GENDER FACTORS INFLUENCING ADOPTION OF YAM MINISETT TECHNIQUE BY FARMERS IN SOUTH-EASTERN NIGERIA: IMPLICATIONS FOR SUSTAINABLE YAM PRODUCTION

ANIEDU, C; NWACHUKWU, I; UWAKAH, C. T. AND R. P. A. UNAMMA

ABSTRACT
To address the low adoption rate of yam minisett technique among farmers in South-eastern, Nigeria this study evaluated adoption of yam minisett technique from gender perspective. A structured interview schedule, administered to 113 women and 121 men randomly selected from 3 zones in each of the states of Abia, Anambra, Ebonyi, Enugu and Imo was the major instrument used for data collection. The data were analyzed using percentages, tables and graphs. Also multiple regression analysis was used to determine the influence of access on the use of improved yam technologies by men and women farmers. The findings revealed that the adoption rate for the female respondents (less than 25%) was lower than that of the male (about 30%) and that majority of the respondents did not belong to any farmers' association. The result also showed that the factors necessary for adoption of yam minisett technique influence men and women differently. Also, the result showed that most respondents were relatively old and perceived the adoption of yam minisett technique as labour intensive and not related to their indigenous technology.

Key words: gender, adoption, yam minisett technique

INTRODUCTION
Yam minisett technique developed by National Root Crops Research Institute (NRCRI), Umudike in early 1980s was seen by Igwilo, (1988) as the miracle necessary for positive transformation of yam production in Nigeria. However over a decade after, Ogbodu (1995) found out that the adoption rate of the innovation was only about 30%. This study therefore looked at the adoption of yam minisett technique from gender perspective with specific objectives such as to: identify some socio-economic characteristics of male and female yam farmers, determine the yam minisett technique adoption rates for male and female yam farmers, determine factors that influenced the adoption of yam minisett technique by male and female farmers, determine problems associated with adoption of yam minisett technique.

METHODOLOGY
The area of study is the geo-political entity of South-eastern Nigeria which comprised of Abia, Anambra, Ebonyi, Enugu and Imo states. Multi-stage random sampling method was used in selecting a block, circle and sub-circle or village in 3 zones of each of the states. Thereafter, 16 farmers made up of 8 female and 8 males were randomly selected, with the exception of Imo state where 6, 6 and 5 of female yam farmers and 8, 8 and 9 of the male yam farmers were randomly selected in the 3 zones. This gave a total of 113 female respondents and 121 male respondents. Socio-economic characteristics of the respondents were determined. To determine educational attainment(X_1) options such as No education, Primary education, un-completed secondary education, completed secondary education and tertiary education were provided. A farmer was considered educated if he/she had primary and above levels of education. Income(X_2) earned from yam farming was determined by finding out those who earned below N200, 000.00, N200,000.00 - N400,000.00 and above N400, 000.00. To determine membership of farmers' association(X_3), respondents were requested to specify yes or no whether they belong to farmers' association or cooperative

society. For availability of extension contact (X4) options such as never, occasional regular and frequent were provided. Availability of market (X5) was determined by where yam was sold; at home, local market and urban market. To determine availability of credit(X6), the respondents were made to provide sources of their credit if any. The farm size(X7) was determined by indicating the land area under yam cultivation such as below 3 hectares, 3-5 hectares and above 5 hectares. Also, the availability of labour(X8) was determined by never, occasional, regular and frequent options. The influence of education, income, extension contact, membership of cooperative society, market, credit, farm size and labour (given by Onyenweaku, 1991 as factors that influence adoption) on female and male respondents was determined by linear and exponential regression analysis using adoption rates of female and male as dependent variables and the factors were independent variables mentioned above as follows:

Adoption level of the Females = Y1, Adoption level of the Males = Y2
$$Y1 = a + b1X1 + b2X2 + b3X3 + b4X4 + b5X5 + b6X6 + b7X7 + b8X8 + ei$$
$$Y2 = a + b1X1 + b2X2 + b3X3 + b4X4 + b5X5 + b6X6 + b7X7 + b8X9 + ei$$ **for linear regression analysis**

$$Y1^* = a + b1X1 + b2X2 + b3X3 + b4X4 + b5X5 + b6X6 + b7X7 + b8X8 + ei$$
$$Y2^* = a + b1X1 + b2X2 + b3X3 + b4X4 + b5X5 + b6X6 + b7X7 + b8X9 + ei$$ **for exponential regression analysis**

Where $Y1^* = \log Y1$ and $Y2^* = \log Y2$
The linear and exponential functions were employed in this study because they gave the highest R^2 and their **F-Statistic** was significant at 1% levels.
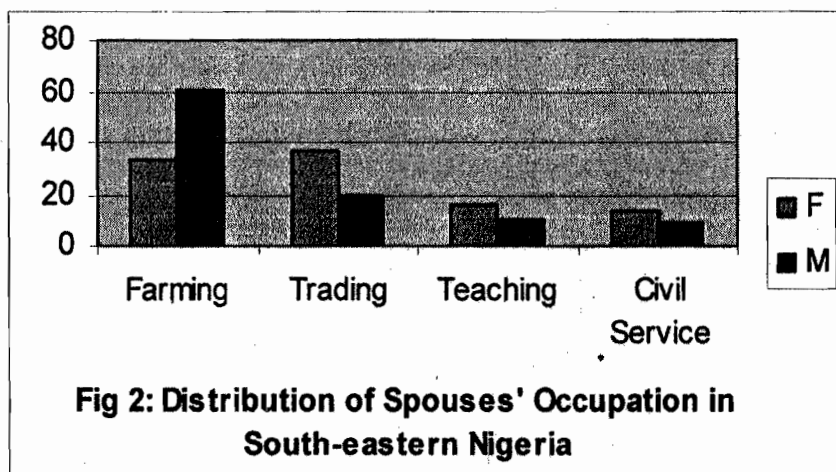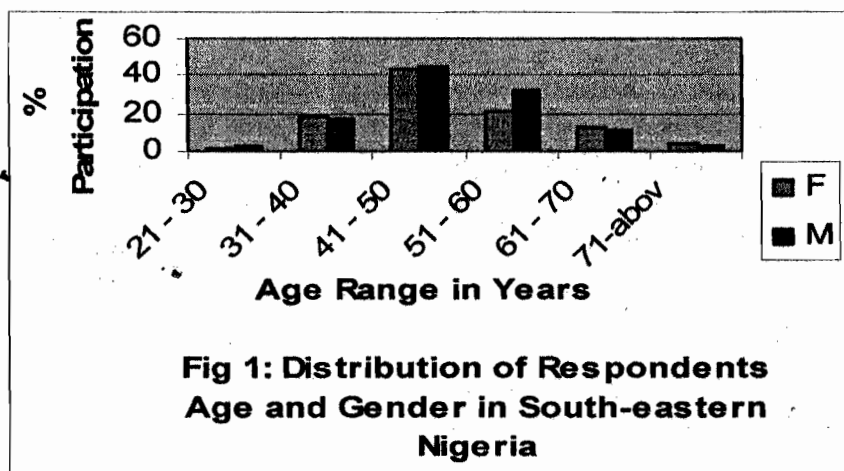
In order to determine the adoption rates of yam minisett technique, men and women respondents were requested to indicate the stages they were in the adopter's category (Rogers, 1995). The stages were non-adoption, awareness, interest, evaluation, trial and adoption. A respondent was considered to have adopted only when he/she was at the adoption stage. The percentage of those at the adoption stage formed the adoption rate.

To determine the problems farmers encountered in adoption of yam minisett technique some options such as labour, time and financial requirements, complexity, relationship with indigenous technology and their assessment of its health implications were provided. The major instrument for data collection was the use of structured questionnaires and interviews. The results were presented in percentages, graphs and tables.

RESULTS AND DISCUSSION
Socio-economic characteristics of the Respondents:
The result in Fig 1 showed that majority of the male and female respondents were within the age range of 41-50 and 51-60 years. This was not quite favourable for adoption as the respondents (male and female) were mostly old people.

Fig 1: Distribution of Respondents Age and Gender in South-eastern Nigeria

Fig 2: Distribution of Spouses' Occupation in South-eastern Nigeria

In support of this view Iwueke, (1988) stated that young people adopt innovations more than old people. The result also showed that the respondents were mostly married (80% female and 98% male) and full time yam farmers (69% female and 76% male). The result of spouses' occupation in Fig 2, showed that majority of female respondents were yam farmers and that disagreed with Okorie's (2005) which stated that yam was a male crop.

Adoption of Yam Minisett Tecnique:
The adoption rate of yam minisett technique showed that about 23.2% female and 30% male respondents were at the adoption stage of the yam minisett technique (fig 3). This was in support of Commonwealth Secretariat (2001) report which stated that male experience was the norm in agricultural practices in Sub-Saharan Africa because the 30% adoption rate recorded by Ogbodu, (1995) was only the male experience.
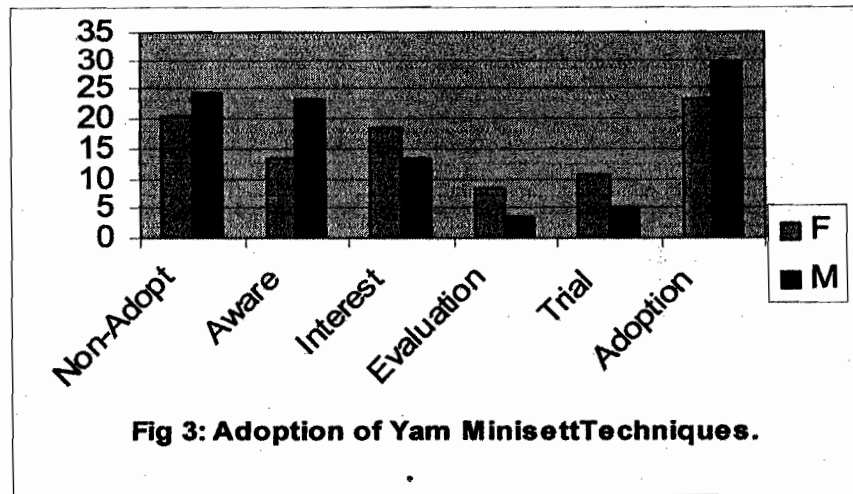
Fig 3: Adoption of Yam MinisettTechniques.

Gender and Access to Resources for Yam Farming
Table 1: Distribution of Resources for Yam Farming by Gender

Resources	Female (n=113) ( ) (%)		Male (n=121) (f) (%)
Education(X1)			
No Education	24 (21)		25 (20)
Primary Education	44 (39)		54 (44.35)
Uncompleted Sec Edu	41 (36.3)		32 (27)
Completed Sec Edu	2 (1.96)		9 (7.69)
Tertiary Edu	1 (0.98)		1 (0.96)
Income(X2)			
N200,000.00pa	84 (74.3)		84 (67.7)
N200,000 -400,00.00pa	16 (14.2)		30 (24.5)
Above N400,000.00pa	13 (11.5)		7 (6.25)
Extension Contact(X3)			
Never	16 (14.2)		10 (8.3)
Occasional	56 (49.6)		45 (37.2)
Regular	34 (30)		53 (43.8)
Frequent	7 (6.2)		13 (10.7)
Farmers' Association (X4)			
Yes	56 (49.6)		58 (47.90)
No	57 (50.4)		63 (52.1)
Market(X5)			
At Home	10 (8.8)		13 (11)
Local Market	87 (76.9)		79 (65)
Urban Market	16 (14.2)		29 (24)
Credit(X6)			
Local Sources	113 (100)		119 (98.3)

Formal Sources	0	2 (1.7)
Farm size(X7)		
Below 3 hectares	95 (84.0)	73 (66.3)
3 -5 hectares	14 (12.3)	33 (27.3)
Above 5 hectares	4 (3.6)	15 (12.4)
Labour(X8)		
1 -3 Man-days	25 (22.2)	29 (24)
4 -6 Man-days	67 (59.2)	63 (52.1)
Above 6 Man-days	21 (18.5)	29 (23.9)

The result in Table 1 showed that the educational attainment of men and women respondents was more or less the same. Only about 20% of the respondents did not have any formal education. However, greater percentage of men than women had primary education and also completed secondary school. The result also showed that majority of men and women respondents earned less than N200, 000 per annum in their yam farming. Like in the case of education, greater percentage of men than women earned N200, 000 - N400,000 and above N400, 000 in yam farming. The extension contact of the respondents revealed that pattern was almost the same for men and women respondents. However, women seamed to have more occasional access while have more regular and frequent access to extension contact. Only 50% of women belonged to farmers' association/cooperatives while men were 47.90%. The result of availability of market showed that majority of the respondents sold their yam at the local market. The men formed greater proportion of those who sold their yam at the urban market. The result of availability of credit showed that that resource was almost non-existent. The few formal credits were available to male respondents only. Most of the respondents cultivated land areas below 3 hectares but the few who cultivated more than 3 hectares were mostly men. The result of availability of labour followed the same pattern as that of farm size.

Factors Influencing Adoption of Yam Minisett Technique:
The linear and exponential regression analyses were employed to determine factors influencing adoption of yam minisett technique by men and women respondents. The linear model gave the best estimates based on economic and statistical criteria, hence the linear model was the chosen equation used for discussion (Table 2). The resources mentioned in 3.3 formed the independent variables. The result for the female respondents recorded F-ratio of 20.041 which was significant at 1% level and R^2 of .607. The independent variables that had significant influence were extension contact(X3), membership of farmers' association(X4), market(X5) and farm size(X7). However, extension contact(X3) and market(X5) had coefficients that were positive but significance level of 10% and 1% respectively.

The result showed that as much as 10% and 1% increase in extension information and market respectively brought about notable increase in adoption of yam minisett technique. This was in conformity with a prior expectation (Benor et al, 1984) which stated that extension information was necessary for farmers to improve their cultivation method, increase their yields and income. De Wilde, (1978) in agreement with this result contended that availability of market increased income and subsequently increased the ability of farmers to invest in innovations that would give more income. Membership of farmers' association(X4) and farm size(X7) had negative coefficients of 1% and 5% respectively. This implied that 1% increase in membership of farmers' association and 5% increase in farm size

gave associated decrease in adoption of yam minisett technique and vice versa. This contradicted the opinion of Sofranko, (1984) which stated that membership of farmers' association influenced adoption positively due to its group dynamic effect. In the same line, Onyenweaku, (1991) stated that farm size influenced adoption positively because large farm size encouraged effective returns of investments made. However, a situation where negative relationships in association existed, the tendency was that less labour would be used towards adoption of yam minisett technique. Also, a situation where labour was a problem (as was the case here) to cultivated increased farm size would not be easily undertaken by farmers and therefore would affect adoption of yam minisett technique negatively.

The result of the male respondents recorded F-ratio of 10.287 and R^2 of .424. The result also showed that education(X1), income(X2) and market(X5) had coefficients that were positive but significant at 1%, 10% and 1% respectively. This showed that as much as 1% increase in education, 10% increase in income and 1% increase in availability of market resulted in appreciable levels of adoption of yam minisett technique and vice versa. This conformed to the opinion of Onweagba and Okorie (2000) which stated that with good education, the farmer would take risks involved in adoption of innovations, Rogers, (1995) which contended that in adopters' category farmers with high income form innovators and early adopters and that of De Wilde (1978) which stated that availability of areas of sales of farm produce encouraged farmers to adopt innovations that will give rise to increased production. However, labour(X8) had a negative coefficient that was significant at 5%. This implied that 5% increase in labour gave rise to decrease in adoption of yam minisett technique and vice versa. This was shown by this study to form an important reason why adoption of yam minisett technique had been low.

Table 2: Determination of Factors Influencing Adoption of Yam Minisett Technique by Men and Women Farmers.

Variables	Male Respondents		Female Respondents	
	Linear	Exponential	Linear	Exponential
Constant	2.885***	3.298**	5.573***	4.739***
	(3.370)	(1.566)	(7.045)	(2.439)
Education(X1)	4.991***	5.497***	.237	.984
	(.379)	(.168)	(1.628E-02)	(2.900E-02)
Income (X2)	2.001*	1.062	1.166	.113
	(7.49E-03)	(1.586E-03)	(3.945E-03)	(1.779E-04)
Extension	.252	-2.677**	2.552*	1.527
Contact(X3)	(7.896E-02)	(-.346)	(.608)	(.186)
Cooperative(X4)	-.777	-1.184	-4.155***	-2.253*
	(-3.014E-03)	(-1.787E-03)	(-1.180E-02)	(-2.927E-03)
Market (X5)	5.673***	3.119**	9.763***	4.361***
	(2.466)	(.680)	(3.011)	(.825)
Credit(X6)	-3.72	.601	.054	-.017
	(-5.856E-02)	(3.697E-02)	(9.237E-03)	(-1.905E-03)
Farm size(X7)	-.372	-1.243	-3.157**	-3.405**
	(-5.856E-02)	(-.121)	(-1.26)	(-.506)
Labour(X8)	-2.805**	-1.142	.271	.399
	(-.849)	(-.149)	(5.444E-02)	(3.948E-02)
R^2	.424	.443	.607	.395
Adjusted R	.651	.665	.770	.629

F- statistic	10.287***	8.142***	20.041***	6.624***

Source: Field Survey Data. **Constant:** Y1 and Y2 defined in the equation.
Note: * Significant at 10%   Values in parenthesis are t-values
** Significant at 5%, *** Significant at 1%,

Problems Associated with Adoption Of Yam Minisett Technique:

The result of the problems of the adoption of yam minisett technique in Fig 4 showed that the bulk of both male and female respondents considered yam minisett technique as labour intensive while a good proportion saw the innovation as not being related to their indigenous technology. Consequently, the relative old age of the female respondents and the labour requirement of yam minisett technique were factors militating against its adoption by respondents in general and female respondents in particular (Iwueke, 1988 and Onyenweaku,1991). Also the high labour requirement of yam minisett technique might be a good reason why young people were not adopting yam minisatt technique.
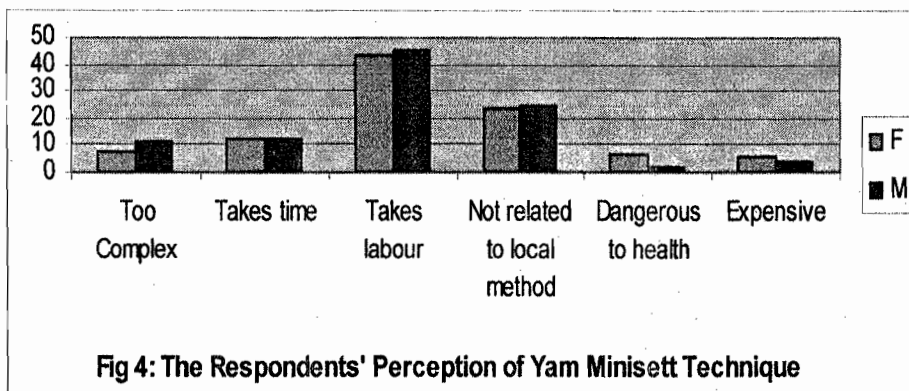

Fig 4: The Respondents' Perception of Yam Minisett Technique

RECOMMENDATIONS

The factors (education, income, extension contact, membership of farmers' association, market, credit, farm size and labour) influenced the adoption of yam minisett technique of men and women yam farmers differently due to their unequal access to resources. Therefore to ensure sustainable yam production through increased adoption of yam minisett technique, the following recommendations were made:

- To empower yam farmers to move from subsistence farming to commercial farming and to ensure high usage of improved yam technologies, it will be necessary for machine fabricators to come up with small mechanical aid to facilitate farm operations in order to save labour and time.
- Policies to ensure that there is equitable distribution of resources for yam production and agriculture generally among men and women farmers should be enunciated.
- The activities of WIA units in ADPs and other agricultural establishments should be encouraged. Efforts should be made to ensure that men and women farmers belong to farmers' associations and groups for extension and other services get to them when necessary.
- There is need for research to develop improved yam varieties that can give higher returns than the 31.5 tons per hectare already recorded and to ensure that these varieties are effectively distributed to farmers. With this effort, the farmers will be rewarded by bumper harvest to meet family consumption and large quantity for sales.

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