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PREDICTION OF ADOPTION OF YAM MINISETT TECHNOLOGY AMONG YAM FARMERS IN RIVERS STATE, NIGERIA

F.E. NLERUM

Department of Agricultural Economics and Extension, Rivers State University of Science and Technology, P.M.B 5080, Nkpolu-Oroworukwo, Port Harcourt, Nigeria.

ABSTRACT

This study examined the predictive variables of adoption of yam minisett technology among yam farmers in Rivers State, Nigeria. Multi-stage, cluster, purposive and simple random sampling methods were used in selecting 252 yam farmers as the sample size of the study. An interview schedule was used in obtaining data from the respondents. Results showed that adoption levels were 16.7 per cent for partial adoption, 18.6 percent for complete adoption and 64.7 per cent for none adoption. Results for test of hypothesis indicated that, four out of the six tested variables that had significant relationship with adoption explained about 89.3 percent (R^2=0.8926) of the adoption variability of the respondents. The best predictor of adoption was extension contact, with R^2=0.3364 contribution. This was followed by educational level, with R^2=0.2440, income, with R^2=0.1805 and farm size, with R^2=0.1317. Efforts directed at improving extension contact, education, income and farm sizes of yam farmers were suggested for a higher adoption of the minisett technology among these farmers.

Key words: Prediction, Yam minisett technology, Yam farmers, Nigeria.

INTRODUCTION

Adoption of farm technology is described as the farmers' decision for a science based production technology (Fliegal, 1984). Technology adoption is not a sudden event, but involves certain stages which an individual passes through on hearing of a new technology (Rogers, 1995). These stages are awareness, interest, evaluation, trial and finally adoption. Aniedu, (2006) confirmed the existence of these stage in a later study among farmers in South-Eastern part of Nigeria. According to Matthews-Njoku (2005), adoption of agricultural innovations by agricultural producers is an essential prerequisite for economic prosperity particularly in less developed countries.

Yam minisett technology package is designed to multiply seed yams planting for the next season (Otoo, *et al.,* 1987) to produce bigger yams for the market. This scientific technology is used to tackle the perennial scarcity of seed yams often encountered by yam-farmers in Nigeria at the beginning of each yam-farming season. Iwueke, *et al.,* (1985) reported that farmers in Nigeria have been offered a reliable method of large scale seed yam production, using yam setts of about 25 grammes. This technology has been tested around the country and found useful and effective in the production of planting materials for bigger yam production (Asnani, 1985) by yam farmers.

E-mail – frankezi@yahoo.com.

Yam farmers as used in this study referred to all farmers who cultivated yams either as a sole or a mixed crop. These resource poor farmers have sustained the position of Nigeria as the highest producer of yam in the world (Onwueme and Sinha, 1991). In view of the above scenario, and the conditions as being faced by the farmers in Nigeria, the purpose of the study was to determine if the adoption of yam minisett technology among yam farmers in Rivers State could be predicted, by certain important attributes of these farmers.

The variables considered in this study were the respondents' age, contact with extension agents, education, income, farm size and agricultural experience.

Objectives of the study: (i) To examine the variable that determined adoption among the respondents in this study area. (ii) To determine the variable that exercised the strongest predictive power on the adoption of yam minisett technology among the respondents.

MATERIAL AND METHODS

This study was carried out in Rivers State of Nigerian. Multi-stage cluster, purposive and simple random sampling procedures were adopted in the study. Cluster sample was used to group the state into Local Government Areas (LGAs). Two LGAs, namely Emohua and Ikwerre were purposively selected because of the intense yam production and agricultural extension activities going on there.

Finally, the simple random sample was used to select 135 and 117 respondents from Emohua and Ikwerre respectively. A higher number of respondents were selected from Emohua because we have higher concentration of yam farmers is there than in Ikwerre. The sum total of the above figures constituted the sample size of 252 respondents which was used for this study. A list of yam farmers from the State Agricultural Development Programme was used for this purpose. An interview schedule was used in generating the primary data from the respondents by trained enumerators of the State Agricultural Development Programme. The interview schedule was constructed to elicit information on the socio-economic characteristics of the respondents as well as their adoption of the technology. The enumerators made individual contracts with the respondents at their homes after the yam cultivation, in the year of study.

Data were analyzed using some mathematical and statistical devices such as frequency distribution, means and percentages. Inferential statistics such as the step-wise multiple regressions at 0.05 level of significant was also used to test the hypothesis. The age, extension contact, formal education, income, yam farm size and its cultivation experience were the independent variables for this study. The multiple regression model is explicitly specified as:

$$Yi = a+b_1x_1+b_2x_2+b_3x_3+b_4x_4+b_5x_5+b_6x_6+e$$

Where:

Yi = Adoption (Dependent or Response Variable)

X_1-X_6 = Independent variables

a = Intercept

b_1-b_6 = Slope (parameter estimates)

X_1 = Age in years

X_2 = Extension contact on monthly bases

X_3 = Education in years spend in schooling

X_4 = Income in Naira ₦ per year

X_5 = yam farm size in hectares

X_6 = Yam cultivation experience in years

e = Stochastic error term

Measurement of Variables: The independent variables (X_{1-6} above) of this study were measured through frequency distribution and mean values. The dependent variable which is adoption was determined by knowing the number of activities in the minisett technology which the respondents actually adopted out of the 8 recommended activities. The number of activities adopted (x), divided by the total recommended activities (8), multiplied by 100 percent constituted the respondent's adoption score. The following were the recommended 8 activities of the yam minisett technology used for this study.

1. Use of clean and healthy mother seed yam of about 500-1000 grammes.

2. Treatment of minisetts with a mixture of minisett dust and slurry of wood ash.

3. Plant geometry of 25 centimeters by 100 centimeters.

4. Planting when rainfall is steady (between May and June).

5. Weeding of plots at least 3 times before harvest.

6. Application of N.P.K 15:15:15 fertilizer at 400-500 kg ha^{-1}

7. Vine staking soon after sprouting with pyramid or trellis method.

8. Harvesting when the leaves are dried and falling.

RESULTS AND DISCUSSION

Socio-Economic Characteristics of Respondents

Table 1, showed that the mean age of yam farmers in Rivers State was 38.4 years. This implies that many yam farmers in the area were within the active and productive stage of their lives. The mean extension contact between agents and yam farmers was two times per month. This agreed with the recommendation of Benor and Baxer (1984) that the productive contacts between extension agents and farmers should be fortnightly. The study further showed that the mean period spent in schooling by the respondents was four years. This indicated a low education of the yam farmers in the area. This tends to explain the reason for poor adoption of yam minisett technology among these respondents since some aspect of the technology would require them to learn what would require record keeping, detailed knowledge and understanding.

The average annual income of yam farmers in this study area was ₦180,000.00. The findings from the interviews indicated further that, most of the yam farmers in the area cultivated two hectares of yam in average. The average yam cultivation experience of yam farmers in the area was 19 years.

Table 1: Average Socio-Economic Characteristics of Farmers in Rivers State. N = 252

S/No	Variables	Mean Values
1.	Age	38.4 years
2.	Extension contact	2 times per month
3.	Years of formal education	4 years
4.	Income (Nair-₦)*	*₦180,000.00/year
5.	Farm size	2 hectares
6.	Yam cultivation experience	19 years

*₦188.00 = $1.00 (US dollar) as at July 2008.

Table 2: Adoption Level of Yam Minisett Technology by Yam Farmers. N=252

No. of Adopted Activities	Frequency	Percentage (%)	Level
1-7	42	16.7	Partial adoption
8 (all)	47	18.6	Complete adoption
None	163	64.7	None adoption
Total	**252**	**100.00**	

Table 2, showed that 16.7 per cent of yam farmers were at the partial adoption level. This is because they applied one to seven yam cultivation activities out of eight such recommended activities of minisett technology. These farmers could not reap the full yield of the minisett technology since they were unable to apply all the activities in the package possibility because of insufficient understanding of the package. Complete adoption level represented 18.6 percent of the farmers. These were the actual adopters in this study. It is this category of yam farmers that benefited more from the technology by reason of the fact that they applied all the recommended 8 activities in the minisett package. The rest 64.7 percent of the farmers were noted as being in the none adoption level. Perhaps this category of farmers relied on their traditional method of seed yam production for their market yam cultivation. The traditional method has been known to yield insufficient seed yams for yam cultivation.

PREDICTING ADOPTION AMONG THE FARMERS

The results of the step-wise multiple regression analysis followed in this study are presented in Table 3. The six independent variables which were initially tested in the study were age, extension contact, educational levels, annual income, yam farm size, and yam cultivation experience. Age and experience of the farmers did not make appreciable impact in the adoption of this technology by the yam farmers and had no significant relationship with adoption in this study. This implied that the above 2 variables did not play meaningful roles in the adoption capability of these respondents. The four variables that had significant relationship with adoption, explained about 89.3 percent (R^2=0.8926) of the variability in the adoption behaviour of the respondents. Specifically, each of these four variables that is, extension contact (R^2=0.3364), educational level (R^2=0.2440) income (R^2=0.1805) and farm size (R^2=0.1317) contributed significantly.

In view of the above contributions, the best predictor of the adoption of yam minisett technology among yam farmers in Rivers State was contact with extension agents. The second was the educational level, the third income and fourth farm size. This results implied that the respondent that had better extension contacts, higher education, more income and larger farm sizes, adopted the yam farmers minisett technology better than those with lesser capabilities generally referred to as the resource poor farmers. These resource poor farmers in developing country like Nigeria were more in number than the progressive ones and contributes more towards the total food production of the nation.

CONCLUSION AND RECOMMENDATION

This study has shown that complete adoption of the yam minisett technology was low among yam farmers in the study area. It was also noted that nearly two-third farmers did not follow this technology. The four

Table 3. Step-wise Regression of Predictors of Adoption Among Respondents N=89

Variables	PE(b)	SE	F-value	Partial R^2	Model R^2	Significance
Intercept (a)	137.57286107	42.67044601	9.75	-	-	-
Extension contact (X_1)	2.04567130	0.43201201	24.66	0.3364	0.3364	*
Educational Level (X_1)	1.02345141	0.26670124	15.64	0.2440	0.5804	*
Income (X_3)	1.41234130	0.31561120	11.40	0.1805	0.7609	*
Farm size (X_4)	1.65123403	0.5561240	4.06	0.1317	0.8926	*

R^2 = 0.8926, PE(b) = Parameter estimate (beta), SE = Standard error, *Significant ($p<0.05$).

variables that made significant contributions in the adoption of yam minisett among yam farmers in Rivers State were extension contact, educational level, income, and farm size. The study further indicted that the best predictor of adoption among yam farmers in this study area was extension contact. It is recommended that efforts may be made to improve the extension contact, education, income and farm sizes of these farmers. Further, they may also be motivated to put more area under yam cultivation, this may not only improve their adoption of this technology but improve their socio-economic conditions also.

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