AGRICULTURAL EXTENSION TEACHING METHODS AND THE ADOPTION OF IMPROVED RICE VARIETIES AMONG SMALL SCALE FARMERS IN EDU LOCAL GOVERNMENT AREA OF KWARA STATE.

BY

Tyabo, I. S., Umar, A., M. Ibrahim., H.U.Muhammed., U.S. Muhammed and J. Ndatsu.
Department of Agricultural Economics and Extension Technology.
Federal University of Technology, Minna, Niger State.
Email – ibrahimtyabo @ yahoo.com. (08069098599)

ABSRACT
This study assesses the role of agricultural extension teaching methods on the adoption of improved rice varieties among small scale farmers in Edu local government area of Kwara state, To achieve the study objectives, multi – stage random sampling technique was used to select 160 respondents from five villages of Edu local government. The data collected were analyzed using descriptive statistics, multiple regression analysis, and T- test. The result showed that 48.5% of the adopters of improved rice varieties were in the active age range of between 30 – 40 years. The result further shows that demonstration (SPAT) with (43.8%) was the best extension teaching method for adoption of improved rice varieties by small scale farmers in the study area. The regression analyses on the estimation factors that affect the output of respondents showed that land size, educational status and adoption rate were statistically significant and have positive relationship with their output. The T- test result of the output of adopters of improved rice varieties and non –adopters was statistically significant (2.579) at 5% level. Some of the problems encountered by the respondents in the study area include inadequate technical knowledge on improved rice varieties, poor communication channels and difficulties in accessing improved varieties of seed. Formulation of agricultural policies that will enhance better communication channels, adequate and timely supply of inputs such as improved seeds of rice and fertilizer, provision of adequate knowledge on the control of pest and diseases will increase the adoption of rice and output of the farmers in the study area.

Key words: Extension education, adoption, output and improved rice varieties.

INTRODUCTION

Rice is the world most expensively cultivated crop and forms the staple food for over 50% of the world population (NCRI, 2008). In the 1960s Nigeria was almost 99% self sufficient in the rice consumed by its citizens. Over the following two decades (1970 and 1980) self sufficiency declined to 38% leading to the demand outstripping supply. To supplement the 62% deficit, the Federal Government of Nigeria resorted massive importation of rice. More than 540,000 tones of rice where imported in 1983 alone. Per capital rice consumption rose from 3.5kg in 1970 to more than 14kg in the 1990 (Anonymous, 1994), this phenomenon was

largely the result of increase in per capital income, rapid population growth and changes in the diet taste diet of Nigeria. Considering the above, there is need for a realistic improvement in Agricultural production and this is only possible through appropriate transfer of technology to farmers. This involves support in the form of varietal improvement, use of advanced farm equipment and farming practices that can be transferred to farmers for adoption is essential for the realization of this objective.

The need for self sufficiency in producing sufficient quantity and qualitative rice for a country with a population of about one hundred and forty million people cannot be realized without transferring improved rice varieties with skills and technical information to small scale farmers that produce more than 70% of Nigerian local rice (Ayotade, 1991). One of the aims of agricultural extension education is to provide small scale farmers with necessary education, skills and technical information to enable them to take effective farm management decision to enhance their agricultural production. Extension teaching methods serve as the avenues, channels and media through which these information and research recommendations becomes accessible to farmers (Ratanachai, 2000; Laogun 2005). An understanding of the strength and the weakness of the various extension teaching methods available to extension workers and the role these methods play in educating and convincing small scale farmers is essential. This is because the result of the adoption or non – adoption of particular technology could be dependent on the type and intensity of the extension method use to pass on the information to farmers. It is against this background the following research questions are formulated to assess the role of agricultural extension teaching methods on the adoption of improved rice varieties among small scale farmers in Edu local government area of Kwara State. The main objective of the study is to assess the role of agricultural extension teaching methods on the adoption of improved rice varieties among small scale farmers in Edu local government area of Kwara State. The specific objectives are to:

1. describe the socio-economic characteristics small scale rice farmers in the study area.
2. identify the extension education methods through which adopters acquired their knowledge on adoption of improved rice varieties.
3. determine the yield of paddy rice of adopters and non adopters of improved rice varieties in the study area.
4. determine the socio -economic factors that affect the output farmers in the study area.
5. identify the constraints faced by the scale farmers in the study area.

Statement of hypothesis

H_{O1}: There is no significant difference between the output of adopters and non adopters of the improved rice variety in the study area.

METHODOLOGY

The study was carried out in Edu Local government area of Kwara state, Nigeria. The study area falls in the Guinea Savannah Zone with an annual rainfall of between 1000mm – 1200mm and temperature range of 27ºC to 34ºC. Multi stage sampling technique was used for this study. The Local Government was purposively selected because of the preponderance of rice farmers in the Local government area. A total of 160 respondents were randomly selected from five villages in the study area. Simple random sampling technique was used to select 16 adopters and 16 non –adopters of improved rice farmers from each of the selected villages. Descriptive statistics was used to attain objective i, ii, and v, and t-test was used to attain objective iii while multiple regression was used to attain objective iv;

The regression model is specified in its implicit form as follows,

Where;

$Y = f(X_1,X_2,X_3,X_4,X_5,X_6,X_7, X_{8+} e)$……(i)

Y = the value of rice output (Kg)

X_1 = farm size (hectares)

X_2 = Membership of co-operatives (1 for membership and 0 for otherwise)

X_3 = Age of the farmer (years)

X_4 = Household size (in number)

X_5 = Extension contact (Number of extension visits per year)

X_6 = Farming experiences (years)

X_7 = Educational level (No. of years spend in school)

X_8 = Adoption index (1 for adoption and 0 for non-adoption)

e = Error term

The explicit forms of the functional form are specified as below;

Linear

$Y= b_0+b_1X_1 + b_2X_2 +b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + e$…… (ii)

Double log

$InY = Inb_0 + b_1InX_1 + b_2InX_2 + b_3InX_3 + b_4InX_4 + b_5InX_5 + b_6InX_6 + b_7InX_7 + e$…….. (iii)

Exponential

$InY=b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + e$ …… (iv)

Semi log

$Y = Loga_0 + a_1LogX_1 + a_2 \text{ Log } X_2 + a_3 \text{ Log } X_3 + a_4 \text{ Log } X_4 + a_5 \text{ Log } X_5 + a_6 \text{ Log } X_6 + a_7 \text{ Log}$

X_7+e …….(v)

RESULT AND DISCUSSION

Table 1: Socio-economic characteristics of respondents (n = 80)

Characteristics	**Adopters**		**Non – Adopters**	
Age (years)	Frequency	Percentage	Frequency	Percentage
<30	12	15.0	6	7.5
31 -40	39	48.5	12	15
41 – 50	21	26.50	17	21.3
>50	8	10.0	45	56.3
Education status				
No formal education	18	22.5	38	47.5
Primary	24	30.0	30	37.5

Secondary	25	31.25	09	11.3
Tertiary	13	16.25	03	3.8
Farm Size (hectare)				
< 1	0	0	0	0
1.1 – 2.0	38	47.50	17	21.3
2.1 – 3.0	29	36.25	21	26.3
3.1 – 4.0	08	10	35	43.8
>5	05	6.25	07	8.8

Source: Field survey, 2010.

The result in Table 1 revealed that 48.5% of the adopters were in the active age range of 30 – 40 years which implies they are young adults who are still strong, have the ability to bear risk and venturesome which influences adoption positively. Majority (56.3%) of the non – adopters have more than 50 years of age. The result shows that most of the farmers in this category are old men who will want to avert risk, always abhor changes, are isolates and always skeptical in making decisions about new practices, they refuse to accept new technologies because of their high attachments to social value and norms of their societies (Ani, 2007). The results in the Table revealed that majority (77.5%) of the adopters have one form of education or the other; this can increase their understanding of new farm technologies and adoption of improved technologies. Agwu (2004) reported that an increase in the level of formal education positively and significantly influences the level of adoption of improved technologies. Education is not only an important determinant of adoption of new technology but also an instrument for successful implementation of new technology. The table showed that 47.5% of the adoptershave1 – 2 hectares of farm size while 43.8% the non –adopters have 3 – 4 hectares of farm size. It can be deduced that smallness of farm size is one of the factors that influence adoption positively since the farmers require high yield (Akinola, 2002).

Table 2: Extension education methods through which adopters acquired their information on adoption of improved rice varieties in the study area (n = 80)

Teaching Methods	Frequency *	Percentage
Contact with Friends and neighbors	7	41.3
Radio	11	13.8
Extension contact	5	6.3
Demonstration (SPAT)	35	43.8
Through contact farmers	13	15.0
Home and farm visit	33	8.8

Source: Field survey, 2010.
***Multiple responses.**

The result from the Table 2 shows that 43.8% and 41.3% of the respondents got their information on adoption improved rice varieties through demonstration plot and contact with friends and neighbors where they share ideas and advises. Through demonstration plots the farmers are able to see the advantages associated with new improved varieties brought to them, this agrees with the report of Morris (1991) who stated that on farm demonstration and adaptive trials on farmer's fields quicken the learning process which makes the messages more convincing to farmers in a short period. The result from Table 2 also revealed that only 6.3% of the adopters got their information through extension contact which is an indication poor extension delivery in the study area and will have a negative impact on adoption of improved technology. Laogun (2005) asserted that lack of frequency of extension contact and distance from source of information on how to apply improved techniques are factors which affect farmer's response to innovation.

Table 3: The yield of paddy rice of adopters and non – adopters of improved rice variety (n = 80)

	Adopters		Non –adopters	
Yield (100kg/bag)	**Frequency**	**percentage**	**Frequency**	**Percentage**
1 – 10	6	7.50	24	30
11 – 20	8	10.00	28	35
21 – 30	37	46.30	19	23.8
31 – 40	23	28.80	5	6.3
>40	6	7.5	3	3.8
Total	**80**	**100**	**80**	**100**

Source: Field survey, 2010.

The result from Table 3 revealed that 46.3% and 28.8% had 21 – 30 bags and 11 – 20 bags of paddy rice from one hectare of their farms respectively. 7.5% of the respondents produce 1 - 10 bags of paddy rice from one hectares of rice farm. The high yield of paddy rice can be attributed to their adoption of improved variety of rice. This result is in line with the findings of Joseph (1992) that adoption of improved varieties would increase the yield of the respondents. On the other side of the Table of non – adopters, the result revealed that 12.5 % and 11.3% had 31 – 40 bags and above 40 bags of paddy rice per hectare respectively. The poor yield could be attributed to non-adoption of improved rice varieties by these farmers.

Table 4: T – test result for yields of adopters and non – adopters of improved rice varieties

Rice varieties	N	Mean diff. (kg)	SD	SE	T cal.	DF	T tab.
Improved Vs local varieties	160	**820.00**	**2844.37**	**318.011**	**2.579**	**79**	**1.960**

Source: Computed from Field Survey, 2010.

The result in Table 4 revealed that there is a significant relationship between the yield of adopters of improved rice varieties with the non –adopters because the t-cal (2.579) is greater

than t-tab (1.960) hence the null hypothesis is rejected. This result implies that adoption of improved rice varieties by the adopters has positively increased their production or yield.

Table 5: Regression Estimates of Factors that Affect the Output of Rice Farmers in Edu Local government of Kwara state

Variables	Regression coefficients	Standard error	T value
Constant	6.671	.292	22.821***
Land size (X_1)	1.226	.047	26.273***
Coop. memb. (X_2)	-.057	.061	-.939
Age (X_3)	-.176	.101	-1.744*
Household size (X_4)	.041	.039	1.060
No. of Ext. cont. (X_5)	-.037	.027	-1.340
Educ. Status (X_6)	.039	.020	1.937*
Farming Exp. (X_7)	.016	048	.338
Adoption index (X_8)	.332	.066	5.060***

R Square 0.829
Adjusted R square 0.829
F - Ratio 91.294
Note: ***, ** and* implies statistical significant at 1%, 5% and 10% levels, respectively.

Source: Computed from survey data, 2010.

The result in table 5 shows the effect of factors that influence the output of farmers on the adoption of improve rice varieties in Edu Local government area of Kwara state; Double-log regression (Cob-Douglass) functional form was chosen as the lead equation of best fit because of significance of the regression coefficient with respect of their t-value and has an R^2 (explanatory power/ coefficient of multiple determination) value of 0829 which indicate that about 82% of the variable in the output of rice (Y) is explained by variables X_1-X_8 included in the model while the remaining 18% is as a result of non inclusion of other explanatory variables. The factors that were found to be statistically significant include farm size, age, educational status and adoption index. The coefficient of land size (X_1) was

positive and significant at 1% level having a positive influence on the effects of adoption of improved rice varieties on the output of the farmers in the study area. The significant and positive value of farm size suggests that as farm size increases; farmers take more interest in their farms and would likely search for needed information on how to adopt improved rice varieties so as to increase their yield. The coefficient of educational status (X_6) was found to be positive and significant at 10%, this implies that an increase in educational level of the farmers the probability to adopt improved rice variety will also increase and his output. This finding is in agreement with the findings of Agwu (2004) that an increase in level of formal education and farm size positively and significantly influences the level of adoption of improved technologies. The coefficient of Adoption index (X_8) is significant at 1% level; this implies that there is a positive and significant relationship between the adoption and output of the farmers. Hence, adoption of improved rice varieties is a critical factor that determines the output of farmers; this implies that an increase in adoption of improved variety of rice will result to increase in the yield or output of the farmers. The coefficient of age (X_3) of the farmers is significant at 10% with a negative value. This implies that there is inverse relationship between age and output of the farmers; this is to say that as the farmers' age increases or grow older the effect of adoption of improved varieties of rice on output will decrease.

Table 6: Distribution of constraints faced by respondents which affect the Adoption of Improved Rice Varieties in the Study Area (N = 80)

Problems	Frequency*	Percentage
Adopters		
Small farm size	47	58.8
Inadequate technical knowledge	35	43.8
Poor communication	23	28.8
Inadequate improved seeds	48	60.0
Lack of credit facilities	25	31.3
Poor extension contact	29	36.3
Incidence of pest and disease infestation	21	
Non –adopters		

Ignorance about the improved varieties	41	51.3
Inaccessibility to improved varieties	27	33.8
Inadequate capital	19	23.8
Inadequate extension contact	23	28.8

Source: Field survey, 2010.
***Multiple responses.**

The result in Table 6 revealed that majority of the adopters of improved rice technology in the study area experienced problems of inadequate improved seeds (60%), small farm size (58.8%) and inadequate technical knowledge (43.8).On the contrary, the reasons given by non – adopters for not adopting the improved rice varieties include ignorance about the improved varieties (51.3%), inaccessibility to improved varieties of seeds (33.8%) and inadequate extension contact (28.8%). Increase number of extension contact with farmers will provide the farmers the forum to be advised and sensitized on the various advantages associated to adoption of improved rice technology such as earlier maturity, higher yield that will boost farmers' income and improve their standard of living.

CONCLUSION AND RECOMMENDATION

This study has revealed that majority of the adopters of improved rice varieties in Edu Local Government Area are middle aged which results in an active adoption of improved rice varieties. Demonstration plot and contact with friends and neighbors were the major sources of information through which farmers got educated on adoption of improved rice technology. Farm size, educational status and adoption index were the factors that significantly influences the outputs of farmers on the adoption of improve rice varieties in the study area. Some of the major problems of farmers on the adoption of improved rice varieties include inadequate improved seeds, small farm size, inadequate technical knowledge, ignorance about the improved varieties and inadequate extension contact. Formulation of agricultural policies that will enhance better communication channels, adequate and timely supply of inputs such as improved seeds of rice and fertilizer, provision of adequate knowledge on the control of pest

and diseases, Intensification of the rate of extension contact and increase in the rate of availability of credit facilities will increase the adoption of rice and output of the farmers in the study area.

REFERRENCES

Agwu, A.E. (2004): Factors Influencing the Adoption of Improved Cowpea Technology in Nigeria .*Journal of International Agriculture and Extension Education, Vol.11(1)*

Akinola A.A (2002): An application of the process analysis to the adoption of tractor living services scheme in Nigeria. Oxford Agrarian study Pp 13 – 14.

Anonymous (1997): Characterization of released rice varieties FARO 1 – 57 National cereal Research Institute Nationally Co- ordinate Rice Research project .Pp 15-18.

Ani, A. O. (2007): Agricultural Extension: A pathway for Sustainable Agricultural Development. Published by Apani Publications Kaduna, Nigeria. Pp 86 – 87.

Ayotade K.A (1991): Improvement of rice production in Nigeria 1969 to 1989 and beyond. A paper presented at the faculty of Agriculture University of Ilorin Seminar, Ilorin Nigeria. May 29, 1991. Pp35.

Laogun, E. A.(2005): Extension Teaching/Learning process and extension Methods, in, Adedoyin, S. F. (ed.), *Agricultural Extension in Nigeria*, Agricultural Extension Society of Nigeria. Pp 201.

Morris, J.P (1991): Characteristics of Teaching and Learning in Extension Education in Community Development of South Africa: Pp 170 – 171.

National Cereal Research Institute Badeggi (2008): Training manual on rice production and processing. Pp 15-18.

Ratanchai, A. (2000): The use of Extension Methods by District Agricultural Extension Officer in Southern Thailand, *Kasetsart Journal of Social Sciences, 21(1): 11- 25.*