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EFFECT OF UTILIZATION OF IMPROVED PLANTAIN PRODUCTION TECHNOLOGIES AMONG FARMERS IN ABIA STATE, NIGERIA

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ABSTRACT
The study focused on the factors that affect the utilization of improved plantain production technologies by farmers in Umuahia Agricultural Zone of Abia State, Nigeria. Data were collected with structured questionnaire and analyzed using both descriptive and inferential statistics. The results revealed that 55% of the respondents were males, with age of about 50 years, married (76.7%) and literate (95%) respectively. Most (95%) of the farmers were not members of any cooperative society and had their plantain plantation located in the field (56%). In terms of technology utilization, weeding ($\bar{x}$ = 4.64) and pruning ($\bar{x}$ =3.01) were highly utilized by the respondents respectively. Capital ($\bar{x}$ = 4.49), poor access to technology ($\bar{x}$ = 3.79), Labour intensive ($\bar{x}$ =3.76), lack of information ($\bar{x}$ = 3.71), transportation constraint ($\bar{x}$ = 3.49) and complexity of technology ($\bar{x}$ = 3.44), time constrain ($\bar{x}$ = 3.42), Disease/pest attack ($\bar{x}$ = 3.37), land availability ($\bar{x}$ = 3 25) and lack of planting material ($\bar{x}$ = 3.25) were found to be the major factors that affect utilization of the improved plantain production technologies in the study area. The inferential results shows that there was a significant effect of low market price, labour intensity and poor access to technologies on the level of utilization of the technologies. The study also shows that the utilization of improved plantain production technologies was very poor. The results therefore recommends that extension agents should step up efforts in agricultural information dissemination especially on improved plantain production technologies and labour efficient strategies to encourage its utilization by farmers.

Keywords: Utilization, Improved Plantain, Production, Technologies and Farmers

Introduction

One way of improving agricultural productivity is through the introduction of improved agricultural technologies to farmers. The adoption of these technologies is an important means of increasing the productivity of small holder agriculture thereby festering economic growth and improve wellbeing. Thus, Ouma *et al* (2006), affirmed that the use of improved technologies will continue to be a critical input for improved farm productivity. Similarly, Ejechi (2015) found out that adoption of improved production practices by farmers leads to improved yield of crops. Also, studies have shown positive correlation between adoption of extension recommendations by farmers and crop yields which translate into increased income and improved quality of life of farmers (African Rice Centre, 2007). However, for a successful adoption of a technology, farmers must not only know about it, but must be able to follow the recommendation given (Adekoya and Tologbonse, 2005) while a thorough knowledge of the target group in the development and dissemination of the technology is a prerequisite to adoption of the technology in question (Ejechi, 2015). Plantain (*Musa paradisiacal*) is one of the oldest cultivated fruits in agriculture in West and Central Africa (FAO, 2001). The crop is critical in bridging the gap between the demand and supply of the basic carbohydrate staples (Fakayode *et al*, 2011). The consumption of

plantain has risen tremendously in Nigeria in recent years because of the rapidly increasing urbanization and the great demand for easy and convenient foods by non-farming urban populations (IITA, 2014). Plantain are used domestically as fried slices (dodo) and plantain flour/bread, cake/pancake, baby foods, wine, beer, dried flakes, biscuits and cookies (Foraminifera, 2014). Its hybrids have made positive impact on farmers' profitability because of the gestation period of the cultivars that also attract higher prices than other varieties (Baruwal et *al*, 2011). However, there is low production and performance of plantain due to mainly poor and traditional methods of cultivation. This has really influenced its availability and farmers-consumer acceptance. International Institute of Tropical Agriculture (IITA) has to develop about 14 different plantain production technologies which are known and these include: weeding, propping, pruning, fertilizer/manure application, hybrid (new) varieties, mulching, hot water treatment, agro-chemical application, sucker cleaning, sucker multiplication, planting space, de-suckering, planting time and de-budding (Akintade, Okunlola, and Akinbani, 2016). According to Olumba and Rahji (2014), majority of farmers are abreast of recommended production practices at field level and seem to lack relevant information on hot water treatment and chemical application indicating low level of adoption. In addition, Faturoti, Agwu, Igbokwe and Tenkouano (2008) affirmed that several studies, attempts and break-through have been made by many research institutions such as IITA, National Horticulture Institute (NIHORT) towards technology or biotechnology development in plantain production, still there is little in terms of adoption and utilization of the improved technologies among farmers. Other constraints noted to have hampered plantain production are the dependence on local plantain cultivars, poor farming techniques and problem of pests and diseases. Abia State is one of States that produces plantain in Nigeria (Faturoti and Madukwe, 2009). It has enabling environment in terms of vegetation, soil and weather that encourage plantain production. In view of the observed problems encountered by farmers, it is imperative to carry out empirical study on the factors that affect utilization of improved plantain production technologies by farmers in Umuahia Agricultural Zone of Abia State. This helps to have reliable data that will assist technology developers and policy makers in coming up with solutions that will encourage plantain production in the zone in particular and to the entire nation at large. Thus, the study assessed the factors that affect utilization of improved plantain production technologies by farmers in Umuahia Agricultural Zone, Abia State with the following specific objectives: to describe the socio-economic characteristics of the farmers in the study area, ascertain the type of improved plantain technologies disseminated to farmers, ascertain the level of utilization of these improve technologies by farmers and determine the factors that affect the utilization of the improved plantain technologies in the area.

Methodology

The study was conducted in Umuahia Agricultural Zone of Abia State. The zone comprises of five Local Government Areas (LGAs) namely: Umuahia North, Umuahia South, Ikwuano, Isiala Ngwa North and Isiala Ngwa South. A multistage sampling technique was adopted for the selection of respondents. First, Two Local Government Areas – Umuahia North and Ikwuano LGAs were purposively selected from the zone because plantain is mostly produced in these two LGAs. Secondly, a simple random sampling technique was used to select three rural communities from both LGAs that gave rise to six rural communities. The communities from Umuahia North LGA were Avonkwu, Okwoyi and Isieke while that of Ikwuano LGA were Iyalu, Itunta and Nkalunta. Then at the third stage, ten farmers were randomly selected from each of the six rural communities. This gave a total sample size of sixty respondents. A structured questionnaire was used to elicit information from the respondents. Data collected for the study were analyzed using descriptive and inferential statistics. Level of utilization were analysed with the use of a 5 point likert rating scale of: Very High level = 5; High level = 4; Moderate level = 3, Low level = 2, Very Low level = 1. This were summed up to obtain an average of (5+4+3+2+1 $=\frac{15}{5}$ = 3) 3.00. An average of 3.00 was used to determine the level of utilization of improved plantain technologies and used as a dependent variable for factors that affect the utilization of improved plantain technologies in the study area. The

independent variables which were also constraints militating against utilization were also expressed as means ranging from 1 to 5. A log-linear regression was used to test the effect of factors affecting the utilization of improved plantain technologies following Ukoha (2000) and Okoye et al, (2008) in cassava and cocoyam production respectively. This functional form is the most popular in applied research because it is easiest to handle mathematically (Koutsiyiannis, 1979). The model is stated thus:

$Y = f(X_1 + X_2 + X_3 + X_4 + X_5 + X_6 + X_7 + X_8 + X_9 + X_{10} + X_{11} + X_{12} + e)$

Y = the level of utilization of plantain technologies (1-5)

X_1 = Capital (1-5)
X_2 = Land availability (1-5)
X_3 = Poor yield(1-5)
X_4 = Low market price (1-5)
X_5 = Disease/pest attack (1-5)
X_6 = Transportation problem (1-5)
X_7 = Complexity of technology (1-5)
X_8 = Lack of planting materials (1-5)
X_9 = Labour demand (1-5)
X_{10} = Lack of information (1-5)
X_{11} = Time constraint (1-5)
X_{12} = Poor access to technology (1-5)

Results and Discussion

Socio-economic Characteristics of the Respondents

Table 1 shows that many (55%) of the respondents were male farmers. This result could be due to the level of labour involved in plantain production and the challenge of land tenureship. Orisakwe and Agomuo (2011) observed in their study that due to the socio-cultural milieu of the area, males have more access to production resources. However, the marginal difference between the males and females in the study area showed that plantain can be produced by both male and female farmers. The mean age of the respondents was about 50 years, which favours agricultural production in terms of labour supply as most of the respondents are still strong and energetic. Abdoulaye *et al* (2014) observed that the older the farmers, the less likely they are able to adopt new practices as they place confidence in their old ways and methods. For marital status, over 76.7% of the farmers were married, indicating that plantain production is an economic activity that generates income for farm families. About 60% of the respondents were literates, 35% uncompleted education while only 5% of them had no formal education. It implies that the farmers have the tendency of utilizing improved technology if properly disseminated. According to Orisakwe and Agomuo (2011), farmers' level of education has a positive relation with adoption of technologies. Furthermore, majority of the respondents (95%) were not members of any cooperative society. This could also affect awareness and utilization of technologies since it is easier to disseminate information as a group.

Table 1: Distribution of Respondents according to their Socio-economic Characteristics

Variable	Frequency (N = 60)	Percentage (%)	Mean (M)
Sex			
Male	33	55.0	
Female	27	45.0	
Age			
21 – 30	9	15.0	
31 – 40	9	15.0	
41 – 50	15	25.0	
51 – 60	11	18.3	
61 – 70	10	16.7	
71 and above	6	10.0	49.88
Marital Status			
Single	8	13.3	
Married	46	76.7	
Divorced/Separated	6	10.0	
Educational Level			
No formal education	3	5.00	
Primary school uncompleted	11	18.33	
Primary school completed	14	23.33	
Sec. school uncompleted	10	16.67	
Sec. school completed	12	20.00	
Tertiary School attended	10	16.67	
Cooperative Membership			
Member	3	5.0	
Non-member	57	95.0	

Source: Field survey, 2017

Level of utilization of improved Plantain Technologies

The result in Table 2 show the level of utilization of the improved plantain technologies among respondents. The results show that weeding ($\overline{x}$ = 4.64) and pruning ($\overline{x}$ = 3.01) were the only significant technologies utilized by the farmers in the area. A grand mean of 2.084 further shows that the level of utilization in the area is low, below a bench mark of 3.00. This is in line with Faturoti et al (2008) who stated that there is little in terms of utilization of plantain production technologies among farmers.

Table 2: Distribution of Respondents according to the level of utilization of improved Plantain Technologies

S/No.	Technologies	Sum	Mean (M)	Remark
1.	Weeding (application of herbicides	274	4.64	High
2.	Propping	121	2.04	Low
3.	Pruning	178	3.01	High
4.	Fertilizer application	97	1.64	Low
5.	Nysrid	10.1	1.71	Low
6.	Mulching	148	2.51	Low
7.	Hot water treatment	74	1.25	Low
8.	Agrochemical application	91	1.54	Low
9.	Sucker cleaning	86	1.46	Low
10.	Sucker multiplication (split technology)	80	1.36	Low
11.	Planting space (3/2 metres)	152	2.58	Low
12.	De-suckering (2-3 stands)	74	1.25	Low
	Grand mean		**2.084**	

Source: Field survey data, 2017; Decision rule: any mean score above 3.0 is considered high otherwise low.

Constraints militating against the Utilization of Improved Plantain Production Technologies

Results in Table 3 reveals that factors such as capital ($\bar{x}$ = 4.49), poor access to technologies ($\bar{x}$ = 3.79), labour intensive ($\bar{x}$ =3.76), lack of information ($\bar{x}$ = 3.71), transportation ($\bar{x}$ = 3.49), complexity of technology ($\bar{x}$ = 3.44), time constraint ($\bar{x}$ = 3.42), Disease/Pest attack ($\bar{x}$= 3.37), land availability ($\bar{x}$ = 3.25) and lack of planting material ($\bar{x}$ = 3.25), were all significant factors militating against the utilization of improved plantain technologies with a mean score above the benchmark of 3.0. However, poor yield ($\bar{x}$= 2.83) was not a major factor. This means that if all factors are favourable, there is the tendency of increase in yield.

Table 3: Distribution of respondents based Constraints Militating against the Utilization of Improved Plantain Production Technologies

S/No.	Technologies	Sum	Mean	Remark
1.	Capital	265	4.49	High
2.	Land availability	192	3.25	High
3.	Poor yield	167	2.83	Low
4.	Low market price	178	3.01	High
5.	Disease /Pest attack	199	3.37	High
6.	Transportation problem	206	3.49	High
7.	Complexity of Technology	203	3.44	High
8.	Lack of plantain material	192	3.25	High
9.	Labour-intensive	222	3.76	High
10.	Lack of information	219	3.71	High
11.	Time constraints	202	3.42	High
12.	Poor access to technologies	224	3.79	High
	Grand mean		**3.49**	

Source: Field survey data, 2017; Decision rule: any mean score above 3.0 is considered high otherwise low

Determinants of Level of Utilization of Improved Plantain Production Technologies

The results in Table 4 above shows that there was a significant effect of such constraints as low market price (10%), labour intensive (10%) and poor access to technology (5%) to the utilization of improved plantain production technologies. The R-square value of 0.589 indicates that the factors affecting the utilization of the technologies accounted for 58.9% of the variations in the utilization of improved production technologies. This result implies that there was a significant effect of these constraints on the utilization of the technologies. These implies that any increase in low market price, labour intensity and poor access to technologies will lead to a corresponding decrease in the level of utilization of the technologies in the study area.

Table 4: Log-Linear Regression Estimates of Determinants of Level of Utilization of Improved Technologies among the farmers in the Study Area

Factors	Standardized coefficients	T-value	Significance
Constant		4.116	0.000***
Capital	0.0034	0.228	0.821
Land availability	0.060	0.325	0.749
Poor yield	-0.075	0.430	0.669
Low market price	-0.339	-1.765	0.084*
Disease /Pest attack	0.148	0.901	0.372
Transportation problem	0.075	0.441	0.662
Complexity of Technology	0.068	0.286	0.776
Lack of plantain material	-0.058	-0.287	0.776
Labour-intensive	-0.382	-2.486	0.017*
Lack of information	-0.154	0.655	0.516
Time constraints	-0.376	-1.316	0.195
Poor access to technologies	0.7856	3.426	0.001**
R^2	0.589		
Adjusted R^2	0.461		
F-Value			

Source: Results from STATA 13A: * and *** is significant at 10% and 1% level

Conclusion

Findings from the study show that the level utilization of improved plantain production technologies was very poor. The level of utilization of the improved plantain technologies among respondents show that out of twelve improved plantain production technologies listed, only weeding($\overline{x}$ = 4.64) and pruning ($\overline{x}$ = 3.01) were the only significant technologies utilized by the farmers in the area, others were low with a grand mean of 2.084, below a bench mark of 3.00. Empirically, low market price, labour intensity and poor access to techniologies were the major factors influencing the level of utilization of the technologies in the study area. Therefore, it is recommended that extension agents should step up efforts in agricultural information dissemination especially on improved plantain production technologies and labour efficient strategies to encourage its utilization by farmers.

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