Factors Influencing the Adoption FARO-44 Rice among Smallholder Farmers in Anambra State, Nigeria

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ABSTRACT

This study examined the factors determining the adoption of FARO-44 rice variety among smallholder farmers in Anambra State, Nigeria. A multi-stage sampling technique was employed in selecting the 175 respondents for the study. Primary data were collected with the use of a semi-structured questionnaire. Data was analyzed using descriptive statistics and regression model. The result revealed that majority of the respondents were young in age, educated and married. The result also showed that majority of the respondents were aware of the FARO-44 rice variety and also adopted the improved variety. Furthermore, the study showed that age, primary occupation, farming experience, access institutional credit, monthly farm income, cost of FARO-44 rice seeds and access to extension services were influencing the adoption of the FARO-44 rice variety in the study area. To increase rice production in the study area, the study recommended that the State government should make access to institutional credit a single digit interest rate, subsidies on farm inputs and more extension services which will enhance and improve the adoption/planting of the improved rice variety in the study area.

Keywords: *FARO-44, Adoption, Smallholder farmers, Agriculture, Rice variety, Factors.*

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Highlights of this paper

- The outcomes of this study will help the government to know how to assist the smallholders to embrace new innovations and technologies knowing the importance of improved technologies in achieving food sufficiency in the state and country.

1. INTRODUCTION

Rice (Oryza sativa) is the most important staple food for about half of the human race and in many parts of Africans [1]. According to Saka and Lawal [2], over 50% of global population depends on rice as the most important staple food which is largely consumed at homes and in occasions. Smallholder farmers in Nigeria also depends on rice as the major cash crop that generates more income than any other cash crop. In 2001, FAO [3] estimated that there should be an annual rice production increased from 586 million metric tons from 2001 to meet the projected global demand for about 756 million metric tons by year 2030 as a result of the importance in the dietary of the global population. In 2020, rice, paddy production for Nigeria was 8.17 million tonnes. Rice, paddy production of Nigeria increased from 388,000 tonnes in 1971 to 8.17 million tonnes in 2020 growing at an average annual rate of 8.74%. There is an encouragement in the production level but there is still room for improvement as Nigeria's rice statistics suggest great untapped potential to increase the production. In Nigeria, there is increasing demand for rice and the demand outstrip the quantity produced in the country due to poor infrastructure and limited efficiency of distribution network [4].

Saka and Lawal [2] stated that for Nigeria to reduce it reduce its reliance on the importation of rice, knowledge dissemination on improved varieties and other modern inputs as a composite package to rice farmers was very important. According to Nwite, et al. [5], when farmers adopt new technologies and improved management practices, there should be a substantial increase in the yield of rice production.

Based on the high yield as evidenced by research institutes and the results from project interventions in Nigeria with the market demand, United State Agency for International Develeopment (USAID) [4] recommended the following improved rice varieties; lowland rain-fed and irrigated rice – FARO-44 (sippi 692033) and FARO-52 (WITA – 4), Upland varieties are FARO- 46 (ITA 150) and FARO-55 (Nerica-1). According to Dontsop, et al. [6], some of the characteristics of FARO 44 variety is early maturity (110 – 120 days) which is earlier than traditional varieties, higher yield, tolerant to some stresses, resistant to blast, long grain etc. Therefore, to increase the competitiveness of Nigerian rice producers, FARO-44 (sippi) was introduced to farmers due to its early maturity and good quality grain.

Anambra State is among the six States of Benue, Ebonyi, Niger, Ogun, and Taraba 13 participating in International Fund for Agricultural Development (IFAD) assisted Value Chain Development Programme (VCDP), keyed into mechanized agriculture mostly in the area of rice production. Most of the farmers in the State are smallholder farmers who contributes to bulk of the food production consumed in the State and is the second employer of labor after trading. Smallholder farming is the prominent type of agriculture in developing countries as approximately three billion people live in the rural areas and two billion of the people are engaged in smallholding agriculture [7]. According to Nagayetes [8], at least 75% of farms in most African nations are 2ha or less.

Despite the importance of the FARO-44 rice variety, the adoption of the rice variety faces several constraints in the State and poses a threat to the achievement of food security in the State. Therefore, objectives of this study were to examine the extent to which rice farmers in Anambra State adopts the FARO-44 rice variety and to determine the factors influencing the adoption of the FARO-44 rice variety in order to work towards finding a solution.

2. METHODOLOGY

2.1. Study Area

Anambra State is situated between Latitudes 5°32' and 6°45' N and Longitude 6°43' and 7°22' E. The State has an estimated land area of 4,865sqkm with a population of 4,177828 people [9]. Anambra state is located in the south -eastern part of Nigeria, and comprises of 21 Local Government Areas. The State is sub-divided into four agricultural zones (Onitsha, Aguata, Awka and Anambra) to aid planning and rural development. The State administrative head quarter is in Awka [10]. Anambra East, West and Ayamelum (Anambra zone), Orumba North (Aguata zone) and Awka North (Awka zone) play a host community to the value development programme due to their comparative advantage in the rice and cassava production [11].

2.2. Data Collection

The method of data collection of the study was the administration of a semi-structured questionnaire. Information gathered was basically on socio-economic characteristics, level of awareness of FARO-44 rice variety, level of adoption and factors contributing to the adoption of the technology.

2.3. Sampling Procedure And Sampling Size

A multi-stage sampling procedure was used in selecting the respondents that were used for the study. The first stage was the purposive selection of two Local Government Areas in the State based on their predominance in rice production according to the information obtained from the Agricultural Development Programme. The Local Government Areas selected for the study included Amayelum and Awka North Local Government Area. The second stage involved a random selection of 175 rice farmers from communities in each LGA. In all, a total of 175 respondents were selected for the study.

2.4. Data Analysis

The data obtained were subjected to descriptive and regression analyses.

Objectives 1 and 2 was achieved using descriptive statistics while objective 3 was achieved using regression analysis. The regression model specification:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \ldots\ldots \beta_n X_n + U$$

Where: X_1 = Sex.

X_2 = Age (years).

X_3 = Primary occupation.

X_4 = Mode of land acquisition.

X_5 = Farming experience (years).

X_6 = Farm size (ha).

X_7 = Level of education (years).

X_8 = Access to institutional credit.

X_9 = Monthly farm income (₦).

X_{10} = Access to FARO-44 rice seed.

X_{11} = Membership of a cooperative.

X_{12} = Access to extension services.

U = Error term.

3. RESULTS AND DISCUSSION

3.1. Distribution of the Respondent's Socioeconomic Characteristics

This section presents the result and discussion on the socio-economic characteristics of the respondents. The results are presented in Table 1.

Table 1. Distribution of the respondent's socioeconomic characteristics for the study.

Sn.	Variable	Frequency (n = 175)	Percentage (100%)
1	Sex		
	Male	132	75.4
	Female	43	24.6
2	Age (years)		
	1 – 20	12	6.8
	21 – 40	103	58.9
	41 – 60	60	34.3
3	Marital status		
	Single	42	24.0
	Married	102	58.3
	Widow(er)	21	12.0
	Separated/Divorced	10	5.7
4	Level of education		
	No formal education	36	20.6
	Primary	56	32.0
	Secondary	57	32.6
	Tertiary	26	14.8
5	Farming experience (Years)		
	1 – 10	117	66.9
	11 – 20	58	33.1
6	Household size (No)		
	1 – 4	47	26.9
	5 – 10	128	73.1
7	Primary occupation		
	Only farming	112	64.0
	Farming with other businesses	63	36.0
8	Farm size (Ha)		
	1 – 3	147	84.0
	4 – 6	28	16.0
9	Monthly income (₦)		
	1 - 50,000	103	58.9
	50,001 - 100,000	60	34.3
	100,001 - 150,000	12	6.8
10	Membership of Cooperative		
	Member	112	64.0
	Non member	63	36.0
11	Access to extension service		
	Yes	108	61.7
	No	67	38.3
12	Access to credit		
	Yes	60	34.3
	No	115	65.7

Sex: The table shows that majority (75.4%) of the smallholder farmers were male while the remaining 24.6% were female. The implication is that men were more engaged in small scale farming than female.

Age: Table 1 shows that majority (58.9%) of the small holder farmers were between the age bracket of 21-40years, while the remaining 34.3% and 6.8% were within the age bracket of 41 - 60years and 1 - 20years respectively.

Marital status: Majority (58.3%) of the smallholder farmers were married, while the remaining 24.0%, 12.0% and 5.7% were single, widow/er and separated/divorced respectively.

Level of education: The finding shows that majority (32.6%) of the smallholder farmers attended secondary school, while the remaining 32.0%, 20.6% and 14.8% attended primary, had no formal education and tertiary institution respectively. The implication is that the small holder farmers were literate and thus, comprehending what was taught with no much challenge with the implementations.

Farming experience: The finding reveals that majority (66.9%) of the smallholder farmers have been into farming for the past 1 – 10years, while the remaining 33.1% have been into farming for the past 11 – 20years respectively. This implies that the farmers were experienced in agricultural activities.

Household size: Majority (65.7%) of the smallholder farmers in the study area had a household size of between 4-6 persons while the remaining 26.9% and 7.4% had a household size between the bracket of 1–3 and 7–9 persons. Large family size supplies family labor for the farm activities while the money that would have been paid for hired labor is saved.

Primary occupation: Majority of the small holder farmers (64.0%) were into agriculture as their primary occupation while 36.0% were into agriculture as their secondary occupation.

Farm size: Majority (84.0%) of the smallholder farmers had a farm size of 1-3 hectares, while the remaining 16.0% had a farm size of 4-6 hectares respectively.

Monthly income: Information generated on the income of the smallholder farmers showed that majority (58.9%) were within the income bracket of ₦1.00 – ₦50,000, while the remaining 34.3% and 6.8% were within the income bracket of ₦50,001 – ₦100,000 and ₦100,001 – ₦150,000 respectively.

Membership of cooperative: The result shows that 64.0% of smallholder farmers were members of a cooperative while 36.0% were not members of one cooperative or the other.

Access to extension service: Majority (61.7%) had access to extension services while 38.0% did not have access to extension services.

Access to credit: Majority 65.7% of the respondents did not have access to institutional credit while 34.3% of the respondents had access to credit.

3.2. Level of Adoption of FARO-44 Rice Variety

Table 2 shows that majority (84.6%) of the respondents have heard about the FARO-44 rice variety while 15.4% had no idea about the variety. Equally, 84.6% of the respondents planted the FARO-44 rice variety. This result confirmed the findings of Ebenehi [12] that most farmers were aware of the FARO-44 variety in his study area and were using it. Sheshi and Usman [13] in their study found that 97.54% of their respondents were considered as adopters of this improved rice variety and devoted up to 10% of their total farm lands to the improved rice variety cultivation.

Table 2. Level of adoption of FARO-44 rice variety.

Variable	Frequency (n = 175)	Percentage of adoption
Have you heard of FARO-44		
Yes	148	84.6
No	27	15.4
Do you use FARO-44		
Yes	148	84.6
No	27	15.4
Length of usage		
< 6 years	98	66.2
> 6 years	50	33.8

The result also showed that majority of the respondents (66.27%) have been planting the FARO-44 variety in less than 6years while 33.8% planted the rice variety above 6 years.

3.3. Determinants of FARO-44 Rice Adoption

Table 3 present the factors that influenced the adoption of FARO-44 rice variety by the farmers in the study area. The table shows that at 5% level of significance, age, primary occupation, farming experience, access to institutional credit, monthly farm income, cost of seeds and access to extension services were the significant factors that determined the adoption of the FARO-44 rice variety. The coefficient of determination (R^2) was 0.96. This indicated that 96% of the variation in the dependent variable was explained by the hypothesized independent variables.

Table 3. Determinants of FARO-44 rice adoption.

Variables	B	Std. Error	Beta	T	Sig.	R^2
(Constant)	-0.479	0.146		-3.279	0.001	
Sex of respondents	0.108	0.090	0.050	1.202	0.231	0.958
Age of respondents	0.215	0.046	0.167	4.709	0.000	
Primary occupation	0.354	0.066	0.395	5.372	0.000	
Mode of land acquisition	0.039	0.060	0.029	0.654	0.514	
Years of farming experience	0.564	0.077	0.357	7.288	0.000	
Farm size	-0.072	0.075	-0.020	-0.966	0.335	
Educational qualification	0.008	0.019	0.017	0.427	0.670	
Access to institutional credit	0.150	0.054	0.076	2.802	0.006	
Monthly farm income	-0.248	0.071	-0.179	-3.465	0.001	
Cost of FARO-44 rice seeds	0.127	0.057	0.075	2.218	0.028	
Cooperative membership	-0.084	0.057	-0.083	-1.467	0.144	
Access to extension services	0.301	0.069	0.141	4.342	0.000	

Age: Age was statistically significant which shows that the respondents were more readily receptive to innovations. Younger farmers are innovative and keen to try new technology in agriculture than the older counterparts.

Primary occupation: Respondents whose primary occupation was farming was statistically significant which implies that the more the farmers' sole occupation is farming, the more they tend to adopt the FARO-44 rice variety.

Farming experience: This was also significant which implies that the number of years the farmers devoted to farming with experience garnered over the years help them to adopt the FARO-44 variety.

Access to institutional credit: Access to institutional credit was significant which implies that it plays a major role in determining the adoption of the FARO-44 variety.

Monthly farm income: Monthly farm income was significant but negative which implies that the more farm income the less the adoption of the FAR0-44 variety. The reason might be that the farmers are devoting some of their farm income to other agricultural activities to avert risk associated with agriculture.

Cost of Faro-44 seeds: Cost of FARO-44 rice seeds was significant which implies that the price of the input determined the farmers willingness to adopt the improved rice variety.

Access to extension services: Access to extension services was also significant which implies that the more farmers come in contact with extension agents who introduces the new rice variety, the more the farmers who are educated adopts such technology.

These results confirm the findings of Sheshi and Usman [13] which showed that at 5% level of significance, educational level (0.285), farm size (0.309) and extension contacts (0.236) had significant positive relationship with adoption of Faro 44 improved rice variety in his study area. This result is not surprising because increase in educational level would expose the farmers to improved technologies, while increase in the farm sizes would improve

the farmers' capacities to bear the risk associated with the adoption of improved technologies. Similarly, increase in extension contacts would improve farmers' level of awareness and knowledge on improved technologies, which would consequently increase adoption and output. The results concur with the finding of Sheshi and Usman [13] who stressed that educational status and farm size influenced the adoption of improved practices by farmers in Niger State.

4. CONCLUSION/RECOMMENDATION

The results of the study have some interesting research implications. First, the study showed that the awareness and adoption level of the FARO-44 rice variety was high in the study area. This was as result of the educational status of the respondents and the extension services in the study area. Secondly, the result revealed that majority of the respondents were young in age, educated and married. Furthermore, the study showed that age, primary occupation, farming experience, access institutional credit, monthly farm income, cost of FARO-44 rice seeds and access to extension services were the factors influencing the adoption of the FARO-44 rice variety in the study area. The study therefore recommends the need for government intervention to eliminate the barriers hindering the adoption of the improved rice variety if the State wants to achieve self-sufficiency in rice production. Government intervention should be to provide institutional credit with low loan interest, subsidies on farm inputs and more extension services which will enhance and improve the adoption/planting of the improved rice variety in the study area.

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