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Adoption of Maize Production Technologies in Ishielu Local Government Area of Ebonyi State, Nigeria

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ABSTRACT

The study examined the adoption of maize production technologies in Ishielu local government of Ebonyi State Nigeria with the arm of ascertaining the levels of adoption of maize production technologies and to determine the socio-economic factors that influenced level of adoption of the technologies. Primary data were collected using a purposive and simple random sampling from 50 maize farmers. Descriptive statistics, likert scale and logistic regression were used to analyze the data. Results showed that majority of the farmers were within the age bracket of 21-40 (64%) and dominated by male (56.5%) and majorities are married (56%). About (76.7%) had formal education; highest level of adoption (80%) was achieved with the use of hybrid maize varieties. Logistic regression result shows that gender, age, marital status, educational status, household size, farm size, membership of social group and annual income were statistically significant at 57 level of probability. High cost of the technologies was identified as the major constraints to adoption. It is recommended that subsidies should be provided on fertilizers and agrochemicals to reduce cost of the technologies to boost production.

Keywords: Adoption, Maize, Technologies.

Introduction

Production of sufficient food for the population is one of the major challenges facing developing countries, in the tropics. It is estimated people of the world over 800 million suffer chronic under nourishment (Nwosu 2005). He further noted that 34 million live in Asia while 186 million live in sub-saharan Africa. One major reason for low agricultural productivity is the low rate of adoption of improved agricultural production technologies. Since agriculture production innovations have no value if they are not taken by the end users, identification

of the factors determining adoption of improved technologies will help improve the effectiveness of research and extension services and agricultural policy to increase productivity of traditional farmers (FAO, 1996). Maize is one of the important grains in Nigeria, not only on the basis of the number of farmers that engage in its cultivation, but also in its economic value (Olaniyi and Adewale, 2012) and these points to the significant role of maize production to sustainable development of rural economy. Despite the economic importance of maize to the teeming populace in Nigeria, it has not been produced to meet food and industrial needs of the country and this could be attributed to low productivity from maize farms or that farmers have not adopted improved technologies for maize production (Onu *et al*, 2010). Improved maize technologies that are capable of raising the farmers agricultures extension work seed, intercropping, fertilizer application, disease and pest control method, harvesting technologies, planting/ field establishment (Njoku; Ojemadu, 2008). New technologies have been developed which aimed at improving the production of maize in Nigeria. Some of the practices include chemical weeding, fertilizer application, harvesting techniques, disease/pest control methods etc. The role of extension service in gelling improved technologies to the farmers can not be over emphasized. The purpose of training and visit (TAV) system of Agriculture extension service is assisting farmers to raise production and increase their income and to provide appropriate support for agricultural development (Bernor and Baxter, 1984). Extension agents play the role of disseminating these technologies to farmers (Agumagu and Nwaogwugwu, 2006).

Methods and Materials

The study was conducted in Ishielu local government of Ebonyi state, Nigeria. The local government is made up of twelve communities Ezillo, Ntezi, Ezza Ameda, Okpoto, Ohofia, Agba, Iyonu, Nkalagu, Amuda, Ezza Ntezi, Ezza Ekwetekwe with a population of 151,048 (NPC, 2006). The area has an annual rainfall between 2000mm and 2500mm and a temperature between 22^0C and 31^0C. The local government lies on longitude 7^0 00E and 8^0 00 and latitudes 4^0 45N and 6^0 17N. These areas favour the production of cereal crops which are observably grown on small holder plots usually in mixtures of at least two simultaneous crops.

Data Collection

The target population was all the maize farmers who adopted modern production technologies in their production activities. The sampling frame was obtained from the community lists of farmers across the local government. Purposive sampling was used to select five communities in the L.G.A (Ezillo, Iyonu, Nkalagu,

Ohofia and Agba). This selection was based on the baseline survey of maize farmers in the local government area carved out by agricultural officers in the area form each of the sampled community, five maize farmers were randomly selected making a total sample size of 100 farmers that were utilized for analysis. The questionnaire sought information in socio-economic characteristics of the maize farmers, improved maize production technologies and constraints of adoption of the technologies.

Data Analysis

Data were analyzed with the use of descriptive statistics including mean, frequency distribution percentages to describe the study variables while logistic regression model and likert scale were used to analyze level of adoption of the technologies and constraints.

Model Specification

Logistic regression model

The model is represented by taking Y as a probability P and making its logarithm to depend linearly on the independent variables. The probability is expressed by (Pindyck and Rubinfeld 1976) as:

$$P\ Yi = 1)\ f\ (Zi) = \frac{1}{i\text{-}e^{2i}} = \frac{e\ Zi}{e^{2i}+1}$$

Where

Zi = Theoretical variable (observable variable). To obtain the value of Zi, the likelihood of observing the sample needs to be formed by introducing a dichotomous response variables Yi such that: Yi = (1 if the ith farmer is the higher adopter of maize technologies; O if the ith farmer is a low adopter of maize technologies).

The general form of the adoption model can be special explicitly as

Fig I

$Zi = B_0 + B_1 X_1 + B_2 + X_2 + \ldots\ldots\ldots B_8 X_8 + e$

Zi = cumulative logistic distribution

X_1 (Age) = Farmer age (years)

X_2 (Gen) = Gender (Dummy: 1 if male, 0 if female)

X_3 =Marital status

X_4 =Educational status (years in school)

X_5 =House hold size number of pass

X_6 =Membership of social group
X_7 =Farm size (ha)
X_8 =Annual income (₦)
B_1B_8 =Regression coefficients
B_0 =Constant term
e =Error term

Fig II
4 point likert – scale
4= Very serious
3= Serious
2= moderately serious
1= Not serious

With a critical means of 2.J (4+3+2+1) = 10.
$\frac{10}{4}$ = 2.5

Result
Socio – economic characteristics of maize farmers

Variable	**Frequency**	**Percentage**
Age		
21 – 30	16	32
31 – 40	16	32
41 – 50	10	20
50 and above	8	186
Total	50	100
Gender		
Male	28	56.5
Female	22	43.5
Total	50	100.00
Marital status		
Single	7	14
Married	28	56
Widowed	15	30
Total	50	100
Educational status		
No formal education	11	22
Primary education	17	34
Secondary education	17	34

Tertiary education	5	10
Total	50	100
Farming experience		
1 – 10	29	58
11 – 20	17	34
21 – 30	3	6
31 – 40	1	2
Total	50	100
House hold size		
1 – 6	26	52
7 – 12	21	42
13 – 18	3	6
Total	50	100
Source of found		
Personal savings	40	80
Loans from bank	10	20
Total	50	100
Labour		
Family labour	30	60
Hired labour	20	40
Total	50	100
Farm size		
1 – 5	45	90
6 – 10	5	10
Total	50	100

Source: Field survey, 2013

Socio economic characteristics of the farmers in Table 1 indicates that majority of the farmers are within the age bracket of 21–40 years which agrees with (Audu and Abu, 1999) that 18–45 years are the major work force, and more males about 56% were involved in the adoption and majority are married (56%). Also about (58%) had 1 – 10 years of experiences act of production through adopting the production technologies over time. Which agrees (Okeke *et al*, 2013; Nkamigbo and Okeke, 2013) that the more experienced a farmer is in his enterprise the more has productivity, efficiency and adoption. The result shows that most (78%) of the farmers had formal education, most farmers had household size 1-6 persons (50%) with more embarking on family labour (60%).

Table 2 contact with Extension Agents

Contacts	**Frequency**	**Percentages**
< 1	30	60
1 – 5	15	30
6 – 10	5	10
Total	50	100

Source: field survey, 2013

Table 2 indicates that about 60% of the farmers had less than one contact with extension agents, while about 40% had more than four contacts. This implies that more extension agents are highly needed in this area. Table 3 costs of technologies and level of Adoption of maize production technologies by farmers.

Variable	**Frequency**	**Percentages**
Cost technologies		
High	40	80
Moderate	8	16
Low	2	4
Total	50	100
Technology		
Fertilizer	18	36
Use of herbicides	8	16
Use of hybrid maize varieties	20	40
Use of local maize varieties	4	8
Total	50	100

Source: field survey, 2013

Table 4: Determinants of level of Adoption of Maize production Technologies

Parameter	**Coefficient**	**T – value**	**Probability**
Constant term	-1.5906	-15.3342	0.1037
Gender	-0.0244	-1.2985	0.0188
Age	0.0040	0.3039	0.0132
Marital status	-0.1314	-0.0129	0.0219
Educational status	0.0403	4.0390**	0.0123
House hold size	-0.0082	-0.8690	0.0029
Membership of Social group	0.0227	2.488**	0.0018
Farm size	0.0461	2.0277*	0.0090
Annual income	0.0382	3.9528**	0.0000
Cli square	3553.985	0000**	

Note: ** and * significant 5% and 7% respectively
Source: field survey 2013

Effects of Social – Factors of the Farmers on Level of Adoption

From the Table 4, the result of the bionomical logistic regression to ascertain the effect of socio-economic factors of the maize farmers shows that four independent variable, educational status, farm size, membership of social group and annual income were positively and statistically important determinants of level of adoption of maize production technologies in the study area. This implies that as the farmers income increases, likewise their awareness of modern technologies through higher education, more likely their acquisition and utilization of modern production technologies. Moreover, farmers who own large farms are likely to belong to cooperative or social organizations from where they grasp opportunities to acquire new knowledge, skills and modern technologies that would enhance and increase their productivity, income and health living.

Table 5: Constraints to Adoption of maize production technologies

Constraints	**Mean score**	**Rank**
High cost of technologies	2.80	1st
Lack of finds	2.70	2nd
Scarcity of land	2.40	3rd
Lack of information on the tech.	2.36	4th
Poor extension visits	2.30	5th

Source: field survey, 2013

Data in table 5 shows that most of the farmers perceived high cost of technologies as the major constraint to adoption with a mean score of 2.80 followed by lack of fund (2.70). This agrees with (Daudu et, al, 2008) who reports that majority of farmers are resource-poor farmers and capital owned by small holders are relatively small, hence, they are generally poor and cannot buy farm assets.

Conclusion and Recommendation

Maize farmers in Ishielu local government of Ebonyi state adopted modern technologies in the production of maize. Furthermore, the important constraints mentioned high cost of the technologies and lack of funds should be ameliorated to enhance the level of adoption of the technologies, productivity and profitability of the enterprise.

It is recommended that government should create awareness campaigns on the advantages of adopting modern maize production technologies through proactive campaigns of the extension services and subsides on fertilizers and agrochemicals should be provided to reduce the cost of technologies and encourage bumper production.

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