon.com). The Probit analysis revealed that educational level and farm size were statistically significant. The major constraints affecting level of adoption were land acquisition (21.11 %), Poor sources of awareness, (25.56%), lack of the fund (22.22%), complexity of technology (4.22%), and lack of implement (10%) and lack of co-operative farmers association (6.67%). The research on the economic impact of improved agricultural technologies cassava productivity by Adofu, Shaibu, and Yakubu (2013) adopted chi square in testing the hypothesis. The result shows that 79.33% of the respondents adopted the use of improved variety within the period under study. The result of the income of the respondents before and after the adoption of the improved agricultural technologies show that revenue from farmers after the adoption of innovation were better off than revenue generated before adoption by N27, 750 on the average per farmer. This result indicates that the impact of improved agricultural Technologies on cassava productivity is positive. Additionally, the results attest to the importance of increasing agricultural productivity in tandem with improvements on the adoption and use of improved agricultural technologies and its availability to the reach of farmers with the farmers' ability to store food (www.ageconsearch.umn.edu).

METHODOLOGY

Study Area

The study is conducted in Obudu Local Government Area; Obudu Local Government Area is one of the 18 LGAs of Cross River State and is located in the Northern Senatorial District of the State in the Ogoja Agricultural zone. The area lies between latitudes $60^{o}10'$ and $64^{o}44'$ East, and longitudes $90^{o}00'$ and $90^{o}12'$ North of the Greenwich Meridian. Obudu is bounded in the North by Benue State, South by Boki Local Government Area, West by Bekwerra/Ogoja Local Government Areas, and East by Obanilkwu Local Government Area. It is a rainforest zone with a high temperature of 27^{0C} and relative humidity of 8% (Ekanem, 1998). The vegetation pattern of the study area shows that it is mainly savannah. This is so because of the combined effect of bush burning and shifting cultivation, which have degraded the original forest vegetation, making it a derived savannah. In some area, only isolated stands of a few trees remain as evidence of the original forest. The soil consists of basement complex and sedimentary rocks. The staple crops cultivated are yam and cassava. Obudu has a land mass of 2,041.25km^2, the people of the area are peaceable, pristine and fun loving. Obudu as a block in Ogoja agricultural zone comprises of five cells which are urban, Kakum, Ohong, Ukpe and Utugwang.

Population of the study

The population of this study consists of all cassava farmers in the five (5) communities in Obudu Local Government Area namely: Obudu Urban, Kakum, Ohong, Ukpe and Utugwang. Data available at the CRADP shows that there are 498 registered cassava farmers in Obudu Local Government Area.

Sample and sampling technique

The sample for this study was drawn from the population of the registered cassava farmers using survey research design. The research design refers to the overall strategy that you choose to integrate the different components of the study in a coherent and logical way, thereby ensuring you will effectively address the research problem, it constitutes the blue print for the collection, measurement and analysis of data (https://libguides.usc.edu>research). Research design is an adopted systematic and scientific plan, blue print, road map of an investigation, detailing the structure and strategy that will guide the activities of the investigation, conceived and executed in such a way as to obtain relevant and appropriate data for answering pertinent research questions and testing hypotheses (Ali, 2006).

A survey is a descriptive study which seeks or uses the sample data in an investigation to document, describe all explain what is in existent or non-existent, on the present status of a phenomenon being investigated. In surveys, views, facts, etc are collected, analyzed and used for answering research questions. Survey research focuses on people, the vital facts of people, and their beliefs, opinions, attitudes, motivations and behavior. It deals with the present. Surveys are particularly versatile and practical, especially for the administrator, in that they identify present conditions, and point to present needs. Surveys do not make the decisions for the administration, but they can provide him/her with information on which to base sound decisions. Surveys interpret, synthesize, and integrate these data and point to implications and interrelationship. As a method of research, survey is more realistic then the experiment in that, it investigates phenomena in their natural setting. This is a great strength in the early stages of the investigation of a problem in that it affords flexibility and versatility (Osula, 2005). If a study is designed to find and describe, explain or report events in their natural settings, as they are, based on sample data, it is a survey (Ali, 2006).

However, representative samples of the farmers will be drawn using random sampling technique to select the farmers for the study. Random sampling is that method of drawing a portion or sample of a population or universe so that each member of the population or universe has an equal chance of being selected. In a random sampling all possible samples of fixed size have the same probability of being selected. A sample drawn at random is unbiased in the sense that no member of the population has any more chance of being selected than any other member (Osula, 2005). Balloting paper of 498 will be used, having 149 ‘yes’ and 349 ‘no’ which will be distributed among the registered cassava farmers in their communities. Therefore, the sample size will 149 farmers and the total population will be 498 registered cassava famers. The selected respondents from each community represent 30% of the total population of registered cassava farmers in each of the communities. Therefore, fifty-three (53), forty-one (41), thirty-three (33), twelve (12), and ten (10) respondents shall be selected from Obudu Urban, Kakum, Ohang, Ukpe and Utugwang communities respectively; making a total of 149 farmers for the study sample as shown below:

TABLE 1

Distribution of Registered cassava-based farmers in Obudu Local Government Area of Cross River State

Total number of communities	Total number of farmers	Sample population
Obudu Urban	178	53
Kakum	136	41
Ohong	110	33
Ukpe	40	12
Utugwang	34	10
Total	498	149

Source: Field survey, 2015

Instrumentation

The instrument used for data collection is structured questionnaire. It contains both close ended and open-ended research questions. The questionnaire is divided into sections. Section A will be designed to elicit information on the personal characteristics of the respondent such as sex, age, educational level, marital status, income and family size. Section B is structured to elicit information on the research questions.

Validation of Instrument

The instrument (a structured questionnaire) was subjected to face and content validity with the assistance of consultants in the Department of Agricultural Education. The inputs made by the consultants

were used to design the final copy of the questionnaire that was administered to the respondents.

Reliability of the instrument

The reliability of the research instrument was determined using a test retest procedure. The same instrument was administered to 50 samples of randomly selected respondents from the various communities in Obudu L.G.A. The respondents that was used for the pilot test was included in the main sample of the study. The data that was obtained from the two administrations will be tested using Pearson Product Moment Correlation.

Procedure for Data Collection

Data for the study were obtained from the respondents with the aid of a structured questionnaire. The questionnaire was administered by the researchers and trained enumerators who was familiar with language of the respondents selected. Relevant instructions will be provided on the completion and return of the questionnaire. No copy of the questionnaire was issued or completed on proxy and all the copies of the questionnaire issued will be returned, representing 100% return. The researchers visited the farmers in their various farming communities with the help of the extension worker in Obudu block of Ogoja agricultural zone in charge of the cells to administer the questionnaires to the randomly selected farmers. For respondents who cannot read or write, efforts were made to explain the content of the questionnaire in their dialects/language while ensuring that bias is completely eliminated to the barest minimum.

Measurement of variables

The dependent variable was utilization of improved cassava production technologies; this was measured at nominal level. Users =1 and non-users =0. The independent variables were sex, educational level, marital status, family size, income, farming experience and farm size.

Objective one: Socioeconomics characteristics. Sex was measured at nominal level (male=1; female=2), age was measured at nominal level (below 31years = 1; 31-40 years=2; 41-50years=3 and above 51=4), marital status was measured at nominal level (single=1; widowed=2;divorced=3 and married=4), educational level was also measured at nominal level (no formal education =1; primary=2; secondary=3 and tertiary= 4), family size was measured at nominal level(less than 5=1; 5-10=2; 11-15=3;and above 15=4), farm size, farming experience and income (naira) was all measured at nominal level.

Objective two: Types of improved cassava production technologies was measured using four-point Likert scale (Strongly Agreed (SA), Agreed (A), Disagreed (D) and Strongly Disagreed (SD).

Objective three: Effects of socio-economic characteristics on utilization of improved cassava technologies by respondents

Objective four: Benefits derived from utilizing improved cassava production technologies was also be measured using four-point Likert scale.

Objective five: Factors influencing the utilization of improved cassava production technologies were measured using four-point Likert scale.

Decision Rule: The mean for 4-point scale =4+3+2+1/4=2.5. Therefore, any mean response below 2.5 will not favour a particular item under consideration while mean equal or above 2.5 will favour the item under consideration.

RESULTS AND DISCUSSION

Socio-economic characteristics of the respondents

Result in Table 2a shows that majority of the respondents were male (70.5%) and only 29.5% were female. It revealed also that a large proportion of the respondents were within the age range of 41-50 years (45.6%) while only a small number (4.0%) were below 31 years. Table 2a further indicated that majority of cassava farmers in the study area were married (84.6%), 6% were single, while divorced and widowed accounted for 4% and 5% respectively. It was also revealed that most of the respondents attended tertiary education. Again, 26.8% of them attended secondary school while non-formal education accounted for 10.1%. The result showed that the respondents had varied family sizes, 42.3% had less than 5 persons, 35.6% had between 5 and 10 persons and 4% had over 16 persons, and cultivated varied farm sizes with majority of them cultivating 2 hectares (60.4%), 4% cultivated 1 hectare and 4 hectares and above. The cassava farmers as indicated in table 2 were of varied income status, 50.3% of them earned between N51,000 – 60,000 annually, 20.1% earned less than N50,000 annually and 11.4% earned N71,000 and above annually. The respondents also differed widely in their farming experience; with most of them (46.3%) having 5–10 years of farming experience and only 12.1% had less than 5 years of farming experience. This result has a number of implications for utilization of improved cassava production technologies. In particular, the study established that cassava farming in the area was dominated by men which disagree with many studies. For instance, Udoh (2003), Wilson and Wilson (2012) and Okunde (2006) found that cassava farming in Africa is largely carried out by women since majority of the farmers were between the ages of 41-50 years, it implies that cassava production in the area is mostly carried out by fairly young people and adult of middle ages. This could be associated with a number of reasons such as the intensive labour involved in cassava production and given that farming operations are manual, very old people are unlikely to possess adequate physical strength to produce cassava on large scale. On the other end, very young people especially those below 31 years are usually focused on full time schooling rather than involved in full time cassava production corroborating earlier results reported by Etosa (2006) which further showed that the respondents were largely married. This is not surprising given that married couple, beside the need to engage in cassava farming to meet family food and income needs, often enjoyed the luxury of utilizing family labour for cassava production. These views were reported by Igodan (2005) and Alao (2009). The study also found that the respondents were fairly educated. This has positive implication for the utilization of improved cassava production technologies because educated farmers are generally more favourably disposed to accept and tinker with new technologies than illiterate ones who are often apprehensive about new technologies. Studies by Eze (2006) and Akinwmi *et al.*, (2002) found that educated cassava farmers adopted cassava production innovations than farmers with limited or no education. Studies by Wilson and Wilson (2012) had established correlation between family size and farming experience and utilization of improved technologies. According to Wilson and Wilson (2012) the large the family size (all things being equal) the more the amount of labour available for farming operation. The prolong farming experience comes expertise which could influence production and acceptance of improved technologies. The result of this study show that the respondents cultivated relatively large areas of land (2 hectare, representing 60.4%, gotten were high with low income earners (about 70.5%) annually from cassava production. This could influence the utilization of improved technologies. For example, some technologies (e.g fertilizers, herbicides, pesticides, cuttings etc) require money and given the farmers' limited income capabilities the likelihood of utilizing their technologies is negatively affected. This agrees with the position of Kinpscheer *et al.*, (2003) who noted that no matter how good a new technology may be farmers economic and social conditions could undermine its utilization.

Table 2

Distribution of Respondents by socio-economic characteristics (N=149)

Variable	Frequency	Percentage	Mean
Sex			
Male	105	70.5	
Female	44	29.5	
Total	149	100.00	
Age (in year)			
Below 31 years	6	4.0	
31 – 40	39	26.2	
41 – 50	68	45.6	
51 – above	36	24.2	
Total	149	100.00	
Marital status			
Single	9	6.0	
Married	126	84.6	
Divorced	6	4.0	
Widowed	8	5.4	
Total	149	100.00	
Level of education			
Non-formal education	15	10.1	
Primary school	20	13.4	
Secondary school	40	26.8	
Tertiary edu. and above	74	49.7	
Total	149	100.00	
Family size			
Less than 5	63	42.3	
5-10	53	35.6	
11 – 15	27	18.1	
16 – above	6	4.0	
Total	149	100.00	
Farm size			
1 hectare	6	4.0	
2 hectare	90	60.4	
3 hectare	47	31.5	
4 hectare and above	6	4.0	
Total	149	100.00	
Annual income (N)			
< 50,0000	30	20.1	
51,000 – 60,000	75	50.3	
61,000 – 70,000	27	18.1	
71,000 and above	17	11.4	
Total	149	100.00	
Farming experience (in years)			
< 5 years			
5 – 10 years	18	12.1	
11 – 15 years	69	46.3	
16 and above	24	16.1	
	38	25.5	
Total	**149**	**100.00**	

Source: Field Survey, 2015.

Table 3
Distribution of respondents according to frequency of extension contact

Variables	Frequency	Percentage
• Weekly	45	30.2
• Fortnightly	71	47.7
• Monthly	12	8.1
• Quarterly	18	12.1
• Not at all	3	2.0
Total	149	100

Source: Field Survey, 2015

Results in Table 2b indicate that 47.7% of the respondents had fortnightly contact with extension agents, 30.2% had weekly contact while 2% did not have contact with extension agent at all. This implies that majority of cassava farmers in the area had relatively frequent contact with extensive agents. This has implication for the utilization of improved cassava technology. Studies by Nsikak (2007) and Wilson (2012) revealed that farmers who have contact with extension services adopted improved technologies more than farmers who had little or no contact with extension services.

Improved Cassava Production Technologies Utilized

Result in Table 3 show the various technologies applicable to cassava production in the study area. It reveals that the respondents utilized a wide range of improved cassava production technologies and a good number of the technologies were similarly not utilized. Eight (8) of the 18 technologies identified were utilized by cassava farmers while ten (10) were not utilized. Specifically, cassava cutting multiplication ($\overline{x}$=3.80) and weed control using chemical ($\overline{x}$= 3.09) were some of the technologies utilized by the respondents. However, use of irrigation/drainage ($\overline{x}$=1.80), cassava breeding ($\overline{x}$=1.00), cloning ($\overline{x}$ =1.46) and use of biological agents to control weeds ($\overline{x}$=1.46) were among the technologies not utilized by the respondents. The implication of this result is that even though different cassava production technologies exist, the utilization of these technologies varies from one place to another. This result corroborates Sokoya (1998) and Mathews–Njoku *and* Asiabaka(2003) who found that different farmers in different localities are attracted to different technologies against the backdrop of prevailing cultural values and their socio-economic status. Okunde (2006) reported that highly technical technologies such as breeding cannot be carried out by farmers especially those in sub-Saharan Africa who have limited education. Clark (1994) opines that it is not possible for all improved technologies to appeal to farmers at the same level and so the utilization of these technologies varies widely from place to place and among farmers with clarification of doubts and misconceptions.

Table 4

Distribution of improved cassava production technologies utilized/not utilized by the respondents (N = 149, Decision Rule = 2.50)

Technologies	(4) SA	(3) A	(2) D	(1) SD	∑fx	$\bar{x}$
• Cassava cutting multiplication	128(51)	15(45)	3(6)	3(3)	566	3.80
• Planting distance (e.g 50cm by 1m)	69(276)	80(24)	-	-	516	3.46
• Cassava breeding technologies	-	-	-	149(14)	149	1.00
• Cloning techniques	12(48)	16(48)	-	121(12)	217	1.46
• Weeds control using chemicals	71(284)	39(11)	21(42)	18(1)	461	3.09
• Mechanized weed control (e.g mower)	42(84)	39(11)	68(136)	-	337	2.26
• Use of biological weed control agents	9(36)	21(63)	-	119(11)	218	1.46
• Pest control using chemical(pesticides)	45(180)	30(60)	71(142)	3(3)	385	2.58
• Mechanized tillage operations (e.g use of tractor etc)	10(40)	5(15)	-	134(13)	189	1.27
• Use of fertilizer (inorganic)	113(452)	33(99)	3(6)	-	57	3.74
• Use of organic manure (e.g animal dropping)	20(80)	-	19(38)	110(11)	228	1.58
• Adoption of conservation farming (e.g mulching, agroforestry, and intercropping etc	90(360)	50(150)	9(18)	-	528	3.54
• Cassava grinding machines	70(280)	69(207)	10(20)	-	507	3.40
• Use of machines to harvest cassava	-	-	-	149(23)	149	1.0
• Use of machines to process into floors)	51(204)	77(232)	12(24)	9(9)	468	3.14
• Use of machines to store cassava (e.g refrigerators)	-	30(90)	100(200)	19(19)	309	2.07
• Use of irrigation/drainage technologies	16(64)	-	71(142)	62(62)	268	1.80

Source: Field Survey 2015.

Note: 2.5 and above = utilized, 2.4 and below = not utilized

Table 5

Distribution of respondents by benefits derived from utilizing improved cassava production technologies (N=149, $\bar{x}$ =2.50)

Variables	(4) SA	(3) A	(2) D	(1) SD	∑fx	$\bar{x}$
• Increase in yield/output	130(520)	19(57)	-	-	577	3.87
• Increase in income	92(368)	51(153)	6(12)	-	533	3.58
• Expansion of farm holding	47(188)	99(297)	-	3(3)	488	3.28
• Acquisition of loan/grants	12(48)	30(90)	2(6)	105(105)	249	1.67
• Reduced cost of production	10(134)	-	69(138)	70(70)	248	1.66
• Having crops resistant to pest/diseases	46(184)	88(264)	5(10)	10(10)	468	3.14
• Improved socio-economic status	31(124)	76(228)	29(58)	13(13)	423	2.84
• Enhanced speed of operations	116(464)	33(99)	-	-	563	3.78
• Adequate food supply	112(448)	36(108)	-	1(1)	557	3.74

Source: Field Survey, 2015.
Note: 2.5 and above = accepted, 2.4 and below = rejected

Benefits derived from Utilization of Improved cassava production technologies

Result in Table 4 shows the benefits derived from adoption of improved cassava production technologies. It showed that seven (7) of the nine (9) benefits identified were accepted by the respondents as these recorded mean scores above the cut off mean of 2.50. In particular, the respondents admitted that utilization of improved cassava production technologies led to increase yield/output ($\bar{x}$ =3.87), increase in income ($\bar{x}$ =3.58) associated with increased sales of produce resulting from increase in output, expansion of farm holding ($\bar{x}$ =3.28) among others. The respondents also stated that they did not acquire loans/grants as a result of utilization of improved cassava technologies. They did not experience a reduction in cost of production which could be associated with the fact that some improved technologies required farmers to spend more money on them rather than save cost and with no subsidies on technologies, farmers were unlikely to have their cost of production reduced. The implication of this result is that the utilization of improved cassava production technologies by farmers yielded tangible benefits though these benefits varied in proportion among farmers. This finding agrees with Fliegal (1994) and Ekanem (1998) who found in separate studies that cassava farmers who adopted improved technologies in South-Eastern Nigeria and Punjam region enjoyed increased output, increased income, improved social status and high food supply. The findings however disagreed with Ajah (2012) that the utilization of improved cassava technologies does not always lead to tangible result and outcomes.

Table 6

Distribution of respondents by the extent of utilization of improved cassava production technologies (N= 149, decision benchmark 2.50)

Variables	Extent of utilization				$\bar{x}$	
	(4) Very high	(3) High	(2) Low	(1) Very low		
• Cassava cutting multiplication	120(480)	20(60)	9(18)	-	3.74	**
• Planting distance	99(396)	50(150)	-	-	3.66	**
• Use of improved varieties	51(204)	86(258)	1(2)	11(11)	3.19	**
• Cassava breeding technologies	-	-	-	-	-	***
• Cloning techniques	11(48)	6(18)	41(82)	91(91)	1.58	*
• Weed control using chemicals	72(288)	66(198)	11(22)	-	3.41	**
• Mechanized weed control	31(124)	-	3(6)	115(115)	1.64	*
• Use of biological weed control agents	10(40)	15(45)	20(40)	104(104)	1.54	*
• Pest control using pesticides	83(332)	60(180)	-	6(6)	3.48	**
• Mechanized tillage operations	3(12)	17(51)	50(100)	79(79)	1.62	*
• Use of fertilizers (inorganic)	49(196)	87(261)	10(20)	3(3)	3.22	**
• Use of organic manure	2(8)	20(60)	22(54)	100(100)	1.49	*
• Adoption of conservation farming	75(300)	69(207)	5(10)	-	3.42	**
• Cassava grinding machines	54(216)	81(243)	10(20)	4(4)	3.24	**
• Use of machines to harvest cassava	11(44)	30(90)	-	108(108)	1.62	*
• Use of machine to process into flour	62(248)	59(177)	20(40)	8(8)	3.17	**
• Use of machines to store cassava	9(36)	19(57)	17(34)	104(104)	1.55	*
• Use of irrigation/drainage techniques	15(60)	7(21)	29(58)	98(98)	1.69	*

Source: Field Survey, 2015

* = Low, ** = High, ***= Not applicable

Extent of utilization of improved production technologies

Result in Table 5 reveals the extent of utilization of the various improved cassava production technologies by farmers in the study area. The result revealed that the technologies were utilized to varied extent among the farmers. In particular, cassava cutting multiplication ($\bar{x}$ = 3.74), planting distance ($\bar{x}$ =3.66), and use of improved varieties ($\bar{x}$ =3.19) etc. were utilized to a high extent, while cloning techniques ($\bar{x}$ =1.58), use of biological weed control agents ($\bar{x}$ =1.54) and mechanized tillage The implication of this finding is that the extent of utilization of different improved cassava production technologies is not the same across farmers and communities. It could be assume that although a variety of

technologies are available to farmers, farmers utilization of these technologies is a function of institutional factors (e.g. ease of obtaining the technology etc) personal preferences and economic capabilities as well as prevailing cultural narratives surrounding the use of a given technology in the area. These are some of the premises advanced by Udoh (2003) and Rogers (2003) to account for variations in the extent of adoption of innovation among farming population.

Factors affecting the utilization of improved cassava production technologies

Result in Table 6 shows the factors influencing the utilization of improved cassava production technologies in the area. It revealed that only four (4) of the 15 factors identified were rejected while all other factors (eleven) were accepted by the respondents. Specifically, the study found that environmental factors and accessibility of improved technology influenced utilization, implying that new technology can only be utilized if farmers can access it. It was also found that cost of technology and lack of extension agents influenced technology utilization. This implies that farmers will only utilize a given technology if they can afford it and if there are extension agents to effect diffusion and persuade farmers using different avenue to utilize the technology.

Table 7

Factor influencing utilization of improved cassava technologies (N=149, $\bar{x}$ =2.50)

Variable	(4) SA	(3) A	(2) D	(1) SD	$\bar{x}$	
• Environmental factors (e.g rainfall/drought)	91(364)	58(178)	-	-	3.61	**
• Inaccessibility of technologies	142(568)	7(21)	-	-	3.95	**
• Cost of improved technologies	112(448)	33(99)	(3(6)	1(1)	3.72	**
• Lack of extension agents	81(324)	58(174)	7(14)	3(3)	3.46	**
• Lack of technical knowledge	93(372)	50(150)	6(12)	-	3.58	**
• Lack of irrigation facilities	20(80)	-	100(200)	29(29)	2.07	*
• Cultural hindrances/compatibility	-	31(124)	64(124)	56(56)	2.04	*
• Suitability of technology to need	69(276)	79(237)	1(2)	-	3.46	**
• Small farm holdings	21(84)	9(27)	18(36)	101(101)	1.66	*
• Relative advantage of technology	49(196)	96(298)	3(6)	1(1)	3.30	**
• Perceived dangers/problems	63(252)	57(171)	20(40)	9(9)	3.17	**
• Time lag between use and benefits	90(360)	-	59(118)	-	3.21	**
• Lack of credit/subsidies on technology	36(144)	111(333)	2(4)	-	3.23	**
• Religious influence	5(20)	10(30)	51(102)	83(83)	1.58	*
• Labour requirement of technology	67(268)	82(246)	-	-	3.45	**

Source: Field Survey, 2015. ** = accepted, * rejected

This confirms the findings of Alao (2009) that other factors that influenced utilization of technology were lack of technical knowledge, comparative advantage of the technology, suitability of technology to local need, labour requirement and time lag between utilization of technology and benefits. This implies that technologies developed without consideration of potential adopters' technical know-how are likely going to suffer. Also, farmers will not utilize technologies that failed to meet their needs, even as farmers are unlikely to utilize technologies that offer no comparative advantage over the existing technologies and for which they will wait for a long time for the technologies to yield tangible benefits. The results corroborate the findings of Adawo (2011). However, lack of irrigation facilities, cultural factors religious factors and small farm holdings did not influence the utilization of improved cassava technologies. The implication of this is that the utilization of improved cassava production technologies in the area is not affected by these factors.

Hypothesis Testing

Ho_i: There is no significant relationship between the selected socioeconomic characteristics of farmers and utilization of improved cassava production technologies in the study area. The result of logistic regression model given in Table 8 gave 87% correct predications of adopters and non-adopters of improved cassava production technologies. The model also has key strong explanatory power.

Table 8

Logistic regression analysis of socioeconomic determinants of farmers' utilization of improved cassava production technologies in Obudu Local Government Area

Variables	Parameter estimate	Standard error	Pr>chi-square
Intercept	4.3029	10.6810	0.7844
X_1	1.2601	1.5303	0.0089
X_2	1.2601	1.5303	0.0171**
X_3	2.8530	0.7733	0.0519**
X_4	1.6331	0.7372	0.0752*
X_5	1.8651	0.4761	0.0009***
X_6	-2.6554	2.3660	0.0300**
X_7	0.5520	0.6074	0.0845*
X_8	0.9344	0.6985	0.1658
Constant	2.384	25.090	1.568 5.322 0.035
Diagnostic statistics			
Nagelkerke R	0.189		
Chi-Square	25.090		
-2Log Likelihood	226.111		
No. of interactions	5		

***significant at 1%; **significant at 5%; *significant at 10%

The diagnostic statistics indicated that there was improvement of fit by the explanatory variables included in the logistic model (Table 7), as shown by the Chi-Square statistic of 25.090 which was significant at 1% level of probability, implying that the independent variables included in the model significantly predicted the dependent variable in the logistic regression. On the other hand, the strength of association between the dependent and the independent variables was captured by the Nagelkerke's R estimated value of 0.189. This value means that the strength of association between the dependent and the independent variables was 18.90 per cent.

Seven explanatory variables were significant, at either 1%, or 5% (adoption) decisions of cassava farmers on improved cassava technologies in Obudu Local Government Area. Age was not significant at 5% and so was negatively related to utilization of improved cassava production technologies. This suggests that a unit increase in farmers' age will lead to decrease in utilization of improved cassava production technologies. This implies that adults or older farmers were likely not to utilize improved technologies in cassava production as the young farmers. This could be associated with the fact that older farmers may have accumulated more experience and knowledge and therefore understand the benefits of utilizing improved technologies. According to Adesina (1996) older farmers are more favourably disposed to adopt improved technologies because they have larger farm holdings which bring the need for technology utilization.

Sex was significant at 5% level and positively signed. This suggests that sex influences the decision of the farmers to utilize or not to utilize improved cassava production technologies. The implication is that men are likely to utilize improved cassava technologies than women. This has been accounted for by Wilcox (2003) who attributed sex influence on technology utilization to the traditional biases against women especially in matters of land inheritance, access to credit and information and gender stereotypes that often alienates women from benefiting from innovations.

Educational level was also significant at 5% level and positively related to the utilization of improved cassava production technologies. This implies that a unit increase in a farmer's education level will lead to an increase in the utilization of improved cassava production technologies. This result agrees with a number of research findings. For example, Okunde (2006) found that farmers' utilization of improved technologies increased with increase in level of education. The result also shows that marital status was significant at 10% level of significance and positively related to the utilization of improved cassava technologies. The implication is that marital status is a determinant of farmers' decision on utilized improved cassava technologies. It also suggests that married farmers were disposed to utilization of cassava technologies than those who are not married. Okpuara (2010) attributed this, in his study, to the fact that married farmers have greater access to labour, higher food needs and larger farm holdings. This does not only enhances technology utilization but also enhances productivity.

Family size was significant at 1% level of significance and positively signed. This indicates that the likelihood of a farmer utilizing improved cassava production technologies increase with a unit increase in family size. This means farmers with large family sizes are favourably disposed to utilize technologies on those with small family size. This could be attributed to the fact farmers with large family size have access to family labour, which leads to expansion of farm holdings, increase income or access to credit which in turn enhance farmers capacity to procure improved technologies. This corroborates the submissions of Nsikak (2007) and Oluyeye and Usman (2006).

The study also revealed that farm size was significant at 5% level of significance but negatively signed. This suggests that there is an inverse relationship between a farmer's farm size and the propensity of utilization of improved cassava production technologies. Thus, a unit increase in farm size will cause a decrease in the utilization of improved cassava production technologies. This could be associated with the fact that farmers with small farm size are ready to experiment with new technologies or tinker with innovations, bearing in mind that any negative consequence of the technology may not cause any substantial economic damage or lose since the farm size is small. But as the farm size increase, farmers will become more cautious about utilizing new technologies. This confirms the finding of Alao (2009).

Income was significant at 10% and positively related to the utilization of improved cassava production technologies. This suggests that as farmers' income increases, their utilization of improved cassava production technologies also increase. According to Sokoya (1998) many technologies require initial financial commitment by the farmers, have only farmers with income capabilities can make such commitments. Information about certain improved technologies requires money, apart from the money needed to procure improved farm inputs such as fertilizers, seeds, pesticides etc. This is why income affects the utilization of technology. However, the study did not establish any empirical evidence of the connection between farming experience and the utilization of improved cassava production technologies. This means, statistically, farming experience is not a determinant of farmers' utilization of cassava production technologies.

SUMMARY, CONCLUSION AND RECOMMENDATIONS

Summary

The study analyzed the utilization of improved cassava production technologies among farmers in Obudu Local Government Area of Cross River State, Nigeria. The specific objectives of the study were to; ascertain the socio-economic characteristics of the respondents, identify the types of improved cassava production technologies available to farmers in the area, determine the extent of utilization of improved cassava production technologies in the study area, the benefits derived from utilizing improved cassava production technologies and factors affecting the utilization. The study was guided by five (5) research questions developed based on the objectives of the study. The study was based on one general hypothesis; Ho_1: There is no significant relationship between selected socio-economic characteristics of the respondents and the utilization of improved cassava production technologies. The study was conducted in Obudu Local Government Area of Cross River State. The population of the study consisted of all registered (498) cassava farmers in the area. The sample for the study comprised 149 cassava farmers randomly selected from the five (5) communities from Obudu Local Government Area. Data collection was with questionnaire with closed and open ended questions. Descriptive statistics and logistic regression model were employed in data analysis. The result of analysis on the socio-economic characteristics reveals that majority of the respondents were male (70.5%) within the age bracket of 41-50 years (45.6%) and were married (84.6%). The result further reveals that the respondents attended tertiary education (49.7%) had family sizes of less than 5(42.3%) and 5-10 (35.6%), cultivated 2 hectares of land (60.4%), earned between N51,000 – 60,000 annually (50.3%) and had 5 – 10years (46.3%) of farming experience. The result on the types of improved technologies available in the area reveals that technologies such as cassava cutting multiplication, planting distance, use of improved varieties, weeds control using herbicides, and use of machines to process cassava into flour were available for used, while technologies like cassava breeding, cloning, use of biological weed control agents,

mechanized tillage operations, and use of machines to store cassava were not utilized in the area. The study showed further that many benefits were derived from the utilization of improved technologies. Specifically, the benefits were increased yield/output (3.87), increase in income (3.58) expansion of farm holding (3.28) and improved socio-economic status (2.84) etc. On the other hand, acquisition of credits and grants and reduced cost of production were not derived. The study indicated also that the various improved cassava production technologies were utilized to varying extent.

The result established that environmental factors (e.g. rainfall), inaccessibility of technologies, cost of technologies, lack of extension agents, lack of technical know-how to use some technologies, suitability of the technologies to local needs, relative advantage of the technologies, and labour requirement of the technology were some of the factors that influenced the utilization of technologies in the area. It was also found that a substantial proportion of the respondents had fortnightly (47.7%) contact with extension service or agents and cultivated a variety of crops (e.g. yam 82.6%, groundnut 71.8% and maize, 66.4%) beside cassava. The result of hypothesis test showed that seven of the eight explanatory variables such as age, sex, marital status, educational level, family size and income were significant at determining the utilization of improved cassava production technologies in the study area.

Conclusion

Cassava is a very important food crops but also a major source of income to households. It plays a key role in rural societies, including employment opportunities, poverty alleviation, food security, and is increasingly becoming an important economic crop with a wide range of uses. Many rural households survive by producing cassava and cassava flour has become a recent national agricultural policy priority. However, the study observed that cassava production cannot be sustained on large scale without full utilization of improved technologies. Unfortunately, although several improved cassava technologies exists and are available to farmers, attaining full-scale utilization or adoption of these technologies remained a significant challenge. In Obudu, this research noted that several improved cassava technologies have not been utilized and many of those utilized is only to a relatively average extents implying that a lot still needs to be done to achieve large-scale utilization of improved technologies in the area. Farmers' socio-economic dispositions played profound roles in influencing the dynamic of utilization of improved technologies even as several benefits are reported to have been derived from the utilization of improved cassava production technologies.

Based on the above findings, this thesis concludes that the rate and level of utilization of improved cassava production technologies is very high due to high level of educated persons in the programme. Large scale production utilization for large farm size cultivation will not be acceptable in the study area since most of the farmers are small holders with two hectares of land. Also, that there is no significant difference in the relationship between the socio-economic characteristics and rate/level of Utilization of Improved Cassava Production Technology (UICPT) among farmers in the study area.

Recommendations

These recommendations are made based on the results of the study:

1. Jobs and Tertiary Institutions within the area should be properly equipped by Government to avoid young peoples' migration to cities to seek for jobs and higher education. This will be a solution to great farm labour problem on the Adult age group in the area.

2. Preference should be given to young and experienced farmers when cassava production technologies are disseminated.

3. Farmers should be encouraged to go into Utilization of Improved Cassava Production Technologies (UICPT) since it has been in circulation for about 10 years in the study area

4. Technologies should be designed and disseminated in a way that will not only suit the Cassava farmers' present situation but also take consideration into farmers changing situations. This can be achieved through a proper understanding of the farmers' feedback from use of the technologies.

5. The use of communication and information means (such as radio and television) should be provided to the Cassava farmers as an incentive by the government in order for them(farmers) to be alert of what is happening concerning adoption and utilization of improved cassava production technologies (new technologies).

Area for further studies

It will be good to conduct a further study on the extent of utilization of improved cassava production technologies among farmer.

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