Socioeconomic Factors Influencing Adoption of Yam Minisett Technology in South eastern Nigeria : A Probit Analysis

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ABSTRACT

Nigeria is responsible for 70% of global harvest of white yam (Dioscorea rotundata). Though Nigeria produces most of the annual output of 28 million tones of yam, the major constraint to increased yam production in the country is scarcity of seed yam. To reduce scarcity and improve on yam production, yam minisett technology trials had been sponsored by European Economic Community (EEC) and International Fund for Agricultural Development (IFAD) in Akwa Ibom State, Anambra, Cross River and Rivers States of Nigeria. This study therefore investigated the factors that influence adoption of yam minisett technology in Akwa Ibom State in the Southeastern Nigeria. A probit model used to identify the factors that affect the decision to adopt yam minisett showed that the estimated coefficient of age was positive but not statistically significant. However, the estimated coefficients for education, awareness and risk were positive and highly significant. Acquisition of higher level of education, increase in awareness and risk of adoption will consequently result in an increase in the adoption of yam minisett technology.

Keywords : *Adoption; Yam minisett; Technology;*

Nigeria is a major yam growing country (Iwueke et al., 1991) and yam constitutes 20% of daily caloric intake. IITA (1990) reports that Nigeria alone is responsible for some 70% of global harvest. Though Nigeria produces most of the world's annual output of over 28 million tones of yam, the major constraint to increased yam production in the country is scarcity and high cost of seed yam. Cost of seed yam may reach 40% or more in the total outlay for yam production (Okoli and Akoroda, 1995).

Alvarez and Hahn (1983) established that white yam production in West Africa has been declining partly because the underground tuber which is the source of food is also the source of planting materials. Before the introduction of YMT to Akwa Ibom farmers, it is maintained that over 35% of total yams harvested was retained and used as planting sets for next year's production. In some parts of Southeastern Nigeria, farmers use small setts of 80-100g or 500-1000g tubers as planting materials for seed yam production. Similarly SPORE (1995) maintains that the planting portion of yam–crop happens to be edible portion thus farmers set aside at least one quarter of their annual harvest for replanting. The trial of yam minisett technology was therefore sponsored by European Economic Community (EEC) and International Funds for Agricultural Development (IFAD) in Akwa Ibom, Anambra, Cross River and Rivers States of Nigeria.

The technology has become very prominent as most yam farmers in Akwa Ibom State are practising it. The introduction of YMT was to alleviate the problem of high cost of seed yams and save more tubers for food rather than for planting. Some farmers have actually specialized in producing seed yams for income as well. Considerable analytical work has been done over the years to ascertain the adoption behaviour of farmers in Nigeria in adopting improved technologies; viz.; Abalu (1980); Ajaji and Akinwumi, (1989); Akinola, (1986), Essiet and Udoh, (1996); Monu, (1982). Udoh, (1995), Udoh and Nyeienakuna, (1997). However, very little work has been done in yam minisett technology in the area and therefore the objective of the study is to investigate the factors associated with adoption of yam minisett technology in the southeastern Nigeria.

METHODOLOGY

There are six agricultural zones in Akwa Ibom State (Latitude $4^0 30^1$ and $5^0 53^1$ North and Longitude $7^0 25^1$ East) of Nigeria. Three zones were randomly selected from the six zones of Akwa Ibom Agricultural Development Programme (AKADEP). From the list maintained by the AKADEP offices, 2280 registered yam farmers were identified. One hundred and ten (110) farmers were randomly drawn from a population of 2280 yam farmers who took part in the study. Descriptive as well as quantitative statistics were used for the analysis of data. To determine the factors that influence the adoption of yam minisett technique, the probit model and regression methods were used.

RESULTS AND DISCUSSION

Age : About 25.46% of the farmers between the ages of 21-30 years took part in yam minisett technology. Fifty three (53) or 48.18% of the respondents which formed a bulk of the respondents also took part in the study. However, yam farmers in general and yam minisett technology farmers in particular between the age range of 40-50 years took part in study. Those over 50 years, who have accumulated experience in yam production, were only 5.45 per cent. The age distribution in Table 1 showed that farmers were represented in all ranges.

Having the younger farmers indicated that farming is becoming more income oriented especially with minisett. It is also interesting to note those within the age range of 31-40 years formed the bulk of the farmers. These are the farmers that have actually taken up yam farming as a serious venture and will want to remain in the business.

Sex and marital status : The study also revealed that 63.64% of the yam farmers were male while 36.36% of them were female. The distribution shows a lot of the female farmers are getting into yam cultivation especially in minisett, which requires less area of land and less quantity of yam stakes. It is believed that with more women venturing into the area the business of yam farming will become stable and sustainable. While 75.45% of the farmers were married, about 19.09% were single while about 5.45% were widow. The involvement of over 70% of married couples emphasizes the importance of yam cultivation as a source of food and income to their respective families. For those not married yet it is evident that they want to remain in yam farming since it is a lucrative venture and can help them to plan for their future. For the widows who are female heads of households, yam production in general and yam minisett in particular is a source to sustain their families.

Education : The data in Table 1 revealed that 27 or 24.55% of the respondents did not acquire any formal education. However, while 54.55% and 17.27% had acquired primary education and post primary education respectively, only 3.64% had post secondary education. Acquisition of formal education will enhance reading and interpretation of extension leaflets and other teaching and demonstration materials. Such farmers can as well listen to radio programmes in farming in English and be able to interpret same to uneducated farmers in their communities. Formal education is an important factor in the adoption of an innovation by a farmer. This is because the more enlightened a farmer is, the higher his ability to weigh the advantages and disadvantages of an innovation and the more his or her likelihood to take to risk.

Table 1. Distribution of farmers according to age, educational level, farm size and income in yam minisett technology (N=110)

Age range (years)	No	%
21 – 30	28	25.46
31-40	53	48.18
41-50	23	20.91
>50	6	5.45
Total	110	100.00
Level of education		
No. of formal education	27	24.55
Primary education	60	54.55
Post primary education	19	17.27
Post secondary education	4	3.64
Total	110	100.00
Farm size (Ha)		
<1	38	34.55
1-3	52	47.27
4-6	18	16.36
>6	2	1.82
Total	110	100.00
Income (N)		
<5000	19	17.27
5000 – 10,000	61	55.45
11,000 – 15,000	24	21.82
> 15,000	6	5.45

Source: Field Data, 2006.

Farm size : Most farmers in Akwa Ibom State intercroped the yam crop with maize, melon and cowpea. The size of farm also depicts the tenurial status and farming experience in yam production. Table 1 as well showed the distribution of farmers

according to farm size. About 34.55% of the respondents had farm size of less than one hectare. This was made up of young farmers who just came into minisett production. Fifty two or 47.27% fell within the group that cultivated between one and three hectares. However, 16.36% fell under 4-6 hectares while only 1.82% had farm size of more than 6 hectares (Table 1). Those with a higher number of hectares had established in the business and devoted more land to raising yam minisett. It could also be observed that this level of farmers will readily adopt innovations in yam minisett technology. It is feasible from on-farm adoptive research (OFAR) that farmers with greater areas of land readily chose to try new crop technologies and Udoh (2003) maintained that farm size showed a significant relationship in adoption of cassava biotechnology by Nigerian farmers. It is also feasible that the level of income that they acquire from the sales of yam sets from minisett will motivate them to adopt more innovations on yam production.

Income **:** Due to food scarcity, seed yams have been significantly used for food. Consequently, the scarcity of seed yams has forced price of seed and ware yams up thus improving the income levels of the farmers. The income of farmers adopting yam minisett technology is shown in Table 1 which showed that 17.27% of the respondents had income of less than N5,000 from yam minisett production. Sixty-one farmers or 55.45% of respondents made an annual income of between N 5000-N10,000 in yam cultivation. This group of income formed the peak of the range of income for the farmers. However, 12.82% of farmers made income in the range of N 11,000 – N 15,000 from their yam minisett production. Finally, just 5.45% made an income of over N 15,000 from yam minisett. The income so realized is obtained from about 20% of the total harvest per hectare because while about 57% of the harvest is reserved for food, 23% is reserved for planting next season. It is feasible that more farmers will join their counterparts since yam minisett is an additional source of income.

Factors influencing adoption behaviour on yam minisett technology :

A probit model : The farm size and educational status of a farm household are often related to other factors that affect the adoption behaviour of farmers. To explain the observed pattern of the adoption behaviour of the farmers on adoption of yam minisett, this was attempted here through the use of a probit model to identify the factors that affect the decision to adopt yam minisett.

The following model was estimated by using the probit method to identify factors that affect the farmers' decision on whether to adopt yam minisett or not.

ADPT = f (AGE, EDU, AWRN, FSZ, MINST, RSK)

Where :

ADPT = dichotomous adoption variable that takes value 1 for adopters and zero for non-adopters.

AGE = age of adopters in farming households in years.

EDU = number of years in formal education.

AWRN = awareness in yam minisett practices by respondent farmers.

FSZ = amount of farmland owned by respondents for cultivation.

MINST = yam minisett as a technology among other farm technologies.

FST = Risk of adoption.

Table 2. Factors influencing decision on adoption of yam minisett technology

Models	Parameter	Co-efficient	SE	F-ratio
Constant	B_0	0.244	0.176	1.388
AGE	B_1	2.973	0.003	0.977
EDU	B_2	0.211	0.023	9.194***
AWRN	B_3	0.570	0.075	7.626***
FSZ	B_4	-9.710	0.095	-1.022
MINST	B_5	0.134	0.090	1.482
RSK	B_6	0.109	0.032	-3.516***

Significant *** 1%, **5%, *10%

R^2

F-ratio 10.73

R^2 – 0.35

The R-value coefficient of 0.35 predicted 35% of the impact of that socioeconomic characteristic of farmers in their level of adoption of yam minisett technology. The rate of percentage was low and therefore implied that the characteristics of the farmers collectively have significantly positive but low relationship with the yam minisett technology.

Table 2 showed the variables and related statistical results of independent variables obtained from the linear probability model. Some of the coefficients in the model were positive indicating the direct relationship of the independent variables to adoption of the probability of the independent variables to the adoption, which does not conform with the expected result.

Age (b_1) : The estimated coefficient of age was positive (2.973) but it was not statistically significant at any

percentage level. This implies that the independent variable age had a direct relationship to the output but an increase in age will not result in an increase in the output. This may be because the young seed yam farmers have noticed that the profit margin may also be related to adoption of yam minisett technology.

Educational level (b_2) : Table 2 indicated the estimated coefficient of educational level to be positive (0.211) which was highly significant at 1% level. This conformed to apriori expectation. The positive coefficient of educational level implied that the increase in educational level of respondents showed a relationship to an increase in adoption of yam minisett technology.

Awareness (b_3) : The estimated coefficient of Awareness level was positive (0.570) and was significant at 1% level. This conformed to apriori expectation. This means that an increase in awareness level of the respondents will consequently lead to an increase in the level of adoption due to the direct relationship of the independent variable to adoption of yam minisett technology.

Farm size (b_4) : Farm size had negative coefficient (-9.710) and was not statistically significant at any percentage level. This did not conform with the apriori expectation. 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.

Minisett (b_5) : The estimated coefficient of minisett was positive (0.134) but it was not statistically significant at any level. This implies that an increase in size of minisett will not lead to an increase in the study area.

Table 3. ANOVA Table for adoption of yam minisett

Models	SS	Df.	MS	F	Sig.
Regression	8.026	6	1.338	10.125	0.000
Residual	12.847	103	0.125		
Total	20.873	109			

Risk (b_6) : The Risk of adoption had an estimated positive coefficient of (0.109) and was highly significant at 1% level. This conformed to apriori expectation. This implied that an increase in the risk of adoption will consequently result in an increase in adoption of yam minisett technology.

CONCLUSION

The result showed that increase in educational level of respondents will lead to an increase in adoption of yam minisett technology. Similarly an increase in risk of adoption will consequently result in an increase in adoption of yam minisett technology. Age, farm size and minisett as a technology did not statistically influence the adoption of yam minisett. Udoh (2001) showed that age, level of education, family size and social participation have been found to be important to adoption of improved practices in maize, cocoa and poultry farming among farmers. The positive coefficient of educational level on adoption showed a relationship that educational programmes for farmers should be sustained. Awareness exercise should also be continued so as to carry every farmer along in yam minisett technology. The positive coefficient of adoption with a high significant level called for improved farm income, which will enhance the increase in the adoption of yam minisett technology. Since Akwa Ibom farmers practice intercropping in their farming systems, yam minisett technology should be taken along with other technologies to encourage farmers that do not engage on only yam cultivation. It is expected that if the above recommendations are implemented, more farmers will evade the problem of shortage of yam seeds for planting. More farmers will increase their income base and therefore a brighter economic future for their households in particular and that of the rural economy in general.

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