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AWARENESS AND UTILIZATION OF CASSAVA PRODUCTION TECHNOLOGIES AMONG FARMERS IN OGBA/EGBEMA/NDONI LOCAL GOVERNMENT AREA, RIVERS STATE

Harry A. T[1], Olise, N. M. [2] and Iferobia, T. L. [3]
[1]Department of Agricultural Extension and Rural Development, Rivers State University, Port Harcourt, Nigeria, [2 and 3]Department of Agricultural Extension and Rural Development, Rivers State University, Port Harcourt, Nigeria

**Author for Correspondence: Email:harryariamebo@yahoo.com, ariaebo.harry@ust.edu.ng*

ABSTRACT

This research focused on the awareness and utilization of cassava production technologies among farmers in Ogba/Egbema/Ndoni Rivers State, the objectives were to describe the socio-economic characteristics of cassava farmers in the study area, describe the current cassava production technologies utilized by farmers, identify the level of awareness of cassava production technologies by farmers, estimate the extent of utilization of cassava production technologies in the area and identify the constraints militating against the awareness and utilization of cassava production technologies in the area. The study was guided by two hypotheses, the research design used for this study was the descriptive survey, the population of this study comprised of all cassava farmers who are involved in cassava farming in the study area, simple sampling techniques was employed in the study, and sample size was 100. Primary data were collected with the aid of well-structured questionnaire as well as personal interview, data for the study was analyzed using descriptive statistics (frequency, percentage and mean) and Inferential Statistics (Multiple Linear Regression). From the findings, majority (51.0%) used local variety, majority (82.0%) of the sampled cassava farmers reported using Zero tillage method of planting, majority (82.0%) reported not using fertilizers of any nature to fertilize their soil, the harvesting equipment used by cassava farmers in the study areas were the traditional farm implements, majority (63.0%) of the sampled farmers reported using a planting distance of 50cm by 50cm. Majority (81.0%) of cassava farmers reported being aware of production technologies available, majority (46.0%) of Cassava farmers got information from family and friends. Improved cassava stem varieties ($\bar{x}$ = 3.45) and Intercropping systems of Farming ($\bar{x}$ = 3.22) were the cassava production technologies adopted by cassava farmers in the study area. The constraints militating against the awareness of cassava production technologies were lack of radio broadcast/ineffective frequencies ($\bar{x}$ = 2.87), inadequate extension programme, ($\bar{x}$ = 2.96), lack television programme ($\bar{x}$ = 2.95), inadequate communication among farmers' ($\bar{x}$ = 2.65), inadequate community leadership ($\bar{x}$ = 2.78). Utilization of cassava production technologies, the challenges were lack of technical/financial assistance ($\bar{x}$ = 3.38), low income ($\bar{x}$ = 2.60), inadequate government support ($\bar{x}$ = 3.78), land ownership system ($\bar{x}$ = 2.82). While inadequate accessibility of community roads ($\bar{x}$ = 2.44) and high cost of input materials ($\bar{x}$ = 2.08) were not challenges militating against utilization of cassava production among cassava farmers in the study. The study concluded that farmers' awareness level of cassava production technology had significant influence on their utilization and recommended that technical and financial assistance should be provided to cassava farmers in the study area to better adopt and utilize these technologies, Government support through grants, trainings and subsidies should be made available for cassava farmers to enable them adopt the technologies and extension trainings and programmes should be made available to the farmers to better understand these technologies in order to fully accept and adopt them.

Keywords: Awareness, Utilization, Production and Technologies

INTRODUCTION

Technologies in cassava production are new and better ways of doing things in cassava farming to help increase production and improve standard of living of farmers. The agricultural sector is key to economic growth in Africa. The recent report on the Global Hunger Index indicates that over half of the world's food-insecure people live in Africa (FSIN, 2019). Sustainable agricultural production is imperative to curb food insecurity, reduce poverty, and impact the livelihood of smallholder farmers (Ojijo *et al.,* 2016; Donkor *et al.,* 2017). Cassava is among the six commodities defined by the African Heads of States as strategic crops for the continent, given its significant contribution to the livelihoods of African farmers and its potential for transforming African economies (Feleke *et al.,* 2016).

Cassava (Manihot esculenta Crantz) is a root crop grown throughout the tropics by more than 800 million people (Nassar and Ortiz, 2010). It can grow with minimal inputs under marginal soil conditions and in regions prone to drought. Though mainly cultivated for its starchy roots, nutrient-dense cassava leaves are also consumed as vegetables in many regions of Africa (Spencer and Ezedinma, 2017). Due to its long harvest window, cassava roots are used as a food reserve during periods of food shortage or during the lean season before harvest of other crops. Although its cultivation has traditionally been associated with subsistence farming, the crop is gradually becoming an industrial crop, which is processed into different products, including bread, pasta, and couscous-like products (Bechoff *et al.,* 2018; Mtunguja *et al.,* 2019). Apart from the food industry, cassava starch is used for textiles, the paper industry, in the manufacture of plywood and veneer adhesives, glucose and dextrin syrups (Tonukari *et al.,* 2015; Spencer and Ezedinma, 2017; Waisundara, 2018).

Conventional breeding has been efficient in providing a continuous supply of improved cultivars that have resulted in a dramatic increase in yield of most major crops (Prohens, 2011). Conventional cassava breeding is based on phenotype-based recurrent selection, which relies on the production of full-sib and/or half-sib progenies followed by successive clonal selection stages, including single row trials, preliminary, advanced, and uniform yield trials (Ceballos *et al.,* 2016). Many cassava varieties have been developed and released through conventional breeding (Malik *et al.,* 2020). Breeding cassava is a challenging task due to the heterozygous genetic make-up of the crop. The development of improved varieties is time consuming due to its long breeding cycle (12 months). New tools and technologies have the potential to improve the efficiency of conventional breeding, especially when several traits are being selected at the same time. Modernization of breeding programs, through the application of innovative tools, is vital for more efficient agriculture, especially in the context of climate change, shrinking resources, land scarcity, and increased food demand. Biotechnology and new genomic approaches have the potential to enhance genetic gain, speed up the development of better cultivars, and impact the livelihoods of smallholder farmers.

The importance of new technologies in agriculture is tremendous. Technology is defined as the method of doing things that are based on the modern knowledge of science and computers (Longman, 2007). Technologies that are very importance in agriculture include: improvement in agronomic practices, production of high yielding, disease resistant crops and animal hybrids with wide adaptability, the use of agrochemicals like fertilizers, herbicides and insecticides, the development of integrated pest management systems, development of irrigation methods and farm machineries with enhanced efficiency. When some of these are combined in production process, they improve productivity. For instance, the intensification of improved crops like cassava with irrigation during drought and fertilization will produce all time high level of cassava output per given land area. Productivity is the increase in the average output per unit input. Productivity enhances increase in income and food security (WTO, 2000).
However, a great deal of these agricultural activities in Nigeria is on small land holdings.

More than half of the Nigerian population are in farming (largely the subsistence type) (Harry and Smart, 2016). The major crops are sorghum, millet, soybean, peanut, cottons, maize, yam, rice, palm products, coca, cassava and rubber, in addition, poultry, goats, sheep, pigs, cattle, fisheries are raised. Farmers with limited resources are the mainstay of food supply for billions of people and this situation is likely to continue for decades, perhaps centuries (Kaindaneh, 2007). The potential for increased food production therefore would rely on adoption of improved (new) technologies by this group of farmers.

Adoption of a technology is the application of knowledge that is new within a specific context like agriculture. When there is a change in the production process of goods and services, technological change is said to occur. Adoption of improved cassava varieties begins with the decision of farmers to replace old varieties or to supplement their stock of planting materials with improved varieties. The most important step in the application of the new technology is the awareness of the economic incentives accruable from it. The level of adoption entails the actual hectare cultivation of improved cassava varieties versus the local/ traditional varieties.
The benefits of adopting improved cassava varieties are much for Nigerian farmers. Though, the hybrids have better sequestration power for soil nutrients than the local/traditional varieties, they need fertilizer and irrigation in case of drought for optimum yield. Nevertheless, improved cassava varieties can survive and perform without those accompanying inputs and yet gives higher yield than the local varieties when grown under the same circumstance. Therefore, it guarantees the households with limited resources to still realize better livelihood from cassava production. In the rural households, the spread of improved cassava varieties does not usually follow commercial pathways. Family relations and neighborhood friends first receive gift of cuttings from primary recipients. Though, accidental sales of propagules only do occur where buyers appreciate the benefits which they derive from growing such new varieties. These improved varieties differ in their resistance to cassava diseases and pests such as Cassava Mosaic Virus (CMV), Cassava Anthracnose Diseases (CAD), Cassava Mealy Bug (CMB) and Cassava Green Spider Mite (CGM). They also produce tubers with varying quality of roots at differing maturity duration and storage in the ground (Okigbo, 1978; Hahn, 1983; Herran and Bennett, 1984; IITA, 1984). In Nigeria and elsewhere in the world, the adoption of agricultural innovation has attracted much scholarly works. Scholars generally agree that socio-economic and institutional factors affect agricultural innovation adoption. Harry and Otto, (2019).

Objectives of the Study
The broad objective of the study were to analyze the level of awareness and utilization (adoption) of cassava production technologies in ONELGA (Ogba/Egbema/Ndoni) Rivers State.

The specific objectives were to:
i. describe the socio-economic characteristics of cassava farmers;
ii. describe the current cassava production technologies utilized by the farmers;
iii. identify the level of awareness of cassava production technologies by the farmers;
iv. estimate the extent of utilization of cassava production technologies and
v. identify the constraints militating against the awareness and utilization of cassava production technologies in the study area.

Hypotheses
H_{O1}: There is no significant relationship between awareness and utilization of cassava production technologies among farmers in the study area.
H_{O2}: Social economic characteristics of the farmers do not significantly influence their utilization of cassava production technologies in Ogba/Egbema/Ndoni L.G.A.

LITERATURE REVIEW

Theoretical Framework

Diffusion of Innovation (DOI) theory

The theory of diffusion of innovation (DOI) was coined by Rogers Everett (1995) who needed to address a social change in a structural society that prevents the progression of certain unprivileged individuals. Diffusion of innovation theory has to do with the process through which new ideas and/or practices are welcomed and/or adopted over time. This usually includes four elements: First, the innovation itself that can be an idea, a practice or an object which the adopting unit or individual considers or perceives to be new (Sahin, 2006). Second, the channels through which the innovation is communicated. Third, the time from which the innovation is encountered, decisions made, awareness developed and the different stages and levels of adoption. Fourth, the social system which makes up the boundaries within which the diffusion of the new idea takes place (Rogers, 1983).

The diffusion of innovation theory (DOI) will be incorporated into this study as a lens by which to understand rural people's perception on cassava innovations towards its adoption. Based on the known facts explained above, DOI theory makes it a suitable theory for this study. Indeed, it provides a very clear framing within which the researcher can understand and explore the perception on cassava innovation towards its adoption.

Theory of Technological Change

The theory of technological change, Jhingan (2000) posited that a technical change or innovation consist of discovering new methods of production, developing new products and introducing new techniques. Technical change is synonymous with a change in the production function, when there is a technical change; it leads to an increase in productivity of labour and capital (inputs). This is represented diagrammatically by a shift towards the origin and even a change in the slope of the isoquant. This signifies that more output can be produced either with the same inputs or with fewer inputs. Methods reduce bulk and make it possible for cassava products to be transported at reduced costs over poor roads to distant urban market centers (Information and Communication Support for Agricultural Growth in Nigeria). All parts of the crop (stem, leaves and tuberous roots) can be harvested for specific market. In Nigeria, there is usually high demand for planting material of improved varieties at the beginning of the planting season. Harvesting, packaging and sale of stems can be made to increase the farmers' profit margin from the farm.

Conceptual Framework

The study conceptual framework depicts the entire process of awareness and utilization of cassava production technologies. It takes into account Socio-economic characteristics. Awareness and utilization of cassava production technologies and challenges faced by farmer in Ogba/Egbema/Ndoni Local Government of Rivers State.

A. **Dependent variable (Box A)** cassava production technologies cassava stem varieties, planting space, tillage systems, weeding frequency, manure/fertilizer depends on the awareness and it's utilization by farmers.

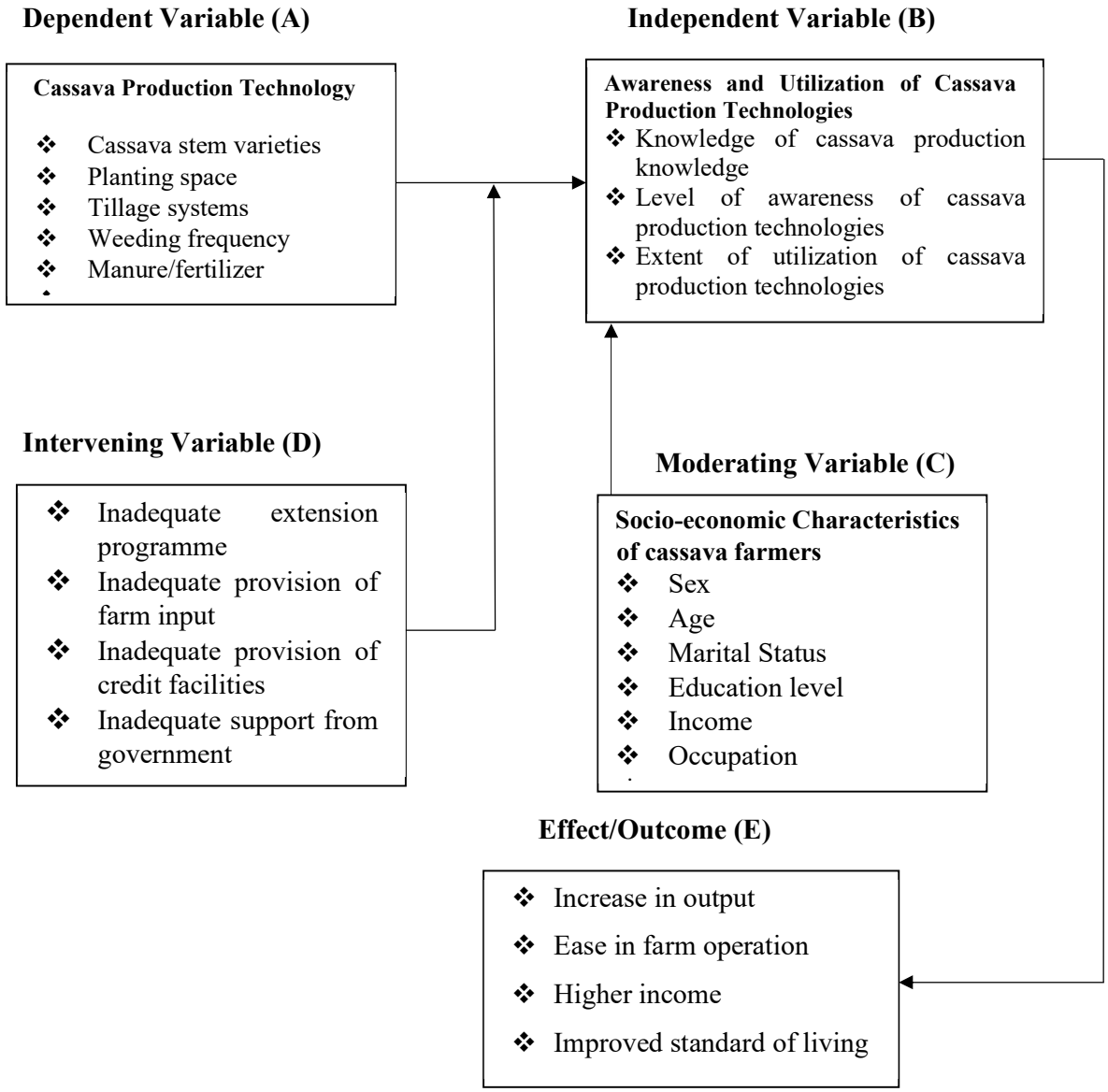
B. **Independent Variable (Box B)** which comprised of knowledge of cassava, level of awareness, and extent of utilization of cassava production technologies by farmers in Ogba/Egbema/Ndoni Local Government Area.

C. **Moderating variable (Box C)**. The independent variable is influenced by the Moderating variable which comprises of the Socio-economic Characteristics of respondents (sex, age, marital status, educational level, occupation and income).

D. **Intervening variable (Box D)** (Challenges) are mitigating factors that may prevent farmers to utilizes the cassava production technologies effectively. Some of this challenge may include; Inadequate extension programme, Inadequate provision of farm input, Inadequate provision of credit facilities, Inadequate support from government. These challenges could lead to a low awareness/utilization of cassava production technologies.

Effective awareness/utilization of cassava production technologies is expected to yield an outcome as shown in box E.

E. **Effect/ outcome (Box E)** which comprises of High production, High output, Ease in farm operation. All these variables are inter-related with one another in such a way that one variable is not a direct cause of another variable but rather could be interconnected to several Variables. For example, the intervening and moderating variables moderates the inter-relationship between dependent and independent variables. They form the basis upon which the dependent and independent Variables can operate. The moderating and intervening variables can either enhance or militate the awareness and utilization of cassava production technologies by farmers in the study area.



Scheme for the Awareness and Utilization of Cassava Production Technologies

Empirical Literature

Concept of Efficiency Measurement using Frontier Profit Function

Farell (1957), in his pioneering study defined efficiency as the ability to produce a given level of output at lowest cost. Efficiency can be analyzed by its two components - technical and allocative efficiency. Technical efficiency is defined as the degree to which a farmer produces the maximum feasible output from a given bundle of inputs (an output oriented measure), or uses the minimum feasible of inputs to produce a given level of output (an input oriented measure). On the other hand, allocative efficiency relates to the degree to which a farmer utilizes efficiency [Rahman, 2003]. Yotopoulos et al. (1970) argued that a production function approach to measure efficiency may not be appropriate when farmers face different prices and have different factor endowments (Ali and Flinn, 1989). Thus, this led to the application of stochastic profit function models to estimate farm specific efficiency directly (Ali and Flinn, 1989; Rahman, 2003; Wang *et al.,* 1996; Ogundari, 2006; Ali *et al.,* 1994). According to Ali et al. (1994) the profit function approach combines the concepts of technical and allocative efficiency in the profit relationship and any error in the production decision is assumed to be translated into lower profits or revenue for the producer.

Profit efficiency is defined as the ability of a farm to achieve highest possible profit given the prices and levels of fixed factors of that farm and profit inefficiency is defined as loss of profit from not operating on the frontier (Ali and Flinn, 1989).

It should be noted that Battese and Coelli (1995) had extended the stochastic production frontier model by suggesting that the inefficiency effects can be expressed as a linear function of explanatory variables, reflecting farm-specific characteristics. The advantage of their model is that it allows estimation of the farm-specific efficiency scores and the factors explaining efficiency differentials among farmers in a single stage estimation procedure. This study therefore, used Battese and Coelli (1995) model by postulating a profit function, which is assumed to behave in a manner consistence with the stochastic frontier concept. The model was applied to cassava producers in Oyo State, Southwestern part of Nigeria.

The estimates of the determinants of adoption and the impact of adoption on cassava yields are presented in Table 5. The full information maximum likelihood approach estimates both the adoption and the outcome equations jointly. Therefore, the selection equation represents the determinants of adoption of improved cassava varieties and these coefficients can be interpreted as normal prohibit coefficients. Results showed that age was negative and significant at a 10% level. This suggests that younger farmers are more likely to try new cassava varieties than older farmers. Danso-Abbeam *et al.,* (2017) as well as Wongnaa et al. (2018) discovered that younger farmers were more likely to adopt improved maize varieties supporting the findings from this study. The experience was found to influence the probability to adopt improved cassava varieties significantly but negatively. As argued early on, less experience and probably younger farmers are more likely to adopt improved cassava varieties.

Summary of Literature Reviewed

Awareness and utilization of cassava production technology is a paramount element for cassava production in Nigeria. The various literature reviewed are relevant and essential. (Jhingan, 2000 Alston, Norton, and Pardey, 1995, Fawole and Oladele,2017 etc.).

In addition Ziberman and Sunding (2000) made distinction between innovation that are embodied and ones that are disembodied, Hayan and Ruttan (1985) formalized and empirically verified theory 0f induced innovation that closely linked the emergence of innovation with economic conditions. On the order hand, Nweke 2004 described how the new Tropical Manihot selection (TMS) varieties have transferred cassava from a low yielding, famine reserve crop to high yielding cash crop that is prepared and consumed as garri a dry cereal.

In all these studies, the awareness and utilization of cassava production technologies was not examined which has indicated a missing link or has created a gap that needs to be filled. The scope of this study is designed to cover the awareness and utilization of cassava production technology. On a geographical note, through the reviewed studies, it was observed that similar study has been done in Nigeria but was not carried out in Onelga Rivers State.

METHODOLOGY

Study Area

The study area is Ogba/ Egbema /Ndoni Local Government Area (ONELGA) of Rivers State, Nigeria. It is one of the 23 Local Government Areas in Rivers State. It was created out of the former Ahoada Local Government Areas recognized by the 1999 Constitution of the Federal Republic of Nigeria, with headquarters at Omoku mainland. It occupies a land mass of 1,621sq.km with a projected population of 350,000 people residing across the various communities. With longitude 6.5976E and latitude of 4.81635N.Ogba/Egbema/Ndoni Local Government Area (ONELGA) is bounded on the North by Ogbaru LGA of Anambra State; on the North-East by Ogwuta and Ohaji/Egbema LGAs of Imo State; on the west by Sagbama/Yenegoa LGAs of Bayelsa State and Ndokwa-East LGA of Delta State; on the South by Ahoada-West LGA and Emohua LGA of Rivers State on the East located on the Eastern bank of the River Niger and in the heart of the Niger Delta region, ONELGA has topography of flat plains netted in a web of rivers - the Niger, Sombreiro (Nkisa), Onita and their tributaries as well as dotted creeks – Idia, Omoku, Onita, Utuegwe, Otuah, Ndoni, Igburu, Osil, etc. ONELGA has three (3) major ethnic/culture groups (Ogba, Egbema and Ndoni) speaking distinct but familiar languages with their unique and peculiar self-sustaining cultures. The presence of good climate, vast arable land and vegetation, fertile soil, hospitality and peaceful disposition make the people predominantly farmers, fishermen and a few traders while others engage in business, politics and white collar jobs to balance her economy. About 57.3% of ONELGA communities reside on the river banks leaving the rest in the hinterland connected to one another through a network of roads making transportation and communications not too difficult. She is blessed with abundant natural endowments including human and the mineral deposits of the world's sustaining natural resources – oil and Gas. She is the heart of the hydrocarbon industry and contributes the highest chunk feeder of natural gas to the Nigeria Liquefied Natural Gas project resulting in Nigeria's foreign earnings, hence earned it the name – 'Land of Black Gold', (Jerrybless Integrated Services, 2007).

Population of the Study

The population of this study comprised of all cassava farmers who are involved in cassava farming in the study area.

Sampling Procedure and Sample Size

A simple random sampling technique was employed in the study. Eleven (11) communities were purposively selected from the study area which comprised of sixty seven (67) communities. All cassava farmers were randomly selected from each of the communities to make a total of 100 respondents.

Table 1: Sample Size According to Selected Communities

S/N	Kingdoms	Communities in kingdom	Selected Communities	Number of Respondent

1.	Ogba	Akabuka Akputa, Waterside, Alinso -Okenu, Ama, Eboaha, Ede, Egboda, Egita-Akabuta, Elehia, Elieta, Erema, Ibewa, Ikiri, Itu, Kreigani, Obagi, Obakata, Obidi, Obiebe, Obieti, Obigbo, Obihuru, Obiozumini/Obukegi, Obite, Oboh, Obokroha, Obosi, Obrikom, Obuburu, Ogbogu, Ohali-Elu, Ohali-Usomini, Ohiauga, Okansu, Okposi, Okpurukpula, Okuku, Omoku, Onuesi -Ogu, Osiakpu, Uju, Ukpazi, Usomini.	Akabuka obite Okposi Omoku Obrikom	9 8 12 15 12
2	Egbema	Agah, Eboaha, Ekpe-Aggah, Mgbede, Okwuizi,	Aggah Mgbede Okwuizi	10 10 9
3	Ndoni	Adiai – Obiofu, Agwe, Amuajie, Ase, Imonita, Ase-Azaga, Isara, Isiukwa, Ndoni, Oboaso, Odugili, Ogbeogene, Ogu, Oniku, Owajinobia, Ugbaja, Umuigwe, Utu.	Ndoni Agwe Amuajie	8 6 6

Method of Data Collection

Primary data were collected with the aid of structured questionnaire as well as personal interview. This was administered to the cassava farmers in the study area. The information on socio economic characteristics such as age, farm size, educational level, current cassava production technologies, level of awareness of cassava production technologies, extent of utilizations and constraints militating against the awareness and utilization of cassava production technologies from the respondents. Secondary data were collected from relevant text books, journals and conference papers.

Data Analysis

Data for the study were analyzed using frequency, percentage and mean (Descriptive Statistics) and Inferential Statistics. Objective 1 and 2 were analysed using descriptive statistics while objective 3, 4 and 5 were analysed using inferential statistics. Hypothesis 1 which states that there is no significant relationship between awareness and utilization of cassava production technologies and Hypothesis 2 which states that socio economic characteristics of the farmers do not significantly influence the utilization of cassava production technologies were analyzed using Simple Linear Regression Analysis.

Model Specification

The model of the simple Linear Regression analysis was used for the test of the hypotheses on the relationship between socio-economic characteristics of the farmers and their utilization of cassava production technologies and the relationship between farmers awareness and utilization of cassava production technologies and constraints militating against the awareness and utilization of cassava production technologies in the study area is presented thus;

$Y = a+\beta_1X_1 + \beta_2X_2 + \beta_3X_3+ \beta_4X_4 + \beta_5X_5-+ \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \beta_9X_9 + \mu_t$ ... .(1)

Where: Y = awareness and utilization of cassava production technologies, extent of utilization and constraints militating against the awareness and utilization of cassava production technologies.
a = Intercept
β_1,.... β_{13}, = coefficient of the regression
μ_t = the error term capturing other explanatory variables not explicitly included in the model
X_1 = Sex: male = 1, female 2
X_2 = Marital status: Single=1, Married= 2, Divorced=3, Widow/Widower= 4
X_3 = Educational level: No formal education= 1, Primary education=2, Secondary education=3, Tertiary=4
X_4 = Income per month (₦): Less than 20, 000=1, 21,000-30,000=2, 31,000-40,000=3, 41,000-50,000=4, 51,000 and above =5,
X_5 = House hold size: 1-3=1, 4-6=2, 7-9= 3, 10 and above= 4
X_6 = Occupation: farming =1, trading =2, civil servant = 3, artisian = 4, others =5,
X_7 = Farming experience (in years): 1-3=1, 4-6=2, 7-9= 3, 10 and above= 4
X_8 = Farm size per hectare: less than 1 = 1, 1-4 = 2, 5-10 = 3, 10 and above =4, others = 5,
X_9 = Land Ownership status: rent=1, Gift=2, Communal=3, bought= 4, inheritance = 5
X_{10} = Age (in years) : 20 – 30 = 1, 31-40 = 2, 41-50 = 3, 51 and above = 4.

RESULTS AND DISCUSSION

Socio-Economic Characteristics of Cassava Farmers in Study Area

Data gathered through structured questionnaire on the respondent's socio-economic characteristics were subjected to statistical analysis and the results are presented in table 1.

Gender

Majority (69.0%) of the cassava producers were women, while (31.0%) were men. The result shows that women were more involved in the planting and processing of cassava in the study area compared to men. Women would be more conversant with the technologies used in cassava production. Also the level education of cassava farmers was looked into in this study, from the result, majority (34.0%) of the respondents had primary school education as their highest level of education, (25.0%) reported having secondary education as their highest level of education, (23.0%) reported tertiary education to be the highest education level attained, while (18.0%) had no formal education. Cassava farmers in the study area were considered educated people as cumulatively 82% of the farmers had one form of formal education. This would play a significant role in their adoption and application of modern technology in cassava processing. This finding, is in line with Okorie (2012), in the study, level of awareness of adoption of improved cassava varieties in Enugu State.

Marital Status

The marital status of the farmers showed that majority of the farmers representing (55.0%) of the sampled farmers reported being married (23.0%) reported being divorced, (15%) reported being widowed while (7.0%) were single. Marital status is a socioeconomic parameter that is always considered in extension research works as it plays vital role in the decision making of a population under study, here a high marital status is an indication that most of the farmers have families to cater for and thus cassava farming is considered an essential means of livelihood sustenance. The age distribution of cassava farmers in the study area shows that majority (43.0%) of the sampled farmers fell between the ages of 41-50 years, this was followed by another (37.0%) who fell between the ages of 31-40 years, (16.0%) reported being above 51 years of age while only (7.0%) fell between the ages of 20-30 years. The farmers are on the average within the active working years and can be more productive in both cassava farming and processing. The result of the household size shows that majority (41.0%) of the sampled farmer had household size ranging from 4-6 persons in a household, (33.0%) reported having households comprising between 1-3 persons, (21.0%) had housed size of 7-10 persons while only (5.0%) reported having household

size of 11 persons and above. According to the farmers, family labour is used often in cassava farming and processing work.

Farming experience

Experience shows how long and possibly how well a farmer or business person or worker as the case may be performs in his or her area of endeavor due to the number of years he or she has done that activity repeatedly, in the case of cassava farmers in Onelga, majority (73.0%) of the sampled farmers reported having over 11 years' experience in cassava production, (19.0%) reported having between 7-10 years' experience in cassava production, (6.0%) reported having 4-6 years' experience and (2.0%) had only 1-3 years' experience. This shows that cassava producers in Onelga are experienced very experienced in cassava production. The more experienced farmers are, the more productive they will be.

Farm Size

The farm size used by the farmers showed that majority (66.0%) of the farmers used between 1.0-1.5 hectares of farm land for planting cassava, (20.0%) used between 1.5- 2.0 hectares of farm land, (7.0%) used between 0.5-1.0 hectares of farm land, while another (7.0%) used above 2 hectares in planting cassava. Cassava farmers in Onelga were mostly producing cassava on a commercial basis, not just for consumption only.

Land Ownership Status

The land ownership status of cassava farmers in Onelga was ascertained in this study and from the report gathered from the field survey carried out, majority (36.0%) used rented land for cassava farming, this was followed by another (26.0%) who reported using inherited land for cassava farming, (20.0%) used communal land for farming, (11.0%) bought the land they use for farming while (7.0%) reported the farm land they use to be gifted to them. These were the reported means of land acquisition for cassava farming in Onelga.

Other than cassava farming, there are other livelihood activities that the farmers also engage in to generate income for themselves, the income range generated from these economic activities are presented in table 1, from the result majority (29.0%) of the sampled farmers reported earning between ₦31,000-₦40,000, (28.0%) earn between ₦41,000-₦50,000, (23.0%) earned between ₦21,000-₦30,000 while (6.0%) earned less than ₦20,000 monthly as their income.

Table 1: Socio-Economic Characteristics of the Respondents

Characteristics	Frequency (n=100)	Percentage	Mean
Gender			
Male	31	31.0	
Female	69	69.0	
Education Level			
No formal education	18	18.0	
Primary education	34	34.0	
Secondary education	25	25.0	
Tertiary education	23	23.0	
Marital Status			
Single	7	7.0	
Married	55	55.0	
Divorced	23	23.0	
Widow/Widower	15	15.0	
Age			
19-30 years	4	4.0	43 years
31-40 years	37	37.0	
41-50 years	43	43.0	

51 years and above	16	16.0	
Household size			
1-3	33	33.0	5 persons
4-6	41	41.0	
7-9	21	21.0	
10 and Above	5	5.0	
Farming experience			
1-3 Years	2	2.0	1
4-6 Years	6	6.0	
7-8Years	19	19.0	
Above 10 Years	73	73.0	
Farm size range per hectare			
0.5-1	7	7.0	2
1-1.5	66	66.0	
1.5-2	20	20.0	
Above 2	7	7.0	
Land ownership status			
Rent	36	36.0	
Gift	7	7.0	
Communal	20	20.0	
Bought	11	11.0	
Inheritance	26	26.0	
Income Level			36840
less than 20,000	6	6.0	
21,000-30,000	23	23.0	
31,000-40,000	29	29.0	
41,000-50,000	28	28.0	
51,000 and above	14	14.0	

Cassava Production Technologies Utilized by Farmers

The components (innovations and technologies) to improved cassava production are all captured in table 2 below. The cassava varieties used by farmers in Onelga were the local variety, hybrid variety and vitamin 'A' variety, of which majority (51.0%) used the local variety, (36.0%) used the hybrid variety while (11.0%) used the vitamin 'A' variety. It could be seen from the result that cassava farmers in the study areas are gradually transitioning from the use of local varieties to improved varieties.

The planting methods mostly adopted in planting cassava in Onelga were the Zero tillage method in which no tilling of the soil is done the grasses are only cleared and planting is done. Majority (82.0%) of the sampled cassava farmers reported using this method in planting, (17.0%) did heaps on the soil before eventually planting, (3.0%) reported making ridges while (1.0%) reported using moulds in planting cassava. Their choice for using zero tillage methods is in the knowledge that zero tillage consumes less time and more planting can be done in considering that they mostly plant in commercial quantity.

The frequency in which the farmers weed their farms to avoid weeds overtaking their farms was also captured in the study, from the result in table 2, majority (cumulatively 86.0%) of the farmers reported weeding their cassava farms every 5 weeks and 2 months' interval respectively, (8.0%) reported weeding their farms every four weeks' interval, (5.0%) reported doing their weeding every 3 weeks' interval, while (1.0%) reported weeding their farms every two weeks' interval.

Fertilizer usage was not on the high side in the study area, as can be seen in the result in table 2, (12.0%) of the sampled farmers used organic manure, (3.0%) used N: P:K 15:15:15 fertilizer

which is a chemical fertilizer, while another (3.0%) reported using green manure for planting fertilizer. Majority (82.0%) reported not using fertilizers of any nature to fertilize their soil.

The harvesting equipment used by cassava farmers in the study areas were the traditional farm implements, there was no presence of any form of mechanization. From the result hoes and cutlasses were the farm implements predominantly used in harvesting cassava.

Weeding is being done by the farmers as can be seen in table 2, the method of weed removal used by cassava farmers was also captured in the table, from the result, traditional implements such as cutlass and hoes are used, herbicides are equally used to control weed growth. Majority (47.0%) reported using hoe in removing weed, (25.0%) reported using herbicides to control the growth of weeds, (17.0%) used cutlass for weed removal, while (11.0%) used a combination of both traditional implements (Hoes and Cutlasses) and Herbicides to control the spread of weed on their farms.

Planting distance is also plays a significant role in the output of crops. When crops are packed together during planting, they tend not to do well. From the result in table 2, majority (63.0%) of the sampled farmers reported using a planting distance of 50cm by 50cm this was followed by (34.0%) who reportedly used a planting distance of 1m by 1m, (1.0%) used a planting distance of 1.5m by 1.5m while (2.0) of the study population used different planting distancing. The planting distance used by cassava farmers in Onelga was to ensure improved and increased yields of the during harvesting.

Table 2: Cassava Production Technologies Utilized by Farmers

Technologies	Frequency (n=100)	Percentage	Mean
Cassava Variety Stem Cutting Used			
vitamin 'A' variety	11	11.0	
Hybrid variety	36	36.0	
Local variety	51	51.0	
Others	2	2.0	
Tillage/planting method adopted			
Zero Tillage	82	82.0	
Ridge Method	3	3.0	
Heap	14	14.0	
Mould	1	1.0	
Frequency of Weeding			
2 weeks intervals	1	1.0	
3 weeks intervals	5	5.0	
4 weeks intervals	8	8.0	
5 weeks intervals	43	43.0	
2 months interval	43	43.0	
kind of fertilizer used			
N:P:K 15:15:15	3	3.0	
organic manure	12	12.0	
green manure	3	3.0	
Non	82	82.0	
kind of harvesting equipment used			
Cutlass	98	98.0	
Hoe	2	2.0	
Method of weed eradication			
With cutlass	17	17.0	
Herbicide	25	25.0	
Hoes	47	47.0	
All of the above	11	11.0	
Planting distance used			
50cm by 50cm	63	63.0	
1m by 1m	34	34.0	
1.5m by 1.5m	1	1.0	
Above 1.5	2	2.0	

Level of Awareness of Cassava Production Technologies by Farmers

The farmers level of awareness of Cassava production technologies were presented in table 3 below, the awareness level was determined using a five point likert scale of very high, high, average, low and very low to portray farmers level of awareness of these cassava production technologies. Using the decision rule that variables (Technologies) whose mean ($\bar{x}$) values were 3.00 and above implied they were the technologies farmers were aware of, on the other hand variable (Technologies) whose mean were below 3.00 implied farmers were not aware of these technologies to boost cassava production. The technologies that farmers were aware of to boost cassava production were Improved Cassava Varieties ($\bar{x}$ = 3.78), Organic manures ($\bar{x}$ = 3.11), Weeding frequencies/interval ($\bar{x}$ = 3.44), Intercropping systems of Farming ($\bar{x}$ = 3.27) and Bush fallow systems of farming ($\bar{x}$ = 3.45) while the technologies that farmers were not aware of their capacity to boost cassava productivity were Planting distance ($\bar{x}$ = 2.80) and Mulching ($\bar{x}$ = 2.91).

Table 3: Level of Awareness of Cassava Production Technologies

Variables	VH (5)	H (4)	A (3)	L (2)	VL (1)	Total Score	Mean
Improved cassava Varieties	35	25	28	8	4	379	3.78
Organic manures	10	12	63	9	6	311	3.11
Weeding frequencies/interval	19	26	40	10	5	344	3.44
Intercropping systems of Farming	13	39	17	24	7	327	3.27
Bush fallow systems of farming	20	25	40	10	5	345	3.45
Planting distance	7	39	4	27	23	280	2.80
Mulching	1	13	69	10	7	291	2.91

Utilization of Cassava Production Technologies

The various Cassava production technologies and their level of utilization were presented in table 4 below, the level of utilization was determined using a five point Likert scale of high, medium, null, low and very low to depict the level of utilization of these technologies by Cassava farmers in Onelga. Using the decision rule that variables (Technologies) whose mean ($\bar{x}$) value is 3.00 and above implies they are being utilized by Cassava farmers, while variable (Tecnologies) whose mean were below 3.00 implied they were technologies that were not utilized by the farmers. The technologies were Improved Cassava Varieties ($\bar{x}$ = 3.45) and Intercropping systems of Farming ($\bar{x}$ = 3.22). These were the two Cassava technologies that were greatly utilized by Cassava farmers in Onelga. Organic manures ($\bar{x}$ = 2.91), Weeding frequencies/interval ($\bar{x}$ = 2.84), Bush fallow systems of farming ($\bar{x}$ = 2.74), Planting distance ($\bar{x}$ = 2.74) and Mulching ($\bar{x}$ = 2.63) were technologies though utilized, but based on their mean values were not considered technologies heavily utilized by Cassava farmers in the Study area. The result further corroborates that of Okorie (2012) in the study, level of adoption of improved cassava varieties in Enugu State.

Table 4: Extent of Utilization of Cassava Production Technologies

Variables	H (5)	M (4)	N (3)	L (2)	VL (1)	Total Score	Mean
Improved cassava Varieties	20	25	40	10	5	345	3.45
Organic manures	1	13	69	10	7	291	2.91
Weeding frequencies/interval	1	44	8	32	15	284	2.84
Intercropping systems of Farming	8	44	17	24	7	322	3.22
Bush fallow systems of farming	9	27	14	38	12	283	2.83
Planting distance	4	39	7	27	23	274	2.74
Mulching	0	6	63	19	12	263	2.63

Constraints Militating against the Awareness of Cassava Production Technologies among Farmers in Ogba/Egbema/Ndoni LGA

The constraints Militating against the Awareness of Cassava Production Technologies among farmers in Ogba/Egbema/Ndoni LGA are presented in table 5 below, the challenges were determined using a four point likert scale of Strongly agree, agree, disagree and strongly disagree. Using the decision rule that variables (Challenges) whose mean ($\bar{x}$) value is 2.50 and above implies that they were challenges against Awareness of Cassava Production technologies, while those whose mean values were below 2.50 were not considered challenges. Lack of radio broadcast/ineffective frequencies ($\bar{x}$ 2.87), inadequate extension programme ($\bar{x}$ 2.96), lack of television programme ($\bar{x}$ 2.95), inadequate community leadership ($\bar{x}$ 2.78) were all challenges because their mean ($\bar{x}$) value were all above 2.50.

Table 5: Constraints Militating against the Awareness of Cassava Production Technologies among Cassava farmers

Variables	SA (4)	A (3)	D (2)	SD (1)	Total Score	Mean
Lack of radio broadcast/ineffective frequencies	20	48	31	1	287	2.87
Inadequate extension programme	51	39	7	3	338	3.38
Lack of television programme	30	50	15	5	295	2.95
Inadequate communication among farmers	40	45	10	5	265	2.65
Inadequate community leadership	50	30	15	5	278	2.78

Constraints Militating against the Utilization of Cassava Production Technologies among Farmers in Ogba/Egbema/Ndoni LGA

The constraints Militating against the utilization of Cassava Production Technologies among farmers in Ogba/Egbema/Ndoni LGA are presented in table 6, the challenges were determined using a four point likert scale of Strongly agree, agree, disagree and strongly disagree. Using the decision rule that variables (challenges) whose mean ($\bar{x}$) value is 2.50 and above implies that they were challenges against utilization of cassava production technologies, while those whose mean values were below 2.50 were not considered challenges. The challenges were lack of technical/financial assistance ($\bar{x}$ 3.38), low income ($\bar{x}$ 2.60), inadequate government support ($\bar{x}$ 3.78) and land ownership system ($\bar{x}$ 2.82). On the inadequate accessibility of community roads ($\bar{x}$ 2.44) and high cost of input materials ($\bar{x}$ 2.08), were not challenges militating against the utilization of cassava production technologies among cassava farmers in the study area.

Table 6: Constraints Militating against the Utilization of Cassava Production Technologies among Cassava farmers

Variables	SA (4)	A (3)	D (2)	SD (1)	Total Score	Mean
Low income	5	50	45	0	260	2.60
Lack of technical/financial assistance	51	39	7	3	338	3.38
Inadequate accessibility of community roads	6	35	56	3	244	2.44
High cost of input materials	3	12	75	10	208	2.08

Inadequate government support	84	11	4	1	378	3.78
Land ownership system	14	55	30	1	282	2.82

Test of Hypotheses

Hypotheses One

This study was guided by two hypotheses which were; there is no significant relationship between awareness and utilization of cassava production technologies among farmers in the study area and Social economic characteristics of the farmers do not significantly influence the utilization of cassava production technologies in Ogba/Egbema/Ndoni L.G.A. These hypotheses were tested using multiple linear regression and the results were displayed in table 7 and 8. For hypothesis one in table 7, the correlation coefficient (R) was 0.529, which was greater than 0.50. This means that there is correlation between awareness and utilization of cassava production technologies. The significance values of the awareness variables were as follows improved cassava variety (0.027), had significant influence on the utilization of cassava production technologies by the farmers, organic manure (0.039) had significant influence on the utilization of cassava production technologies by the farmers, weeding interval (0.019) had significant influence on the utilization of cassava production technologies by farmers, intercropping system of farming (0.014) had significant influence on the utilization of cassava production technologies by the farmers, bush fallow system of farming (0.025) had significant influence on the utilization of cassava production technologies by the farmers, planting distance (0.013) had significant influence on the utilization of cassava production technologies, mulching (0.015) had a significant influence on the utilization of cassava production technologies by the farmers. The F- Probability value which shows the overall significance of the variable was (0.011) this value was less than 0.05. This shows that the awareness level of cassava processing technology had significant influence on their utilization. The researcher therefore rejected the null hypothesis which states that there is no significant relationship between awareness and utilization of cassava production technologies among farmers in the study area.

Table 7: Regression Analysis of the Influence of Awareness on the Utilization of Cassava Production Technologies

Variables	B Statistic	Standard Error	P-Value
(Constant)	20.424	1.362	0.000
Improved cassava variety	3.788	2.531	0.027
Organic manure	0.877	0.366	0.039
Weeding frequencies/interval	0.753	2.149	0.019
Intercropping system of farming	-4.245	1.138	0.014
Bush fallow system of farming	0.765	0.354	0.025
Planting distance	0.856	1.243	0.013
R (Correlation Coefficient)	0.529		
R Square (Coefficient of Determination)	0.618		
F-Statistics	3.884		
F-Probability	0.011		

Hypotheses Two

For hypothesis two in table 8, the correlation coefficient (R) was 0.345, which was less than 0.50. This means that there is no correlation between socioeconomic characteristics of cassava farmers and their utilization of cassava production technologies. The significance values of the socioeconomic characteristics were all above the 0.05 bench mark, Gender (0.963), Educational level (0.606), Marital Status (0.338), Household size (0.823), Income Level (0.510), Farming experience (0.324), farm size range per hectare (0.045), Age (0.858). The F- Probability value which shows the overall significance of the variable was (0.224) this value was supposed to be less than 0.05, but here it is greater than 0.05. This shows that the socioeconomic characteristics of the farmers does not influence their utilization of Cassava production technologies. The researcher therefore failed to reject the null hypothesis that Social economic characteristics of the farmers do not significantly influence the utilization of cassava production technologies in Ogba/Egbema/Ndoni L.G.A.

Table 8: Regression Result of the Relationship between Farmers Socio-Economic Characteristics and their Utilization of Cassava Production Technologies

Variables	B Statistic	Standard Error	P-Value
(Constant)	19.699	3.643	0.000
Gender	0.047	1.012	0.963
Educational level	-0.236	0.456	0.606
Marital Status	-0.526	0.546	0.338
Household size	-0.125	0.555	0.823
Income Level	0.283	0.427	0.510
Farming experience	0.760	0.767	0.324
farm size range per hectare	-1.396	0.687	0.045
land ownership status	0.751	0.309	0.017
Age	0.129	0.716	0.858
R (Correlation Coefficient)	0.345		
R Square (Coefficient of Determination)	0.119		
F-Statistics	1.347		
F-Probability	0.224		

CONCLUSION

The study concluded that farmer's awareness level of cassava processing technology had significant influence on their utilization.

RECOMMENDATIONS

The following recommendations were made based on the findings,

1) Technical and financial assistance should be provided to cassava farmers in the study area to better adopt and utilize these technologies,
2) Government support through grants, trainings and subsidies should be made available for cassava farmers to enable them adopt the technologies
3) Extension trainings and programmes should be made available to the farmers to better understand these technologies in order to fully accept and adopt them.

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