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ADOPTION OF EARLY MATURING MAIZE VARIETIES AMONG FARMERS IN IDO LOCAL GOVERNMENT AREA OF OYO STATE

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Abstract
The study assessed the adoption of early maturing maize varieties among farmers in Ido Local Government Area of Oyo State. Purposive sampling procedure and simple random sample were used to select the wards and sample size of 99 respondents. A well-structured questionnaire with interview section was used to obtain data from the respondents. Both descriptive and inferential statistics were used for analyses of data. Findings showed that 59.6% of the respondents were male. 50.50% of respondents were within the ages of 36-45 years. Majority of them were involved in farming (69.7%) as major occupation. The findings also showed high rate of adoption rate (69.7%) of early maturity within 80-85 days. The study also revealed that (74.7%) of the respondent stated that weather condition was a factor that influence the level of adoption of early maturing maize varieties with the major constraint being inadequate availability of improved early maturing maize seeds. The chi square analysis showed that there was significant association between and adoption of improved maize varieties with age (χ^2 =16.076, p<0.05) and sex (χ^2 =6.738 p<0.05). The study therefore, concluded that adoption of early maturing maize varieties in the study area was mostly done by males within the youthful age bracket. Also, the most adopted varieties were EV 99 DTWSTR and EV 99 DTWSTR. It is therefore recommended that farm size available to maize farmers should be increased through lease by the Government or other organizations. Also seed production outlets should be made available near communities to facilitate and promote cultivation of improved early maturing maize varieties by farmers.

Key Words: *Adoption, Early maturing, Maize varieties, Farmers*

Introduction

Maize *(Zea mays* L.) is a cereal of the family graminae produced across the world. It is a highly yielding crop easy to process, readily digested with cost advantage when compared to other cereals (IITA, 2011). It is an important source of carbohydrate and if eaten in the immature state, provides useful quantities of Vitamins A and C (Kudiet *et al.*, 2011). Iron and vitamin B are also present in maize (Faleye, 2013).

Adoption is the most important force in increasing agricultural productivity in

the long-term. However, to affect productivity, technology must be adopted in the production processes. Largely, the rate of adoption of a new technology is subject to its profitability, degree of risk associated with it, capital requirements, agricultural policies, and socioeconomic characteristics of farmers (Rogers, 2003).

Seed is the key input in agriculture and to a great extent yield and quality of crop depend on the quality of the seed used (Awotide *et al.*, 2012; Adenuga *et al.*, 2014). Early maturing varieties make farmers to cultivate several times within the planting season because of a relatively short growing period. The genetic potential of these seeds also ensures increase in quantity harvested, disease and pest resistance, and drought tolerance; and can compete favorably with weeds (Africa Rice Center, 2008). There can be drastic improvement in Nigerian agriculture if the available improved technologies are accepted and adopted by the farmers (Ibrahim *et al.*, 2012).

Modern agricultural technologies and improved practices have keys in the realization of increased agricultural productivity and in raising the standard of living of the farming population (Adenuga *et al.*, 2014).

Over years the International Institute of Tropical Agriculture (IITA) has in collaboration with national partners developed and disseminated a number of early maturing maize technologies that meet the requirement of their major clients and small-scale farmers in Nigeria and West Africa savanna at large. The limited use of improved varieties in a predominantly maize growing region may be due to several factors; lack of information on early maturing maize varieties, unavailability of seed, or the unacceptability of new varieties due to low market values or unsuitability for the farming system (Ellis-Jones, 2009).

Maize is a major cereal and one of the most important food crops in Nigeria. Its genetic plasticity has made it the most widely cultivated crop in the country, from the wet evergreen climate of the forest zone, to the dry ecology of the Sudan savanna. Being photoperiod sensitive, it can be grown anytime of the year giving greater flexibility to fit into different cropping patterns. It is one of the most dominant cereal crops in the southern and northern Guinea and Sudan savannas (Onyibe *et al.,* 2006). The development and promotion of quality protein maize (QPM), a high lysine type of maize that can improve the nutrition particularly for women and children in places where maize comprises the major source of protein in human diets. QPM also boosts the productivity of monogastric farm animals (poultry and swine) when used in feeds, and is valuable where farmers cannot afford or obtain lysine supplements for feed (CIMMYT, 2008). However, despite the potential for further yield increases, maize production faces numerous problems including poor soil fertility, Striga, disease, drought, low and erratic rainfall, and long dry season (Tambo and Abdoulaye, 2011).

Maize is a staple food for an estimated 50% of the population in Nigeria. It is an important source of carbohydrate, protein, iron, vitamin B and minerals. Nigerians consumes maize as a carbohydrate base in a wide variety of porridges, pastes, grits and beer. Green maize (fresh on the cob) is eaten parched, baked, roasted or boiled, playing an important role in filling the hunger gap after the dry season (IITA, 2009).

Various Agricultural Development Programs have evolved in Nigeria with the

aim of modernizing and improving the farmer's technical knowledge and skills for greater output and higher standard of living (Olarinde *et al.,* 2007). Despite these agricultural programs, there still remains a dearth of food supply to meet the requirements of the rapidly growing population. A big gap still exists between national food supply and demand for food in Nigeria (Abdullai, 2015). This now enables research institution to search for solution to this problem through scientific research. The challenges have been to develop technologies that will enhance the productive potentials of small scale farmers who produce the bulk of the nation's food supply. These peasant farmers mostly relied on traditional ways of agriculture using low yielding local varieties that can only produce food for subsistence.

In Oyo State, efforts have been made to disseminate early maturing maize varieties that are adapted to the harsh environment in order to improve crop yields, ensure food security, and increase income. Since the introduction of the adoption of early maturing maize varieties on security food status into the study area, much works have not been done to access the extent to which these varieties have been adopted by the small scale farmers and their impact on the farmers' livelihood.

Methodology

Study Area

The study was carried out in Ido Local Government area of Oyo state. It has an area of 986 km² with a population of 103,261 at 2006 Nigeria's population census. It lies between longitude 3° 47′ 34.99″ E and latitude 9° 30′ 44.49″ N. It is located in the forest belt zone and supports mostly food crops. Ido has a relatively high humidity and average daily temperature ranges between 25°C and 35°C throughout the year with a rainfall of about 1800mm annually (Yusuf *et a*l., 2011). The vegetation pattern consists of rainforest in the South and guinea savannah in the North. The climate favours cultivation of crops. The soil is extensively fertile and it is suitable for agriculture. The basic occupation of the people is farming. There are large hectares of grassland which are suitable for animal rearing, vast forest reserves and rivers. The inhabitants of the area grow varieties of cash crops such as banana, plantain, cocoa, kolanuts, palm oil, timber, and arable crops like maize, yam, cassava, rice, vegetables etc. The area is also suitable for a wide range of edible fruits.

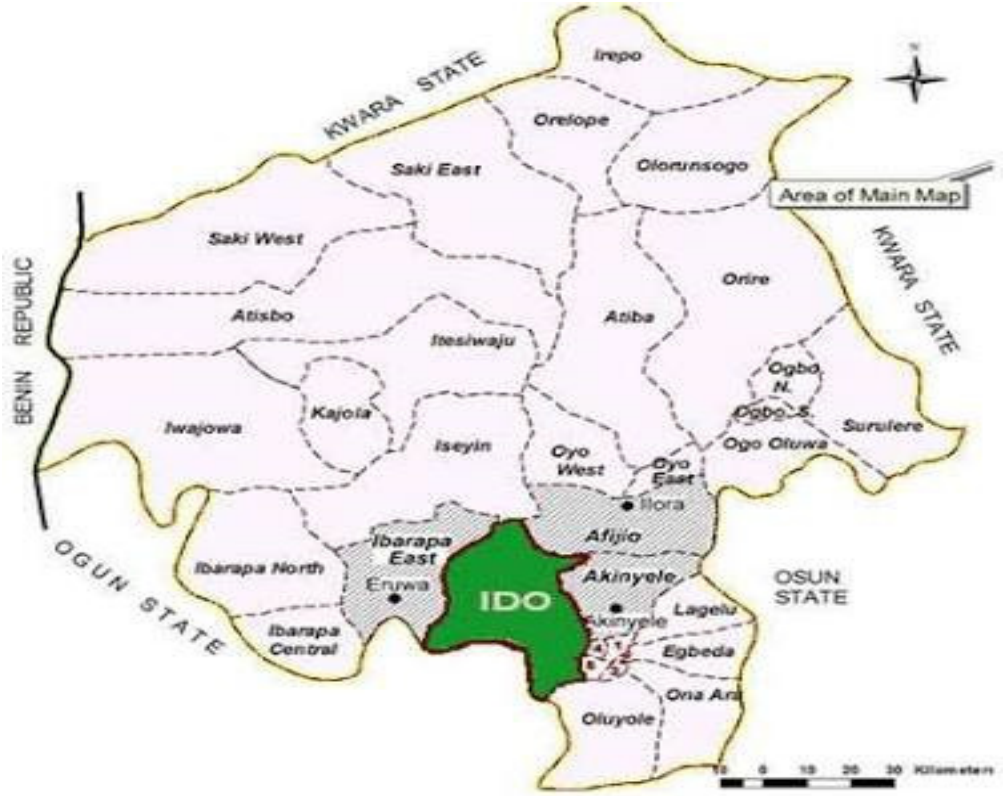

Fig. 1: Map of Oyo State showing Ido Local Government Area

Sample and Sampling Procedure

Purposive sampling was used to select four main villages in the study area due to high presence of maize farmers in the area. The villages were Akufo village, Omi Adio village, Akindele village, Akinware village. However, simple random sampling was used to select 99 respondents across these villages. The data for the study were collected with a well-structured questionnaire and interview section. Furthermore, the data collected were analyzed with descriptive statistics such as frequencies, percentages while inferential statistical tools (Chi square and Pearson product moment correlation, PPMC) were used to test for relationship between the dependent and independent variables in the hypotheses.

Results and Discussion

Socio-Economic Characteristics of the Respondents

Table 1 shows that (59.6%) of the respondents were male while (40.4%) are female. This agrees with (Adenuga *et al.* (2014) that maize farming in the tropics is dominated by male gender due to the peculiarity of farming system mostly used. Also (50.5%) of the farmers were between the age of 36-45 years. The result further shows that majority of the respondents (40.4%) have secondary education in the study area. This result is in line with Diagne *et al.* (2009) who stated that adoption of improved agricultural production technologies is faster among educated farmers compared to the uneducated. (69.7%) of the respondents were farmers as revealed in the table. Also, majority (50.5%) of the farmers has farm size of 1-2 acres in the study area.

Table 1: Socio-economic characteristics of respondents (N = 99)

Variables	Frequency	Percentage (%)
Sex		
Male	59	59.60
Female	40	40.4
Age		
16-25	8	8.1
26-35	25	25.30
36-45	50	50.50
46-55	12	12.10
55 above	4	4.0
Education level		
No formal education	20	20.20
Primary education	29	29.30
Secondary education	40	40.40
Tertiary education	10	10.10
Occupation		
Farming	69	69.7
Trading	19	19.20
Civil servant	11	14.11
Farm size		
Less than acre	25	25.30
1-2 acres	50	50.30
Above 2 acres	24	24.20

Table 2 shows that (77.8%) of the farmers have been cultivating maize before. It also revealed that majority 77.8% of the respondents were aware of new early maturing maize varieties, 57.6% of the respondents have planted new early maturing maize varieties. Also 24.2% of the respondents agree on low price why the early maturing maize varieties have not be planted while 75.8 disagree, 16.2% of the respondents agreed with lack of credit while 83.8% disagree. The table also revealed that 18.2% of the respondents agree on lack of fertilizer while 81.8% disagree. This findings indicated that majority of farmers were involved in cultivation of new early maturing varieties inthe study area. These findings agree with Obayelu and Onasanya (2017) that most of the farmers in the derived guinea savannah cultivate improved varieties of maize (yellow and white).

Table 2: Practices involved in cultivation of maize (N = 99)

Variable	Frequency yes %	No %
Do you plant maize?	77(77.8)	22(22.2)
Are you aware of new early maturing maize varieties?	77(77.8)	22(22.2)
Have you planted new early maturing maize varieties?	57(57.6)	42(42.6)
If no answer the following:Low price	24(24.2)	75(75.8)
Lack of credit	16(16.2)	83(83.8)
Lack of fertilizer	18(18.2)	81(81.8)

The result in table 3 shows that majority of the farmers adopted EV 99DT W STR (SAMMAZ 54) with an adoption rate of (69.7%) and EV 99DT W STR (SAMMAZ 53) had an adoption rate of 68.7% , both SAMMAZ 54 and SAMMAZ 53 varieties are bred for high grain yields up to 7.6 t/ha and 7.2 t/ha and had early maturity (80-85 days) with resistant to maize streak virus, rust, leaf bright and curvularia leaf spot (IITA). Also variety EV 99 DTWSTR (SAMMAZ 52) had an adoption rate 65.7% as a result of bio-fortification with pro vitamin A. The results indicated majority of the farmers were aware and already cultivating the early maturing maize varieties in the study area. These findings agree with Lawal *et al*. (2008) that adoption was high with the majority of the farmers in the southwest Nigeria preferring a yellow-grained early maturing variety of maize to other varieties.

Table 3 Types of early maturing maize varieties adopted by farmers (N = 99)

Varieties	Frequency yes%	No %
EV 99 DTWSTR (SAMMAZ 52)	65(65.70)	34(34.30)
EV 99 DTWSTR (SAMMAZ 53)	68(68.70)	31(31.30)
EV 99 DTWSTR (SAMMAZ 54)	69(69.7)	30(30.3)

The result in table 4 reveals that majority (74.7%) of the respondents agreed that weather condition is favourable as a factor that influence the level of adoption of early maturing maize varieties. It also reveals that (69.7%) of the respondents agreed that resistant to disease is also a factor that influenced the level of adoption. Also, 65.7% of the respondents agreed that low pest infestation is a factor influencing the level of adoption because the new early maturing maize varieties show resistance to pest infestation. The findings indicated that weather condition, resistance to diseases and low pest infestation were factors that contributed to adoption of early maturing varieties. The findings agree with Atehnkeng *et al*. (2017) and Ortiz (2017) that resistance to disease, low pest infestation and weather condition were factors that influenced the adoption of early maturing maize varieties in Nigeria.

Table 4: Factor that influenced adoption of early maturing maize varieties (N = 99)

Variable	Frequency	
	Yes %	No %
Weather condition	74(74.7)	25(25.3)
Resistant to disease	69(69.7)	30(30.3)
Consumer preference	61(61.6)	38(38.4
Pest infestation	65(65.7)	34(34.3)
High yield	66(66.7)	33(33.3)

The result in table 5 reveals that (60.0%) of the farmers in the study area opined that inadequate of improved early maturing seeds are major constraint. The finding indicates that inadequate availability of early maturing maize seeds was a major constraint experienced by farmers in the study area. This agrees with

Poku *et al*. (2018) that access to improved maize seed remained a major constraint in many countries. Also, (52.5%) of the respondents also agreed that high cost of seeds is a minor constraint associated with the adoption of early maturing maize varieties. This result is line with Khapayi and Celliers (2016) farmers face high cost in the maize production. Furthermore, 45.5% of the respondents also agreed that lack of information on early maturing maize is minor constraint while 34.3% was major constraint. The result indicates that lack of information on early maturing maize varieties was not a serious problem among farmers in the study area. This finding concurs with Poku *et al*. (2018) that information asymmetry have less effect on maize production. Also, 48.5% of the respondents agreed that pest infestation is minor constraint while 31.3% are major constraint and 19.2% was not a constraint. In case of disease outbreak, 41.4% of the respondents agreed that was a minor constraint while 38.4% was a major constraint and 19.2% not a constraint. More so, (37.4%) of the respondents agreed that low market price is serves as both major and minor constraints and (25.3%) is minor constraint. The findings indicated that inadequate availability of seeds was the major constraint experienced by the farmers in adoption of early maturing maize varieties. This finding concurs with Umar *et al*. (2014) that majority of farmers (75.6%) stated inadequate availability of seeds was the major constraint in adoption of improved varieties of maize seeds.

Table 5: Constraints associated with the adoption of early maturing maize (N = 99)

Statements	Major constraints	Minor constraints	Not constraint
Inadequate of improved early maturing seeds	60(60.0)	27(27.3)	12(12.1)
High cost of seed	37(37.3)	52(52.5)	10(10.1)
Inadequate fertilizer	36(36.4)	53(53.5)	10(10.1)
High cost of fertilizer	40(40.4)	50(50.5)	9(9.1)
Lack of information on early maturing varieties	34(34.3)	46(46.5)	19(19.2)
Pest infestation	31(31.3)	48(48.5)	19(19.2)
Disease outbreak	38(38.4)	41(41.4)	20(20.0)
Low market price	37(37.4)	37(37.4)	25(25.3)

Table 6 revealed that there is significant association between socio-economic characteristics of the respondents (sex; P = 0.034, and age; P = 0.041) and adoption of improved maize varieties at $P \leq 0.05$ while there is no significant relationship between marital status, level of education, occupation, religion, ethnicity, farm size and adoption of improved maize varieties. Table 7 shows that there is no significant relationship between constraints and adoption of improved maize varieties.

Table 6: Chi-square distribution

Variable	χ^2 –value	P–value	Decision
Sex	6.738	0.034	Significant
Age	16.076	0.041	Significant
Marital status	6.838	0.336	Not significant
Level of education	11.001	0.088	Not significant
Occupation	3.448	0.486	Not significant
Religion	3.627	0.459	Not significant

Table 7: PPMC for test of relationship between constraints and adoption

Variables	χ^2-value	p-value	Decision
Constraints versus Adoption	0.098	0.334	Not significant

Conclusion

The study therefore concluded that adoption of early maturing maize varieties in Ido local government area is mostly adopted by males, the adopter had a mean age (50.50%) and falls within the age range of 36-45 years, which indicates that most adopter of the early maturing maize varieties are youth. Also (40.4%) adopter had secondary education and farming (69.7%) was their major occupation. The result also revealed that EV 99 DTWSTR (SAMMAZ 54) and EV 99 DTWSTR (SAMMAZ 53) had the adoption rate of (69.7%) and (68.70%) because these varieties have attribute of high grain yields up to 7.6 t/ha and 7.2 t/ha as led to an increase in productivity. The varieties were early maturity (80-85 days) with resistant to maize streak virus, rust, leaf bright and curvularia leaf spot. This study also showed that weather condition, resistant to disease, high yield, are the major factors influencing the level of adoption of early maturing maize varieties in the study area. This study further concluded that (60.0%) of the farmers in the study area agreed that inadequate availability of improved early maturing seed is a major constraint associated with the adoption of early maturing maize varieties.

Recommendations

1. Farm size available to maize farmers should be increased through lease by the Government or other organizations in order to encourage large scale production and better adoption of the improved maize seed and that community seed production should be encouraged and promoted to facilitate easy access to improved seeds by farmers.
2. Early maturing maize varieties and credit should be made available to farmers.
3. The extension system should be strengthened and more efforts should be intensified on the part of extension agents in educating the farmers so as to boost their efficiencies in maize production and to disseminate adequate information about improved maize seeds to the farmers.

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