Journal Of Agriculture and Social Research (JASR) Vol. 7, No.2, 2007

ADOPTION OF YAM MINISETT TECHNOLOGY BY WOMEN FARMERS IN ABIA STATE, NIGERIA

A.G. IRONKWE, R. ASIEDU AND R.P.A UNAMMA

ABSTRACT

The study was designed to determine the adoption of yam minisett technology by women farmers in Abia state in 2004. This was with a view to determining how best to accelerate the adoption of the technology in the state. A multi-stage random sampling technique was used to select 243 yam growing women farmers from the three agricultural zones of the State. Interview schedule was used to collect primary data from the respondents. The data was analysed using simple statistics and multiple regression analysis. The level of awareness of the technology was moderately high (58%) while adoption was low (33%). The major sources of information about the technology were fellow farmers and neighbours. Benefits in forms of increased yield and income were the major rewards accruing from adoption while unavailability of the complementary inputs and lack of loan and credits were limiting factors to its adoption. Years of farming experience, membership of co-operative/farmers association, income and land ownership were significantly related to adoption. In order to improve the adoption rate the study recommended among other things, the need for mobilization of women farmers towards formation and membership of women groups and co-operatives; provision of steady market and good price system for seed yams, more awareness campaigns, provision of complementary inputs and increasing the number of extension agents to teach the women farmers the technology.

Keywords: Women farmers, adoption, yam minisett.

INTRODUCTION

The yam minisett technique is a rapid multiplication procedure for producing healthy seed yams at reduced cost. It was developed by the National Root Crops Research Institute (NRCRI), Umudike, Abia State in collaboration with International Institute of Tropical Agriculture, (IITA), Ibadan, Nigeria to address the recurrent problems of high cost and unavailability of seed yams, the whole tuber needed for producing ware tubers (Okoli *et al*, 1982, and Iwueke 1983). This technology has been extended to farmers in yam growing zones of Nigeria mostly through the Agricultural and Rural Development Project (ARDPs) using the Training and Visit (T and V) system of agricultural extension (Benor and Baxter, 1984). Subsequent adoption studies on the technology in the South-east agricultural zone pointed to low adoption rates of less than 40%. (Ogbodu, 1995, Anuebunwa *et al,* 1998, and Anuebunwa, 1999). These various adoption studies were not gender specific and adoption rates by women might have been diluted.

Empirical evidence has shown that the involvement of rural women farmers in yam production has not been adequately recognized and their efforts not properly documented (Ezumah and Didomenico, 1995; and Aiyedum and Kormawa, 2001). It has also been argued in several quarters (Ezumah and Didomenico 1995; Jiggins *et al* 1997; and Abiola and Omoabungan, 2001) that women farmers are excluded from government agricultural policies and programmes because their contributions in relation to men's are not objectively assessed and commensurately appreciated and documented. Because the gender- related issues are not effectively articulated in these policies and programmes, the women farmers are relegated to the back- ground while the men farmers become the prime focus or hub of the policies. The distribution that have crept into the farming system of traditional societies, especially in gender roles and production practices are not considered in the formulation of these

government policies and programmes. Hence the "invisibility" of women in agriculture has made researchers and other people involved in crop management issues not been able to tap the rich experience and knowledge of women farmers (Ezumah, 1990).

One of the several approaches of remedying the above shortcoming is to study and document the levels of access, performance, technological needs, problems, priorities and reactions of Nigerian women farmers to the production technologies already developed and extended. Such information objectively obtained and properly harnessed should engender proper formulation, implementation, monitoring and evaluation of agricultural progammes. This study was therefore carried out to find out the position of women farmers in the adoption of yam minisett technology. This is with a view to determining how best to accelerate the adoption of the technology in the State.

METHODOLOGY

Study Area

The study was conducted in the three agricultural zones of Abia State, Nigeria. Abia State is located in southeastern zone of Nigeria which is one of the yam growing zones. It is one of the 36 states in Nigeria. Abia State has a total land area of about 8,000 square kilometers and a population of about 2.3 million people (Abia State Development Committee, 1991; FOS, 1993). The state administratively is divided into 17 local government areas (LGAs) but agriculturally it is divided into three agricultural zones, (Aba, Umuahia and Ohafia). Agriculture is the major occupation of the people. Men and women take part in farm work but have different responsibilities, priorities, needs and constraints in agricultural production. The ecological zone of the State is suitable for growing of tree, root and tuber crops, cereals, vegetables etc. These crops are usually grown in mixtures of at least three crops simultaneously and in small holder plots or units and are determined by gender. The main cash crops grown in the State are oil palm and cocoa while the major food crops are yam, cassava, cocoyam, sweet potatoes, maize, rice and vegetables. In this state, traditionally yam used to be 'man's crop', but due to changes in gender roles in the recent time, women are becoming active in the production of the crop. They participate in most of the production activities and some of them even own yam plots (Ezumah and Didomenico, 1995). Women farmers in this study area are a strong viable part of the social and economic systems of their communities. They participate actively in decision making in household level and also in agricultural production (Ezumah, 1990). They easily adopt new relevant technologies and also help in their promotion (Unamma 1991; and Okarimia and Nwogu, 1994).

Data Collection Procedure

A multi-stage random sampling technique was used in selecting the units for this study. The State was divided into three agricultural zones – Aba, Umuahia and Ohafia. From each zone, three blocks were randomly selected and from each block three circles were randomly chosen, from each circle three sub-circles were randomly selected and from each sub-circles three farm families were randomly chosen as the study units. In each of the selected farm families, one woman farmer was interviewed. This gave a total sample size of 243 women farmers. Information was collected by means of interview scheduled on socio-economic characteristics of the women farmer, participation in yam production and extension activities, access to, and control over agricultural information and productive resources, awareness, adoption, benefits and problems of adoption of yam minisett technology. All the 243 interview schedules were retrieved and used for the analysis.

Analytical Technique

The data collected were analysed using frequencies, percentages, means and multiple regression analysis. The four functional forms were tried. The final choice and the significance of the best fit regression model was based upon the magnitude R^2, significance sign and magnitude of regression coefficients, and the significance of the F-ratio. Generally, the exponential met with the above econometric criteria and thus was chosen as the lead equation.

The model is explicitly specified as :

$InY = b_0 + b_1X_1 + b_2 \times X_2 + b_3 X_3 + b_4X_4 \ldots\ldots b_9X_9 + e$

Where:

Y = the adoption index or rate of adoption of the yam minisett measured by the number of components of the technology adopted.

X_1 = age of the farmer in years.

X_2 = household size measured by the number of adult members in the family.

X_3 = educational status measured by number of years spent in school.

X_4 = farm size in hectare

X_5 = years of farming experience.

X_6 = membership of co-operative/farmers association (a dummy variable that took a value of 1 for members and 0 for non members).

X_7 = frequency of extension contact measured by the number of times the extension agent visited the farmer or vice versa.

X_8 = ownership of land (a dummy variable that took a value of 1 for land owners and 0 for other wise.

X_9 = income from seed yam measured in naira.

$b_0 - b_9$ = the regression parameters to be estimated.

e = error term.

RESULTS AND DISCUSSION

Socio-economic characteristics of respondents

The results in Table 1 show that the larger proportion of the respondents (46.09%) were between the ages of 41 to 50. The mean age is 47.71 years. This implies that most of the women farmers are in their economically active years and as such there is high prospect for increased adoption of the technology. This confirms the findings of Abiola *et el*, Omoabugan (2001). The majority had household size between 6 and 10 with 7 as the mean. This is an indication of availability of cheap farm labour. Forty-nine percent had primary education with 28.4% not having any formal education. The mean farm size is 2.45 hectares with 53.9% cultivated between 0.02 to 2 hectares. The mean years of farming experience is 21.89% years with 38.27% having between 11 to 20 years of farming experience. Majority of the respondents (81%) did not belong to cooperative/farmers association. Larger proportion (83.8%) did not have contact with extension agents.

Table 1: Distribution of Respondents According to Socio-Economic Characteristics

Variables	Frequencies	Percentages
Age Group		
30 – 40	71	29.22
41 – 50	112	46.09
>50	60	24.69

Mean = 47.71 years

Household size		
1 - 5	88	36.21
6 - 10	138	56.79
11-15	15	6.17
>15	2	0.82
Mean = 7 members		
Educational Status		
No formal education	69	28.39
Primary education	118	48.56
Secondary education	44	18.11
Tertiary education	12	4.94
Farm Size (ha)		
0.02 – 1	77	31.69
1.01 - 2	54	22.22
2.01 - 3	75	30.86
3.01 - 4	17	7.00
>5		
Years of Farming Experience		
1 – 10	43	17.70
11–20	93	38.27
21–30	69	28.39
>30	38	15.63
Membership of Cooperatives		
Members	46	18.93
Non-members	197	81.07
Frequency of Extension Contact		
No contact	129	53.09
Twice a month	129	11.93
Three times a month	82	33.74
Once in two months	2	0.82
Once in a year	1	0.41

Table 2: Distribution of Respondents According to Levels of Awareness, Adoption and Sources of Information about Yam Minisett Technology

Variables	**Frequencies**	**Percentage**
Awareness		
Aware	140	57.61
Not aware	103	42.39
Adoption		
Adopted	79	32.51
Not adopted	164	67.49
Sources of Information		
Friends and Neighbours	122	50.00
Extension agents	52	21.40
Radio and Television	24	10.00

Agricultural shows/field days	24	10.00
Newspapers/Magazine	21	8.60

Level of awareness, and adoption of the Technology and Sources of Information.

Table 2 shows the level of awareness, adoption and sources of information about yam minisett technology. The result shows that over 57.6% of the respondents were aware of the technology while 33% adopted it. Considering the fact that it has been long a time (1983) the technology was promoted and transferred to the farmers in the state, one had expected a higher level of awareness than observed from the result. Hence the result is regarded to mean a low level of awareness and agrees with the findings of Onyenweaku and Mbuba (1991), but differs with the findings of Chikwendu *et al* (1994).

The low rate of adoption of the technology observed from the results is consistent with those of Ogbodo (1995); Anuebunwa (1999); and Odurukwe *et al* (2003) whose results showed low adoption of the technology in Enugu, Southeast, and Rivers State of Nigeria respectively.

This result in Table 1 also reveal that farmers' friends and neighbours (50%) were the major sources of information about yam minisett technology to the rural women farmers. This result differs from the findings of Onyenweaku and Mbuba (1991), and Chikwendu *et al.*(1994), who found that extension agents were the most widely used sources of information about the minisett technology in Anambra and Cross River States respectively. Most of the female farmers not getting the information about the technology from the extension agents might have also contributed to the low adoption, (Table 2) probably because their neighbours could not explain the issues involved very well.

Factors Influencing Adoption of Yam Minisett Technology

In order to determine the personal characteristics which influence adoption of yam minisett technology, the adoption index (Y) was regressed on the socio-economic characteristics of the respondents. The results of the exponential function were chosen for the discussion because it has a higher coefficient of multiple determination (R^2), highest significance of regression coefficient, F – ratio and appropriate signs of coefficients (See table 3). Table 3 reveals that income (X_9), years of farming experience and (X_5) and membership of cooperative/farmers association (X_6) are positively and significantly related to the adoption of yam minisett technology while ownership of land is negative but significantly related to adoption. The results show that an increase in the value of these three variables (X_5, X_6 and X_9) will invariably lead to increase in the adoption rate, while an increase in ownership of land (X_8) will result to a decrease in the rate of adoption. This result further implies that non land owners are more likely to adopt the technology than the land owners. Nevertheless, in the other hand, this might even depend on the size of the land the individual farmer owns. For instance, the ones who own small size of land may wish to maximize benefit from the available land and as such could easily adopt any profitable technology like yam minisett. This result agrees with the findings of Chikwendu *et al* (1994), who found negative but significant relationship between ownership of land and the rate of adoption of yam minisett in Eastern Nigeria.

The significance of years of farming experience reveals that those women who have spent more years in the business are more likely to adopt the technology. This is because the farmer's previous experience with other innovations will likely influence her perception of the gross margin of the innovation. Experience, according to Ghadim and Pannell, (1999), improves the farmer's skill at production and higher skill may enhance the profitability of the innovation which is an advantage to the adoption of the innovation by the farmer. This result

disagrees with the findings of Ekumankama and Nwankwo (2002) who found an inverse relationship existing between farming experience and adoption.

The significance of membership of cooperative means that farmers, who are members of cooperatives, tend to adopt more than the non members. This reveals that social organizations serve as a forum through which farmers could exchange ideas, learn new farm practices and have access to information and farm resources. The more a farmer belongs to such organization, the more likely she will be predisposed to adopt farm practices (Chikwendu *et al*, 1994; Ghidan and Pennel, 1999; and Odurukwe *et al*, 2003).

The positive significance of income shows that it has a direct relationship with adoption. This implies that the farmers adopt technologies that will help to increase their income. This is in consonance with a priori expectation and agrees with the findings of Rogers (1995), and Ghadin and Pannell (1999). In contrast, no significant relationship was found to exist between age, labour availability, educational status, farm size and frequency of extension contact.

Benefits and Constraints of yam minisett technology:

Table 4 shows the rewards and constraints the women farmers experienced in the adoption of yam minisett technology. The respondents identified eight benefits they derived in adopting the technology. The most important ones are, increased seed yam production (100%), increased income from seed yams (92%), reduction in cost of planting materials (86%) and provision of more food for the family (75%). All these confirmed the importance of the technology as stated by Chinaka (1986) in Chikwendu *et al* (1994), Okoli and Akoroda (1995), and Otoo *et al* (2001). Eleven problems were identified by the respondents as constraints to their adoption of yam minisett technology. Among these are, lack of fertilizer (89%), scarcity of minisett dust (84%), lack of access to loan and credits facilities (59.5%), lack of good feeder road and transportation system (59.5%) and lack of storage facilities (59.5%). The results implies that scarcity of complementary inputs is a serious problem to the adoption of yam minisett technology. This result agrees with the findings of Chikwendu *et al* (1994).

CONCLUSION AND RECOMMENDATIONS

The results of this study show that the awareness and adoption rate of yam minisett technology (58%) and (33%) respectively are low among women farmers in Abia State, Nigeria. The sources of information about the yam minisett technology are friends and neighbours not the extension agents. This confirmed that the transfer of the technology was gender specific, hence, the low awareness and adoption observed among the women farmers. The important factors found to influence adoption of the technology among women farmers are years of farming experience, membership of cooperatives, income and ownership of land. The major benefits the women farmers derived from the technology are increased seed yam production, increased income from seed yam produced, reduction of cost of planting materials and provision of more food for the family. The most pressing problems limiting adoption by women farmers are lack of fertilizer, scarcity of minisett dust, lack of access to loan and credit, lack of good feeder roads and transportation systems.

However, since the socio-economic factors identified in this study are interdependent and operate simultaneously to determine women farmers' adoption behaviours, their failure to adopt the yam minisett technology cannot be blamed solely on any single factor. This is because physical, socio-cultural, personal, technical as well as other factors jointly influenced their decision to adopt the technology. Hence, there is need to address those factors in combination if adoption of the technology is to be improved in the State. This could be done by carrying out more awareness campaign on the technology among the women farmers in

the State. Providing complementary inputs (fertilizer and minisett dust) at reduced cost to the women farmers. Ensuring steady market and good prices for seed yams produced. Encouraging the women farmers to form groups and co-operatives to enable them have more access to farm inputs and agricultural information. Since this is found to be important in the adoption of the technology, the government should intensify effort in creating awareness about the existence of such associations and their importance among the women farmers. It should also encourage the women to organize or join the existing one. However, where these are not in existence, the messages to persuade the women farmers to adopt the technology may be of little use because the support mechanisms which facilitate implementation are not in place. Therefore, development strategies in such instance ought to include efforts to develop service institutions in such areas.

Table 3: Regression Results of Socio-Economic Factors Influencing Adoption of Yam Minisett Technology by Women Farmers in Abia State

Functional Forms	Coefficient of Explanatory Variables											
	Constant	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	R^2	Adjusted R^2	F-ratio
Linear	0.939	-5.473 E-03	4.162 E-02	3.550 E-02	-6.860 E-02	1.245E -02	1.701 E-02	0.288**	2.242 E-02	2.602 E-05***	0.553	0.536	32.057
Exponentia l	2.798	-0.309	-0.124	0.118	5.524 E-02	0.379**	0.422**	4.570 E-02	-0.480**	0.398***	0.853	0.847	150.29 4
Double log (Cobb Douglas)	0.310	-0.101	-4.737 E-02	3.119 E-02	7.010 E-03	0.103**	9.928 E-02	-1.540 E-02	-0137**	0.140***	0.885	0.880	198.41 6
Semi log	1.938 E-02	-1.903 E-03	1.392 E-02	1.113 E-02	-3.100 E-02	3.863 E-02	-6521 E-03	.101**	2.762 E-02	9.003 E-06***	0.557	0.539	32.487

Note * = Value significant at 1%**
**** = Value significant at 5%**
***** = Value significant at 10%**

Table 4: Distribution of Respondents According to Perceived Benefits and Problems of Yam Minisett Technology (n = 79)

Variables	Frequencies	Percentages
Benefits		
Increased seed yam production	79	100
Increased income from seed yam	73	92.41
Reduction of cost of planting materials	68	86.08
Provision of more food for the family	59	74.68
Reduction of cost of labour	55	69.62
Increased ware yam production	54	68.35
Problems		
Lack of fertilizer	70	88.61
Scarcity of yam minisett dust	66	83.54
Lack of access to loan and credits	47	59.49
Lack of good feeder road and Transportation	47	59.49
Lack of storage facilities	47	59.49
Insect/termite attack	47	59.49

*Multiple responses were recorded from the respondents who adopted the technology

ACKNOWLEDGEMENT

We wish to appreciate the support of the International Institute of Tropical Agriculture (IITA), Ibadan, Nigeria, in funding this work.

REFERENCES

Abia State Development Committee (1991). Blue Print for the Present and Future Development of Abia State, Ministry of Education, Information, Culture, Youths and Sports, Umuahia, Abia State, Nigeria.

Abiola, R.O. and O.B. Omoabugan (2001). Women Involvement in Food Crop Production, Processing and Marketing in Nigeria. Industrialization in Nigeria. Bullion Publication of the Central Bank of Nigeria, Volume 25 No. 3 July/September. Pp 39-43.

Aiyedum, E. and P. Kormawa (2001). Sustainability of Yam Production by Indigenous Women in Abuja. Program of Event and Book of Abstracts of 35th Annual Conference of the Agricultural Society of Nigeria (ASN) held at the University of Abeokuta, Nigeria, Sept., 16th to 20th. Pp. 68.

Anuebunwa, F.O.., B.O. Ugwu, A.W. Iloka, J.E.U Ikeorgu and A. Udealor (1998). Extent of Adoption of Improved Yam Minisett Technology by Farmers in the Major Yam Growing Areas of Nigeria. Research Report Submitted to NARP Abuja by NRCRI, Umudike. August. Pp. 29.

Anuebunwa, F.O. (1999). Research Extension Farmers Input Linkage System. Activities and Impacts in Southeast Agricultural Zone of Nigeria. National Root Crops Research Institute, Umudike, Newsletter No. 1. Vol. 2. Pp. 1.

Benor, D. and M. Baxter (1984). *Training and visit Extension.* World Bank Washington D.C pp. 170-177.

Chikwendu, D.O., C.C. Chinaka and A.M. Omatayo (1994). Adoption of Minisett technique of seed yam production by farmers in the Eastern Forest Zone of Nigeria. Journal of Discovery Innovation. Vol. 7, No. 4. Pp 367-375.

Ekumankama, O.O and G. Nwankwo (2002). Radio Broadcast: A study of Adoption of Agriculture Innovations In Umuahia zone, Abia State. Journal of Agricultural Extension. A publication of AESON, Vol. 6. Pp 17-23.

Ezumah, (1990). Women in Development: The role of Igbo rural Women in production. Unpublished Ph.D thesis in the Development of Agricultural Extension, University of Ibadan, Nigeria.

Ezumah, N.N. and C.M. Didomenico (1995). Enhancing the Role of Women in Crop Production. A Case Study of Igbo Women in Nigeria. World Development. Vol. 23, No. 10, printed in Great Britain. Pp 1731-1744.

Federal Office of Statistics (1993). Annual Abstracts Statistics. FOS. Lagos.

Food and Agricultural Organization (1998). Many Talents and Women Feed The World. FAO of the United Nation. Rome Pp 3-7.

Ghadim, A.K. and D.J. Pannell (1999). Conceptual Framework of Adoption of an Agricultural Innovation. Journal of Agricultural Economics. Vol. 21 Pp. 145-154.

Iwueke, C.C. (1983). Rapid Multiplication of Seed Yam by Minisett Technique. Advisory Bulletin of NRCRI, Umudike. No. 9 Pp. 2-8.

Iwueke, C.C., H.E. Okereke and A.W. Iloka (1985). Farmers Related Factors Influencing the adoption of Agricultural Innovations in Imo State. Unpublished Ph.D. thesis in Department of Agricultural Extension, University of Nigeria, Nsukka, Pp. 62.

Jiggins, J.R., Samanta and J.E. Olanoye (1997). Improving Women Farmers' Access to Extension Services. In: B.E. Swanson, R.P. Bentz and A.J. Sufranko (eds). Improving Agricultural Extension. A Reference Manual FAO of the United Nations, Rome, Pp. 73-80.

Odurukwe, S.N., E.C Matthews - Njoku and A.I. Ugochukwu (2003). Determination of Adoption Gaps in Yam Minisett Technique of Women Farmers in River State, Nigeria. Agriculture: The Bedrock of An Enduring Democracy. Proceedings of the 37th Annual Conference of the Agricultural Society of Nigeria held at the University of Calabar, Calabar, Nigeria 16th – 20th November. Pp 36-43.

Ogbodo, B.C (1995). Report on Extension. Activities in Enugu State of Nigeria in 1995. Proceedings of 10th annual zonal Farming systems Research and Extension Workshop held at Umudike on December 4 to 8.

Okarimia, S.U. and I.E. Nwogu (1996). Report on Extension Activities in Abia State, Nigeria. REFILS: Achievement, Problems, Prospects and Sustainability. In: S.O. Odurukwe and F.O. Anuebunwa (eds). Proceedings of the 10th Annual Farming Systems Research and Extension Workshop in South-eastern Nigeria, Pp 160 – 167.

Okoli, O.O., M.C. Igbokwe, L.S.O. Ene and J.C. Nwokoye (1982). Rapid Multiplication of Yam Minisett Technique. NRCRI, Research Bulletin No. 2.

Okoli, O.O., and M. O. Akoroda (1995). Providing seed tubers for the production of food yam. A review article in African Journal of Root and tuber Crop. Vol. 1. No. 1, Pp. 1-6.

Onyenweaku, C.E. and A.C. Mbubu (1991). The Adoption of Yam Minisett Technique b Farmers in Anambra State of Nigeria. Nigerian Journal of Agricultural Extension. Vol. 6 No. 1 and 2.

Otoo, J. A., O.O. Okoli and O. Ilona (2001). Improved production of seed yam. IITA Research guide 63 printed in Nigeria by International Institute of Tropical Agriculture (IITA), Ibadan, Nigeria. Pp 1-4.

Rogers, E.M (1983). Diffusion of Innovation 3rd Edition. Free Press. New York. U.S.A.

Unamma, R.P.A (1991). Moving improved cassava/maize production technology from research to farmers fields. The Case of Nigerian Farming systems Research and Extension Network. Agricultural Systems in Africa. Vol. I, No. 1. Pp 51-59.