Determinant Factors to the Adoption and Discontinue Adoption of Improved Okra (Abelmoschus Esculentus) Production Technologies in Ivo Local Government Area of Ebonyi State, Nigeria.

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Abstract
The determinant factors to the rate of adoption and rejection of improved okra production technology among small-holder farmers in Ivo Local Government Area of Ebonyi State, Nigeria was studied using 120 selected using multi stage random sampling technique. Percentage, Logit model and Tobit model analyses were used to address the objectives of the study. Structured questionnaire and oral interview were use ormation d to collect relevant infas it related to the study. The results of the study showed that most of respondents were female, had formal education and had long years of farming experience. The determinant factors to okra production in the study area were household size, education level, membership of cooperatives and access to credit. More so, the determinant factors to discontinue adoption of okra production technology were attitude, feedback provision, marketability and input availability. The following recommendations were proffered: there is need to enhance farmers' access to credit through commercial banks and microfinance banks. Furthermore, there is need to expose farmers to adult education, worships and seminars in order to improve their adoption rates.
Keywords: *Adoption, Determinant, Discontinue adoption, Okro, Production, Technology*

Introduction

In most countries of the world, vegetable is one of the staple food components whose production has continued to increase (Udoh and Akpan, 2007). In Nigeria, CBN (2004) observed that vegetable production constitutes about 4.6% of the total staple food production between1970 – 2003. In recent time, Eze and Akpa (2010) reported that low production and productivity has continued to characterize Nigeria agricultural sector vegetables inclusive, thereby limiting the ability of the sector to perform its traditional role in economic development. The role of agriculture to economic development as enumerated by Tanko (2004) are; provision of food, contributing to gross domestic product (GDP), provision of employment, provision of raw materials for agro allied industries and generation of foreign earnings.

The low productivity in agriculture is orchestrated by inefficient production techniques manifested in technical and allocative efficiencies, over reliance on household resources, labour intensive agricultural technology and declining soil productivity (Tanko and Opara, 2010). The effects of low productivity of agriculture could be evidenced by decline in average food security status of Nigerians, which results in food consumption contributing more than 75% of the total household spending budget (Adeotti, 2002). Furthermore, the poor performance of agriculture according to FAO (2007) is most noticed by low standard of living of the people especially in the rural areas that are pre occupied with farming.

However, Idiong (2007) stated that low productivity of farmers generally can be improved either by adoption of improved production technologies or improvement in resource use efficiency or both. However, with lots of research innovations from research institutes, technology adoption option becomes most feasible of alleviating farmers' poor yield (Rogers, 2003). Nevertheless, in Nigeria, the production of Okra has been boosted immensely by the efforts of National Horticultural Institute (NIHORT) through development of technologies and onwards dissemination to the farmers. Such technologies are on field production practices like mulching, timely planting, crop geometry and use of improved Okra varieties such as new Lady's finger (malavi-27) and Perkin's long pod (ORS 803) (NIHORT, 2004). The adoption of these technologies by farmers according to Ashraf (2007) have yielded dividends as yield increases of 4-6 tons/ha were reported in Nigeria and other developing countries.

Unfortunately, the gains of these technology adoptions by the farmers were short-lived as Udo (2011) reported that farmers' output on okra dropped drastically to less than 1-3tons/ha. This may perhaps be accredited to the rejection of the technologies by the farmers. Rejected adoption is the decision to reject an innovation after previously adopted. Rogers (2003) reported that rejected adoption could be inform of replacement rejection (that is rejecting an idea in order to adopt a better one that supersedes it) and disenchant rejection (when a decision to rejects an idea as result of dissatisfaction with its performance). Ogunfiditimu (2007) used the term abandoned adoption to describe rejection of previously adopted innovations or technology by farmers. Studies revealed that input availability, extension contact, feedback and marketability of outputs could result in farmers abandoning adopted technologies for previous method (Ume and Uloh, 2011,). Iwueke (1999) attributed the rejection of yam minisett production technology farmers in South East to high cost of production inputs, problem of marketing of Minisett tubers and poor extension outreach. The effect of rejected use of technology could be associated with low productivity that characterized agricultural production in the developing world. This scenario is often evidenced by extreme poverty among the farming populations especially in rural areas especially in Sub-Sahara African where appropriate technology development are limited (Oguntidimu, 2007 and Ume *et al*, 2010). It is therefore of paramount importance for research and policy makers to not explain vividly the reasons behind the persistence dis continue the adoption of okra technologies and as well as to factor out those variables that could be associated with initial increase in rate of adoption technology by the farmers in order to tinker them with policies that would tantamount to revolutionizing okra production in the study area and as well as in states in country with similar situation.

The specific objectives of the study were mainly to ascertain rate of adoption and discontinue adoption of okra production technologies by smallholder farmer in the study area.

Empirical application and theoretical framework of Tobi Model

Ume and Uloh (2011) studied the propensity to discontinue the adoption of yam minsett technology using 120 farmers selected from Anambra Agricultural Zone of Anambra State, Nigeria. They got result by selecting the respondents from three (3) block of the zone using multistage random sampling technique. Farmers were interviewed using structured questionnaire. Similarly, prices of input and output were collected through questionnaire. The result of the analysis shows that extension contact, input availability, feedback provision and marketability were major determinant of farmer's propensity to discontinue adoption of yam minisett technology.

Oladele and Kareem (2005) used 160 okra farmers selected in south-west, Nigeria to study the propensity to discontinue adoption of agricultural technology. The primary data were fitted into tobit model. They reported that substantial number of farmers in Oyo State had stopped using improved varieties of okra due to poor feedback provision between farmers and extension agents. Arikpo (2010) work on analysis of propensity to discontinue the adoption of yam minisett technology among small scale farmers in Yakurr Local Government Area of Cross River State, Nigeria and he got result by studying with eighty (80) farmers. Tobi analysis was used to capture the discontinue of technology adoption. The factors responsible for discontinue of the technology were extension contact (1%), input availability (5%) and feedback provision (10%) while attitude and marketability had no impact.

Ochiaka et al. (2015) examined on the determinant of propensity to discontinue adoption of catfish technology in Anambra State, Nigeria. A total of 90 farmers were selected across the state using multi-stage random sampling technique. Data which comprised information on the factors predisposing farmers to propensity to discontinue the adoption of technology, prices of inputs and output and qualitative variables relevant to the study were collected using structured questionnaire and interview schedule. The factors predisposing farmers' propensity to adopt technology were analyzed using descriptive statistics such as percentage response and frequency. Tobit model was used to analyze the propensity to discontinue the adoption of the technology. The results obtained showed that extension contact, input availability, feedback provision and marketability were major determinants of farmers' discontinue adoption of the technology.

The Tobit model originated from the work of Tobin 1958. tobit is used to estimate the likelihood of adoption and the extent (intensity) of adoption. The model is preferable to binary adoption model which the decision to adopt also involves simultaneously the decision regarding the intensity of adoptions (Fender and Umali, 1993). Tobit model is used where the dependent variable has the propensity of dumping discretely to zero or any other threshold. The estimation method used in maximum likelihood under the assumption of homosecadastic normal distribution. Tobit analysis is based on concord dependent variable and often called censored regression model or limited dependent variable (Ebo, 2009).

The Tobit analysis approach has been applied in previous studies on technology adoption including adoption of conservation tillage (Noris and Batine, 1997) and adoption of alternate crop varieties (Adesina and Zinnah, 1993). This model assumes that many variables have a lower or upper limit and take on this limiting value for a substantial number of respondents for the regaining respondents, the variables take on a wide range of values above or below the limit (Batx, 1999). An explanatory variable in such a situation may be expected to influence both the probability of limited responses and the size of non-limited responses.

The theoretical framework of Tobit can be explained by the threshold concept. This explanation originated from the work of Ebo (2009) who proposed that the decision to adopt innovation may be characterized as a dichotomous choice between two mutually exclusive alternatives. This implies that there is a break in the dimension of the explanatory variables below which a stimulus elicits no observable response. Only when the strength of the stimulus exceeds the threshold level does a reaction occur and the secret decision on the intensity of use is taken.

For example, lets denote a decision variable which is the dependent variable Y and X a vector of explanatory variables. The Y variable can be defied in the context of a limited variable which takes on two values Y = Y*. If the decision results to adoption and Y = 0, if it results in non-adoption. The dichotomous nature of this kind of decision can be illustrated below point "T" represents the breakeven point or a threshold. If values of X greater than one, there is a probability of one of the positive action (adoption) and the intensity of adoption, represented by Y*, is a continuous (i.e. line ic). At values of X below or equal to T, the probability of positive action (adoption) is zero and the intensity of adoption is zero.

However, the probability of decision variable y, takes on only values 1 or 0 and the threshold of all members in the sample are distributed among different values of the explanatory variables, then the expected functional relationship of the threshold decision model would resemble a sigmoid curve (Noris and Batine, 1997).

The main characteristics of normal Sigmood curve, as indicated by Apu (2004) is the existence of sections in the lower and upper ranges of the explanatory variable in which increase in its value would not exert any (or at most in negligible) influence on the value of the decision variable can be observed only in the segment between these two extremes. It may be assumed that the decisions of a population of potential adopters would follow an 'S' shaped curve of this type, when the values of explanatory variables exceed the threshold point. The implication of this is that when values of the explanatory variables are close to the threshold point policies that would increase the values of X are likely to encourage positive decision making.

Theoretical framework of Logit

In modeling the farmer's decision to adopt the use of improved okra, we followed earlier studies that have investigated technology adoption by farmers. According to Feder et al. (1985), technology adoption is affected by such factors as availability of credit, limited access to information, aversion to risk, inadequate incentives, farm tenure systems, insufficient investment in human capital, inadequate farm size, absence of equipment to relieve labour shortages, unreliable and insufficient complementary inputs and inappropriate transportation infrastructure. Kehinde (2011) reported that the decision of farmers to adopt improved okra variety is represented by "1" while the decision not to adopt is represented by "0". We further assume that the farmer is an

independent decision maker who makes rational choices and maximizes his utility (Ameniya, 1981; Rahm and Hufman, 1984). In stipulating the logit model, we followed Sheikh et al. (2003) and Kehinde (2011) to assume that the farmers decision not to adopt and to adopt improved pearl millet variety equals 0 and 1 respectively. And that the utility of the technology depends on a vector Si (farmers' socio-economic characteristics) and a vector *Ri* (farmers farm characteristics that is production input and output characteristics related to improved pearl millet production). Further,

Ui1 and *Ui2* are indirect utilities derived from not adopting and adopting improved okra varieties, respectively. These utilities can be stated as: $Ui0 = di\ S0 + gi\ Ri0$ *and* $Ui1 = di\ S1 + gi\ Ri1$ (1) Where *di* and *gi* are vectors of coefficients corresponding to the variables representing farmer's socioeconomic characteristics and a vector of farmer's farm characteristics which are attributed to adoption of improved okra and e0 and e1 are additive error terms. A farmer therefore adopts improved okra if $Ui1>Ui0$ or does not if $Ui1 < Ui0$. If we now redefine improved okra adoption with a qualitative variable $yi = 0$, then the probability of adoption of improved okra variety can be written as:

$Pi = P(yi =1) =P(Ui1>Ui0) =P(ei0- ei1) < [(di0- di1) Si + (gi0-gi1)Ri]=P (ui)< (BiXi)=F (Bi\ Xi)$.(2)

Where *Xi* includes both *Si* and *Ri* as stated in Equation (1) and *ui =(ei1-ei2)* is a random distribution term; P(.) is a probability function; and F is a distribution function for *ui*. Thus the probability of a farmer adopting improved pearl millet variety is the probability that the utility of not adopting is less than the utility of adopting or the cumulative distribution function evaluated as *Bi Xi*. The exact distribution of *F* depends on the distribution of the random term *ui*. Ifit follows a logistic distribution then the F is a cumulative logistic function. If *ui* is normal then *F* is a cumulative normal distribution function. Thus the distribution assumption for *ui* determines the type of probability model that reflects the farmers' adoption behavior. We used the logit model from the cumulative logistic probability function to transform the dependent variable to predict the probabilities within the bound of 0 and 1. The dependent variable thus becomes the natural logarithm of the odds when a positive choice is made and the model is specified as:

In [Px/(1-Px)]=Σ Bi Xi ………………………………………………………..(3)

Where *Px* = the probability that farmers adopt improved pearl millet
for an observed set of variables Xi as earlier defined and *Bi* = the regression coefficient to be estimated.

Materials and Method

The research project covered Ivo Local Government Area of Ebonyi State, Nigeria. Ivo Local Government Area is one of the Local Government Area created on 1st October, 1996. Ivo Local Government Area is located between Latitude 5^0 56^1 and 6^0 59^1 N of equator and Longitude 7^0 33^1 and 7^0 24E of Greenwich meridian. It has rainfall range of 1500 – 2500mm, temperature range from 28 – 45^{0c} per annum with moderate relative humidity of 65%.

Ivo Local Government Area is bounded in the North by Ohazara Ebonyi State, Aninri and Awgu local government areas of Enugu State, in the South by Bende Local Government Area in Abia State and Afikpo South Local Government Areas of Ebonyi State, in East by Onicha Local Government Area in Ebonyi State and in the West by Umunneochi and Isuikwuato local government areas of Abia State. Ivo Local Government Area covers an area of 35060km2 with population of 220,919 people (NPC, 2006). The Ivo Local Government Area is mainly agrarians and prominent in the production of rice, okra, yam, cassava, sweet potato, cocoyam and vegetables. The animals reared are: pig, goat, poultry and sheep. Major economic activities of the study area apart from agriculture include quarrel, mineral resources, minning and artisan fishing. The people of the area are involved in pot marking.

Multi-stage random sampling technique was used to select communities, villages and respondents. In stage I, four communities were randomly selected out of five. Secondly, five villages were randomly selected from each of the villages. This brought to a total of twenty villages. Finally, six okra farmers were selected from each of the twenty villages, totaling one hundred and twenty farmers for detailed study.

The information used for this study was two sources: Primary and Secondary sources. The primary data was obtained through the use of structured questionnaires and informal or oral interview of respondents. The secondary sources was obtained from review of related literatures, text books, conference papers, seminars, Journals, Published and unpublished thesis, workshop, internets and government publications.

Objective i was addressed using percentage response and frequency distribution. Objective ii was addressed using Logit model, while objective iii was addressed using Tobit Model Analysis.

Model Specification

Logit Model Model specification

We specified a logit model to identify factors that determine the adoption or non-adoption decision of farmers to use improved okra varieties. Thus, the probability (Pi) that a farmer will adopt improved okra variety is a function of an index Zi which is
also the inverse of the standard logistic cumulative function of Pi
that is,

Pi (Y=1) = F-1(Pi) (4)

Then, *Zi = F-1(Pi)*

The index is a set (Xi, that is farmers' socioeconomic characteristics, while bi are regression coefficients which indicate the probability effect of farmers' attributes) and is a linear function
of the attributes, that is,

Z = b0 + b1X1 + b2X2 + bnXn… (5)

The probability of adopting improved okra variety is given by

P_t (Y-1) = $\frac{1}{1+A^{3t}}$ ……………………………………………………(6)

While the probability of not adopting improved pearl millet is given by

P_t (Y=1) = $\frac{1}{1+6^{2t}}$ ……………………………………………………(7) and

$6^{2t} = \frac{F1(Y=1)}{1-F(F=1)}$ ……………………………………………………(8)

The dependent variable, (Yi, which is farmer's decision to adopt or
not to adopt) takes the value 1 if the farmer adopts and 0 if he does not. We used maximum likelihood estimation since the dependent variable is binary thus making ordinary least squares estimation inappropriate (Pindyck and Rubinfield). The probability that a farmer will adopt improved pearl millet variety
(Equation 3) can be estimated the average value of Zi as:

Zt = In $\frac{P_1}{1}$ – P_t = $b_o + b_1 + x_1 + b_2 + x_2 + b_3x_3 + b_4x_4 + b_5x_5 + b_6x_6 + b_7x_7$……………………(9)

Where X1 = Household size (in number), X2 = Education (in years),
X3 = Age (years), X4 = Sex (male= 1 and 0 otherwise), X5 = Farm
size (hectares), X6 = Farming experience (years), X7 = Member of farmers organization (yes=1 and 0 otherwise), X8 =okra maturity period (days),X9 = Yield (Kg), X10 = Distance of source of improved seeds (Km), X11 = Extension contact (yes=1 and 0 otherwise), X12 = Access to credit (yes=1 and 0 otherwise).

Tobit Model Analysis

The tobit model was developed by Tobin (1997), would be expressed as:

$y^* = x\beta + e$

Where: β is a vector unknown coefficient x is a vector of independent variable is an error term that is assumed to be independently distributed with mean zero and a variance of S^2 – Y^* is a latent variable that is unobservable. If the data for the dependent variable is above limiting factors, zero is this case; y is the limiting factor, it is held at zero. This rushing is represented mathematically in the following two equations

$y = y^*$ if $y^* > Y_0$

$y = 0$ if $Y^* < Y_0$

Where: Y_0 is the limiting factor. There two equations represent a censored distribution of the data. The tobit model can be used to estimate the expected value of y as a function of a set of explanatory variables (X) weighed by the probability that $Yi \geq 0$. Moddada, (2003) shows that the expected intensity of adoption $\sum(y)$ is $\sum y = x\beta f(Z) + af(z)$ and $z = x\beta / б$

Where: f (z) is the cumulative normal distribution of z, f(z) is the value of the derivative of the normal curve at a given point (Unit normal density). z is the z score for the standard error of the error term. The coefficients for variables in the model, B do not represent marginal effect directly but the sign of the coefficient will give the researcher information as to the direction of the effect.

The rejection of okra production technology in the study area can be represented as

$Y = f(x_1, x_2, x_3, x_4, x_{4,} x_5 \text{ --- } x_n + e)$

y= Rejected adoption (0 low, I medium, 2 high), X_1 = Attitude = (1 for yes, 0 otherwise), X_2 = Extension visit No (1 for yes, 0 otherwise),X_3 = Feedback provision (1 for yes, 0 otherwise), X_4 = Marketability (1 for yes, 0 otherwise),X_5 = Input availability (1 for yes, 0 otherwise).

Results and Discussion

Table 1 showcased that less than 38% of the respondents were below 40 years of age, while 62% were above 40 years of age. This implies that most of the sampled farmers were under the age of which Asiabaka (2002) described to be conservative and not receptive to technology adoption. This situation may not be favourable for agricultural development of the country. Moreover, twenty percent (20%) of the respondents had no formal education, while 80 percent had tertiary education. This implied that majority of the respondents were not likely to have much difficulty in understanding and adopting modern agricultural technologies/innovation because of their educational acquisitions advantage. Education is very important to the farmers since it enhances their innovativeness and decision making processes (Unamma, 2003).

Also, Table 1 revealed that 59% of the farmers had farming experience of less than 10 years, while 41% had above 10 years. The number of years of farming experience may give an indication of the practical knowledge he/she has acquired on how he can overwhelmed certain inherent problems associated with farming (Onyenweaku, 2010). Nevertheless, studies show that experienced farmers are poorly adaptive individuals as they have confidence much in the old order to circumvent risks and uncertainties associated with new innovations. Furthermore, 33 percent of the farmers had access to credit either from formal or informal sectors, while 67 percent did not have access to credit. This finding collaborated by CIMMYT (1993) who asserted that paucity of fund for adoption of the technology is a persistent problem in the adoption process. The design and delivery of financial services in many countries of sub-Sahara Africa greatly affects its accessibility particularly for the smallholder farmers. For instance, financial institutions often require traditional forms of collateral property like land, house for which smallholder farmers frequently lack titles. Furthermore, complicated application procedures and documentation requirements prevent poor farmers with lower education and inadequate skills from applying. For example, studies conducted by Gabagambi (2003) revealed that commercial bank and other financial institutions are reluctant to lend to smallholder farmers because of associated risks. This is attributed by several factors like, the high risk associated with the main economic activity, rain fed agriculture, and the absence of traditional physical collateral normally required by the banking system (ADB, 2006). These situations have made the cost and risks associated with the delivery of lending services in rural areas to be high, hence affecting farmers' adoptability of technology no matter how the technology would boost their wellbeing.

In addition, sixty seven percent (67%) of the sampled farmers had contact with extension agent, while only 33 percent had no contact. Extension services as opined by Asiabaka, (2002) helps to disseminate innovations to farmers through among others provision of technical assistance and sources of improved inputs.

Table 2 shows the average statistics of farmers in variables for describing propensity to discontinue the adoption of okro production in Ivo LGA. Attitude had mean value of 0.487. The attitude of farmers according to Oladele and Kareem, (2005) is basically affected by group influence and family consideration. Extension contact had mean of 16.7. This finding coincides with Ume and Uloh (2009). The insufficient transfer of technologies to the farmers as well as bottleneck that militate against enhancing the adoption of technology as asserted by Eze and Akpa (2010) could be critical reasons for farmers' to discontinue technology adoption.

Input availability had mean value of 0.667. Ochiaka, *et al (*2015) study on the propensity to discontinue the adoption of catfish production technology among farmers in Anambra State of Nigeria made similar assertion. Input inaccessibility at right time and quantity as declared by Ume and Uloh (2009) could possibly depress technology adoption. The mean value of marketability was 0.586. Oladele (2005) reported that the intensification of any commodity production largely depends on the commodity price. Feedback provision had mean of 0.497. This finding conformed with Ume *et a*l. (2011), who reported on the need for feedback provision for more clarity of technologies disseminated to the farmers in order to sustain adoption of the technology else discontinue of the innovation could ensue.

As expected, the coefficient of age of farmers was negatively signed and significant at 10% alpha level as shown in Table 3. This finding disagrees with Okoli, (2012) who reported that innovativeness, motivational and adoptability of individual decreases with age. Nevertheless, the work of Onyenweaku et al. (2010) had a direct relationship between age and technology adoption. They opined that such relationship is expanded from accumulated knowledge and experience obtained from years of observations and experimentations with various technologies.

As against a priori expectation, the coefficient of number of years of farming experience by the farmers was negative and significant at 1% alpha level. The negative attitude of experienced farmers accord to extension agents while discharging their duties as well as the fact that experienced farmers have gained over years experiences in production of a particular crop and hence may find it difficult to switch to a new one, no matter the perceived benefits (Ume *et al.* 2010). Tanko (2004) found positive relationship between years of farming experience and technology adoption. He opined that years of farming experience helps farmers in setting realistic goals.

The extension service coefficient was significant at 10% level of significance and against expectation displayed a negative influence on technology adoption, which is inconsistent with the findings of Ume *et al.* (2010). The insufficient transfer of technologies to the farmers as well as bottleneck that militate against enhancing the adoption of technology as asserted by Eze and Akpa (2010) are the critical reasons for the behaviour of the variable. On the other hand, extension helps to disseminate information on mode of application or usage of the technology and as well as availability of technological inputs. However, frequent extension services could likely minimize doubts among farmers and ensure timely procurement of inputs, perhaps encouraging sustained usage of the improved technologies (Unamma, 2003).

Credit coefficient was significant and maintained its expected positive sign implies that credit is an important source of capital which facilitate adoption. This is consistent with Opeke (2003) who opined that farmers who have better access to credit stands a better chance of adopting technologies faster than those who are capital-constrained. Ume et al. (2010) and Eze and Akpan (2010) ensured similar finding. It is believed that access to credit promotes the adoption of risky technologies through relaxation of the liquidity constraints as well as through boosting of household risk bearing ability. This is because with an option of borrowing, a household can do away with the risk reducing but inefficient income diversification strategies and concentrate on more risky but efficient investment (Onyenweaku, *et al*. 2010). Credit often is gender bias as female household are often discriminated against by credit institutions, as such they are unable to finance yield raising technologies leading to low yield. There is therefore need for policy makers to improve current small holder credit systems to ensure that a wider spectrum of small holders are able to have access to credit, especially female headed households. (Coppenstedt *et al*. 2003).. Nonetheless, Onyenweaku *et al*. (2010) on their studies on fertilizer technology adoption by farmers in Bende Local Government Area found a negative relationship between credit and adoption of technology. They opined that diversion of agricultural credit to non-farm uses could be the reason for the negative sign of the coefficient. Furthermore, Ume *et al.* (2009), the negative coefficient of credit could connote poor access to credit.

Table 4 showed that the results of the tobit analysis and with X_1 being significant at 1% level of probability, implying goodness of fit. The coefficient of extension contact was negatively signed which implies that rejection of Okra technology by farmers could likely occur where there is limited or poor access to extension contact. The poor extension contact could be as a result of high extension farmers ratio, poor motivation and lack of mobility (Asiabaka, 2002). This finding is in line with Kolawole (2000) and Ochiaka *et al*. (2015). Extension services to farmers help to reinforce the message and enhance the accuracy of recommendation and implementation of technologies (Ume and Uloh , 2011).

Furthermore, the coefficient of feedback provision was significant at 5% of risk level. Feedback provision according to Kolawole *et al.* (2003) is the opportunity to express reaction to technology by the farmers. When this opportunity is not given to the farmers, disinterestedness may follow consequently resulting in abandoning the technology. Feedback provision according to Unammah (2003) helps to ensure proper comprehension of technology by the farmers in order to reduce the chances of rejecting the adoption of technology. The provision of feedback on adopted technology is also important since farmers tend to withdraw from the recommended technologies when there is no follow up to acknowledge and congratulate adopters (Opeke, 2003).

Additionally, the coefficient of input availability was positive and significant at 1% alpha level. This connotes that high cost, untimely and unavailability of inputs has profound effect on rejection of adoption of technologies by farmers. This finding concurred with Ume and Uloh. (2011) who did a related study on yam minisett and found that due to scarcity of fertilizer, pesticides and labour, many farmers in Anambra Zone of Anambra State reject the adoption of the technology. Also, similar observation was made by Kolawole *et al*. (2003) on the reasons for discontinue adoption of cowpea production technologies, among farmers in South West Nigeria.

Conclusion and Recommendations

Based on the results, the following conclusions were deduced:

1. Most of the respondents were elderly (above 40 years) and educated.
2. The determinant factors to adoption of technology were age, household size, education level, farming experience, extension contact and access to credit. The determinant factors to discontinue adoption

of technology were attitude, extension services, feedback provision, marketability and input availability.

The following recommendations are proffered based on the result:

i. Extension agents should be motivated through adequate training and motivations enrich their working efficiency and effectiveness to technology dissemination.
ii. Experienced farmers should be encouraged to remain in agriculture through provision of improved inputs at subsidized prices.
iii. Government policy on fertilizer distribution, tractor hiring services, improved seeds, insecticides and herbicides should not be politicized. They are to be made available to farmers in sufficient quantities at appropriate time and affordable prices.
iv. Government should employ more village-extension workers and provide efficient means of transportation to be able to reach out to the farmers in their villages and farms.

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Table 1: Distribution of Respondents According to Farmers' Socio economic Characteristics

Variables	Frequency	Percentage
Age		
20 – 29	14	12
30 – 39	31	26
40 – 49	30	25
50 – 59	21	18
60 – 69	14	11
70 – 80	10	8
Size of Household		
2 – 3	12	10
4 – 5	66	55
6 – 7	31	26
8 – 9	11	9
Level of Education		
No Formal Education	24	20
Primary Education	35	29
Secondary Education	32	27
Tertiary Education	29	24
Farming Experience		
2 – 5	40	33
6 – 9	51	43
10 – 13	19	16
14 – 17	8	6
18 – 20	2	2
Extension contact		
No contact	40	33
Contact	80	67
Access to Credit		
Yes	40	33
No	80	67
Total	**120**	**100**

Source: Field Survey, (2015)

Table 2: Average Statistics of Discontinue Adoption of Technology by Okro Farmers in Ivo LGA

Variable	Description	Mean	Standard Deviation	Minimum	Maximum
X_1	Change in attitude	0.487	0.521	0	1
X_2	Extension contact	-16.7	0.481	8	24
X_3	Input availability	0.667	0.404	26	62
X_4	Marketability	0.497	0.690	0	1
X_5	Feedback	0.207	1.270	2	6

Source: Field Survey, (2015)

Table 3: Determinant Factors to Technology Adoption Using Logit Model

Variables	Parameters
Intercept	-1.573
	(-4.105)***
Age	-0.032
	(-1.089)*
Household size	0.272
	(5.349)***
Education level	0.378
	(0.263)
Farming experience	-0.022
	(-5.085)***
Extension contact	-0.003
	(-4.879)***
Access to credit	0.131
	(1.155)**
LR – Chi Square (7)	= 5.92
Prob > Chi Square	= 0.5489
Pseudo R^2	= 0.0072
Log likelihood	= -410.02998

*, ** and *** implies significance at 10%, 5% and 1% respectively

Source: Field Survey, (2015)

Table 4: Result of Tobit Analysis on Discontinue Adoption

Variables	Estimated Parameters
Intercept	-2.518
	(-5.038)***
Attitude	0.468
	(0.975)
Extension	-0.378
	(-4.909)***
Feedback provision	1.130
	(2.502)**
Marketability	0.814
	(o.773)
Input availability	1.098
	(2.652)***
LR – Chi Square (7)	= 4.49***
Prob > Chi Square	= 0.7225
Pseudo R^2	= 0.0031
Log likelihood	-716.64402

*, ** and *** implies significance at 10%, 5% and 1% respectively

Source: Field Survey, (2015)