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FACTORS INFLUENCING RICE FARMERS' LEVEL OF PARTICIPATION IN THE FADAMA III ADDITIONAL FINANCING (AF) DEVELOPMENT PROJECT IN PLATEAU STATE, NIGERIA

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ABSTRACT

This study examines the socio-economic characteristics of rice farmers and the factors influencing their participation in the Fadama III AF development project in Plateau State, Nigeria. A multistage sampling procedure was used to select 259 farmers who participated in the project, and primary data were collected using a structured questionnaire. Descriptive statistics (Frequency distribution tables, percentages (%) and mean) and inferential statistics (Probit regression analysis) were used to analyze the data.

The results showed that the average age of the farmers was 44 years, with 67% being males and 33% females. The majority (85%) of the farmers were married, with an average household size of 7 persons. The farmers cultivated an average of 1 hectare of land and had 18 years of farming experience. Also, 57% of participants rice farmers in Fadama III AF project had 1-3 yearly extension visits. It was found that all participants (100%) were members of cooperative groups. The study found that marital status ($P<0.01$), years of education ($P<0.01$), household size($P<0.01$), membership in cooperative societies ($P < 0.01$) and farming experience ($P < 0.05$) were significant factors that influenced rice farmers' level of participation in the Fadama III AF development project. This study has identified the socio-economic characteristics of rice farmers in Plateau State, Nigeria, and the factors that influence their participation in the Fadama III AF development project. It was concluded that marital status, years of education, household size, farming experience and membership in cooperative societies are significant factors that influence farmers' participation in the project. The study recommends that government, project implementers, community leaders, and other stakeholders should build farmers' capacity through training and education and provide farmers with necessary support and guidance in participating in rural and agricultural development project.

Keywords: Development, Fadama III Additional Financing, Participation, Rice and Influence.

INTRODUCTION

The agricultural sector in Nigeria has suffered neglect since the discovery of oil, despite efforts to revitalize it through various programs and projects (Noko, 2017). Some of the initiatives, include Operation Feed the Nation, Green Revolution, and the National Fadama Development Project, aimed to boost agricultural production and improve rural livelihoods (Akarowhe, 2018). Rice, which is a crucial cash crop in Nigeria, is adapted to four primary ecologies: rainfed upland, shallow swamp and inland valley swamp, irrigated lowland, and mangrove or tidal swamp ecology, each suited for specific rice varieties (Imolehin and Wada, 2005). Rice has emerged as the fastest-growing sector and a staple food, particularly for urban populations, accounting for 10.5% of the average caloric intake, making it the second most important staple in Nigeria (FAO, 2019). Recent data indicates that Nigeria produces 4.3 million tons of paddy rice, with a yield of 1.72 metric tons per hectare, resulting in 2.7 million tonnes of milled rice (USDA, 2017). Small-scale farmers, who cultivate less than a hectare under rain-fed conditions, are the primary producers of rice in Nigeria, contributing approximately 80% of the country's rice production (IRRI, 2013; Takeshima and Bakare, 2016). However, the agricultural sector faces various challenges, including low productivity, limited access to credit and markets, and inadequate extension service (Nsikan, 2023).

The Fadama III AF development project was designed to address these challenges and improve the livelihoods of farmers in Nigeria. The National Fadama Development Project, funded by the World Bank, targeted the development of Fadama lands, which are irrigable farming areas with high agricultural potential (Chukuemeka, 2019). The project's objectives included increasing rural incomes, reducing poverty, enhancing food security, and contributing to the achievement of the Millennium Development Goals (Amadi *et al.*, 2019). The project was implemented in phases, with Fadama III and Additional Financing (AF) focusing

on supporting the growth of non-oil sectors through agricultural productivity and livelihood diversification (Agunloye *et a*l., 2017). Despite the importance of the project, there is limited information on the socio-economic characteristics of rice farmers and the factors that influence their participation in the project in Plateau State (Nandes and Matakhitswen, 2024). The research therefore examined the socio-economic characteristics of rice farmers and the factors that influence their participation in the Fadama III AF development project in Plateau State, Nigeria. The findings of this study will provide valuable insights for policymakers, project implementers, and other stakeholders involved in agricultural development in Nigeria., ultimately contributing to the improvement of the livelihoods of rice farmers in the country.

Materials and Methods

Plateau State, the study area, is located in the North-Central Zone of Nigeria, distinguished by a unique highland geography with an average elevation of 1,200 meters above sea level (Plateau State Agricultural Development Programme, 2000). The state's geographical boundaries lie between latitudes 8° 35' and 10° 30' North, and longitudes 7° 30' and 8° 37' East, encompassing a total area of 26,224.14 square kilometres. According to the National Population Commission (2006), the state's population was approximately 3,577,699, with a projected population of 5,587,141 in 2023 based on a 2.5% annual growth rate (National Bureau of Statistics Estimates, 2023). Plateau State shares borders with neighbouring states, including Kaduna and Bauchi to the northwest and northeast, and Nassarawa and Taraba to the south and southeast. The state is divided into 17 local government areas, grouped into three agricultural political zones: Northern, Central, and Southern zones, each with distinct agricultural characteristics.

A multi-stage sampling technique was employed for the selection of 259 respondents. In the first stage 6 Local Government Areas were purposively selected. These were based on the fact that these zones farm rice more and have been given priority consideration for the Project in the State (Fadama III AF Fact sheet 2015). In the second stage 10 communities were randomly selected from the L.G.A . The Slovian formula was based on the assumption of 5% expected margins of error and (ii) 95% confidence interval was used to calculate the sample size. Slovian formula was expressed thus:

$$n = \frac{N}{1 + N(e^2)} \quad \text{----------} \quad (1)$$

Where: n = Sample size without consideration for finite population correction factor, e = is the expected margin error (5%) and N = Total number of observation (Population of participants and non-participants) as given by PADP.

Hence: $n = \frac{N}{1 + N(e^2)}$

$$n = \frac{735}{1 + 735(0.05)^2}$$

$$n = \frac{735}{1 + 735(0.0025)}$$

$$n = \frac{735}{1 + 1.8375}$$

$$n = \frac{735}{2.8375}$$

$n = 259$ $\quad \frac{259}{735} \times 100 = 35\%$

Primary data for the study were generated through the administration of structured questionnaire. Data collected from the structured questionnaire were analysed using descriptive statistics such as frequency, percentages, mean and presented in table and chart. Probit regression was used to estimate factors influencing farmers participation in the Fadama III AF development project in Plateau State, Nigeria.

Table 1: Sample distribution of respondents

Zones	L.G.A	Villages	Sample Frame	Sample Size
Southern	Shendam	Kalong	63	22
		Shimanker	75	26
	Langtang North	Shebyer	73	26
		Zamko	68	24
	Langtang South	Nasarawo	73	26
		Sabogida	78	27
Central	Kanam	Kafel	76	27
		Gaddi	73	26
	Kanke	Kabwir	78	27
	Pankshin	Lonkat	78	27
Total	Six		735	259

Probit Regression Analysis. The ordered probit model can be expressed as:

$Y=\beta_0 + \beta_1X_1+ {}_2X_2 +\beta {}_3X_3 +\beta {}_4X_4 + \beta_5X_5 + \beta_6X_6+ \beta_7X_7+ \beta {}_8X_8+Ui....….....(1)$

Where:

Y == Level of participation (This was measured by asking research question with binary response. To what extent did the following factors influence your decision to participate in the Fadama III AF Project? 1= to a great extent; 2= to an extent; 3= to no extent)

Where:

$X_1 – X_{10}$= Independent variables

X_1 = Age (years)

X_2 = Sex (male=1 and female=0)

X_3 = Marital status (Single= 1, Married=2, Divorced=3, Widowed=4)

X_4 = Years of education (number of years spent in school)

X_5 = Household size (Number of people per household)

X_6 = Farmers experience (Years rice of farming)

X_7 = Rice farm size (ha)

X_8 = Membership of social organisations (Member=1 and non-member =2)

X_9= Credit (Access to credit yes=1 and no=2.)

X_{10} = Extension contact (number of visits), U_i = is the error term,

βo = Constant

$\beta_1 – \beta_{11}$ = Coefficients of the explanatory variables

e = error term.

RESULT AND DISCUSSIONS

Percentage Distribution of Respondents based on their Socio-economic Characteristics

Figure 1 shows that 39% and 8% of the farmers were in age bracket of 40–50 and 62–72 years respectively. Also, the mean age of the farmers was 44 years, indicating that the majority of respondents were in their productive years. This means the demographic characteristic is likely to have a positive influence on rice yield, income, and may also suggest a willingness to engage in additional rice production activities such as processing , packaging and marketing.

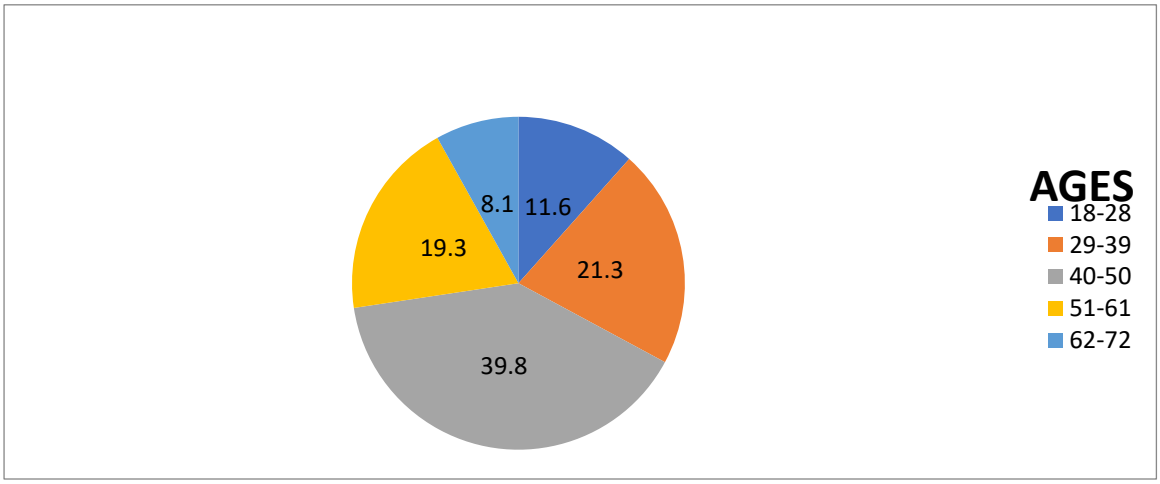

Fig. 1: pie chart representation of the percentage variations in the ages of the sampled farmers participating in Fadama iii AF development project in Plateau state.

Sex and Marital status of respondents

Table 2 reveals that 67% of respondents identified as male and 85% reported being married. As observed from the table, there is dominance of married men in the rice farming sector in the study area, this is likely due to the labour-intensive nature of rice farming and the social responsibilities associated with marriage. This demographic composition has important implications for family economic opportunities, as male-dominated rice farming households may reduce their reliance on hired labour and increase their income, enabling them to meet basic family needs. This finding is consistent with previous research by Jacob *et al.* (2020) and Shehu *et al.* (2019), which highlighted the prominent role of married male individuals in agricultural activities and their reliance on family members for various farming and financial needs.

Table 2: Distribution of Respondents based on Sex and Marital status

Sex	**Frequency**	**Percentage**
Male	173	67.0
Female	86	33.2
Marital Status		
Single	33	12.7
Married	220	85.0
Divorced	6	2.3
Widowed	13	5.0

Level of education

Figure 2 shows that majority (72%) of the rice farmers had completed secondary education, with only a small proportion (5%) lacking formal education. This suggests that most farmers had acquired some form of formal education, enabling them to make informed decisions regarding farm management and increasing their receptivity to new information and participation in future projects. This finding is consistent with previous research by Folayan (2013) and Danjuma, Oruonye, and Ahmed (2016), which showed that farmers with formal education are more likely to participate in development programs due to their increased awareness and exposure to social and environmental issues.

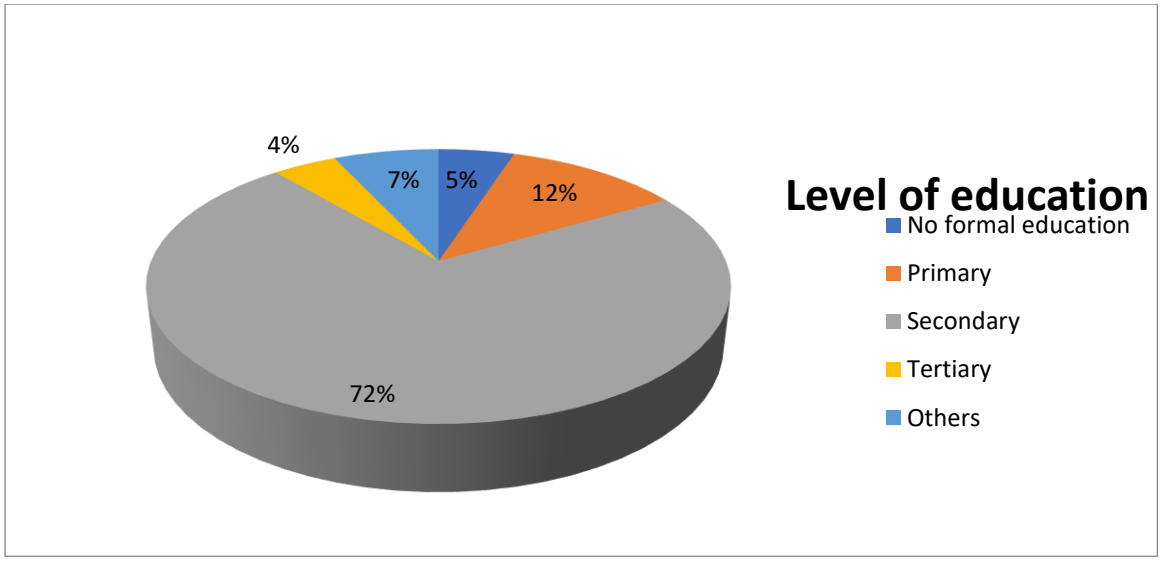

Fig. 2: pie chart representation of the percentage variations in the level of education of participating farmers in Fadama iii AF development project in Plateau state.

Household size

Figure 3 shows that a significant proportion (72%) of the rice farmers had a household size of 6-10 members, while a smaller percentage (0.8%) had a larger household size of 16-20 members. This suggests that a larger household size may provide a readily available source of labour, potentially reducing the need for hired labour and subsequently decreasing the costs associated with rice production. This finding is consistent with Shehu *et al*. (2019), who reported that larger household sizes can increase labour availability for various rice production activities, leading to enhanced productivity and reduced labour costs.

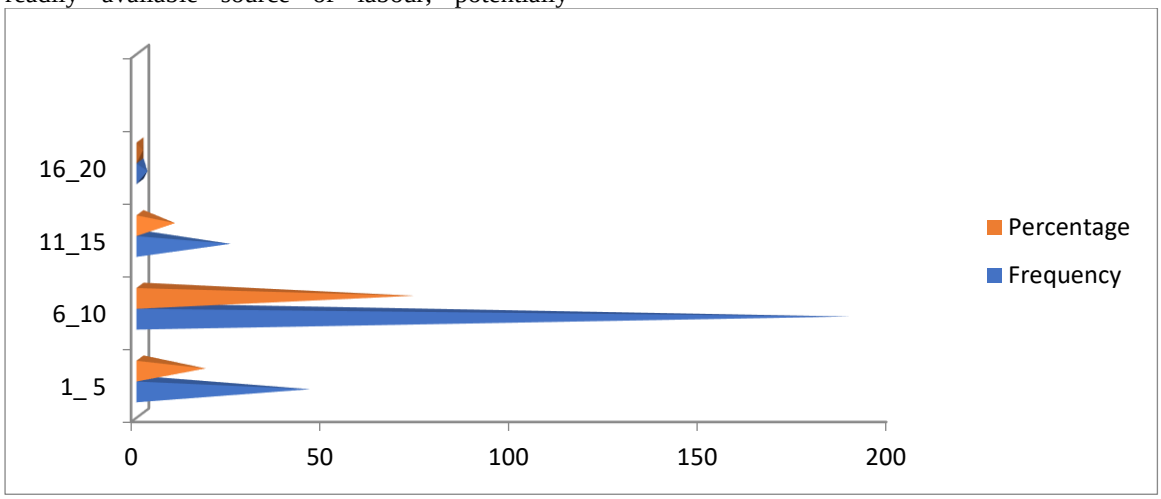

Fig. 3: bar chart representation of the percentage variations in the household of the sampled farmers in Fadama iii AF development project in Plateau state.

Farm size and Farming experience of respondents

Table 3 revealed that a significant majority (70%) of the rice farmers operated on a relatively small scale, with farm holdings ranging from 0.6 to 1.5 hectares. This was followed by 20% of farmers with slightly larger holdings of 1.1-1.5 hectares. Furthermore, the results showed that a larger proportion (72%) of the participating rice farmers had accumulated considerable farming experience, ranging from 11 to 20 years. These findings suggest that the rice farmers in the study area are predominantly smallholder farmers with significant experience in farming. The relatively small farm sizes may be attributed to the Fadama project's focus on maximizing output from limited landholdings. This finding is consistent with previous research by Jacob *et al*. (2020) and Isah and

Muhammad (2018), who reported that the Fadama III AF intervention resulted in all farmers in their study area having 1 hectare of land and advanced years of farming experience.

Table 3: Distribution of Respondents based on farm size and farming experience

Farm Sizes(ha)	Frequency	Percentage
0.6-1.0	183	70.7
1.1-1.5	53	20.5
1.6-2.0	11	4.2
2.1-2.5	8	3.0
2.6-3.0	4	1.5
Mean		1
Farming Experience		
1-10	18	7.0
11-20	187	72.2
21-30	27	10.4
31-40	20	7.7
41-50	7	2.7
Mean		18

Access to extension services

Table 4 revealed that approximately 96% of the rice farmers had interacted with extension agents, with 57% reporting 1-3 annual visits. The mean frequency of contact with extension agents among the farmers were 5, indicating a relatively low level of extension contact. During interviews with Fadama staff, it was disclosed that limited funding, insecurity, and disease outbreaks had hindered their ability to regularly visit farmers, resulting in suboptimal service delivery. This suggests that farmers in the Fadama III AF development project did not receive adequate support, potentially limiting their adoption of new technologies. Notably, this finding contradicts Jacob *et al.*'s (2020) research, which indicated that farmers had minimal or no access to extension services, thereby hindering the adoption of innovations and interventions.

Table 4: Distribution of respondents based on extension visit

Extension Visit	Frequency	Percentage
Yes	248	96.0
No	11	4.2
Number of Ext. Visit (Annum)		
1-3	149	57.5
4-6	87	33.6
7-9	23	8.9
Mean	3.5	2.7
SD	2.0	1.0

Factors that influence farmer's level of participation in Fadama III AF development project in Plateau state

The statistical model's excellent fit is demonstrated by the high log-likelihood ratio (273.1583), low AIC value (-1.84166), and Anova-based fit measure (0.000). The model provides a robust explanation of the factors influencing participation, supporting the role of marital status, education, household size, and cooperative society membership as significant predictors. Table 4 shows that marital status, years of education, household size, and membership of cooperative were positively correlated and statistically significant at ($P < 0.01$) indicating a positive relationship between rice farmers' participation in the Fadama III AF development project. This means married rice farmers may be motivated to improve their agricultural productivity and income to support their families and become more receptive to adopting innovative farming practices and improved production methods. Also rice farmers with larger households will require external support to sustain their families, particularly the young and elderly members and are more likely to engage in the project or other interventions. Farming experience was statistically significant at ($P < 0.05$) indicating a negative relationship between farming experience. This shows that farmers with more years of experience in rice farming are less likely to participate in the project or other interventions.

Table 4 Factors influencing Rice Farmers participation in *Fadama* III AF Project

Variables	Coefficient	Standard Error	t-value
Constant	-0.062	0.043	-1.424NS
Age	-0.001	0.001	-0.920NS
Marital Status	0.017	0.006	2.723***
Sex	0.062	0.180	0.342NS
Years of Education	0.071	0.008	8.748***
Household Size	0.011	0.002	4.433***
Farm Size	0.007	0.006	1.217NS
Farming Experience	-0.034	0.014	-2.451**
Access to credit	-0.285	0.588	-0.484NS
Access to ext. Services	-0.009	0.147	-0.063NS
Membership of cooperation	0.081	0.013	6.376***
Sigma	0.093	0.004	25.750***
Number of observations	259		
Log likelihood	273.1583		
Info. Criterion: AIC =	-1.84166		
Decom based fit measure =	0.302723		
Anova based fit measure =	0.000		

Note: Significant at 1%***, Significant at 5%**, and ^{NS} Not Significant

CONCLUSION AND RECOMMENDATIONS

This study has identified the socio-economic characteristics of rice farmers in Plateau State, Nigeria, and the factors that influence their participation in the Fadama III AF development project. The results show that marital status, years of education, farming experience, and membership in cooperative societies are significant factors that influence farmers' participation in the project. These findings have important implications for the design and implementation of agricultural development projects in Nigeria. The study recommends that the government, project implementers and other stakeholders should build farmers' capacity through

training and education to improve their participation in agricultural and rural development projects. Finally, regular extension visits should be conducted by Federal Ministry of Agriculture and Rural Development (FMARD), Research institutions and other Agricultural Agencies to provide farmers with necessary support and guidance in participating in any rural and agricultural development project. By implementing these recommendations, the Fadama III AF development project can increase the participation of rice farmers in Plateau State, Nigeria, and improve their overall productivity and well-being.

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