RESEARCH ARTICLE

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Socio-economic determinants of smallholder rice (*Oryza sativa*) farmer's access to Loan facilities, Abuja, Nigeria

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Abstract

This research study focused on socio-economic determinants of smallholder rice farmer's access to loan facilities, Abuja, Nigeria. Multi-stage sampling technique was adopted to select 100 smallholder rice farmers. Primary sources of data were used. Data were collected from smallholder rice farmers with the help of well-designed and well-structured questionnaire. Statistical and econometric tools were used for data analysis. The results show that 82% of smallholder rice farmers were between 31 to 50 years of age. About 67% of smallholder rice farmers had access to loan facilities. Sources of loan obtained by smallholder rice farmers are formal (68.66%) and informal sources (31.34%). Averagely, smallholder farmers obtained 200, 754.72 Naira and 129,558.82 Naira from formal and informal sources respectively. Age (X_1), farm size (X_2), household size (X_3), marital status (X_5), access to extension services (X_7) and membership of cooperative organizations (X_8) were statistically and significant socio-economic factors influencing smallholder rice farmers access to loan facilities at ($P<0.05$). In addition, level of education was statistically and significant socio-economic factors influencing smallholder rice farmers access to loan facilities at ($P<0.01$).The constraints encountered by smallholder rice farmers in accessing loan facilities were: lack of collaterals for formal sources, cumbersome administrative procedures, high interest rate for formal sources, late disbursement of loan, long distant to financial institutions for formal sources, small amount of loan, and short re-payment period. The study recommends that loan with single digit interest rate should be provided by the government; cumbersome administrative procedures involved in accessing loan should be addressed, micro finance banks should be located in rural areas to meet the need of smallholder rice farmers loan demand; smallholder rice farmers should be encouraged to join cooperative organizations in order for them to have easy access to loan facilities.

Keywords: Smallholder Rice Farmers, Loan Facilities, Socio-Economic Factors, Nigeria

INTRODUCTION

Rice (*Oryza sativa*) is an important and major staple food security crop in the world. Rice ranks third coming after wheat and maize in terms of worldwide production (Imolehin and Wada, 2000). Nigeria is the largest producer of rice in West Africa, (Falola, Ayinde and Ojehomon, 2013). Rice accounted for 12% of total cereals produced in Nigeria (Ademiluyi, Okeke-Agulu, and Folorunso, 2021). In 2021, rice paddy production for Nigeria stands at 9 million metric tonnes

(CBN, 2022). In 2020, rice paddy production in Nigeria stands at 8.17 million metric tonnes. The production of milled rice in 2021 and 2020 stands at 5.0 million metric tonnes and 4.89 million metric tonnes respectively. In Nigeria, production of milled rice is 5.0 million metric tonnes, inspite of this, 6.7 million metric tonnes is consumed in Nigeria resulting in a deficit of 2 million metric tonnes which is left to be imported (USDA, 2020). Nigeria ranks third-ties with Iraq after Philippines and China in the group of major rice importing countries in the world (Awe, 2006). Local rice production cannot meet the demand for its teeming population, this has led to demand-supply gap (Oloyede, Muhammad-Lawal, Amolegbe, Olaghere and Joseph (2020). The demand and supply gap in rice production is widening, resulting in huge import bill on rice. Rice imports have affected the domestic production of Nigeria's local rice (Ademiluyi, Okeke-Agulu, and Folorunso, 2021). In, 2014, Thailand alone exported 1.3 million metric tonnes of rice to Nigeria but due to Anchors Borrowers Programme, by 2016 and 2021, rice import from Thailand had fallen to 58, 000 metric tonnes and 2,160 metric tonnes respectively (CBN, 2022). The annual consumption of rice per capital has grown significantly from 18Kg in 1980s, to 22 Kg in 1990s, to 29 Kg in 2008 and 32Kg in 2021 (Akande, 2003; USAID, 2008; USDA, 2020). Nigerian rice has a lot of potentials for increased rice productivity as the country is blessed with abundant rice growing environment (Nwaobiala and Adesope, 2013). Nigeria has estimated 4.6 million hectares of land suitable for rice production, but only 1.8 million hectares of land representing 39% is under rice cultivation (Danbata et al, 2013). Five major rice production systems have been identified, these are: upland rainfed, inland shallow swamp, deep water, floating lowland, and irrigated production system. Rice is used in the preparation of local dishes that are eaten in every homes especially during festivals and ceremonies (Ekeleme et al, 2008). Rice is used in making wine, beer, spirit, and vinegar. Rice wine contains 10 – 15 % alcohol and is usually made from glutinous rice. About 90% of domestic rice production in Nigeria comes from weakly organized, peasant, resource-poor smallholder farmers (USAID, 2009; Cadoni and Angelucci, 2013). Smallholder rice farmers use low-input strategy to rice production, minimum input requirements and low productivity (IFAD, 2012). Smallholder rice farmers are faced with many challenges such as: limited access to productive inputs and assets, low productivity, inadequate market and rural infrastructures, inadequate support extension and research services, constrained enabling environment post-harvest losses and paucity of opportunity for agricultural value addition (IFAD, 2012).

A loan is property, money, or other materials goods given to another party in exchange for future repayment of the loan value or principal amount along with interest or finance charges. A loan may be specific, one-time amount, or it can be made available up to a specific limit (Kagan, 2019). Access to loan could increase the willingness of smallholder farmers to adopt new farming technologies which can increase production as well as income (Li and Zhu, 2015). Agricultural loan reduces poverty, enhances productivity and promotes standard of living of smallholder farmers. Availability and accessibility to loan by smallholder farmers can alleviate capital constraints on agricultural households, farm loan remain one of the major means of improving farm capital investment. Lack of access to adequate loan can have significant and negative effects on various aggregate and household level outcomes including agricultural productivity, technology adoption, nutrition, health, food security, and household welfare. Smallholder farmers are faced with inadequate and restricted access to capital and limited access to loan facilities.

Without loan, smallholder farmers have little chance of substantially increasing their production.

Objectives of the Study

This research study focused on socio-economic determinants of smallholder rice farmer's access to loan facilities, Abuja, Nigeria. Specifically, the objectives were:

(i) determine the socio-economic characteristics of smallholder rice farmers,

(ii) identify sources and amount of loan accessed by smallholder rice farmers,

(iii) evaluate socio-economic factors influencing smallholder rice farmer's access to formal loan facilities, and

(iv) determine the constraints encountered by smallholder rice farmers in accessing loan facilities in the study area.

METHODOLOGY

This research study was conducted in Federal Capital Territory, Abuja, Nigeria. Abuja lies between Latitudes $9^0\,4'\,20''$ North and Longitudes $7^0\,29'\,28''$ East. The population of Abuja is about 3,464, 000 people in 2021 and 3,652,000 people in 2022. Abuja experiences three weather conditions. The weather conditions are: harmattan period, wet season, and dry season. The harmattan period is brief and comes in between the dry and wet seasons. Abuja is located in the savannah zone vegetation. The vegetation in the area is classifies into three savannah types: shrub savannah, savannah woodland, and grassy savannah. The people are predominantly farmers, they are involved in growing crops and rearing of animals. Crops grown include: rice, maize, sorghum, yam, millet, soyabean, garden egg, beans, and groundnut. Animals kept include: sheeps, poultry, goats, cattle, turkey, and rabbit. Multi-stage random sampling technique was

employed. One hundred (100) smallholder rice farmers were sampled. Data were of primary sources. Data were obtained from smallholder rice farmers with the help of well-designed and well-structured questionnaire. The questionnaire was designed considering the objectives of the study stated and analytical tools employed. Analytical tools employed for of data analysis include:

Descriptive Statistics

This include the use of measures of central tendency and it involves the use of mean, percentages, and frequency distributions to summarize the socio-economic characteristics of smallholder rice farmers as stated in specific objective one (i). Descriptive statistics was also used to summarize the sources and amount of loan accessed by smallholder rice farmers as stated in specific objective two (ii).

Probit Dichotomous Regression Model

The dichotomous response model is defined as follows:

$$Y = \alpha_0 + \alpha_1 X_1 + \alpha_2 X_2 + \alpha_3 X_3 + \alpha_4 X_4 + \alpha_5 X_5 + \alpha_6 X_6 + \alpha_7 X_7 + \alpha_8 X_8 + U_i$$

Y=Dichotomous Response Model (1, Access to Formal Loan;0, Otherwise),

X_1=Age of Smallholder Rice Farmers (Years),

X_2=Farm Size (Hectares),

X_3=Household Size (Units)

X_4=Gender (1, Male;0,Otherwise)

X_5=Marital Status (1, Married;0, Otherwise)

X_6=Level of Education(0, Non–Formal;1, Primary;2, Secondary;3, Tertiary)

X_7=Access to Extension Services (1, Access;0,Otherwise)

X_8=Membership of Cooperative Organizations (1, Member;0, Otherwise)

U_i=Error Term,

α_1-α_8 =Regression Coefficients,

α_0 =Constant Term,

This was used to achieve specific objective three (iii).

Principal Component Model

This is a statistical technique that can transform many interrelated variables into few uncorrelated ones. This was used to determine the constraints encountered by smallholder rice farmers in accessing loan facilities as stated in specific objective four (iv).

RESULTS AND DISCUSSION

Socio-Economic Characteristics of Smallholder Rice Farmers in the Study Area

The socio-economic characteristics of smallholder rice farmers under consideration were: age, gender, marital status, household size, level of education, farming experience, farm size, cooperative memberships, and access to loan facilities as presented in Table 1. The results show that 82% of smallholder rice farmers were between the age of 31 to 50 years. The smallholder farmers are within the active, productive age, and they are young, energetic and resourceful. This is in line with findings of Alabi et al (2020b). This is also similar to findings of Girei et al (2018) who reported that age has significant influence on the way smallholder farmers make farm decisions with respect to production decisions, risk aversion, and on adoption of improved agricultural technologies. Gender of smallholder rice farmers was classified into male and female. Smallholder rice production in the area was male dominated (78%), while female has 22%. This is also in line with findings of Alabi et al (2021b). Agronomic practices involved in rice production is labour intensive, so it is male dominated, while female take part in processing and other livelihood activities that can earn income for the household. About 39% of smallholder rice farmers were single, 56% were married, and 05% were divorced. Kuye and Ogiri (2009) indicated that married respondents among smallholder rice farmers are likely to incur more expenditures on family upkeeps. According to Saliu et al (2017), household size is the total number of individuals who live within and feed in the same house. About 58% of smallholder rice farmers had between 1 to 5 people per household. The average number of people per smallholder rice farming household was 6 people. This is similar to the findings of Alabi et al (2020b) who reported that smallholder rural rice farmers had on the average of 7 people per household. Furthermore, 87% of smallholder rice farmers had formal education, while 13% had non-formal education. This is in agreement with results of Alabi et al (2020a) who reported that education of smallholder farmers is an important and significant factor that can influence smallholder farmer's adoption of new innovations and research findings. Educated farmers adopt new innovations and research findings quickly, and also understand the guidelines involved in accessing formal loan. Averagely, smallholder rice farmers had 7 year's experiences in rice production. About 75% of smallholder rice farmers had less than 11 year's experiences in rice production. This finding is in line with Maurice et al (2015). Most (67%) of the sampled smallholder rice farmers had between 1 to 2 hectares of planted farm land. The average farm size was 2.28 hectares of planted farm land. The results confirmed that they are smallholder, smallscale, resource poor rice farmers. Also, 67% of smallholder rice farmers had access to formal and informal sources of loan facilities, while 33% do not have access to any form of loan facilities. About 78% of smallholder rice farmers belong to one form of cooperative organizations or the other, through memberships of coop-

erative organizations they could as groups access farm inputs, fertilizer inputs, seeds inputs, credit facilities such as loan facilities and they can participate in bulk purchase their farm inputs and bulk sold their farm produce.

Sources and Amount of Loan Facilities Accessed by Smallholder Rice Farmers in the Study Area

The sources of loan facilities obtained by smallholder rice farmers was presented in Table 2. The amount of loan accessed by smallholder rice farmers was presented in Table 3. The major sources of loan to smallholder rice farmers was through formal (68.66%) and informal sources (31.34%). The average loan accessed from formal sources by smallholder rice farmers was 200,754.2 Naira with the maximum interest rate of 36% charged per annum. The minimum and maximum amount of loan accessed from formal sources by smallholder rice farmers were 30,000 Naira and 500,000 Naira respectively. Averagely, the amount of loan accessed from informal sources by smallholder rice farmers was 129, 558.82 Naira with maximum interest rate of 20%. The minimum and maximum amount of loan accessed by smallholder rice farmers were 25,000 Naira and 400,000 Naira respectively. This result is in line with findings of Alabi et al (2016). According to Kuye and Ogiri (2009) the average value of loan applied and received was 169, 583.33 Naira in Cross River State, Nigeria. Formal sources provide loan to smallholder rice farmers at higher interest rate, which makes it difficult and unaffordable.

Socio-Economic Factors Influencing Smallholder Rice Farmers Accessed to Formal Loan Facilities in the Study Area

The socio-economic factors influencing smallholder rice farmers access to formal loan facilities was examined using Probit dichotomous response model as presented in Table 4. The socio-economic factors under considerations were age, farm size, household size, gender, marital status, level of education, access to extension services, and membership of cooperative organizations. All explanatory variables included in the Probit dichotomous response model had positive coefficients.

Level of education (X_6) was statistically significant in influencing smallholder rice farmers access to formal loan facilities at ($P<0.01$). Age (X_1), farm size (X_2), household size(X_3), marital status(X_5) and access to extension services (X_7) were statistically and significant factors influencing smallholder rice farmers access to formal loan facilities at ($P<0.05$). The positive marginal effects of the explanatory variables implies that a unit increase in farm size, level of education and being membership of cooperative organizations will by 19.77%, 35.65% and 20.72% increase the likelihood and probability of the smallholder rice farmers having access to formal loan fa

Table 1. Socio-Economic Characteristics of Smallholder Rice Farmers

Socio-Economic Characteristics	Frequency	Percentage	Mean
Age of Farmers (Years)			
31 – 40	54	54.00	42.0
41 – 50	28	28.00	
51 – 60	18	18.00	
Gender			
Male	78	78.00	
Female	22	22.00	
Marital Status			
Single	39	39.00	
Married	56	56.00	
Divorced	05	05.00	
Household Size (Units)			
1 – 5	58	58.00	
6 – 10	26	26.00	6.0
11 – 15	16	16.00	
Level of Education (Years)			
Primary	28	28.00	
Secondary	52	52.00	
Tertiary	07	07.00	
Non-Formal	13	13.00	
Farming Experience (Years)			
1 – 5	52	52.00	
6 – 10	23	23.00	
11 – 15	19	19.00	7.0
16 – 20	06	06.00	
Farm Size (Hectares)			
1 – 2	67	67.00	2.28
3 – 4	27	27.00	
5 – 6	06	06.00	
Cooperative Memberships			
Yes	78	78.00	
No	22	22.00	
Access to Loan Facilities			
Yes	67	67.00	
No	33	33.00	
Total	100.00	100.00	

Source: Field Survey (2021)

Table 2. Sources of Loan Obtained by Smallholder Rice Farmers

Sources of Loan	Frequency	Percentage
Informal Sources	21	31.34
Formal Sources	46	68.66
Total	67	100.00

Source: Field Survey (2021)

cilities respectively. This is in line with findings of Alabi et al (2016) and Ameh & Iheanacho (2017) who reported that educated farmers has courage, boldness and technical know-how required to approach financial institutions for loan facilities. According to Asogwa, Abu and Ochoche (2014) who stated that level of education raises smallholder rice farmers' knowledge and level of awareness about the needs for loan for increased agricultural output. The maximum likelihood estimates revealed that the Log Likelihood value was -44.89681, the Chi square value was 15.79 which was statistically significant at (P<0.01). The Pseudo R square was 0.6498, this means that 64.98% of variations in access to formal loan facilities were explained by the explanatory variables included in the Probit dichotomous response model.

Constraints Encountered by Smallholder Rice Farmers in Accessing Loan Facilities in the Study Area

The constraints encountered by smallholder rice farmers in accessing loan facilities were subjected to principal component analysis and presented in Table 5. Principal component model is widely used statistical technique that can reduce many interrelated variables into few uncorrelated ones. Seven constraints with Eigen-values greater than one (1) were retained by the model. Constraints with Eigen-values less than one (1) were discarded by the principal component model. Lack of collaterals in obtaining formal loan was ranked 1st with Eigen-value of 3.28907 based on the perceptions of the smallholder rice farmers and this explained 11.61% of all constraints retained by the principal component model. Cumbersome administrative procedures in obtaining formal loan was ranked 2nd with Eigen-value of 3.1001 based on the perceptions of smallholder rice farmers and this explained 10.23% of all constraints retained by the principal component model. Other constraints were high interest rate in obtaining formal loan (3rd), late disbursement of loan (4th), long distant to financial institutions (5th), small amount of loan (6th), and short re-payment period (7th). This is in line with findings of Alabi et al (2021a). All constraints retained by the principal component model by smallholder rice farmers in accessing loan facilities explained 71.65% of all constraints encountered by the smallholder rice farmers. The Chi-square value was 3702.21 and was statistically significant at (P<0.01).

Table 3. Amount of Loan Accessed by Smallholder Rice Farmers

Sources of Loan	Mean (Naira)	Minimum Amount (Naira)	Maximum Amount (Naira)
Formal Sources	200,754.72	30,000	500,000
Informal Sources	129,558.82	25,000	400,000

Source: Field Survey (2021)

Table 4. Maximum Likelihood Estimates of the Probit Dichotomous Regression Model

Variables	Coefficients	Standard Error	Z-Score	Marginal Effects
Age (X_1)	0.00639**	0.00256	2.50	0.01625
Farm Size (X_2)	0.07872**	0.02894	2.72	0.19770
Household Size (X_3)	0.08264**	0.02839	2.91	0.21022
Gender (X_4)	0.31760*	0.16715	1.90	0.09232
Marital Status (X_5)	0.04593**	0.02274	2.02	0.01168
Level of Education(X_6) Access to Extension Services (X_7)	0.21879***	0.06128	3.57	0.35653
Membership of Cooperative Organizations	0.49172**	0.21194	2.32	0.12508
(X8)	0.31462*	0.15889	1.98	0.20721
Constant				
Log Likelihood	3.1021	1.3371	2.32	
LR Chi2	-44.89681			
Prob > Chi2	15.79			
Pseudo R^2	0.00027			

Source: Field Survey (2021)
*-Significant at 10% probability level
**-Significant at 5% probability level
***-Significant at 1% probability level

Table 5. Principal Component Analysis of Constraints Encountered by Smallholder Rice Farmers in Accessing Loan Facilities in the Study Area

Constraints	Eigen-Value	Difference	Proportion	Cumulative
Lack of Collateral	3.28907	0.2709	0.11615	0.11615
Cumbersome Administrative Procedures	3.1001	0.2686	0.10231	0.21846
High Interest Rate	2.9043	0.2601	0.15062	0.36908
Late Disbursement of Loan	2.3003	0.2590	0.09016	0.45924
Long Distant to Financial Institutions	1.9110	0.2501	0.08173	0.54097
Small Amount of Loan	1.8076	0.2209	0.09932	0.64029
Short Re-Payment Period	1.5001	0.2009	0.07621	0.71650
Bartlett Test of Sphericity				
KMO	0.7176			
Chi Square	3702.21***			
Rho	1.00000			

Source: Computed from Data Analysis (2021)

CONCLUSION AND RECOMMENDATIONS

This research study has established that smallholder rice farmers are young, energetic, resourceful, and their productive age. Some smallholder rice farmers do not belong to any members of cooperative organizations, this make it difficult for them to access loan facilities, farm inputs, fertilizer inputs, and seeds inputs. In addition, they could not participate in bulk purchase of farm inputs or bulk sold farm produce as done by members of cooperative organizations. The smallholder rice farmers obtained loan facilities through formal and informal sources. Loan obtained by smallholder rice farmers from formal sources are with high interest rate. Averagely, smallholder rice farmers obtained 200, 754.72 Naira and 129,558.82 Naira from formal and informal sources respectively. The socio-economic factors statistically and significantly influencing smallholder rice farmers access to formal loan facilities were age, farm size, household size, marital status, level of education, access to extension services and members of cooperative organizations. Seven constraints with Eigen-values greater than one (1) retained by the principal component model and encountered by smallholder rice farmers in accessing loan facilities were: lack of collaterals in obtaining formal loan, cumbersome administrative procedures, high interest rate of formal loan, late disbursement of loan, long distant to financial institutions, small amount of loan, and short re-payment period. The following recommendations were made based on the findings of this research study:

(i) Loans should be made available at affordable interest rate, with single digit, to smallholder rice farmers.

(ii) The cumbersome administrative procedures involved in accessing loan facilities by smallholder rice farmers should be addressed

(iii) Government should make a provision of special microfinance banks that should be located in rural arears to meet the need of farmers' loan demand.

(iv) Training, education and workshops should be organized by extension agents for smallholder rice farmers on guidelines involved in accessing formal loan facilities.

(v) Smallholder rice farmers should be encouraged to join cooperative organizations in order for them to easily access loan facilities.

(vi) Farm inputs, seeds inputs, tractors, fertilizers, credit facilities should be provided for smallholder rice farmers at subsidized price.

COMPLIANCE WITH ETHICAL STANDARDS

Conflict of interest

The authors declared that for this research article, they have no actual, potential or perceived conflict of interest.

Author contribution

The contribution of the authors to the present study is equal. All the authors read and approved the final manuscript. All the authors verify that the Text, Figures, and Tables are original and that they have not been published before.

Ethical approval

Ethics committee approval is not required.

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Data availability

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Consent for publication

Not applicable.

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