



Factors influencing adoption of improved maize varieties in Ekiti State, Nigeria

Obembe Oluwatosin Emmanuel ^{1*}, Aniyi Oluwatoba John ²

¹⁻² Department of Agricultural Extension and Rural Development, Landmark University, Omu- Aran, Kwara State, Nigeria

* Corresponding Author: **Obembe Oluwatosin Emmanuel**

Article Info

ISSN (online): 2582-7138

Volume: 03

Issue: 03

May-June 2022

Received: 01-05-2022;

Accepted: 16-05-2022

Page No: 400-404

Abstract

The study assessed the factors influencing adoption of improved maize varieties in Ekiti State, Nigeria. Primary data were collected from 120 maize farmers using a well-structured questionnaire. Descriptive statistics and Logit regression model were used to analyze the data collected. The result of the study shows that majority (90%) of the sampled maize farmers were male while 10% were female. Largest proportions (75.0%) of the maize farmers were around the ages of 31-50 years, majority (85.83%) of the respondents were married. The result also shows that majority (95.83%) of the respondents had some form of education. Majority (63.33%) of the respondents were aware of the improved maize varieties and majority (73.63) of the adopters mostly grown Sammaz 16 maize varieties. Factors including age, household size farm size, level of education and access to technology were found to significantly influence adoption of improved maize varieties in the study area.

Keywords: Improved maize, Adoption, Logit regression, Ekiti State, Nigeria

1. Introduction

As the world's population is expected to reach 9.1 billion by 2050, the production of food, mainly staple crops is expected to increase accordingly, especially for the 870 million people who are currently food insecure (International Finance Corporation [IFC], 2013). This suggests that the dominant role of agriculture as the primary source of food and employment creation in the developing economies should be stepped up. A study by Alexandratos and Bruinsma (2012) indicated that agricultural production needs an increase of 60% by 2050 to meet the world's consumption demand. This expected growth means that smallholder farmers who are the principal conduit of agricultural production have a significant role to play. In Sub-Saharan Africa (SSA), a majority of the population is agriculture dependent with about 55% in the rural areas (IFC, 2013). Agriculture in Nigeria is a crucial sector contributing about 24.65% to GDP and employing more than 70% of the labor force (Food and Agriculture Organization [FAO], 2015). The contribution of agriculture to achieving the Millennium Development Goal (MDG) of halving poverty and hunger by the end of 2015 was quite impressive. However, the sector remains predominantly small-scale with over 82.5% of rural households involved in producing about 80% of the output through rudimentary methods leading to low productivity (FAO, 2015). Also, over 25% of the people, particularly in the northern part of the economy, still live under US\$1.25 per day (FAO, 2015). The vital sector in the Nigerian agricultural economy is the crop sector consisting of major crops such as cocoa, maize, rice, yam, cassava, plantain, and other cereals and fruits. Other crops like oil palm, cotton, coconuts, and soybean are also essential cash crops in the agricultural sector. The sector has been fluctuating regarding its contribution to GDP. Among the cereal crops, maize is considered the most critical crop accounting for about 50% of the total cereal production with an estimated 2.1 million households involved in its cultivation (NBS, 2014). Maize has been cultivated in Nigeria since late sixteenth century and was formerly a significant food crop in the southern part of the country. Today, maize is an essential Nigeria's staple food produced by the vast majority of the rural households across the country. The poultry and livestock sectors largely depend on maize for their survival since it forms a substantial component of livestock and poultry feed. Moreover, the crop is used for the preparation of other materials such as corn starch, corn flakes, maltodextrins, corn oil, corn syrup and products of fermentation and distillation industries.

Despite the significant contribution of maize to the Nigerian economy, growth in the sector has come as a result of expansion in the area of land cultivated rather than productivity.

However, in recent years the expansion of the crop was limited by lack of improved varieties that can withstand climatic and soil factors. Research to improve the existing maize varieties, with a view to increase production, were initiated in different research institutes in Nigeria such as the Institute for Agricultural Research (IAR) at Ahmadu Bello University (ABU) Zaria and International Institute for Tropical Agriculture (IITA) Ibadan. These Improved Maize Varieties were Sammaz 15, Sammaz 16, Sammaz 27 and Corn 5 DT, were promoted by a project Promoting Sustainable Agriculture in South West, Nigeria including Ekiti State. Until recently, most of the farmers producing maize relied on traditional technology with low use of improved inputs. The country provides an interesting case study because the importance of maize as an income-generating food staple has been increasing steadily during the last two decades. National average grain yields have increased from 1.13 t/ha in 1990 to about 1.85 t/ha in 2014 and Ekiti included (FAOSTAT 2016). The introduction of improved agricultural technologies to farmers will help manage the constraints facing maize farmers. Doss (2013) opined that adoption of improved technologies is an important means to increase the productivity of smallholder farmers in Africa, thereby fostering economic growth and improve wellbeing of millions of the poor households, it is important to understand the factors which determine the likelihood and rate of adoption of improved technologies. The main objective of the study was to examine the factors affecting adoption of improved maize varieties in Ekiti State, Nigeria.

Methodology

Study Area

The study was carried out in Ekiti State, Southwestern region of Nigeria. Ekiti State covers an area of 14,875 square kilometers, out of which 9,251 square kilometers are land area and its land area lies between latitudes $7^{\circ} 15'$ and $8^{\circ} 5'$ North and longitudes $4^{\circ} 5'$ and $5^{\circ} 45'$ East. The State has 16 Local Government Areas (LGAs) which are categorized into three ADP zones. The State has a population of 3,423,535 and the people are mainly Yoruba (NPC, 2006). Two distinct climatic seasons exist in the State which are rainy and dry seasons and these seasons occur from March to October and from November to early March respectively. The State also experiences average annual rainfall of 1570 mm with a mean temperature that ranges between 25.0°C – 39.0°C annually. The soil is well drained sandy loam and supports the cultivation of food and cash crops. The people of the state are mostly farmers, traders, and artisans. The farmers produce food crops such as rice, yam, maize, cassava, beans and cocoyam and the main cash crops grown include cocoa, kola and oil palm. Hence, the choice of the study area.

Sampling procedure, sample size and data collection

A multistage sampling procedure was used for the selection of respondents for this study. At the first stage, three local government areas was purposively selected due to concentration of maize producers. At the second stage, two communities was randomly selected from each of the selected local government. Lastly, twenty maize farmers was

randomly selected from each community. A total of 120 respondents was used for the study. Primary data was used for the study. Primary data was collected using a well-structured questionnaire. Information collected included, socio-economic characteristics of farming households (such as age, farming experience, level and years of completed formal education, household size and access to credit, income, farm size, age of household head); and also information on maize production such as inputs used which include land, seed, labour, fertilizer, agro-chemicals and output obtained. This study employed the use of descriptive statistics and logit regression model to analyzed the data. The explicit form of the logit regression model is specified as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + u_i \dots \dots \dots (1)$$

Y= adoption (adopt=1, non-adopt =0)

X_i = Vector predictors

X_1 = Sex of the household head (1 for male and 0 for female)

X_2 = Age of the household head (years)

X_3 = Size of the household (numbers)

X_4 = Farm size (hectares)

X_5 = Level of education of the household head, (in years)

X_6 = Extension contact (Dummy variable (1, 0) (D=1 if accessed and 0 otherwise)

X_7 = Access to credit (Dummy variable (1, 0) (D=1 if accessed and 0 otherwise)

X_8 = Access to technology (Dummy variable (1, 0) (D=1 if accessed and 0 otherwise)

X_9 = Distance to market (km)

β_i and u_i denote the coefficients of the explanatory variables and the changes in the unobservable error term, respectively.

Results and Discussion

Socio-economic Characteristics of the Respondents

This sub-section presents the socio-economic attributes of the maize farmers using descriptive statistics. Table 1 shows that 90.0% of the maize farmers were male while 10% were female. These finding shows that the production of maize in the study area was mainly prevalent among the men as they were actively involved in maize production in the study area. Largest proportions (75.0%) of the maize farmers were around the ages of 31-50 years (Table 1). The mean age is 45.74 ± 9.9 years. This suggests that majority of the maize farmers were in their active age and thus expected to be productive and be open to accepting new innovations as regarding maize production. Also, findings presented in Table 1 revealed the marital status of the respondents in the study area. This result shows that majority (85.83%) of the respondents were married and thus have responsibilities. It could also be implied that marriage is highly cherished in the study area especially among the sampled maize farmers. This implies that the use of family labour for maize production might be possible in the study area.

The result from Table 1 shows that majority (95.83%) of the respondents had some form of education with 55.83% of the maize farmers having primary education. As low as 17.50% had secondary education while 5.0% had tertiary education. However, 17.50% of the maize farmers had Arabic education while only 4.17% of the maize farmers sampled had no formal education. This distribution shows a considerable level of literacy as majority of the respondents had at least primary education. This is expected to positively affect the

adoption of the improved maize varieties in the study area. From Table 1, it was revealed that majority of the maize farmers (40.84% and 42.5%) have household size of 6-10 and 1-5 people respectively while 8.33% have between 11-15 people in their household. The mean of the household size is 8.4 ± 3.7 people. This implies that the use of family labour might be prominent in the study area as they had a relatively big family size. Family labour is recognised as a source of labour supply in small holder agricultural production in most part of Africa with Nigeria inclusive. The result presented in Table 1 also revealed the years of experience in maize production. The results showed majority (46.67%) of the respondents had been into the production of maize between 11-20 years. The average years of experience for the respondents were 28.8 ± 14.8 years. This indicates that

farmers in the study area have acquired necessary experience in maize production, and adoption of new innovations will pose no problem.

The data in Table 1 further shows the membership of association status of the respondents in the study area. It was shown that majority (72.50%) of the respondents belong to association. This implies that they have a very good platform for dissemination of vital information and also experience the benefits of group dynamics. The farm size of the respondents is also shown on Table 1. The results indicated that 67.5% of the respondents had a farm size of <1ha, 30.0% had between 1.1-3.0 ha while 2.5% had >3.1ha. The result therefore implies that, majority of the farmers in the study area are relatively small-scale maize farmers.

Table 1: Socioeconomic characteristics of maize producers

Variables	Frequency	Percentage (%)
Sex		
Male	108	90.0
Female	12	10.0
Age (years)		
<30	9	7.50
31-40	28	23.33
41-50	47	39.17
51-60	30	25.0
>61	6	5.0
Mean	45.74	
Std dev.	9.9	
Marital Status		
Single	8	6.67
Married	103	85.83
Widowed	8	6.67
Divorced	1	0.83
Level of Education		
No formal Education	5	4.17
Primary	67	55.83
Secondary	21	17.5
Tertiary	6	5.0
Arabic	21	17.5
Household Size		
1-5	51	42.5
6-10	49	40.5
11-15	10	8.33
16-20	8	6.66
>21	2	1.67
Mean	8.4	
Std. dev.	3.7	
Years of Production Experience		
1-10	22	18.33
11-20	56	46.67
21-30	23	19.16
>31	19	15.84
Mean	28.8	
Std. dev.	14.83	
Membership of Association		
Belong	87	72.5
Do not belong	33	27.5
Farm Size		
<1.0	81	67.5
1.1-3.0	36	30.0
>3.1	3	2.5
Mean	17.6	
Std. dev.	7.6	

Source: Data Analysis, 2021

Awareness of improved maize varieties

The result of the awareness of the maize farmers with respect to the improved maize varieties was presented in Table 2. Majority (63.33%) of the respondents were aware of improved maize varieties while 36.67% were not aware of the existence of improved maize varieties. This implies that substantial amount of the sampled respondents have the knowledge of improved maize varieties in the study area.

Information source of the improved maize varieties

The result of the source of information of the improved maize varieties was presented in Table 3. About 16.67% of the respondents got information about the improved varieties from extension agents, about 50% source information from other farmers, 20% got their information from friends while about 13.33% got their information from village head. This implies that information about the improved varieties were mostly spread through other farmers in same community/village in the study area.

Table 2: Distribution of Respondents by extent of awareness

Extent of awareness	Frequency	Percentage
Yes	76	63.33
No	44	36.67
Total	120	100.00

Source: Data Analysis, 2021

Table 3: Distribution of Respondents by information source of new varieties

Information source of new varieties	Frequency	Percentage (%)
Extension agent	20	16.67
Other farmers	60	50.0
Friends	24	20.0
Radio	--	--
Village head	16	13.33
Total	120	100.00

Source: Data Analysis, 2021

Improve maize varieties grown

The result of the improved maize varieties grown by the adopters was presented in Table 4. About 15.79% of the respondents grown Sammaz 15 varieties, 10.53% grown Sammaz 27 varieties while majority 73.68% of the respondents grown Sammaz 16 varieties. This implies that among the improved maize varieties disseminated to the maize farmers, Sammaz 16 varieties is the most popular varieties that are been grown in the study area.

Table 4: Distribution of Respondents by improve maize varieties grown

Improve maize varieties grown	Frequency	Percentage (%)
Sammaz 15	12	15.79
Sammaz 16	56	73.68
Sammaz 27	8	10.53
Total	76	100.00

Source: Data Analysis, 2021

Factors influencing adoption of improved maize varieties

The result of the factors influencing adoption of improved maize varieties was presented in Table 5 (Logit regression). Factors including age, household size farm size, level of education and access to technology were found to significantly influenced adoption of improved maize varieties

in the study area.

Age of the respondents was positive and significant at 1% level of probability. This implies that age of the respondents increases the probability of adopting improved maize varieties by 10.7%. Thus, as age increases, the probability of adopting improved maize varieties also increases. Household size was positive and significant at 1% level of probability. This implies that household size increases the probability of adopting improved maize varieties by 84.8% in the study area. Farm size was positive and significant at 5% level of probability. Thus, as farm size increases, the probability of adopting improved maize varieties increases. Level of education was positive and significant at 1% level of probability. This implies that the more the farmers increase their level of education the higher the probability of adopting improved maize varieties in the study area. This might be due to the fact that as more education is attained by the farmers, more knowledge is acquired during the process thus influencing their decision to adopt improved maize varieties. Access to technology was positive and significant at 5% level of probability. This implies that the more the farmers have access to the improved technology, the likelihood of adopting the improved maize varieties in the study area. Thus, having access to the improved technology increases the likelihood of adopting the improved maize varieties in the study area.

Table 5: Results of Maximum Likelihood Estimates of Logit regression model

Variables error	Coefficients	Standard	t-value
Constant	-3.109***	0.357	-8.69
Sex	0.009	0.075	0.13
Age	0.107***	0.045	2.38
Household size	0.848***	0.088	9.57
Farm size	0.026**	0.013	1.97
Level of education	5.132***	2.235	2.30
Extension contacts	3.961	3.853	1.03
Access to credit	0.404	1.376	0.29
Distance to market	0.140	0.483	0.29
Access to technology	6.430**	2.980	=2.16
Log likelihood function L/f	98.53		
LR test	12.89		

***, **, * significant at 1%, 5% and 10% respectively Source: Data Analysis, 2021

Conclusion and Recommendation

The study assessed the factors influencing adoption of improved maize varieties in Ekiti State, Nigeria. The result of the study shows that majority of the sampled maize farmers were male while 10% were female. Largest proportions of the maize farmers were around the ages of 31-50 years, majority of the respondents were married. The result also shows that majority of the respondents had some form of education. Majority of the respondents were aware of the improved maize varieties and majority of the adopters mostly grown Sammaz 16 maize varieties. Factors including age, household size farm size, level of education and access to technology were found to significantly influenced adoption of improved maize varieties in the study area. It is recommended that more awareness of the improved varieties should be carried out in the study area. There is a need to increase the knowledge base of the farmers with respect to the improved maize varieties so that the farmers will increase their rate of adoption of the new technology in the study area.

References

1. Alexandratos N, Bruinsma J. World agriculture towards 2030/2050: The 2012 Revision (ESA Working Paper No. 12-03). Rome: Food and Agriculture Organization of the United Nations (FAO), Agricultural Development Economics Division, 2012.
2. Doss CR. Understanding Farm-Level Technology Adoption; Lessons Learned from CIMMYT Micro Survey in Eastern Africa, 2013, 24-35.
3. FAO. Food and Agriculture Organization of the United Nations, Country Fact Sheets on Food and Agriculture Policy Trends. Nigeria: Food and Agriculture Policy Development Analysis, 2015.
4. Nigeria Bureau of Statistics. Nigeria Living Standard Survey 6: Poverty Profile Report. Nigeria: Government of Nigeria, 2014.
5. National Population Commission (NPC). Nigerian Population Commission, Abuja. Population of Nigeria by State and Sex, 1991-2006.