ADOPTION OF OBA 98 MAIZE PRODUCTION TECHNOLOGIES BY FARMERS IN NORTHERN DELTA STATE, NIGERIA.

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ABSTRACT
This study examined the adoption of Oba 98 maize production technologies by farmers in Delta State, Nigeria. The specific objectives are to ascertain the major sources of information on Oba 98 maize production technologies; determine the extent of adoption of Oba 98 maize production technologies; determine factors influencing the adoption of Oba 98 maize production technologies; and identify perceived constraints to adoption of Oba 98 maize production technologies. The study was carried out in Delta State. Multistage sampling technique was used to collect data from a sample of 120 farmers. The data collected were analyzed using descriptive statistics and multiple regression models. The results revealed that the majority of the farmers understudied (73.3%) had been visited by extension agents, and that 33.3% of the respondents received information on Oba 98 maize production technologies through radio broadcast. Results of multiple regression analysis showed that the only significant variable is annual income realized from the sale of maize. The major constraints identified were poor access to sources of agricultural information, poor accessibility to institutional credits, inadequate rural roads, inadequate extension contact inadequacy of modern storage and processing facilities, poor health status of rural farmers and weak market information. The study recommended that farmers should be encouraged to participate actively in farmers/social organizations and co-operative societies in order to strengthen their group action and as such act as effective channels for extension information delivery system to farmers. Also, farmers should be linked to sources of affordable credit so as to enable them purchase input.
Keywords: Oba 98, Maize, Production, Technologies, Adoption

INTRODUCTION

Maize *(Zea mays* L.) is the most essential grain crop in sub-Saharan Africa. It is also one of the three most essential grain crops in the globe (International Institute of Tropical Agriculture, 2006). It is easy to process, easily digested and an affordable grain (Ismaila, Gana, Tswanya & Dogara, 2010; Kudi, Bolaji, Akinola & Nasa'l, 2011). All parts of the maize plant have economic value (IITA, 2006). The grains, leaves, stalk, tassel and cob are used in the production of a variety of food and non-food products. Maize is one of the most essential crops in Nigeria because it is an important source of dietary fiber and calories which aregood sources of energy, and it is used in industries for the production of food, beverages, and livestock feed. Maize grains abound in vitamins A, C and E, carbohydrates, and important minerals, and contains about 9% of protein (IITA, 2010).

Notwithstanding the fact that maize contributes significantly to the food requirements of the Nigerian populace, its production is extremely below the average maize consumption quantity of 53.20g/day and 43 kg per year (FAOSTAT, 2007). Maize production output in Delta State of Nigeria has not been enough to meet the needs of humans and livestock, notwithstanding the introduction of improved packages like Oba 98 (Babatunde, Fayode & Bardo, 2008). In Delta State, there has been a downward trend in maize production, from 81.1 metric tons in 2002 to 80.1 metric tons in 2017 (ADPAP, 2017).

This study aims at ascertaining factors that influence the adoption of Oba 98 maize production technologies by farmers in the study area. The specific objectives are to:

i. Ascertain farmers' sources of information on Oba 98 maize production technologies
ii. Assess the extent of adoption of Oba 98 maize production technologies
iii. Determine the factors influencing the adoption of Oba 98 maize technologies, and
iv. Identify constraints to the adoption of Oba 98 maize production technologies.

METHODOLOGY

Study Area

This study was conducted in Delta State, Nigeria. Delta State has a population estimate of 4,098,391 (National Population Census, 2006). The State has common boundaries with Edo State in the North, Ondo State in the West, Anambra State in the east, and Bayelsa State in the south. Delta State is an agrarian state where the greater percentage of the populace are seasoned farmers engaging themselves in farming as an occupation. The major food crops grown by farmers in Delta State are maize, rice, vegetables and different varieties of fruits. Delta State experiences two seasons, the rainy and dry seasons. The rainy season starts in April and ends in October, while the dry season begins in November and ends in March.

Instruments for Data Collection

Data for the study were collected through the use of structured interview schedule which

consisted of closed and open ended questions to obtain information from the respondents. Information was collected on the socio-economic characteristics and objectives of the study.

Population and Sampling Procedure

Multi stage sampling technique was used to select respondents for the study. The study area comprised of six (6) Local Government Areas (LGAs) which were deliberately selected out of the 25 LGAs in Delta State based on the popularity of maize production in the state. The LGAs used are Aniocha South, Aniocha North, Ika North East, Ukwuani, Ndokwa West, and Oshimili North. Two (2) communities were randomly selected from each of the 6 LGAs to give a total of twelve (12) communities. The communities are as given in Table 1 below.

Table 1: Selected communities in the various LGAs

LGA in Delta State	Communities selected
Aniocha North	Onicha Olona Ululubu
Aniocha South	Ogwashi-Uku Ubulu-Unor
Ika North East	Akumazi-Umuocha Igbodo
Ndokwa West	Kwale Utagba-Unor
Oshimili North	Illah Ugbolu
Ukwuani	Obiaruku Umutu

10 maize farmers were randomly selected in each community, giving a total of 120 maize farmers used as respondents for the study.

Method of Data Analysis

Data obtained on socio economic characteristics of the farmers in the study areas were analyzed using descriptive statistics which consist of percentages, frequencies and mean scores. Objective 1 (sources of information on Oba 98 maize production technologies) and objective 2 (extent of adoption of Oba 98 maize production technologies) were also analyzed using frequencies and percentages. Objective 3 (factors which influence adoption of Oba 98 maize technologies) were analyzed using multiple regression model. Objective 4 (constraints to the adoption of Oba 98 maize production technologies) was analyzed using mean score and standard deviation.

Specification of Models

Multiple regression model was used to determine the factors influencing the adoption of Oba 98 maize technologies. The regression model is specified as follows:

$T = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + ... b_{12}X_{12} + \mu$

where:

T = adoption of Oba 98 maize technologies measured by the individual farmer's adoption score (dependent variable)

a = constant term

$b_1 - b_{12}$ = regression coefficients

X_1 = age (measured in years)

X_2 = gender (male = 1, female = 2)

X_3 = education (measured by the number of years spent in formal education)

X_4 = Marital status (1 for being married and 0 none)

X_5 = Household size (measured by the number of people living under one roof)

X_6 =Access to credit (dummy variables for receiving credit = 1 and 0 for not received)

X_7 = Farm size (measured in hectares)

X_8 = Total farm income (measured in Naira)

X_9 = Participation in social activities (members = 1, non-members = 0)

X_{10}= Number of cooperatives or organizations belonged to (1, 2, 3)

X_{11} = Market price of the technologies (per 50kg bags)

X_{12} = Extension contact (measured by number of times visited by extension agents in the last one year)

μ = Error term.

Results and Discussions.

Sources of information on Oba 98 maize production technologies

Table 1 shows that the majority (33.3%) of the respondents obtained information on Oba 98 maize production technologies from the radio. other sources used to receive information included friends/neighbours (19.2%), television (10%), cooperatives (7.5%), extension agents (5%), USAID (2.5%), community leaders (4.2%), research institutes (4.2%), input suppliers (4.2%), NGOs (2.5%), university (2.5%), print media (2.5%) and internet (2.5%). This is in agreement with Ejembi, Omoregbee & Okoye (2006) and Prathap & Ponnusamy (2006), who both reported that radio is a vital source of information. This is also in line with the findings of Ray (2003) who observed that radio is a well known electronic medium that can be used for dissemination of information for attitudinal change.

Table 1: Percentage distribution of respondents by sources of information on Oba 98 maize production technology

Sources of Information	Percentage
Radio	33.3
Television	10.0
Cooperatives	7.5
Internet	2.5
USAID	2.5
Friends/Neighbours	19.2
NGOs	2.5
Community leaders	4.2
University	2.5
Research Institutes	4.2
Input suppliers	4.2
Extension agents	5.0
Print Media	2.5

The result in table 2 revealed that 25.5%,19.2%,74.2%,19.2%,17.0%,33.6% and 83.3% of the respondents adopted the recommended technologies in respect of use of Oba 98 maize seeds, planting space, application of manure, use of N.P.K15:15:15,use of pre-emergence herbicides before planting, use of post emergence herbicide, use of insecticides and use of shelling machines.

Table 2: Distribution of respondents by stages of adoption of Oba 98 maize production technologies

S/No.	Factor	Not Aware	Aware	Interest	Evaluation	Trial	Adoption	Rejection	Adoption Mean Score	Adoption Grand Mean	Adoption Index
1	Use of Oba 98 maize seed	10.5%	42.7%	10.5%	8.4%	2.7%	25.5%	-	1.98		
2	Use of planting space 75cm × 25cm	6.7%	39.2%	19.2%	5.0%	10.8 %	19.2%	-	3.48		
3	Application of organic manure	1.0%	0.8%	2.5%	3.5%	10%	74.2%	3.4%	2.28		
4	Use of NPK 15:15:15	6.7%	39.2%	19.2%	5.0%	10.8 %	19.2%	-	2.22		
5	Use of pre-emergence herbicides before planting	6.7%	39.2%	19.2%	5.0%	10.8 %	19.2%	-	2.22	2.54	0.51
6	Use of post herbicides after maize seeds have sprouted	42%	37.3%	7.6%	0.8%	11%	17.0%	22.0%	2.45		
7	Use of insecticides	2.1%	42.7%	7.7%	4.9%	8.4%	33.6%	0.6%	3.38		
8	Use of shelling machine	-	0.8%	3.3%	3.0%	4.0%	83.3%	0.5%	2.28		

Factors Influencing the Adoption of Oba 98 Maize Production Technologies by Farmers

Results of the multiple regression analysis on factors influencing the adoption of Oba 98 maize production technologies are presented in Table 3. The results show that out of the twelve variables investigated, only one variable was found to be statistically significant as influencing the adoption of Oba 98 maize production technologies. This is annual income realized from the sale of maize ($t = 5.411$, $p = 0.000$). Annual income had a significant positive influence on the adoption of Oba 98 maize production technologies by the farmers in the state. This implies that the higher the income that accrues from the sale of maize by the farmers as a result of high productivity, the more maize innovation technologies will be adopted. This finding further indicates that the annual income realized from the sale of maize is an important determinant of technology adoption. This is in agreement with Degnet and Belay (2001) who observed that factor like annual income level significantly affected farmers' adoption decision of high yielding maize varieties in Ethiopia.

However, variables like age of the respondents, years spent in school, size of the household, size of farm, farm size set aside for maize, quantity of maize harvested (bags), marital status of the farmer, access to credit facility, farming experience, extension contact and farmers' membership of organizations have no significant influence on adoption of maize production technology.

Table 3: Factors influencing the adoption of Oba 98 maize production technologies

	Unstandardized Coefficients	**standardized Coefficients**		
Variables	**B**	**Standard Error**	**Beta**	**T**
Constant	-1.522	0.661		-2.304
Age	0.007	0.007	0.080	1.038
No of. years sch	0.012	0.016	0.053	0.770
Household size	0.022	0.034	0.050	0.664
Annual income realized from sale of maize	1.990E-5	0.000	0.726	5.411*
Farm size	0.065	0.202	0.035	0.324
Farm size allocated to maize	-1.017	0.298	-0.42	-3.091
Quantity of maize harvested(bags)	0.001	0.020	0.006	0.042
Marital status	0.223	0.258	0.060	0.866
Access to credit	0.190	0.316	0.046	0.601
Farming experience	0.030	0.034	0.065	0.874
Extension contact	-0.011	0.059	-0.015	-1.093
Farm group	-0.036	0.395	-0.007	-0.091

* =significant

Perceived constraints to the adoption of Oba 98 maize production technologies

Data in table 4 shows the perceived constraints to adoption of Oba 98 maize production technologies. The major constraints include: poor access to sources of agricultural information ($M = 2.87$), poor access to agricultural information restricts farmers from obtaining useful information meant to find better solution to farming problems (Okunade, 2007). Others are poor accessibility to institutional credits, inadequate rural roads, Inadequate extension contact, inadequate modern storage and processing facilities, poor health status of rural farmers, weak market information, scarcity and high cost of inputs, Ignorance of the usefulness of the technology and lack of adequate nutritional knowledge has also been identified as a constraint by the respondents to adoption of Oba 98 maize production technologies. The standard deviation values of the mean constraints to adoption of Oba 98 maize variety were less than one in all variables. This reveals that the responses of the respondents on these variables did not vary much from the mean and hence can be useful in policy formulations.

Table 4: Mean scores on perceived constraints to Oba 98 maize production technologies

Constraints	Mean	Standard Deviation
Poor access to sources of agricultural information	2.87*	0.429
Poor accessibility to Institutional credits	2.86*	0.416
Inadequate rural roads	2.84*	0.485
Inadequate extension contact	2.81*	0.523
Inadequacy of modern storage and processing facilities	2.77*	0.601
Poor health status of rural farmers	2.71*	0.703
weak market information	2.67*	0.678
Unavailability of labour	1.28	0.698
Disease and pest infestation	1.20	0.495
Technicalities of innovation	1.67	0.920
Unavailability of markets	1.27	0.590
Low output quality of the variety	1.24	0.580
High cost of information	1.25	0.612
Poor income realized from the variety	1.22	0.542
Ignorance of usefulness of the technologies	2.53*	0.744
Inadequate farm land	1.31	0.646
Scarcity and high cost of inputs	2.62*	0.674

*Perceived constraints

CONCLUSION AND RECOMMENDATIONS

The study revealed that majority of the farmers were aware of Oba 98 maize production technology and the most important source of information on Oba 98 maize production was radio and friends/neighbours. The regression analysis showed that the most important variable that influences adoption of Oba 98 maize production technologies is annual income realized from sales of maize. It is a vital determinant of technology adoption.

Based on the findings of this study, the following recommendations are proffered:

1. Input support services like fertilizers and other agrochemicals should be made available by both Governmental and Non-Governmental Organizations.
2. Farmers should be connected to sources of affordable credit to enable them purchase inputs and other needs.
3. Extension services should be improved by Governmental and Non –Governmental Organizations, so as to teach farmers how best to use the outcomes of these technologies and improve food security.
4. Farmers should be encouraged to form co-operative societies, as the co-operative society is a very vital tool in obtaining credit and other farm inputs.

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