Factors Influencing Adoption of Plantain Improved Technologies among Small Holder farmers in Edo state, Nigeria

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Abstract

This study examined the determinants of factors affecting the adoption of plantain improved technologies among small holder farmers in Edo state Nigeria. The specific objectives of the study were to ascertain the socio-economic characteristics of the farmers in the study area, determine the level of awareness and adoption of the improved technologies by respondents and constraints encountered. Multi-stage random sampling technique was used to select one hundred and fifty farmers for the study. A structured and pre-tested questionnaire was administered on the farmers. Descriptive statistics and chi-square analysis was used to analyze the collected information. The result revealed large proportion (82.0%) of the respondents were married, mean age was 56.9years, respondents level of education was high, mean farm size was 2.2 hectares, farming experience was high. The result of chi-square analysis showed that there were no significant association between level of adoption and sex, religion, marital status. The study recommended that agricultural development project should be encouraged to adopt plantain as mandate crop and farmers should be sensitized to know the potentials inherent in adopting plantain as income generation crop.

Keywords: Improved Technologies, adoption, credit facilities

1. Introduction

There has been a rapid development of the plantain and banana industry since the early 1960's. this is due to the global increase in the demand for the products, the upsurge in the potential profitability of the crops, imperativeness of diversification of the sources of income by the plantain growing countries.

Plantain (*Musa SPP, ABB genome*) is a giant herb that is cultivated in humid forest and mid-latitude zone of sub Sahara Africa. Its origin is believed to be South East Asia. However, a remarkable diversity of plantain exists in sub-Sahara Africa. The food crop is generally triploid, sterile and develops fruits by parthenocapy. Total world production is estimated to be 76million metric tons. Twelve million metric tons are produced in Africa annually (INIBAD in Fakayode *et al*., 2011).

Nigeria is the largest producer of plantain in West Africa with annual production of about 6.5 million metric tons (FAO, 2014) and despite it's prominence, Nigeria does not feature among plantain exporting nations. If Nigeria is to harness the export potential of plantain, the current level of production must be improved. There is also the need to understand whether farmers are aware of the improved technologies and also to know the adoption level of these improved technologies by the farmers. Although these improved technologies if adopted are expected to give a higher yields under a good environmental conditions. Unfortunately despite all the innovations introduced over the years, the output from the system has continued to divide as studies have shown. The objectives of the past and present agricultural system and rural development programmes in Nigeria though durable, the problem of food shortages still persist because among others, the extension system has been weak and ineffective (Emefic, 1991).

In addition to these problems are, adherence to old habits, poverty, ineffective technical know-how. It is to this effect that this study attempted to answer the following research questions.

> ➢ What are the socio-economic characteristics of the farmers?
> ➢ What is the level of awareness of these technologies?
> ➢ What is the level of adoption of these improved technologies?

The objective of the study is to ascertain the factors influencing the adoption of the improved technologies in plantain, ascertain the socio-economic characteristics of the farmers, determine level of awareness   and adoption of these technologies,

Hypothesis of the study

$H0_1$: There is no significant association between socio-economic characteristics of the respondents and level of adoption of improved technologies by farmers

2 Methodology

This study was conducted in Edo state, Nigeria. a multi-stage sampling technique was used for the study. Edo state has eighteen (18) local government area. In the first stage of sampling, three out of the eighteen local

government areas (LGA's) were purposively selected from the state. the three local government area include Ondo West, Ondo East and Ile-OlujiOkeigbo Local Government Area. Two communities were randomly selected within the purposively chosen local government areas while at the final stage 25 plantain farmers were randomly selected and interviewed making a total of one hundred and fifty (150) respondents.

Data were collected through a structured interview schedule and analyzed using frequency counts, percentage and chi-square.

3 Results and Discussion

3.1 Socio-Economic Characteristics of Respondents

Data collected shows that 82.9% of the farmers in the study area were male and 18% were female. This implies that there is a dominance of male gender and this could be because most of the production activities were carried out by men while women are mostly involved in processing and marketing of products (Alfred, 2001).

The mean age is 59.6 years. This shows that the farmers are ageing and this could affect their adoption of technology. Okunlola (2008) and Iwala (2004) stated that age influences adoption of technology.

The mean household size is 7. The result is similar to those of Odebode and Mungong (2001). Bammeke (2003) who reported an average of 6-10 people as the modal family size group among rural household. Majority of the respondents (85%) had formal education. This shows a high level of literacy in the study area. This will enable the farmers to be fast adopters of technologies. Also majority (52.9%) of the farmers had plantain farm between 2.6-4.0 hectares. this implies that the respondents are mainly small holder farmers which might not really be favorable for adoption of plantain technologies.

Distribution of Respondents Socio-Economic Characteristics(n= 150)

Gender	Frequency	Percentage
Male	123	82
Female	27	18
Age of the farmers (years)		
<25	5	3.3
26-35	10	6.7
36-45	40	26.7
46-55	18	12
55-65	75	50
Above 56	2	1.3
Household size		
2-5	42	28
6-10	82	54.7
11-15	24	16
Above 15	2	1.3
Educational status		
No formal education	11	7.3
Primary education	24	16
Secondary education	82	54.7
Tertiary education	33	22
Farm size		
0.1-2.5	30	20
2.6-5.0	79	52.7
5.1-7.5	20	13.3
7.6-10.0	12	8
10.0-12.5	8	5.3
12.6 and above	1	0.7
Farming experience		
Less than 5	10	6.7
Between 6 and 15	25	16.7
Between 16 and 25	29	19.3
Between 16-35	45	30
Above 35	41	27.3
Marital status		
Single	30	20
Married	88	58.7
Divorced	20	13.3
Separated	10	6.7
Widowed	2	1.3

Result also shows that majority (78.6%) of the farmers had farming experience of over 15 years. This reveals that many of the Farmers are quite knowledgeable about plantain production in the study area. This assertion corroborates a previous study which noted that farmers with higher experience appear to have often full information and better knowledge   and are able to evaluate advantages of technology (Chilot 1991). Further result shows that 58.7% are married.

Table 2 further revealed that distribution of farmers by their level of awareness of the improved technologies. In order to determine the level of awareness fourteen(14) plantain improved technologies were considered. the result revealed that farmers has a very low level of awareness as regards tissue culture (98.7%), Sucker multiplication (86.7%) and Hot water treatment (60%). It may be because these technologies are complex and very difficult to practice

Table 2: Farmers knowledge of Improved plantain Technologies

Technologies	Aware		Not aware	
	Frequency	Percentage	Frequency	Percentage
New varieties	105	70	45	30
Debudding	90	60	80	53.3
Hot water treatment	60	40	90	60
Adequate spacing	75	50	75	50
Pruning	79	52.7	71	47.3
Fertilizer application	82	54.7	68	45.3
de suckering	85	56.7	65	43.3
Weeding	109	72.7	41	27.3
Agro-chemical Application	113	75.3	37	24.7
Propping	125	83.3	25	16.7
Sucker multiplication	20	13.3	130	86.7
Time of planting	97	64.7	53	35.3
Tissue culture	2	13.3	148	98.7
Mulching	101	67.3	59	37.3

Table 3 revealed the level of technologies adopted by respondents in the study area. The result showed that majority of the respondents adopted mulching (94.7%), followed by agrochemical application (94.7%), fertilizer application (93.3%), pruning (88%), planting time (87.3%), new varieties (86.7%), propping (24.7%), weeding (83.3%), adequate spacing (80.7%), debudding (74%) and desuckering (67.3%). The reason for high adoption may be due to the fact that these technologies may not be new to the farmers since the techniques were traditionally practiced. Also the high rate of adoption in the selected technologies may be connected to the fact that they are technologies promoted by agricultural development programme and international institute of tropical agriculture (IITA) in the study area. The low level of adoption in tissue culture, sucker multiplication and Hot water treatment may be due to poor extension delivery and complex nature of the technique.

Hypothesis Testing: Association between socio-economic characteristics of respondents and level of adoption of result of chi-square analysis in table 4 showed that there were no significant association between the level of adoption of improved technologies and sex (p=0.876), religion (P=0.380), marital status, (p=0.062) and land ownership (p=0.557) at p$\geq$ 0.05. The result showed that only level of education was significant. Level of education had been linked to adoption of innovation. Ekong (2003) asserted that adoption increases as Education status of respondent's increases. The implication of these findings is that respondents with higher education status are expected to adopt improved technologies better and quicker than those with low education.

Table 3: Adoption of respondents According to the level of adoption of the improved technologies in plantain

Improved technologies	Adopter		
	Frequency	Percentage	Rank
New varieties	130	86.7	5th
Debudding	111	74	9th
Hot water treatment	25	16.7	11th
Adequate spacing	121	80.7	8th
Pruning	132	88	3rd
Fertilizer application	140	93.3	2nd
De suckering	101	67.3	10th
Weeding	125	83.3	7th
Agro-chemical Application	142	94.7	1st
Propping	127	84.7	6th
Sucker multiplication	21	14	12th
Time of planting	131	87.3	4th
Tissue culture	2	1.3	13th
Mulching	142	94.7	1st

Table 4: Socio-Economic Characteristics of Respondents and their Level of Improved Technologies

Characteristics	d.f	p.value	Decision
Sex	1	0.876	Not significant
Religion	3	0.380	Not significant
Educational qualifications	5	0.007*	Significant
Marital status	4	0.062	Not significant
Land ownership	4	0.557	Not significant

*Significant at 0.05 level

4. Conclusion

This study has explored the factors influencing the adoption of improved plantain technologies in Edo state, Nigeria. The study showed that awareness and adoption of improved technologies were high. These technologies include improved varieties, fertilizer application, adequate spacing, debudding, propping, mulcting and planting time. The farmers also were not introduced to tissue culture, sucker multiplication and hot water treatment. These technologies had low level of awareness and adoption. The findings concluded that provided improved technologies are profitable and accessible and constraints that could affect farmers usage are eliminated, farmers will have no choice than to take positive decision in adopting these technologies, and through this, the standard of living of the farmers will improve.

5. Recommendations

1. Agricultural development project should be encouraged to adopt plantain as a mandate crop
2. Agricultural development programme (ADPs) should partner research institution such as IITA to encourage increased sucker multiplication for stimulating plantain productivity.
3. The farm size is a very significant factor in adopting improved technologies. Therefore efforts should be made to make it available to enhance plantain production.

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