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Full Length Research Paper

Determinants of Yam Minisett Technology Adoption among Rural Farmers in Ekiti State, Nigeria.

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The study investigated the adoption of yam minisetts technology by yam farmers in Ekiti State, Nigeria. One hundred and twenty yam farmers were randomly selected from the study area. The study made use of primary data with the aid of questionnaire as a means of data collection. Data on farmers' socio-economic characteristics, level of awareness of the yam minisett technology, farmers' knowledge, attitude and practice of the technology were analysed using descriptive statistics while Probit regression analysis was carried out to determine the relationship between socio-economic factors of the farmers and adoption of the technology. The findings revealed that farmers' socio-economic characteristics significantly at 5% affected the likelihood to adopt yam minisett technology in Ekiti State. The farmers' sex (.7997746), marital status (.4763562), household size (.327583), farming experience (.2542498) and educational technology (.1072602), had a positive relationship and served as an important socio-economic factors that determines the adoption of the yam minisett technology in the study area. While complexity of the technology (-.0501066), age (-.2592128) and farm size (-.1242509), had a negative relationship with the adoption of the technology. However, only sex, marital status, and educational level were statistically significant at 5%. It was concluded that sex, marital status, household size, educational level, and farming experience will lead to an increase in adoption of the yam minisett technology in the study area.

Keywords: Yam Minisett Technology, Adoption, Farmers, and Probit Regression.

INTRODUCTION

Yam is a major staple food for over 1 million people in western and central Africa and it is also tied to the socio-cultural life of the people in the humid forest. More than 95% of the global production of yam is in the yam belt of West Africa with Nigeria alone producing 71% of the global output and also producing 37 million tons. These potentials are indication that the crop could contribute to exports earnings should production increase. Nigeria is said to be the highest producer of yam in the world with annual output of about 36-72 million metric tons (FAO, 2008). It is one of the principal tuber crops in the economy in terms of land under cultivation and in the volume and value of production (Bamire and Amujoyegbe, 2005).

Apart from its nutritional value, the importance of yam in economic and socio-cultural development cannot be understated, as yam plays an important role in social and religious festivals. In many areas of western Africa, it is a vital integral part of the cultural heritage of the people. Yam also occupies a place in many traditional marriage ceremonies in traditional areas. (Zuofia, 2005).Yam tuber is usually prepared for consumption in a variety of way that include peeling, boiling, frying, baking, roasting. It is also processed into flour by drying thin slices in the sun and pound or grind into flour for the production of 'Amala'. It can further be processed into pounded yam as well as porage. Yam can be made into a food similar to instant potato chips and also fried chips. In addition, most starch industries use yam as one of their most important raw material. It provides job opportunities to both producers and sellers. It also provides income for dealer improvement. The peel serves as feed for livestock [such as pigs, goats, rabbits, etc.] and good component of farm yard manure [FYM] it is used as a laboratory crop for scientific investigations. Yam is propagated by tuber and recently by yam setts,

which are portions of large tuber of ware yams used for breeding purpose, (Welch, 2005). Yam production and marketing are major sources of employment and income for 70% of the farming household population of over 140million people (NBS, 2006).

Nigeria is faced with a number of constraints paramount to yam production; among these constraints are pest and disease attack, procurement of the required seed yam for more production, its recurring scarcity and high cost during planting season.

However, yam production has been on the decline despite the increasing demand for local consumption and export. The continuous increase in the demand for yam could be attributed to the value of the product and ever increasing population usually leading to product scarcity and soaring price (Ikeorgu and Igwilo, 2002). Some other constraints to yam production are unavailability of planting material, scarcity of labour, lack of fund, insufficient market information, soil depreciation or nutrient depletion, poor handling and storability and high cost of seed yam. (Olasoji, 2005).

The high cost of seed yam is burdened with mediocre quality. This deprive the farmers of a good part of their production as the tuber which have been stored for 4-6 month and have undergone over physiological deterioration as planting materials leads to a decrease in harvest yield.(Okoro, 2006). Shortage of good quality and affordable planting materials suppress yam production. The basic yam multiplication technique using minisett is not new and has been subjected to numerous earlier promotional companies for example, systems based on the treatment of cut setts with a fungicide plus insecticide mixture, for the more reliable and efficient production of equal quality, clean and disease- free seed yams have been explored but have had limited uptake. In other to address and solve the problems associated with yam production in Nigeria, the National Root crop research Institute [NRCRI] and the International Institute For Tropical Agriculture [IITA] developed the yam mini sett technology [YMT] as a rapid means of multiplying germ-plasm of yam. (Welch, 2005).

Presently, some farmers still make use of the traditional method of planting yam (i.e. either using ware yam tubers to produce mother seed yams or using “Yam Head” despite the introduction of the Yam Minisett Technology which give rise to high quality seed yams. Thus, this study seeks to address the following objectives;

- Describe the socio-economic characteristics of the farmers.
- Ascertain farmers awareness of the yam minisetttechnology
- Ascertain if the farmers’ adopt the technology and also determine the level of adoption of yam minisett technology.
- Determine the relationship between farmer’s socio-economic characteristics and adoption.

METHODOLOGY

This study was carried out in Ekiti state. It is located between longitudes 40^0 51’ and 50^0 451’ East of the Greenwich meridian and latitudes 70^0 151’ and 80^0 51’ north of the Equator. The state is a relatively young state requiring enormous resources to advance its development. It has an area of 5887.890sqkm and temperature of between 21^0c and 28^0c with high relative humidity. The vegetation of Ekiti state is guinea forest including all forms of flora and fauna with an annual rainfall of 1,400mm.Agriculture is the main occupation of Ekiti people and it is a major source of income for many in the state. Agriculture provides income and employment for more than 75% of the population of Ekiti state. The National population commission (NPC, 2006) stated that Ekiti state has a population of 2,398,957 with 16 LGA

Sampling Technique and Sample Size

Four out of the sixteen LGA’s were randomly selected. From each of the 4 LGA’s, 3 communities were selected. In each of the community, ten yam farmers were randomly selected using a simple random sampling technique. The sampling procedure thus gave rise to 120 yam farmers which served as respondents for the study.

Data Collection and Analysis

Primary source of data was used through the administration of structured questionnaire; this was used to obtain information about the farmer’s socio-economic characteristics, level of awareness of the yam minisett technology, farmer’s knowledge, attitude and practice of the technology. Data was analysed using descriptive statistics including mean, frequency distribution and percentages. To determine the factors that influence the adoption of yam minisett technique, the probit regression analysis was used.

The probit regression analysis calculates maximum likelihood estimates of regression parameters and the natural (or threshold) response rate for quanta response data from event data.

Therefore;

$Y=f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, ei)$

Where,

Y = Adoption of Yam Minisett Technology

X_1= Age (years), X_2= Sex, X_3=Marital status, X_4=Household size, X_5=Level of formal education, X_6=Farm size (ha), X_7=Farming experience (years), X_8=complexity of the technology ei=error term.

RESULTS AND DISCUSSIONS

Table 1 revealed that 50% of the respondents were male and the remaining 50% were female. This indicates that irrespective of gender, Yam is widely cultivated in the study area. This may have an implication on the Yam Minisett Technology adoption because women don't really have the strength to farm as much as men.

Table 1: Socioeconomic Characteristics of the Respondents.

Variables	Frequency	Percentage
SEX		
Male	60	50
Female	60	50
AGE		
≤20	32	26.7
21-30	31	25.8
31-40	24	20
≥40	33	27.5
Total	120	100
MARITAL STATUS		
Single	53	44.2
Married	48	40.2
Divorced	9	7.5
Widowed	10	8.3
Total	**120**	**100**
EDUCATIONAL QUALIFICATION		
Primary	17	14.2
Secondary	47	39.2
OND/NCE or Equivalent	15	12.5
HND/B.SC	19	15.8
Postgraduate	8	6.7
No Education	14	11.7
Total	120	100
HOUSEHOLD SIZE		
1-4	62	51.7
5-8	36	30
≥9	10	17.5
Total	**120**	**100**
FARM SIZE		
≤5	46	38.8
5.1-10.0	52	43.3
≥10.0	22	18.3
Total	**120**	**100**
FARMING EXPERIENCE		
≤1	29	24.2
2-5	56	46.7
6-10	26	18.3
>10	12	10
Total	**120**	**100**

Source: Field survey, 2014.

The table also show the age bracket of yam farmers in the study area. it revealed that 26.7% of the respondents are less than or equal to 20 years, 25.8% are between 21-30 years while 20.0% of the respondents are within 31-40 years and 27.5% are greater than 40 years.This finding reveals that most of the farmers are below 40 years of age indicating that they are still full of energy which will enhance better Yam Minisett Technology adoption.

It also revealed the marital status of the respondents, 44.2% of the respondents are single, 40.2% are married, while 7.5% are divorced and 8.3% are widowed. This implies that since most of the respondents are relatively young and only the married ones would have additional hands to help in farming, considering the fact that the technology is somewhat labour intensive.

Table 2: Distribution of the respondents according to level of awareness

Awareness	Frequency	Percentage
Yes	82	68.3
No	38	31.7
Total	120	100.0

Source: Field Survey, 2014.

Table 3: Distribution of respondents according to level of adoption

Level of adoption	Frequency	Percentage
Yes	41	34.2
No	79	65.8
Total	120	100.0

Source: Field Survey, 2014

Table 4: Distribution of Respondents according to Complexity of the Technology adoption.

Complexity	Frequency	Percentage
Yes	72	60
No	48	40
Total	120	100.0

Source: Field Survey, 2014.

Table 1 also revealed the educational status of the respondents, it was observed that 39.2% have secondary education, 12.5% have equivalents of OND/NCE, 15.8% have HND/BSC, 6.7% have post graduate education, 11.7% have no education, and 14.2% have primary education. This indicates that most of the yam farmers in Ekiti state are literate and can read and write which might make the adoption of the yam minisett technology easier.

Table 1 shows that 51.7% of the respondents have family size of between 1 and 4, 30.0% have between 5 and 9 while 17.5% have family size greater than 10.The large proportions of the farmers have small household size because majority of them are relatively young in age and are still single. This means less family labour will be utilized and hence higher reliance on hired labour for most of their operations and thus discourages the adoption of new technologies since most of them are labour intensive.

Table 1 also revealed that 38.3% of the farmers had a farm size of ≤5ha, 43.3% had a farm size of 5-10ha, while 18.3% had a farm size of ≥10ha. This indicates that most of the yam farmers in the study area are still stick to the traditional method of farming, hence farming on a relatively small area of farm land.

Table 1 shows that 24.2% of the farmers have farming experience of less than or equal to 1 year, 46.7% have experience of 2-5 years, 18.3% have been farming for a period of 6-10 years and 10.0% have experience of over 10 years. This indicates that yam farmers in the study area have the necessary experience to increase their yam production given the adoption of the yam minisett technology to be positive.

Table 2 shows that 68.3% of the population are aware of the Yam Minisett technology while 31.7% are not aware. The level of awareness may be attributed to their level of education and also majority were in their active age capacity that enables them to seek for knowledge that could bring improvement to their farming activities, though their awareness does not translate to adoption.

Table 3 revealed the adoption level of yam farmers in Ekiti state, it shows that 34.2% of the farmers adopt the Yam Minisett technology, and 65.8% do not adopt the technology. This indicate that most of the yam farmers in Ekiti state are yet to key into the adoption and utilization of the yam minisett technology given the numerous process it involves and its labour use intensiveness.

Table 4 revealed the complexity of the adoption of yam minisett technology by yam farmers in the study area. The results obtained shows that 60% think the Yam Minisett technology is complex while 40% think it is not complex to adopt. Most of the farmers think the technology is complex which has the tendency of slowing down level of adoption.

Table 5 revealed the impact of the Yam Minisett technology on production, production levels were grouped into increase, decrease or no change in production. The results show that the technology

Table 5: Distribution of Respondents according to Level of Production

Level of production	Frequency	Percentage
Increase	41	34.2
Decrease	14	11.7
No change	9	7.5
Not Adopt	56	46.7
Total	120	100.0

Source: Field Survey, 2014.

increases productivity of the farmers by 34.2%, for 11.7%, there is decrease in production, no change in production for 7.5% and 46.7% do not adopt.

The results indicates that among those who adopt the technology, decrease and no change in output could be attributed to inappropriate adoption of the technology (treatment, material acquisition). Also, the complexity of the technology can discourage total and proper adoption.

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THE PROBIT REGRESSION RESULT

Socio-economic factors that determines the adoption of the yam minisett technology in the study area as shown in table 6.

Table 6: Probit analysis result

Variables	Coefficient	Std.Error	P-value
Age	-.2592128	.2092244	0.215
Sex	.7997746	.3227223	0.013**
Marital status	.4763562	.2267144	0.036**
Education level	.1072602	.0880632	0.223
House size	.327583	.2028715	0.106
Farm size	-.1242509	.214257	0.562
Farming exp	.2542498	.2012143	0.206
Complexity	-0.501066	.1979324	0.907
LR chi^2 (13)	47.66		
Prob> chi^2	0.0000		
Log likelihood	-51.732211		
Pseudo R^2	0.6154		

5% Level of significant **

Source: Field Survey, 2014.

The above provides the overall results of the Probit model of adoption outcome regressed on the explanatory variables.

Goodness-of-fit measures indicate that the model is highly significant at P>0.0000 with a likelihood ratio chi^2 of 47.66, Log likelihood value of -51.732211 and a Pseudo R_2 of 0.6154 (i.e.61% of the impact of socioeconomic characteristics of farmers in their level of adoption of Yam Minisett Technology).

Age: The coefficient of age being negative (-0.2592128) and being insignificant at 5% implies that an increase in age will not lead to an increase in adoption.

Sex: Table 6 indicated the estimated coefficient of sex to be positive (0.7997746) and statistically significant at 5% which means an increase in both sexes increases the probability of adopting the technology.

Marital Status: This has a direct relationship with the output (adoption) being positive at 0.4763562 and statistically significant at 5%.

Educational Qualification: With a negative coefficient of 0.1072602 and also statistically significant at 5% it implies that an increase in educational level of the respondents will lead to an increase in adoption.

Household Size: The household size having a positive coefficient of 0.327583 and not statistically significant at 5% still has a direct relationship with the output i.e. an increase in the household size will lead to an increase in adoption by 0.327583.

Farm Size: Having a negative coefficient of -0.1242509 but statistically insignificant at 5%. The implication of the negative coefficient of farm size was that an increase in farm size will not result in an increase in adoption of Yam Minisett.

Farming Experience: This has a positive relationship with the output at 0.2542498 but statistically insignificant at 5%; meaning that an increase in farming experience of the farmers will increase the probability of adoption by 0.2542498.

Complexity: This also, not being part of the socio0economic characteristics but having a coefficient of -0.501066 and being statistically significant at 5% indicates that an increase in complexity of the technology will not increase the probability of adoption

CONCLUSIONS AND RECOMMENDATIONS

The research work examined the socio-economic factors as a determinants of Yam Minisett Technology (YMT) in Ado, Irepodun/Ifelodun, Ikole and Oye local Government Areas of Ekiti State. Using 120 farmers randomly sampled.

The result of the Probit regression analysis shows that sex, marital status, time frame of the technology and educational level were positively correlated and influences adoption of Yam Minisett technology.

Complexity and increase in farm size had a negative correlation which indicates that it does not serve as a determinant for the adoption of yam minisett technology in the study area. Results also indicated that the major problems hindering the adoption of Yam Minisett technology included scarcity of treatment chemicals, and inability to understand the highly technical procedure, others included tediousness of the practice, and poor compatibility to farmers farming system.

The study recommends for increased extension contacts, inputs availability and increased sensitization programme for yam farmers in Ekiti State which would most likely promote the adoption of Yam Minisett Technology in Ekiti State.

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