Determinant Factors to Decision to Adopt Pro-Vitamin a Cassava Varieties by Farmers in Abia State of Nigeria

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Abstract: **Determinant factors to decision to adopt pro-vitamin A cassava varieties by farmers in Abia State of Nigeria was studied. Multistage random sampling technique was used to select one hundred and twenty respondents for the study. A structured questionnaire and oral interview were used to elicit data for the study. Percentage responses and Probit model analysis were used to address the objectives of the study. The result of the probit analytical model showed that farmers' educational level, membership of organization, farming experience, farm size, off-farm income and extension services were the determinants factors to the decision to adopt improved pro vitamin A cassava varieties There is need to enhance farmers' access to educational programmes, credit facility, off-farm employment and extension services.**

Keywords; **Probit model, Decision, Adopt, Pro Vitamin A, Cassava Varieties, Farmers**

I. INTRODUCTION

Cassava and its derivatives as reported by Food Agriculture 0rganization (FAO), (2015) are utilized as food, confectionery, sweeteners and livestock feed. It serves also as source of employment and income for rural people particularly women (Ume, Onuh, Jiwuba, and Onunka, 2016). Cassava storage root as asserted by Onunka, Ume, Ekwe and Silo (2017) and World Bank,. (2018)is rich in starch but poor in protein and micronutrients like iron, zinc and Pro-vitamin A, thus predisposing the consumers particularly pregnant women and children under five years to dietary related diseases. Prominent among the diseases is vitamin A related diseases, they added.

The health risks associated with vitamin A deficiency especially among vulnerable groups in rural areas of sub Saharan Africa are well documented (FAO, 2013; Ekwe, 2013, Ume, Okoye, Onwujiariri and Achebe, 2020). Studies inferred that pro-vitamin A deficiency is capable of causing impaired vision, reduced immunity, and compromises growth and development leading to death in the most severe cases (FAO, 2015; Ume, Uloh, Onyeka, and Nwose, 2020). Bio-fortification (using natural breeding techniques or genetically modified organisms) is recommended as remedy to pro vitamin A deficiency for the poor that often rely on their own produce of staple starchy crops as their main source of food, and who live in rural areas where supplementation programs cannot reach or who cannot afford fortified products (Onadipe-Phorbee, Olayiwola, Sanni, 2013, World Bank, 2018). The chiefly among the gains of biofortification rests squarely on the selection of staple crops such as cassava in many rural areas in sub- Saharan African, thereby enhancing their adaptability (MCdowell and Odoru, 2012). Second, Omodamiro Oti E., Etudaiye, Egesi, Olasanmi and Ukpabi (2012) reported that biofortification has benefit of adding to daily micronutrient intake to people, as longer as the crop is consumed, quite in contrast to other interventions that may perhaps pursue to provide a high instantaneous dosage of micronutrient through food supplementation/fortification In line to bio- fortification ideal, the Federal government of Nigeria in collaboration with International Institute for Tropical Agriculture (IITA), Ibadan in collaboration with National Root Crops Research Institute (NRCRI), Umudike developed and released new improved cassava varieties that contain beta carotene (β-carotene) known as "Pro-vitamin A, among them are NR07/0326, NR07/0506,NR07/0497, NR07/0499, NR07/0427, NR07/0432, Umucass, 44, 45, and 46 NR07/0220, IITA-TMS IBA 070593 and IITA-TMS IBA 070557 (Egesi and Ekeokoro, 2013, Onadipe-Phorbee,et al, 2013). These cultivars, apart from having above characteristic of possessing vitamin A have the following features as purported by Mcdowell and Odoru (2012) and Onunka, *et al*; (2017) high in dry matter content, high leaf retention in dry season and possesses high quality flour for confectionaries.

The increasingly adoption of this variety of cassava could serve as a sure way of bridging the gap between production and demand, increasing food security and solving malnutrition issues in the areas (Ume, et al; 2020). However, adoption of the improved cassava has remained low in many States in the country and this could be evidenced through among others; high costs of derivatives of this variety compared to other cassava varieties in the market (Ekwe, 2013). Second, there is a high yield differential between research results and that of farmers' farms (Omodamiro; el al;2012). The low production and productivity of the cassava variety could be correlated to low adoption of the technology (FAO, 2015, Ume, et al; 2020). The low adoption of technology as witnessed in many developing countries could be attributed to weak extension services, lack of clear exchange mechanisms between farmers, researchers and extension agents and lack of enough knowledge on adoption behavior of the improved cassava by farmers (Ojo and Ogunyemi, 2014, Saliu, Ibrahim, Eniojukan, and Saliu, 2015, Onyekere, 2017).

It's imperative to state that the production potential of the cassava is best achieved, when the improved varieties is cultivated with its associated production recommendations, which according to Nkematu, Obinabo and Uzoka, (2003) were adequate tillage, 1m×1m cropping geometry, timely weeding, use of appropriate chemical fertilizer and other pesticides application and timely harvesting which would help to boast the production and productivity of the crop. These production recommendations had been disseminated to the farmers in the study area for onward adoption by extension services arm of Agricultural Development programme (ADP) (Nkematu, Obinabo and Uzoka, 2003; Ume, *et al*; 2017), communities and Non- Governmental Organization (NGO) (Omodamiro; el al;2012). However, information on the farmers' decision to adopt the technologies is not yet known especially in the study area. Therefore, there is need to abridge this research gap, by considering household head - specific, economic and institutional caracteristics for adequate assessment of those factors that would effectively influence the farmers' decision to adopt pro- vitamin A cassava varieties in the study area. Furthermore, the determination of factors influencing the decision to adopt technology would go a long way in aiding policy makers and extension planners for further modifications of the system. The study would further serve as source of research information for scholars for further studies in related subjects and also provides useful information for agricultural extension agents for effective dissemination of information to farmers.

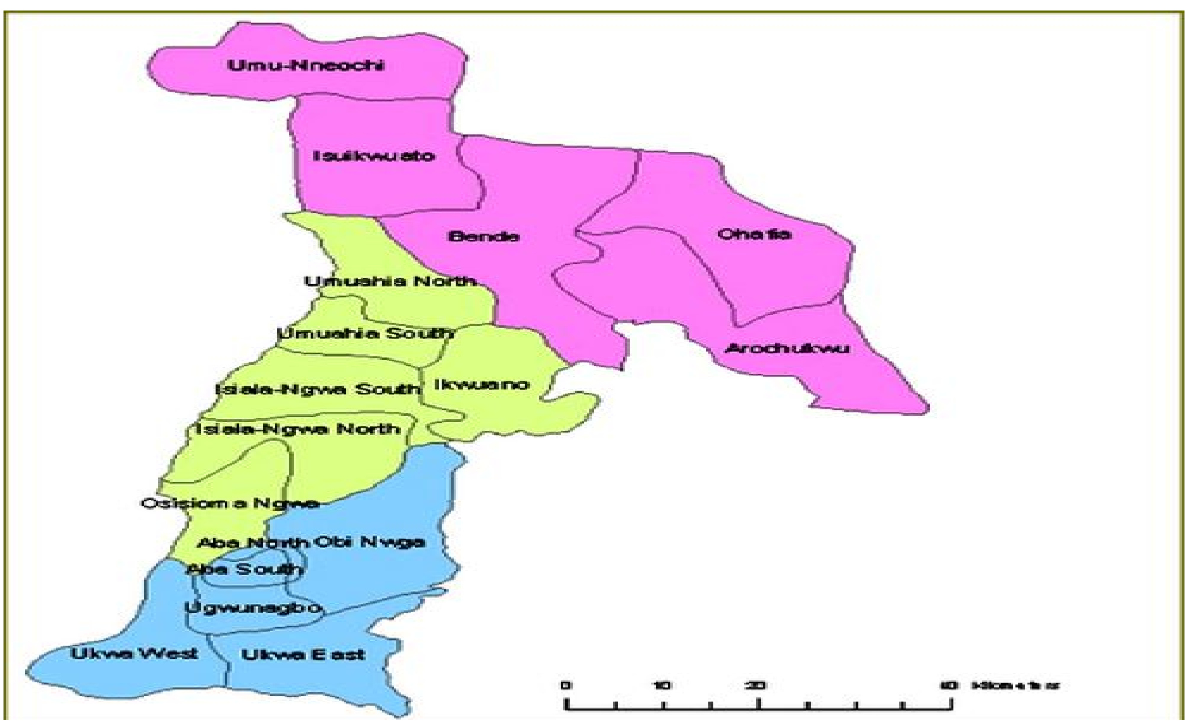
This study intends to provide answers to the following research questions:

● What are the farmers' economic and institutional characteristics affecting their adoption of technology?

● What are the factors swaying the respondents' decision to use pro vitamin A cassava varieties in the study area? This study pursues to offer answers to the following the specific objectives:

1) Describe the farmers' economic and institutional characteristics affecting the decision to adopt technology and
2) Determine the factors affecting farmers' decision to adopt pro-vitamin A cassava varieties in the study area

Map of Abia State of Nigeria



II. MATERIALS AND METHODS

The study was carried out in Abia state, which is located in South east, Nigeria with Umuahia as State capital. It occupies a total land area of 6,420square kilometer with a population of approximately 284.104 million people (NPC, 2006). It lies between latitudes $04^0$45'and 0441' North and longitudes $7^0$5' and $08^0$04' East. It has annual rainfall of 1800-2000mm and temperature range of 22^0C-38^0C during the year. It is bounded by Imo state at the western boundary, Ebonyi/Enugu states at the north, Cross River/Akwa Ibom states at the east and Rivers state at the south. The southern part of the state lies within the riverine part of Nigeria. The state is divided into three agricultural zones namely, Umuahia, Aba and Ohafia agricultural zones with 17 Local Government Areas. The people in the area are predominantly farmers, although engage in other economic activities such as civil service, carpentry, brick layers, hunting, petty traders, hair saloon, automobile mechanics and among others

Sampling Procedure and Sample Size

Purposive and multi-stage random sampling techniques were used to select zones, blocks, cycles and respondents. First, the three Agricultural zones of the State; namely, Umuahia, Aba and Ohafia were purposively selected. Second, two blocks were randomly selected from each of the selected zones. This brought to a total of six blocks. Third, ten circles were randomly selected from each of the six blocks, making a total of sixty circles. Finally, two pro vitamin A cassava varieties producers from the lists of farmers provided by the extension agents covering the areas and the local leader were randomly selected from each of the sixty circles. These brought to a total of one hundred and twenty for detailed studies.

III. METHOD OF DATA COLLECTION

3.1 Method of Data Collection

Primary data were collected using structured questionnaire and interview schedule, while, secondary data were obtained from published and unpublished survey articles, journals, textbooks, the internet, proceedings and other periodicals.

Method of Data Analysis

Percentage responses was employed to describe the socioeconomic profiles of the respondents, while probit analysis model was employed to identify factors affecting the decision to adoption pro vitamin A cassava varieties in the study area..

Model Specification

Probit Model

The Probit model is used to analyze data with binomial distributions. The Probit model could be stated as the probability that;

$$Prob(Y=1) = 1 - F[-\sum_{K=1}^{K} \beta_K b_K] = F[\sum_{K=1}^{K} \beta_K b_k] = \varphi[\sum_{K=1}^{K} \beta_K b_K] \quad (1)$$

The equation for probability of non event is then:-

$$Prob(Y=0) = 1 - \varphi[\sum_{K=1}^{K} \beta_K b_K] \quad (2)$$

The farmers' decision as regards to use of a definite input is effected by the criterion function, stated as:-

$$Y^* = \gamma Z_i + U_i \quad (3)$$

Where,

Y^* =Underlying index signifying the disparity between the use of an input and its non-use.

γ = Vector of Parameters to be considered

Z_i = Vector of Exogenous Variables which clarify use of an Input

U_i = Standard Normally Distributed Error Term

Taking for instance, farmers' evaluation, which Y_i^* crosses the threshold value, 0, we could conclude that respondent employed the input in question in farming In practice, Y_i^* is unobservable and its supplement could be ascribed as If (Farmer I use the input in question), and If otherwise. Normal distribution function herein was used to determine the chances of the respondent using an input which could be assigned as :-

$Y_i = 1$ If $Y_i^* > 0$ (Farmer I employ the input in question), and $Y_i = 0$ If otherwise

Also, in relation to normal distribution function, the model could be employed to measure the odds of observing a farmer using an input and stated as thus:-

$$P\left(Y_i = \frac{1}{X}\right) = \varphi(X\beta) = \int_{-\alpha}^{X\beta} \frac{1}{\sqrt{2\Pi}} exp\left(\frac{-Z^2}{2}\right) dz \quad (4)$$

Where,

P = Prospect that the ith farmer using the input and 0 otherwise

$X = K$ by 1 Vector of the explanatory Variables.

Z = Standard Normal Variable (i.e. and $Z \sim N(0, \delta^2)$

$\beta = K$ = by 1 Vector of the Coefficients appraised.

For a non-dichotomous variable, the marginal probability is the partial derivative of the possibility that $Y_i = 1$

with respect to that variable. For the jth dependent variable, the marginal probability could be denoted as

$$\frac{\partial P}{\partial x_{ij}} = \varphi(X_i\beta)\beta_j \tag{5}$$

Where,

$\varphi(.)$ = Distribution Function for the Standard Normal Random Variable

β_j = Coefficient of jth explanatory Variable.

The Probit model specification in this can be represented as :-

$$Y_i^* = X_i\beta + \varepsilon_i \tag{6}$$

$$Y_i = \begin{cases} 1 \; if \; Y_i^* \geq 0 \\ 0 \; if \; Y_i^* < 0 \end{cases}$$

Where,

Y_i = Observed Dichotomous Dependent Variable which could assigned the value of 1 when the ith farmer uses pro-vitamin A cassava varieties and 0, otherwise.

Y_i^* = Underlying Latent Variable that indexes the use of agrochemicals.

X_i = Row Vector of Values of K r egressors for the ith Farmers.

β = Vector of Parameters to be measured

ε_i = Error term which is predictable to have standard Normal Distribution.

The model is specified in an implicit form as follows:

Y= F (X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8 + ei)…………(2)

Where :Y = Adoption rates (%), X_1 = Age in years, X_2 = Years of farming experience in years, $X_{3=}$ Educational level in years, X_4 = Farm size(Ha), X_5 = Extension service (Dummy), X_6 = Household size in no.of persons, X_7 = Access to Credit (Dummy), X_8 = Membership of Organisation (Dummy), X_9 = Cost of Technology(Dummy), X_9 = Off farm income.(Dummy),Extension contact.(Dummy), ei = Error term.

Table 1 Variables Description and Signs

Variable	Measurement	Sign
Age (Years)	Age of the household head in years	-
Farm. Experience (Years)	Farm experience of household head in years	+
Educational Level (Years)	Educational status of the household head where; 1= literate, 0=illiterate	+
Farm Size (Ha)	Size of farm holing owned by the farmer	+
Extension Services(Dummy)	Access; 1; otherwise, 0	_
Household Size	No .of people that resides and fed by the household head	+
Access to credit(dummy)	Access to credit; 1 Otherwise=yes, 0=no	+
Organization.(dummy)	Membership of organ; 1; otherwise, 0	+
Cost of Technology(Dmmy)	Costs of using the new technology	+
Off- farm income	Income derived outside farm activities	+

IV. RESULTS AND DISCUSSION

Table 2: shows the farmers' economic and institutional characteristics affecting adoption technology

Table 2: Distribution of Farmers', Economic and Institutional Characteristics of Technology.

Factors	Frequency (n=120)	Percentage
Age in Years		
20 – 29	23	19.2
30 – 39	11	9.2
40 – 49	32	26.7
50 – 59	14	11.7
60 and Above	40	33.3
Mean	40	
Household Size (No)		
1-5	22	18.3
6-10	35	29.2
11-15	34	28.3
16-20	17	14.2
Mean	6	
Farm Size (ha)		
0.01-1.00	40	33.3
1.01 – 2.00	30	25
2.01 – 3.00	18	15
3.01 – 4.00	15	12.5
4.01 – 5.00	12	10
> 5.00	5	4.2
Mean	2.7	

Years of Farming (yrs)		
1 – 5	12	10
6 – 10	20	16.7
11 – 15	50	41.7
16 – 20	32	26.7
21 and above	16	13.3
Mean	12	
Extension contact (dummy)		
Had extension contact	40	33.3
No extension contact	80	66.7
Access to Credit Use (dummy)		
Yes	20	16.7
No	100	83.3
Membership of Organization (Dummy)		
Yes	78	65
No	52	45
Level of Education (Yrs)		
0	12	10
1-7	55	45
7-12	30	25
13-18	25	20
Off Farm Income		
Yes	78	65
No	52	45
Cost of Technology(Dummy)		
High	80	66.7
Low	40	33.3

Source: Field Survey, 2018

Table 2 shows that 28.4% of the farmers were below the age of 40 years, 71.6% were above 40 years of age. The implication was that many of the farmers studied were aged, hence not economically active age. Aged people as reported by Onunka, *et al*; (2017) are noted to be often conservative to make decision to technology adoption. However, Onyekere, (2017) work was dominated by youths, who he said to be motivational, innovative and adaptive individuals, therefore, influencing positively their decision to adopt the technology .

In addition, the result of household size showed that 47.5% of the respondents had household size of less than 11 persons, while 52.5% had household size above 11 persons. Large household size as opined by Ume, et al; (2020) ensures availability of cheap labor for adoption of labour intensive technology adoption, thus enhancing the likelihood of aiding in farmers' decision to adopt such technology. Also, majority (33.3%) of the farmers studied cultivated farm size ranged from 0.01 – 1.00, while the least (4.2%) cultivated above 5 hectares. This implied that pro-vitamin A cassava varieties production in the study area was performed by small holding farmers. Farm size has mix relationship with adoption of technology. Farm size could positively influenced adoption especially for technologies that are termed as scale-dependent, while small scale sized farms may provide an incentive to adopt a technology especially in the case of an input-intensive innovation such as a labor-intensive, land-saving technology such as greenhouse technology, zero grazing among others as an alternative to increased agricultural production (Ghimire, Wen-chi and Shrestha, 2015).

On the farming experience as shown in Table 2, revealed that 26.7% of the sampled farmers had farming experience of less than 11 years, 73.3% had above 11 years. Years of farming experience of farming household head could contribute positively in making decision to adopt technology as asserted by FAO, (2015), since farmers that have perceived and experienced the gains associated with such innovation can share their experiences thereby inspiring other farmers to adopt. Besides, Table 2 explained that only 33.3% of the respondents had contacts with extension agents, while the greater majority (66.7%) had no extension contact. This implies poor extension outreach, which adversely effected innovation adoption decision by the farmer. Extension services informed farmers as asserted by Onyeneke, (2017) about the existence as well as the effective use and benefit of new technology through extension agents. Several studies opted the important on the influence of extension agents in counter balancing the negative effect of lack of years of formal education in the overall decision to adopt certain technologies (Saliu, et al; 2015). More so, only 16.7% of the sampled pro vitamin A cassava varieties farmers had access to credit through any of the lending institutions. The vast majority of the farmers (83.3%) did not have access. Access to credit stimulates the adoption of risky technologies through relaxation of the liquidity restriction and in addition to advancing of household's-risk bearing aptitude (FAO, 2013). The finding of Onunka, et al; (2017) gave positive credence to the above statement. They reported that credit helps farmers to pay for hired labour especially for labour intensive technologies. Additionally, 65% of the respondents were members of different organizations, while 45% did not belong to any organization. Members of organization enjoy interaction with other members on any farming issues such as technology adoption, thus enhancing their decision for adoption of the technology. Ume, *et al*; (2016) finding concurred to the assertion. They reported that members of cooperation societies are exposed to farm inputs at affordable prices, thereby stimulating for positive decision to technology adoption. Still, 90% of the sampled farmers had formal education which is against popular perception that farmers in developing countries are illiterates. However, only 10% of the respondents do not have western education. Education catalysis the process of information flow and leads the farmer to as wide as possible, the different pathways of getting information about a technology, hence increases their likelihood in taking decision on technology adoption (Hagos, Ndemo and Yosuf, 2018).

Furthermore, 65% of the respondents were engaged in off-farm employment such as petty trading, automobile mechanics, salon and among others, whilst 35% did not participate. Off-farm income access influences farmers' decision to adopt given technology through aiding in offering a risk management tool to curtail maximally the income unpredictability accompanying with farm household head for acquiring output augmenting inputs such as improved seed and fertilizers.

The work of Ogada, Mwabu and Muchai, (2014) harmonized with the aforesaid assertion. They opined that off-farm income increases the profitability of farming by increasing the accessibility of inputs and improving access to market outlets, thereby affecting farm household heads' decision to adopt the technologies. Additionally, 66.7% of the respondents complained about high cost of technology, whereas 33.3% opined low cost.

FAO, (2015) opined that a vital contributing factor to the decision to adopt a new technology is the net gain to the farmer from adoption, all-encompassing of all costs of employing the new technology The cost of technology adoption, particularly agricultural type has been found to be a constraint to technology adoption. A case in point was the removal of subsidies on farm inputs such as seed and fertilizers since the 1990s due to the WorldBank-sponsored tructuraladjustment programs in sub-Saharan Africa has expanded this limitation (Ume, al; 2020).

Table 2; Probit Model Result of Decision to Adoption Pro Vitamin A Cassava Varieties in the study area

Variable	Coefficient	t ratio	Marginal Probabilities
Constant	0.458977***	0.27561	
Age (Years)	-0.34558**	-0.45713	0.023
Farm. Experience (Years)	0.22782	1.08736	0.250
Educational Level (Years)	0.3628***	0.11139	0.168
Farm Size (Ha)	0.42126***	0.53241	0.083
Off-farm income (Naira)	0.45185***	0.56080	0.117
Extension Services(Dummy)	0.23467*	0.15092	0.280
Household Size	0.19623**	0.51176	0.112
Access to credit(dummy)	0.12621	0.01256	0.018
Organization.(dummy)	0.17786***	0.23029	0.260

Pseudo $R^2 = 0.7659$

Prob> Chi = 0.0000

LR Chi (9) = -57.678***

***,**,* shows significant at 1%, 5%, 10% level of probability respectively

Source; Field Survey; 2019

The result of the analysis revealed that the overall fitness of the model had found to be statistically significant at less than 1% probability level. Table 2 revealed that the coefficient of age of the farming household head had indirect correlation to decision to adopt technology and statistically significant at 95% confidence level. This implied that as farmers start advancing in age, the greater the chances of decreasing their decision to adopt the technology by 2.3%. The risk averse nature of aged farmers could be associated with the sign identity of the coefficient. Ume, et al; (2020) finding was in consonance with above assertion. They opined that aged people are usually conservative to technology adoption for fear of failure as farming is fully of risks and uncertainties. In contrary, Mwangi and Kariuki, (2015) found a positive link between age of the farmer and the decision to adopt technology. They opined that old farmers are usually have long years of farming experience and better able to evaluate the characteristics of modern technology than younger farmers, hence has higher prospects of adopting the technology. Furthermore, Hagos, et al, (2018) found negative sign identity between the variable and the dependent variable in their study of the factors affecting adoption of upland rice in Tselemti district, northern Ethiopia. They posited that younger farmers easily incline to trying new innovations and have lower risk aversion and they often have abundant time to experiment with new approaches as against to the aged ones who are conservative to change and prefer to remain with the status quo. Additionally, comparable to a priori expectation, the coefficient of farming experience had positive influence to decision to adopt innovations as related to pro- vitamin A cassava varieties at 10% significance level as revealed in Table 2. This means that as the number of years of farm experience of the household head increases by one year, the more likely that the farmers' decision to adopt the technology to increase by 25%. The finding of Mwangi and Kariuki, (2015) gave credibility to positive sign of the coefficient. They reported that farming experience enhances efficient use of scarce resources by small holder farmers, hence propelling the decision to adopt the technology. Against aforesaid relationship, Ojo and Ogunyemi, (2014) stated that the conservative attitude of experienced farmers in detesting new technologies no matter how genuine and profitable for old ways of doing things in which they are used to, could be the reason for the sign identity of the coefficient.

Furthermore, the sign identity of the coefficient of level of education was positive and significant at 1.0% risk level. Ogada, et al; (2020) finding concurred to aforesaid statement. They were of the view that educated farmers have more likelihood to acquire the ability to obtain, interpret and comprehend information pertinent to making innovative decisions than less educated ones. This is likely to facilitate an inducement among them (educated farmers) to procure more information. Diiro, (2013) reported that educated farmers has more inclination of understanding the information in a simple agricultural brochure or even from a workshop organized by extension workers compared to less educated ones. Furthermore, comparable to a priori knowledge, farm size had a positive effect on the decision to adopt pro vitamin A cassava varieties in the study area at 5% alpha level. The positive sign of the variable could be linked to the fact that producers with large farms diversify crop production and trying new crops in their farms. This finding agreed with work of Ojo and Ogunyemi, (2014), who found that large farm size influences the decision to adopt agricultural technologies positively.

Moreover, the coefficient of off-farm income had positive influence on decision to adopt the technologies. Availability of off-farm income increases the likelihood of enhancing farmers' decision to adopt pro- vitamin A cassava varieties by 11.2%.The reason for the positive sign of the coefficient could be because household heads that engage in off- farm employment activities have more livelihood of having more funds to procure the necessary farm inputs, thereby facilitating in their decision to adopt technology. In contrary, Kohoely, Sapay, Mmbanda and Baiyeunhi, (2016) reported that where farmers' income accruing from off-farm employment supersedes that of the farm income, there is higher tendency that such farmer could totally or partially jettison the decision to adopt the technology. Additionally, the coefficient of extension services had a positive influence on the decision to adopt the technology. This implied that the higher the number of extension contacts farmers had with the change agent, the more the likelihood for increase in the decision to adopt pro-vitamin A cassava varieties by 28%. Extension services functions to the farmers as revealed by Odoemenem and Obinne, (2010), included innovation transfer, effective use and benefits of new technology and in sourcing of improve farm inputs, thus assisting the farmers in making decision on technology adoption. Also, membership of farmer group positively influenced the decision to adopt pro vitamin A cassava varieties at 1% alpha level. The implication is that farmers' being member of organization such as cooperative society could increase their decisions to adopt the technology by 26.0 % than non-cooperative members. Membership of organization as reported by Ekwe, (2013) affords members the opportunity of being involved in capacity building such as training and study, tours and information on new agricultural technologies as usually undertaken by organization . Furthermore, farmers in groups share their experiences and challenges, hence fostering a positive way forward. Moreover, groups could be effective in persuading farmers to try new technologies and encourages the sharing of knowledge and experiences among members, provides valuable learning and collective bargaining opportunity for farmers, provide a means of collective action by farmers, providing resources such as credit, labor, and information (Kohojely, et al; 2016). The result concurred to adoption study by Ume, et al; (2017) who found that farmers who did not adopt improved cassava crop production technology were non-members in farmer groups. Therefore, group formation is necessary in order to expand farmers' awareness and knowledge on improved Cassava crop production technology.

As well, the coefficient of household size was positive to decision to adopt the technology and statistically significant at 5% alpha level. This implied that an increase in number of household members by one person, has the possibility of increasing the household head's decision to adopt pro-vitamin A cassava varieties by 11.7%. Several studies (Odoemenem and Obinne, 2010; Ojo and Ogunyemi, 2014, Ume, et al; 2016) opined that family size is a proxy to labor availability and its availability reduces the labor constraints faced in the farmers especially during the peak of farming when resource is dearth in most farming society in sub- Saharan Africa.

V. CONCLUSION AND RECOMMENDATION

The farmers' educational level, membership of organization, farming experience, farm size, off-farm income and extension services were the determinants factors to the decision to adopt improved pro vitamin A cassava varieties in the study area. Based on the conclusion, the following recommendations were proffered;

- There is need to enhance farmers' level of education in order to increase the farmers' decisions to adopt the pro vitamin A cassava varieties through workshops, seminars and adult education.
- Furthermore, extension agents should be inspired to be efficient and effective in their performance of their duties of innovation dissemination and technical aids to the farmers through timely payment of their salaries, out of pocket expenditure, attendance of workshops and seminars and among others incentives in order to enhance the farmers' decision making processes to technology adoption
- Farmers should be encouraged to form or join cooperatives for the gains of capacity building and cross breeding of ideas in order to facilitate in decision to adopt the technology.
- The land use decree of 1978 should be revisited by Federal Government of Nigeria, to ensure genuine farmers having access to land in order increase their decision to adopt the technology.

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