ASSESSMENT OF FADAMA BENEFICIARIES' ATTITUDE TO UPTAKE OF CASSAVA PRODUCTION TECHNOLOGIES IN OSUN STATE, NIGERIA

ADELEKE A. AND ADESOJI S. A.

Department of Agricultural Extension and Rural Development, Faculty of Agriculture, Obafemi Awolowo University, Ile-Ife, Nigeria. kalvatech5@gmail.com, 07061310868
Department of Agricultural Extension and Rural Development, Faculty of Agriculture, Obafemi Awolowo University, Ile-Ife, Nigeria. dapadesoji@yahoo.co.uk, 08035605062

ABSTRACT

The study assessed the attitude of Fadama III Additional Financing Project beneficiaries towards the uptake of improved cassava production technologies in Osun State. A proportionate sampling technique was used to select four Local Government Areas (LGAs) from Osogbo and two from Iwo Zones. Proportionate and systematic random sampling techniques were used to select 160 beneficiaries from 535 in Osogbo and 80 from 268 beneficiaries in Iwo zones. Data were collected on beneficiaries' socio-economic characteristics and their attitude towards the uptake of improved cassava production technologies. Data were analyzed using percentages, means, Chi-square, and correlation analytical tools. The results show that beneficiaries had favorable attitudes towards five of the 12 technologies while they had indifferent attitudes towards the other seven of the technologies disseminated by the Fadama III+AF Project. Furthermore, nine of the 12 cassava production technologies disseminated by the Fadama III+AF Project had high uptake levels while the remaining three had low uptake levels. Further results show that socio-economic characteristics like age (r=0.128), cassava farm size (r=0.162), and Fadama group membership (r=0.230) were positively and significantly correlated with uptake of cassava production technologies at p≤0.05 and p≤0.01 respectively. Also, non-parametric variables like sex (χ^2=10.417), religion (χ^2=111.600), and marital status (χ^2=497.500) had a significant association with the uptake of cassava production technologies. It was concluded that the beneficiaries' attitude towards the uptake of cassava production technologies disseminated by Fadama III+AF was favorable and high among respondents in Osun State.

Keywords: ***Fadama, attitude, uptake, cassava, technologies***

INTRODUCTION

According to the Food and Agriculture Organisation Statistics (FAOSTAT) (2018) and the Federal Ministry of Agriculture and Water Resources (2017), Nigeria is the largest producer of cassava in the world and cassava is the largest produced agricultural commodity in the country. FAOSTAT (2022) observed that past increases in cassava yield have been due to increases in land area cultivated rather than increases in yield per hectare. This trend, FAOSTAT (2022) warned was not sustainable because of competing demand for land from other uses coupled with a geometric increase in population and demand for cassava products in the forms of food and raw materials to industries. Hence, an urgent need to raise cassava yields through productivity increase rather than land area expansion.

To increase the current level of production, there is a need to examine other ways through which productivity increases could come. One possible way is through the improvement of productivity with the use of modern cassava production technologies among farming communities in Nigeria (Atagher, 2013). Okpukpara (2010), described the major cassava production technologies to be the use of high-yielding improved cassava stems, insecticides for pests and diseases control, herbicides for weed control, inorganic fertilizer to enhance higher tuber yield, mechanization of tillage and planting

operations, appropriate plant spacing, planting date, and proper management practices.

Fadama is a Hausa word for irrigable land and the Yoruba interpretation is *Akuro*. This type of land is best described as floodplain and low-lying areas underlined by shallow aquifers and found along Nigeria's major river courses. Fadama lands are especially suitable for crop irrigation, fishing, feed, and water for livestock. The National Fadama Development Project (NFDP) popularly known as the Fadama Project took place in phases, viz: phase I, phase II, and phase III. Osun State benefitted only from the third phase which is the Fadama III and is presently benefitting from the Fadama III Additional Financing (Fadama III+AF) Project.
Fadama III+AF Project keyed into the crop production side of the Agricultural Transformation Agenda (ATA) and set a target of 30 tonnes per ha for cassava production. The Project also provided improved production technologies for farmers to uptake to achieve the targeted yield level.

Statement of Research Problem
Osun State Fadama III+AF Project started implementation in the year 2014. Some cassava production technologies were disseminated to the farmers and backed up with capacity building training (100 percent supported), advisory services training (90 percent supported), support in the form of subsidized inputs up to 50 percent, and productive assets up to 70 percent. Advisory Service and Input Consultants (ASICs) were also engaged to ensure on-farm demonstration of the technologies, ascertaining the varieties cultivated the supported ones, and adherence to the recommended activities and farm practices. Zulqarnain *et al.* (2020) in their study carried out on Factors Influencing Attitudes towards Technology Adoption among Permanent Food Production Park (PFPP) Program Participants in West Malaysia obtained results that indicated that the respondents had a positive attitude towards technology adoption and factors such as knowledge and skill, benefit, education level, years of experience in agriculture and gross income had influenced their attitude. Various authors have also worked on the uptake or adoption of cassava production technologies.
Zulqarnain *et al.* (2020) in their study on Permanent Food Production Park (PFPP) explored the attitude towards technology adoption by considering two main elements. These elements were selected based on the relevant theory and previous studies. The first element consists of two dimensions which are the socio-demographic factor and farm profile. Meanwhile, the second element consists of four dimensions, i.e., practices, attitude, knowledge, and skill. Fadama provided support to farmers of diverse socio-demographic characteristics along the cassava value chain. These farmers were also supported with training on the cassava production technologies introduced to them to make the farmers uptake the cassava production technologies.

For an increase in production to occur there has to be an increase in uptake of improved production technologies (Doss, 2006). This research was carried out to assess farmers' attitudes towards the uptake of improved cassava production technologies, and the constraints to improved technology uptake and it provided answers to the following research questions:

(i) What are the socio-economic characteristics of the beneficiaries in the study area
(ii) What is the attitude of beneficiaries towards the uptake of improved cassava production technologies disseminated by the Fadama III Additional Financing Project in Osun State?
(iii) At what level are uptake of improved cassava production technologies disseminated by the Fadama III Additional Financing Project in Osun State?

Objectives of the Study
The general objective was to assess the uptake of improved cassava production technologies

among Fadama III+AF Project beneficiaries in Osun State.

The specific objectives of the study are to:

i) describe the socio-economic characteristics of cassava farmers in the study area;
ii) determine farmers' uptake of improved cassava production technologies in Osun State; and
iii) examine farmers' attitudes toward the uptake of improved cassava production technologies disseminated by the Fadama III Additional Financing Project in the study area.

Hypothesis: There is no significant relationship between selected variables and uptake of improved cassava production technologies disseminated by the Fadama III Additional Financing Project in Osun State

RESEARCH METHODOLOGY

The Study Area

The study was carried out in Osun State, in the Southwest geopolitical zone of Nigeria. Osun State was carved out from the old Oyo State on August 27, 1991, by the then-military government headed by General Ibrahim Badamosi Babangida. Osun State lies within longitudes 2.75^{o} and 6.75^{o} East of Greenwich Meridian and latitudes 7^{o} and 9^{o} North of the equator. It covers a total land area of about 14.875 km^{2} (Osun State government diary, 2005). It is bounded in the west by Oyo State, in the east by Ekiti and Ondo States, in the north by Kwara State, and the south by Ogun State (Osun State government diary, 2005). The Federal Office of Statistics (2007) reported that Osun State has a population of 3,423,535 people as of the 2006 National Population Census and it is normal to be on an exponential increment since then. The southern part of Osun State is a rainforest zone with a mean annual rainfall of 1,420mm, and the northern part of the state is a derived savannah with an average annual rainfall of 1,133mm. The Osun State Agricultural Development Programme (OSSADEP) divided Osun State into three agricultural zones with their headquarters in Osogbo, Iwo, and Ilesa.

Sampling Technique and Sample Size

The study was carried out in Osun State, Nigeria. Osun State was purposively selected for the study because the State benefitted from the Fadama III+AF Project. Cassava production farmers who benefitted from the Osun State Fadama III+AF Project were the target population for this study. The State has three agricultural zones which are Osogbo, Ife/Ijesa, and Iwo with 13, 10, and seven Local Government Areas (LGAs) respectively. A multistage sampling procedure was used to select the respondents (population sample) from the entire population.

The first stage involved the purposive selection of Osogbo and Iwo agricultural zones because of the predominance of Fadama III+AF Project cassava farmer-beneficiaries in the zones. In the second stage, a proportional sampling method was used to select four Local Government Areas (LGAs) from the Osogbo Zone and two LGAs from the Iwo Zone. In the third stage, a proportionate sampling technique was used to select 30 percent of the beneficiaries in each of the selected LGAs. Lastly, through Fadama User Groups (FUGs), a systematic random sampling method was used to select 36 respondents in Ifelodun, 44 respondents in Ede North, 49 in Egbedore, and 31 respondents in Ila LGA representing Osogbo Zone. Furthermore, 32 respondents were selected for Ayedire while 48 respondents were selected in Olaoluwa LGA representing Iwo Zone, making a total of 240 respondents interviewed for the study.

Measurement of Variables

There were two categories of variables considered in this study and they were the dependent variable and the independent variables.

Dependent variable: The dependent variable of the study was the uptake of cassava production technologies among Fadama III+AF cassava farmers in Osun State. This was operationalized by using the uptake

(adoption) score of respondents to calculate the total technology score from the uptaken technologies disseminated by the Fadama III+AF Project. In developing the uptake score, a series of technology-specific questions were asked. Scores were apportioned for each of the 12 technologies.

Independent variables: The independent variables taken into consideration in this study were the personal and socio-economic characteristics of the respondents and their attitude towards the uptake of the cassava production technologies disseminated by the Fadama III+AF Project.

RESULTS AND DISCUSSION

The results in Table 1 show that the mean age was 37.86±8.50. This indicated that the majority of the farmers were still in their productive age and also agrees with the findings of Olanrewaju, (2013) in a study carried out in Osun State which showed that age of majority of the farmers fell between 30 and 60 years old. This result implies that most of the respondents in this age range are still active and productive which could have influenced their uptake of Fadama III+AF improved cassava production technologies. Results in Table 1 further show that 38.3 percent of the Fadama III+AF cassava farmers were Christians, 58.3 percent were Muslims and 3.3 percent belonged to the Traditional worshippers. This implies that all the respondents were affiliated with religions and many of the respondents practiced Islamic religion, and this could be because Osogbo and Iwo Agricultural Zones of Osun State have high Muslim dominance. The implication of this might be that religion could influence the uptake of technologies.

According to Olaolu *et al.* (2013), religion affects people's beliefs and as such could constitute a barrier to the acceptance of new technologies if it negates their faith. The mean cassava farm size was 1.54±0.76 hectares. The result implies that farmers still own farmland because all the respondents indicated their farm size, which is an indication of farm ownership. This means there is the availability of land on the side of the farmers for the uptake of cassava production technologies. Khatun and Haider (2016) reported land holdings were statistically significant in determining technology uptake level. Feder *et al.* (1985) as cited by Melesse (2018) reported that farmers with bigger land holding sizes are assumed to have the ability to purchase improved technologies and the capacity to bear risk if the technology fails (Table 1). The mean cassava farming experience was 13.16±6.34 years. This indicates that even if some farmers were not into full-time farming because of diversification, most of the respondents had been involved in farming for well over 10 years.

This implies that the farmers had good experience and knowledge of cassava farming. Ainembabazi and Mugisha (2014) reported that there was a strong relationship between farming experience and uptake of technologies, although not for all crops (Table 1). Results in Table 1 further show that all (100%) Fadama III+AF Project cassava farmers were smallholder farmers and belonged to Fadama groups and clusters. The small sizes of their farms can affect their uptake of cassava production technologies. Nearly all the respondents belonged to other agricultural organizations, this might mean that they would be exposed to discussion on new ideas, technologies, or innovations related to agriculture that could improve their economic status and standard of living. This could be because Fadama III+AF Project did not deal with individual farmers but with groups of farmers in cooperative bodies. This agrees with the findings of Knierim (2020), who asserted that cooperative associations influenced farmers in accessing relevant agricultural information. Furthermore, Ojo and Ogunyemi (2014) reported that membership in cooperative societies is one of the determinants of the uptake of cassava production technologies in Ekiti State.

Results in Table 2 show that parametric variables like age (r=0.128), size of cassava farmland (r=0.162) and Fadama group membership (r=0.230) had positive and

significant relationship with uptake of cassava production technologies while household size (r=-0.249), years of farming experience (r=-0.141) and This indicates that the positively correlated variables and the uptake of cassava production technologies are directly proportionally related. The table also revealed the coefficient of determination for each of the variables.

Table 1: Respondents according to socio-economic variables that are significant to uptake of cassava production technologies

Variables	Frequency	Percentage	Mean	Std. dev.
Age				
20-35	100	41.67		
36-50	123	51.25		
51-65	15	6.25		
Above 66	2	0.8	37.86	±8.50
Religion				
Christianity	92	38.3		
Islam	140	58.3		
Traditional	8	3.3		
Marital status				
Single	23	9.6		
Married	209	87.1		
Separated	2	0.8		
Widowed	6	2.5		
Cassava farm size (Ha)				
2 and below	192	80		
2.1- 4.0	48	20	1.54	0.76
Years of cassava farming experience				
10 and below	89	37.08		
11-20	119	49.58		
21- 30	29	12.08		
31 and above	3	1.25	13.16	6.34
Membership of agricultural Organization				
Fadama groups and clusters	240	100		
AFAN	221	92.05		
Cassava Growers Association	144	60.00		
Roots and Tubers	76	31.5		

Source: Field survey, 2020.

Results displayed in Table 3 show that non-parametric variables like religion (χ^2 =201.942), marital status (χ^2 =271.515), years heard about Fadama III+AF Project (χ^2 =214.962) and the number of training attended (χ^2 =342.846) had a significant association with the uptake of cassava production technologies in the study area. This might mean that religion could be a good platform to spread innovations if the innovation does not negate the religious beliefs of the farmers (Olaolu *et al.*, 2013). Furthermore, the earlier the farmers heard about the benefits of a project the more they are likely to uptake the technologies

(Rogers 1995). Also, the more the number of sources of information, the more the rate of spread of innovation information to farmers, in other words, multiple sources of information tend to influence the uptake decision of farmers. Lastly, the more favorable the attitude of farmers towards innovations, the more their tendency to uptake the innovations.

Table 2: Summary of correlation analysis showing the relationship between some socio-economic characteristics and uptake of Fadama III+AF cassava production technologies

Variables	Correlation coefficient (r)	Coefficient of determination (r^2)	Percentage contribution
Age	0.128*	0.02	2.0
Household size	-0.249**	0.06	6.0
Number of years spent on education	0.093	0.01	1.0
Size of cassava farmland	0.162*	0.03	3.0
Years of farming experience	-0.141*	0.02	2.0
Fadama group membership	0.230**	0.05	5.0
Cosmopolite-ness of farmers	-0.148*	0.02	2.0
Year heard about Fadama III+AF	0.549**	0.30	30.0
Number of sources of information	0.317**	0.10	10.0
Constraints	-0.092	0.01	1.0

Source: Computation of correlation analysis, 2020

** Significant at 0.01 (99%) * Significant at 0.05 (95%)

Table 3: Chi-Square Analysis showing an association between selected socio-economic characteristics of respondents and uptake of cassava production technologies disseminated by Fadama III+AF Project

Nominal socio-economic variables	χ^2	DF	P-value
Sex	77.823	70	0.244
Religion	201.942**	140	0.000
Marital status	271.515*	210	0.003
Year heard about Fadama III+AF	214.962**	140	0.000
Number of training attended	342.846*	280	0.005
Nature of farming	65.327	70	0.636

**Significant at $P \leq 0.01$; * Significant at $P \leq 0.05$ DF = Degree of Freedom

Number of Respondents = 240 χ^2 = Chi-square

Source: Field survey, 2020.

Table 4 below shows the means of attitudinal statements and their respective decisions. The results in Table 5 show that farmers had a favorable attitude toward five of the technologies while they had an indifferent attitude towards the other seven of the technologies disseminated by the Fadama III+AF Project. It could be inferred that most of the technologies towards which farmers showed favorable attitudes were less costly while most of the ones with indifferent attitudes were relatively costly to utilize for the farmers. This study conformed to the results obtained by Sunding, (2000) as cited in Johan (2011), and Adesakin *et al.* (2017) that identified the high cost of innovation as one of the constraints to the uptake of cassava production technologies.

Table 4: Means of attitudinal statements

S/N	STATEMENTS	Mean	Dec
1	The subsidy on the improved varieties given by Fadama III+AF Project encouraged me to uptake the varieties	1.35	A
2	The improved cassava varieties mature early compared to the old varieties	1.28	A
3	The reason I did not adopt the improved varieties of cassava was because tubers rot when harvesting was delayed	1.29	D
4	The yield obtained from the improved cassava varieties per hectare was less than the yield of the old varieties	1.38	D
5	The varieties fit perfectly into the type of cassava demanded by both local and industrial processors because of the high starch content	1.32	A
6	The income I realized from the sale of stems of improved cassava varieties was not tangible and discouraging	1.33	D
7	The furrow spacing recommended by the Fadama III+AF Project is very good for my targeted yield.	1.26	A
8	The tractor operators found it very easy to comply with recommended furrow spacing and calibration of ridgers	1.28	A
9	Plant spacing recommended was too close for me and made me not to adopt it	1.28	D
10	The plant population per hectare was too much and made me believe that yield would be low	1.29	D
11	Discouragement of mixed cropping by the Fadama III+AF Project put me off.	1.40	D
12.	I feel the plant spacing recommended is just good for the optimum plant population	1.38	A
13	Utilization of cassava stems for less than one year is proper for good yield	1.33	A
14	Cassava stems of two to three years of old varieties are better to be planted than the improved varieties.	1.24	D
15	The yield of old varieties that mature in two years is higher than the yield of improved varieties that mature in one year	1.34	D
16	The resistance of the new varieties to pests and diseases is higher when compared to the old varieties	1.34	A
17	The cost of farm maintenance (weeding) is reduced with the use of a combination of herbicides and manual weeding instead of the manual weeding method formerly used	1.35	A
18	Wearing of hazard-prevention materials is always too cumbersome for me	1.35	D
19	Contact with chemicals has not done any harm to me despite many years of farming	1.33	A
20	Cassava does not need insecticide, it only needs herbicides to control the weeds	1.28	A
21	Spraying of chemicals will cause tubers to rot, therefore I prefer manual weeding to the use of chemical control	1.38	D
22	I have access to cheap labour so I don't like to use chemical weed control	1.39	D
23	Mechanical planters are not affordable for individuals to use because of the cost of transportation	1.38	A
24	Mechanical planters can save costs by carrying out planting and fertilizer applications simultaneously	1.33	A

S/N	STATEMENTS	Mean	Dec
25	Mechanical planters can only work on harrowed land and I prefer ridging my cassava farm	1.39	D
26	The mechanical planters are not readily available because they are still new and very few	1.29	D
27	I am aware that some agrochemicals have been banned by the government because they are not safe for human health and the environment	1.27	A
28	The banned chemicals perform better than the approved ones and are still available in the market	1.40	A
29	Fertilizer application replenishes the soil nutrients, so I uptake it	1.28	A
30	Fertilizer is not always available when needed	1.42	D
31	The cost of fertilizer and its application cost will reduce income and increase the cost of production	1.37	A
32	Fertilizer application causes cassava tubers to rot	1.30	D
33	Cassava does not need fertilizer, fertilizer application is a waste of resources	1.30	D
34	Fertilizer application caused yield to increase	1.38	A
35	Modern land measuring devices cannot work alone	1.34	D
36	Modern land measuring devices is costly to buy	1.35	A
37	Harvester reduces human effort during operation, so I love it.	1.38	A
38	Harvester reduces the drudgery in the tuber harvesting operation	1.35	A

A = Agreed, D = Disagreed
Source: Field survey, 2020.

Table 5
Attitude of Respondents towards each Cassava Production Technology disseminated by Fadama III+AF Project

S/N	Technology	Mean	SD	Attitude
6.	Farmers protection against chemical contact by wearing PPEs	1.39	0.01	
12.	Use of Geographic Positioning System (GPS)	1.37	0.02	
2.	Calibration of ridgers to 90cm furrow spacing	1.36	0.04	Favorable
1.	Cultivation of improved cassava Variety	1.35	0.05	
4.	Adherence to recommended plant spacing	1.35	0.01	
8.	Precautions on the use of agrochemicals	1.34	0.09	
9.	Adherence to the recommended number of nodes	1.34	0.06	
10.	Fertilizer application to cassava	1.34	0.06	
7.	Planting stems with modern machines	1.33	0.05	Indifferent
5.	Age of planting materials below one year	1.33	0.03	
11.	A mechanical device to harvest cassava tubers	1.31	0.05	
3.	Ploughing across the slope to control erosion	1.28	0.01	

0.00-0.67 = Not favorable, 0.68-1.34 = Indifferent, 1.35-2.00 = Favorable
Source: Field survey, 2020.

The results in Table 6 show that nine of the 12 cassava production technologies disseminated by the Fadama III+AF Project had high uptake levels while the remaining three had low uptake levels. The categorization was done based on the grand mean of "how often the technology was

utilized". It could be inferred that most of the technologies with high uptake levels cost less compared to the ones that had low uptake level. This study agreed with the results obtained by Sunding (2000) as cited in Johan (2011) and Adesakin *et al.* (2017) who identified the high cost of innovation as one of the constraints to the uptake of cassava production technologies.

Table 6: Farmers' Uptake Level of each Cassava Production Technology disseminated by the Fadama III+AF Project

S/N	Technologies	Mean How Often	SD	Uptake Level
4.	Adherence to recommended plant spacing	2.07	0.78	
3.	Ploughing across the slope to control erosion	2.01	0.78	
8.	Precautions on the use of agrochemicals	1.93	0.80	
6.	Farmers protection against chemical contact by wearing PPEs	1.91	0.85	High
5.	Adherence to the age of planting materials below one year	1.85	0.83	
2.	Calibration of ridgers to 90cm furrow spacing	1.78	0.71	
10.	Fertilizer application to cassava	1.73	0.80	
9.	Adherence to the recommended number of nodes	1.72	0.83	
1.	Cultivation of improved cassava Variety	1.61	0.73	
7.	Planting stems with modern machines	0.94	1.22	
11.	Mechanical device to harvest cassava tubers	0.88	1.17	Low
12.	Geographic Positioning System (GPS)	0.86	1.12	

How often was technology utilized?
Once in a while = 1, Most times = 2, Every time = 3
Grand mean = 1.61, Grand SD = 0.45
Source: Field survey, 2020.

CONCLUSION

It could be concluded from the study that the uptake level of respondents with respect to the cassava production technologies disseminated by the Fadama III+AF Project was determined by age, marital status, religion, membership of an association, number of training attended, how early they were aware of the project's benefits, cost implication of the technologies and farm size. Hence, the high uptake level recorded in the study could be adduced to the favorable attitude of the farmers towards the less costly cassava production technologies.

REFERENCES

Adesakin, M. F. and Oluwatusin, F. M. (2017). Profitability Analysis of the Adoption of Improved Agricultural Technologies among Cassava Farmers in Ekiti State, Nigeria. *Journal of American Science*, 13(4):115- 121.

Adesoji, S. A. (2009). Assessment of Fish Farming Management Practice in Osun State, Nigeria. *Unpublished Ph.D. Thesis, Obafemi Awolowo University, Ile-Ife, Osun state Nigeria*, pp. 4-10.

Adesoji, S. A. and Farinde A. J. (2007): Assessment of Attitude of Participants in Agricultural Youth Empowerment Programme of Osun

State, Nigeria; *Journal of Agriculture and Rural Development*, 1:84-94.

Ainembabazi John Herbert and Johnny Mugisha (2014) The Role of Farming Experience on the Adoption of Agricultural Technologies: Evidence from Smallholder Farmers in Uganda, The Journal of Development Studies, 50:5, 666-679.

Atagher, Monica Mwuese (2013). Effects of the Benue ADP's Cassava Production Technologies on the Productivity and Incomes of Women Farmers in Benue State, Nigeria. An unpublished Ph.D. Thesis in the Department of Agricultural Economics, Faculty of Agriculture, University of Nigeria, Nsukka.

Doss Cheryl R. (2006). Analyzing technology adoption using microstudies: limitations, challenges, and opportunities for improvement. *Journal of the International Association of Agricultural Economists*, 34(3), 207-219.

Erhabor P.O and Emokaro C.O (2007): Relative Technical Efficiency of Cassava Farmers in the Three Agro-Ecological Zones of Edo State, Nigeria. *Journal of Applied Sciences*, 7(19).

FAOSTAT. Food and Agricultural Organization of the United Nations. 2022. Available online: https://www.fao.org/faostat/en/#data/QCL/visualize (accessed on 2 November 2022).

Federal Ministry of Agriculture and Rural Development (2017): Communique of the First Nigeria Food, Safety and Investment Forum www.fmard.gov.ng/

Federal Ministry of Agriculture and Water Resources (2008): National Food Security Programme, May 2008. *A Comprehensive Report*, Pp. 87-106.

Federal Office of Statistics (2007). National Bureau of Statistics. Plot 762, Independence Avenue, Central Business District, FCT, Abuja Nigeria. www.nigerianstat.gov.ng, feedback@nigerianstat.gov.ng.

Food and Agriculture Organization Statistics (FAOSTAT), (2018). Statistics of World Crop Production. http://www.fao.org/faostat/en/#data/QC/visualize visited November 22, 2018

Khatun Fatima & Mohammed Ziaul Haider, (2016). Impact of Technology Adoption on Agricultural Productivity. *Journal of Agriculture and Crops, Academic Research Publishing Group*, 2(9), 87-93, 09-2016.

Knierim Andrea (2020). Public agriculture extension and Information and Communication Technologies: A case study in South Wollo, Ethiopia. Faculty of Agricultural Sciences Institute of Social Sciences in Agriculture Communication and Advisory Services in Rural Areas (430a)

Melesse B (2018). A Review on Factors Affecting Adoption of Agricultural New Technologies in Ethiopia. *Journal of Agricultural Science Food Resources*, 9, 226.

Ojo S.O., Ogunyemi A.I. (2014): Analysis of Factors Influencing the Adoption of Improved Cassava Production Technology in Ekiti State. *Nigeria International Journal of Agricultural Sciences and Natural Resources,* 1(3), 40-44.

Okpukpara Benjamin (2010) Credit Constraints and Adoption of Modern Cassava Production Technologies in Rural Farming Communities of Anambra State, Nigeria. *African Journal of Agricultural Research,* 5(24): 3379-3386.

Olanrewaju, K. O. (2013): Assessment of Traditional Communication Methods used in Information Dissemination among farmers in Osun State, Nigeria. *An unpublished M.Phil. Thesis,* Obafemi Awolowo University Ile-Ife.

Olaolu M.O., Akinnagbe O. M. and Agber, T. (2013): Impact of National Fadama Development Project Phase (II) On Poverty and Food Security among Rice Farming Beneficiaries in Kogi State, Nigeria. American Journal of Research Communication www.usa-journals.com

Osun State Diary (2005). *Osun State Information Services.* Osun State Official Diary of General Information, Ministry of Information and Women Affairs, Osogbo, Nigeria.

Rogers, E. M. (1995). *Diffusion of innovation*s (4th ed.) New York: Free Press. Pp 519.