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ANALYSIS OF FARM CREDIT ACCESS AMONG CASSAVA-BASED FARMERS IN SOUTH-SOUTH NIGERIA

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ABSTRACT

The study examined the factors that determine rural credit access among farmers who are engaged in cassava-based farming in South-South Nigeria. It identified the reasons for farmer's inability to access farm credit, and analyzed the factors that influences the decision to access farm credit and the amount of farm credit accessed. Data was collected from 284 farmers across three States, and analyzed by descriptive statistics and Heckman selection model. The Heckman first hurdle regression model had a significant Lambda value of -0.102, and positively significant coefficients of age, education, farming experience, land area, and awareness of lending institutions at $p < 0.01$, while household size and incidence of oil spillage were significant at $p < 0.10$ respectively; similarly, the second hurdle model recorded significant values on: education at $p < 0.01$, years of experience at $p < 0.05$, whereas household size, extension visit, land area, and incidence of violence were found to be significant at $p < 0.10$. The factors identified as key constraints to farm credit access are: lack of collateral, exorbitant interest rates, bureaucracies, constrained mobile networks, delayed loan approval, sentiments and tribalism, absence of guarantors, and dearth of banks in rural areas. Also, majority of the farmers perceived that reduction in interest rates and the removal of collateral security as requirement for accessing farm finance will help to improve access to farm credit. To address important demand-side obstacles impeding smallholders' access to farm finance, we recommend that policy must focus on enhancing the availability of information, extension services, and banking services to rural farming families. This will expand smallholders' access to credit, boost agricultural output, and enhance rural livelihoods.

Keywords: Farmers, credit, banking, output, rural.

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INTRODUCTION

Cassava (*Manihot esculenta*), is an essential staple crop in Nigeria and other parts of the world. The growing importance of cassava (*Manihot esculenta*) among Nigerian crops is related to both the country's growing need for food and its evolving potential as a versatile cash crop with significant implications for food security and poverty alleviation (Apata, 2019). The crop is widely reported to be indigenous from South America and was introduced into Southern Nigeria during the slave trade era thriven by Portuguese explorers and colonial masters in the sixteenth century and it accounts for more than 30 percent of Nigeria's agricultural output and the country's food consumption outlay (Nzeakor and Ume, 2021).

For the majority of Nigerians, Cassava (*Manihot esculenta*) is a dietary staple that crosses all social and cultural boundaries (Otekunrin and Sawicka, 2019). Although it can also be used to make fufu, tapioca, chips, and cassava flour, the majority of the cassava grown in Nigeria is consumed as garri (ground cassava roots). Non-edible by-products of cassava include starch, ethanol, and pellets. Waste from cassava processing can also be converted into animal feed, glue, and medicinal chemicals (Musa, Samuel, Sani, and Mari, 2022). According to FAO, (2021), the entire amount of cassava (*Manihot esculenta*) produced globally was estimated to be 278 million tonnes, with Africa producing 170 million tonnes (56%) of the total amount produced while Nigeria produced about 60 million tonnes during the same period, thus holding the coveted title of being the world's highest cassava producer. Despite this high annual production level, the country’s production per hectare falls below the global average of 30 tonnes/ha. This shortfall has been partly attributed to common challenges confronting rural farmers in the country which include poor access to farm credit, inadequate access to improved varieties of planting materials, small farm holdings, as well as poor adoption of necessary technologies on the farm. This makes it difficult to maximize cassava productivity in ways comparable to those used in other cassava-producing nations like Thailand and India, which are witnessing greater yield/ha due to the deployment of new technology and improved farming practices (Otekunrin and Sawicka, 2019).

Credit accessibility has an impact on agricultural performance because it eases capital constraints and promotes investment in contemporary technology, which boosts productivity and output growth. It also improves efficiency because it makes more money available to meet input requirements, which raises output and improves the welfare of smallholder farmers (Haryanto et al., 2023). According to Ukwuaba, Ogbu, and Owutuamor (2020), farmers' use of improved technologies, such as genetically modified seeds, pesticides, farm machinery, and access to credit, is essential to the growth of the agricultural sector and sustainability. In order to achieve sustainable output and ensure food security, farmers may be persuaded to invest in farm inputs by having access to agricultural financial services. Generally, agricultural credit enhances farmer's output by boosting technical efficiency and closing the technological divide by facilitating the use of

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improved farm inputs (Abdallah, 2019). Government and stakeholders at all levels have initiated a number of strategies to increase food production; one of these plans is based on the need to increase farmers' access to agricultural finance in order to boost productivity, while other plans emphasize agricultural diversity (Matthew *et al*. 2019). These tactics are required since the agricultural sector employs more than 50% of the labor force and considerably contributes to the Gross Domestic Product (GDP) in emerging nations, especially in Africa and Nigeria in particular (Osabohien et al., 2020).

According to Ekwere and Edem (2020), mechanization, industrialization, and sustainable economic growth are all aided by agricultural financing. Also, it encourages the development and upkeep of a smooth flow of agricultural inputs, guaranteeing increased productivity in the operations of farm businesses. Furthermore, having access to farm financing helps smallholder farmers to produce more efficiently, which improves rural wellbeing and reduces food scarcity (Mariyono, 2019). Access to credit affects farm performance because farmers who have limited credit are more likely to use less inputs in their operations than their counterparts who have access to financing and the capacity to enable optimal input utilization leading to high output. In a similar vein, Elum and Obiajunwa (2022) found that farmers require financial support in order to cover a variety of everyday costs, including taxes, land levies, maintenance, repairs, and the cost of hiring and purchasing agricultural inputs. They also need to pay labour wages on time. Accessing agricultural credit facilities is therefore necessary for long-term agricultural growth. In most rural areas, credit has been demonstrated to be a useful instrument for lowering poverty and accelerating rural development. Among the causes of the reduction in agricultural output in Nigeria is the scarcity of credit and the absence of a formal national credit policy institutions that can help farmers. Umeh, Udeh, and Egbudu (2023) observed that the provision of farm inputs that farmers are unable to obtain through their own limited capital is a fundamental function of government and financial institutions.

In light of the above realities, this paper provides an analysis of rural credit access among cassava-based farmers in south-south Nigeria. The specific objectives of the study are: evaluate the factors that influences access to farm credit and to analyze the constraints to rural credit access. It is strongly believed that the study will bridge existing knowledge gap on rural credit accessibility and its association with output of cassava farmers in the country. In addition, it will offer evidence that will help policy makers in the country create policies that specifically address financial access in connection with the productivity of cassava-based farmers, especially in rural areas.

MATERIALS AND METHODS

The study was carried out in south-south geopolitical zone of Nigeria, made up of the following states: Akwa Ibom, Bayelsa, Cross River, Delta, Edo, and Rivers. With an estimated population of

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over 26 million people, the South-South zone makes up almost one-third of all of Nigeria's land area. Farmers in the area grow a wide range of crops, such as cassava, maize, yam, vegetables, plantains, and cocoyam etc. Cross-sectional primary data was gathered from farmers who grew cassava in the 2021–2022 cropping season with the use of a structured questionnaire.

Using a multi-stage sample technique, farmers who grow cassava crops in the selected States were chosen at random from the target population. First, the three States (Rivers, Akwa-Ibom and Bayelsa) were selected from the South-South zone of the country. Secondly, two (2) Agricultural Development Programmes (ADPs) zones were selected from each of the Agricultural Zones of the three States (Bayelsa, Rivers, and Akwa Ibom). Thirdly, two (2) Local Government Areas (LGAs) were chosen from each Agricultural Development Zone to form a total of twelve (12) Local Government Areas. Fourthly, four (4) villages from each LGA were chosen at random to form a total of forty-eight (48) villages. Finally, using a list of registered farmers as sampling frame, six (6) cassava-based growers in each village were randomly selected to form a total of 288 respondents although only 284 completed questionnaires were retrieved. The methodology created by Krejcie and Morgan (1970) and applied by Nanjundeswaraswamy and Divakar, (2021) was used to get the sample size. The following variables formed part of the gathered data: the farmers' socioeconomic characteristics such as age, sex, household size, educational background, farming experience, farm size, extension contacts, output and market price of crops, costs, and benefits; the amount of land cultivated; access to credit; labour input; loan repayment history etc.

Data was analyzed using both descriptive and inferential statistics. The determinants of access to farm credit by cassava-based farmers in the study area was analyzed using Heckman double hurdle model. This model follows the theory of consumer behaviour. In order to use the Heckman selection model, it is necessary to first estimate the likelihood that farmers will have access to farm credit. Secondly, the relationship between access to credit and amount of credit received is estimated while accounting for the possible presence of selection bias (Anang, et al., 2015). Thus, the first stage of the Heckman two-stage estimation method is to obtain consistent estimates of the parameters (independent variables as well as inverse Mills ratio, λi), by maximising the log-likelihood function of the probit model of access to credit. The probit model limits the estimated probabilities to fall between 0 and 1. It also loosens the requirement that the effect of the independent variable is constant across a range of predicted values of the dependent variable. The dependent variable in this equation is a dummy variable that takes the value of 0 in the absence of decision to access credit and 1 if the farmer decides to access credit. In the second estimation stage, for all situations where the selection equation equals 1, i.e., for those farmers that have access to farm credit, the estimated inverse Mill, λi is employed as an additional regressor in an ordinary least squares (OLS) regression of Υ_i on the explanatory variables W_i.

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The inclusion of λi as a regressor in equation (2) in the second stage enables us to estimate $\Upsilon_{i,}$ which adds an estimate of the predicted value of the error terms, the inverse Mill's ratio or lambda, to the OLS equation to generate consistent estimates (Long, 1997; and Heckman, 1979). One outcome of the two-step process is a reasonably straightforward test to determine whether sample selection bias is present. The parameters obtained from the second stage are consistent and asymptotically normal. A significant inverse Mill's ratio shows that selection bias is present. The Heckman two-stage selection model was estimated simultaneously in one procedure using Stata Version 13. Several studies including Certo et al. (2016); Anang, Bäckman, and Kola (2015), and Essien, Arene, and Nweze, (2013) have demonstrated that when we have discrete dependent variables, the use of Ordinary least squares (OLS) is insufficient.

Using the Heckman model, the decision of a household to access credit facility is usually determined by a series of factors and it's represented in the following equation:

$$\dot{S}_i = \Upsilon X_{i+} + \mu_i \quad (1)$$

Where,

$\dot{S}_i$ = dummy variable representing farmer's access to credit (probability of access to credit.)

x_i = vector of explanatory (exogenous) variables which influences $\dot{S}_i$

$\dot{S}_i$ is only observable if a farmer had access to credit or not.

Υ is a parameter to be estimated.

In the second stage of estimation, credit amount is regressed on various socio-economic characteristics such as age, marital status, education level, etc.

$$\grave{E}_i = \beta' W_i + \nu_i \, (\text{If}, S_i = 0) \quad (2)$$

Where,

$\grave{E}_i$ = amount of credit received

W_i = vector of variables which determine amount of credit

β = parameter estimates.

From the model shown above, equations (1) and (2), μ_i and v_i have bivariate normal distributions with zero means, standard deviation δ_u and δ_v and they are correlated with correlation coefficient ρ (Duy et al., 2011). It is also assumed that S_i and x_i are both observable for a random sample of individual farmers. However, $\grave{E}_i$ is observed only when the household have access to credit ($S_i=0$). From Heckman (1979), the expected amount of credit received equation is derived as:

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$$E(\grave{E}_i \mid S_i = 1) = E(\grave{E}_i \mid \mathring{S}_i > 0) = E(\grave{E}_i \mid \mu_i > \Upsilon X_i) \quad (3)$$

$$= \beta' W_i + E(v_i \mid \mu_i > \Upsilon X_i) = \beta' W_i + \beta\rho_v\lambda_i(\alpha_\mu)$$

Where,

$$\lambda_i(\alpha_\mu) = \frac{\varphi(\alpha_\mu)}{1-\phi(\alpha_\mu)} = \frac{\varphi(-\alpha_\mu)}{\phi(\alpha_\mu)} = \frac{\varphi(\Upsilon X_i|\alpha_\mu)}{\phi(\Upsilon X_i|\alpha_\mu)} \quad (4)$$

Note that

φ = normal density function

$\boldsymbol{\phi}$ = normal distribution function

$\lambda_i(\alpha_\mu)$ = inverse mills

Therefore,

The Heckman rural credit access model is expressed as:

$$Si = \Upsilon_0 + \sum_{n=1}^{N=13} \Upsilon_n x_{ni} + \mu i \quad (5)$$

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$$Si = \Upsilon_0 + \sum_{n=1}^{N=13} \Upsilon_n x_{ni} + \mu i \quad (5)$$

Where,

S_i = access to credit (dummy, able to access credit =1, unable to access credit = 0);

Υ_0 = vector of unknown parameters

x_i = vector of exogenous variables affecting Si (i= 1-13)

μ_i = random disturbance term.

X_1 = sex of respondent (dummy, male = 1, female = 0);

X_2 = education: (number of years in school)

X_3 = farming experience (number of years of farming);

X_4 = household size (number of household members);

X_5 = total land size (Ha);

X_6= household income (Naira, ₦);

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X_7= value of farm assets (Naira, ₦);

X_8= extension contact (dummy, 1 if there was extension visit, 0 if no extension visit);

X_9= source of credit (dummy, 1 if formal, 0 if others);

X_{10}= incidence of oil spillage (dummy, 1 if oil spill occurred, 0 if no occurrence of oil-spill);

X_{11}= awareness of lending institutions (dummy, 1 if there was awareness, 0 if no awareness)

X_{12}-= incidence of violence (dummy, 1 if violence occurred, 0 if no incidence of violence)

X_{13}= interest rates (dummy, 1 if interest rates are high, 0 if low interest rates)

While the Heckman model for amount of credit received is presented as:

$$\grave{E}_i = \beta 0 + \sum_{j=1}^{N=13} \boldsymbol{\beta j'} \boldsymbol{ji} + \boldsymbol{\nu i} \quad (6)$$

Where,

$\grave{E}_i$ = amount of credit received (Naira, ₦)

β_0 = vector of unknown parameters

W_{ji} = vector of variables which determine loan size (j=1, i = 1-13)

V_i = random disturbance term.

W_1= sex of respondent (dummy, male = 1, female = 0)

W_2 = education (number of years in school);

W_3 = farming experience (number of years in farming);

W_4 = household size (number of household members);

W_5 = total land size (Hectare, Ha);

W_6 = farm income (Naira, ₦);

W_7 = value of farm assets (Naira, ₦)

W_8 = extension service: (dummy, 1 if there was extension visit, 0 if no extension visit);

W_9 = source of credit (dummy, 1 if formal, 0 if others);

W_{10} = incidence of oil spillage (dummy, 1 if there was spillage, 0 if no incidence of spillage)

W_{11} = awareness of lending institutions (dummy, 1 if there was awareness, 0 if no awareness)

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W_{12} = incidence of violence (dummy, 1 if violence occurred, 0 if no incidence of violence)

W_{13} = interest rates: (dummy, 1 if high interest, 0 if low interest)

In order to achieve the study objectives, the respondents' perceived factors limiting access to farm credit were rated on a four-point Likert scale, and presented as follows: strongly disagreed 4, disagreed = 3, agreed = 2, strongly agreed = 1. The Likert scale is a technique for giving numeric values to qualitative perception that may be subjected to statistical analysis. To find the mean score, the response values were put together and then divided by four. The mean score equation is expressed as:

$$X = \frac{\sum f_n}{N} \quad (7)$$

Where,

X = Mean score;

$\sum$ = Summation;

f = Frequency or number of respondents.

RESULTS AND DISCUSSIONS

Table 1: Distribution of cassava farmers based on gender, types and amount of credit accessed

	Formal credit households		**Informal credit households**	
Gender	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Male	65	43.1	59	39.1
Female	86	56.9	74	60.9
Total	151	100	133	100
	Mean Credit received (₦)		**Mean Credit received (₦)**	
Male	65	250714	59	120315
Female	86	238000	74	97842
Pooled	151	244483	133	109078

Source: *field survey data, 2023*

The distribution of the respondents based on the types and amount of credit across gender is presented in Table 1. The result reveals that more female headed households were engaged in

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cassava-based farming activities than their male counterparts in both groups of households. Specifically, while the female-headed households recorded under formal credit and informal credit access were 56.9 percent and 60.9 percent respectively, the share of male-headed farmers in the informal credit households was 43.1 percent and 39.1 percent respectively. On the contrary, the mean amount of formal credit obtained by the male-headed households was two hundred and fifty thousand, seven hundred and fourteen Naira (₦250,714), a little above the amount received by their female counterparts, which was found to be two hundred and thirty-eight thousand Naira (₦238,000). In a similar vein, male headed farmers in the informal credit category got an average farm credit amounting to one hundred and twenty thousand, three hundred and fifteen thousand Naira (₦120,315) compared to the ninety-seven thousand, eight hundred and forty-two Naira (₦97,842) accessed by the female farmers in the area. The result implies that while more females were engaged in cassava farming activities, their male counterparts had access to more volume of farm credit, irrespective of the source. This result aligns with Odoh, et al. (2024), who observed that women in sub-Saharan Africa have less access to productive inputs, such as improved seed varieties, extension services land, and capital input than their male folks. This scenario envisages a threat to development as gender equity is vital for poverty reduction and sustainable development (Sadiq et al., 2022). According to Galli, Mascia, and Rossi, (2020), financial inclusion promotes the creation of enterprises and enables people to build up savings while gender gap in financial inclusion limits women's ability to participate in the economy, which is a significant barrier to women's empowerment.

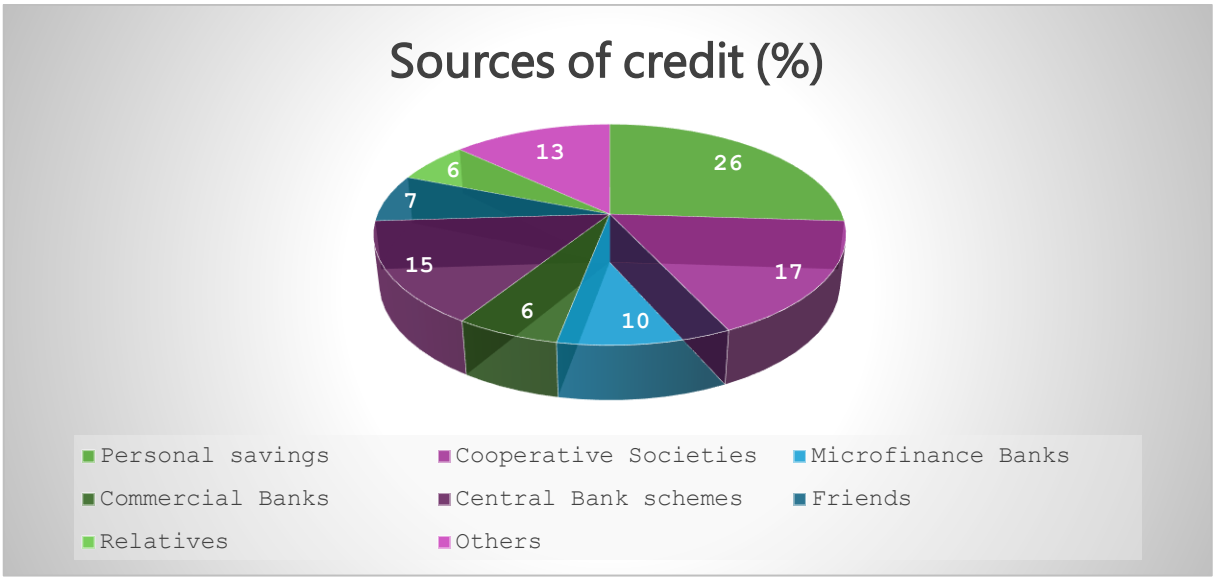

Figure 1: sources of farm credit by farmers in the study area

Source: Field survey, 2023.

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The distribution of the common sources of credit for the cassava-based farmers in the study area is presented in Figure 1. It was observed that the farmers obtained their credits from both prescribed formal sources and informal sources. The commonly accessed formal farm credit sources in the area include: cooperative societies (17 percent), incentives and interventions from the Central Bank of Nigeria (15 percent); and Microfinance banks (6 percent). On the other hand, result revealed that the most dominant informal sources of credit in the area were: personal savings (26 percent), friends (7 percent), and family members (6 percent), while 36 percent of the respondents depended on other sources to finance their daily farming operations. According to Ikenga, Oyita and Gbigbi, (2024), Smallholder farmers in Nigeria obtained farm credit from two major sources for their farming activities namely formal financial segment or the informal financial sector. More so, Akporawo, Emaziye, and Osemedua (2022) in their study found that 45.2% of respondents obtained their farm credit from cooperative societies, while 94.8% of respondents obtained their farm credit from personal savings. This massive self-provision of loans is a sign of a lack of capital for the investment needs of rural farmers.

Table 2: Determinants of rural credit access by farmers in the study area

Variables	**Decision to access credit (First Hurdle Model)**		
	Coefficient	**SE**	**Z**
Age	1.114	0.092	12.118***
Gender (male=1; female=0)	-0.012	0.015	-0.770
Level of education (years)	0.009	0.002	5.413***
Farming experience (years)	0.009	0.002	4.379***
Household size	-0.009	0.005	-1.893*
Total land size (Ha)	0.006	0.001	5.847***
Household income (Naira)	0.000	0.000	-0.375
Farm capital (Naira)	0.000	0.000	0.225
Extension contacts (number)	0.002	0.016	0.142
Incidence of oil spillage (YES=1, NO=0)	0.032	0.018	1.791*
Awareness of lending institutions	0.073	0.019	3.842***
Incidence of violence (YES=1, NO=0)	-0.017	0.015	-1.112
Interest rates (%)	-0.004	0.004	-0.877
Lambda	-0.102	0.028	-3.59***
Wald chi^2 (26)	120.20***		
Uncensored (credit access) observations	151		
Censored (non-credit access) observations	133		

Source: Field survey data, 2023, ***, ** and * are significant at 1%, 5% and 10% respectively.

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The results from Table 2 presents the maximum likelihood estimates of the first part of the Heckman model. The lambda of the model provided the percentage of total variability not explained as 10%. This implies that the variables in the model accounted for 90% of the variability in the amount of credit obtained for farming. Stated otherwise, the explanatory variable's coefficients quantify the sole impact of the independent variables on the main equation's dependent variable, which is the amount of credit received. The negative sign of the inverse Mill's ratio indicates that, in the absence of selection bias correction in the model, it is likely that the estimated coefficients were skewed down. The chi-square of the model was statistically deviated from zero, indicating that socioeconomic characteristics of farmers have a significant effect on their decision to access credit and on the amount of credit received. The coefficients of age, education, farming experience, land area, and awareness of lending institutions were positively significant at $p < 0.01$ respectively, while household size and incidence of oil spillage was positively significant at $p < 0.10$; similarly, the second hurdle model recorded significant values on: education at $p < 0.01$, years of experience at $p < 0.05$, whereas household size, extension visit, land area, and incidence of violence were found to be significant at $p < 0.10$. The household size, on the other hand, had a coefficient with negative sign at 10 percent level of significance. This implies that a unit increase in the age, years of education, years of farming experience, land size, incidence of oil spillage, and awareness of presence of lending institutions of the farmers in the area will bring about a corresponding increase in chances of rural cassava-based farmers having access to credit facilities from financial institutions.

In reality, education has a significant impact on farmers' decisions to obtain loans as well as the actual amount of credit they acquire. Gupta and Sharma (2022), observed that because credit has an indirect effect on raising productivity, educated farmers are more likely to understand the value of money and how to use it. It is also generally perceived that educated farmers have higher administrative skills and talents that increase the possibility of loan repayment, financial institutions are also more ready to offer loans or credit facilities to these farmers. According to Rahman, Islam, Mahmuda, and Hossain, (2022) educated farmers were more likely to request for credit and were more likely to access larger loans than less educated farmers. This is because educated farmers have a better understanding of financial concepts and are perceived as having better managerial skills, making them more attractive borrowers for financial institutions.

Similarly, the decision to access credit showed a positive relationship with years of farming experience. Farmers with greater expertise are more likely to request credit since they are more aware of its advantages due to prior use. Financial institutions are also more likely to grant credit to seasoned farmers who have a history of making their loan payments on time or managing their loans well. The claim that seasoned farmers are more likely to get finance and receive greater loan amounts is supported by research by Johnson et al. (2021). According to the study, farmers with a

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longer history of farming had established ties with lenders, were more familiar with credit utilization, and had access to more loans. Financial organizations evaluate a person's creditworthiness by evaluating their financial records, income stability, and past repayment behavior **(**Bhattacharya et al., 2021). Farmers are more likely to have greater access to credit and receive bigger loan amounts if they have a strong credit history, as evidenced by prompt loan repayments and prudent money management. On the other hand, farmers with bad credit histories can have trouble getting credit or might only get smaller loans because they are seen as larger risks (Umeh et al., 2023; Bhattacharya et al., 2021).

Total land area revealed a favourable correlation with both the choice to access credit and the amount of credit actually received. Due to larger farm sizes, with corresponding higher output, farmers are more likely to request for credit to pay for labour, farm equipment, and seedlings. As these farmers are thought to have a higher likelihood of earning income and repaying the loan, financial institutions are likewise more likely to grant credit to them. Farmers with larger plots of land are seen by financial institutions as having higher potential for increased production capacity, income generation and loan repayment. This conforms to the findings of Ekwere and Edem (2020); Li and Wang (2020)**,** who found that that farmers with larger land holdings had higher credit demand and obtained larger loan amounts.

It was further found that the prevalence of oil spillage had a positive impact on farmers' decisions to access farm credit, probably because farmers with oil spillage problems may need credit to invest in structures that lessen its impact, on farm productivity. According to Yang et al. (2023), the need for additional finance to invest in solutions that reduce the impact of soil degradation on agricultural productivity may be recognized by farmers who are experiencing soil failure. Although, oil spillage may not be a criterion that lenders specifically take into account when making decisions to determine the credit a mount granted to farmers. Edaba and Brown (2021) identified oil spillage as one key obstacle to the ongoing fight against food insecurity and poverty levels in South-South region of Nigeria.

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Table 3: Determinants of level of credit access by the farmers in the area

Variables	Amount of credit received (Second Hurdle Model)		
	Coefficient	SE	Z
Age	-3.311	1.099	-3.014***
Gender (MALE=1; FEMALE=0)	-0.049	0.096	-0.506
Level of education (years)	0.447	0.127	3.512***
Farming experience (years)	0.025	0.013	1.996**
Household size	0.154	0.074	2.066**
Total land size (Ha)	0.602	0.206	2.916***
Household income (Naira)	0.000	0.000	0.233
Farm capital (Naira)	0.070	0.023	3.043
Extension contacts (number)	0.008	0.231	1.714**
Incidence of spillage (YES=1, NO=0)	-0.309	0.291	-1.064
Awareness of lending institutions	0.177	0.247	0.716
Incidence of violence (YES=1, NO=0)	-0.184	0.219	-0.839
Interest rates (%)	-0.353	0.040	-8.824***
Lambda	-		
Wald chi^2 (26)	120.20***		
Uncensored (credit access) observations	151		
Censored (non-credit access) observations	133		

Source: Field survey data, 2023, ***, ** and * are significant at 1%, 5% and 10% respectively.

The results of the second hurdle equation as presented in Table 3 reveals the maximum likelihood estimates of the second stage of the Heckman selection model. The result showed positive and significant coefficients for education level at $p < 0.01$, years of farming experience and household size at $p < 0.05$, land area under cultivation and extension visits at $p < 0.10$, while age and interest rate were all found to be negatively significant at $p < 0.05$, respectively. The interpretation of this result is that cassava-based farmers in the area have the tendency to receive additional units of credit facilities as their education levels, years of farming experience, extension visits, and area of land under cultivation increase. On the other hand, increase in age and interest rate will reduce the amount of farm credit accessed.

Household size showed a weak correlation with the decision to access credit but a good correlation with the amount of credit actually received. Larger households frequently use family members to help with farming tasks, which reduces the need for hired labour and, thus, the demand for loans. But when larger households do need more labour and pay more, they might turn to borrowing credit to cover their expenses. Therefore, since the borrowed credit is used for its intended purpose,

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farmers with larger household sizes are more likely to acquire higher volumes of credit. According to a study by Chen et al. (2019), larger households have a tendency to rely on family labour, which lowers the need for credit by reducing the requirement for hired labour**.** According to Taremwa (2022), family size is a crucial factor in the rural economy since it affects how many workers each farmer has access to. Similar results were obtained by Onoja et al. (2014) who found that larger households were connected with greater agricultural yields. Similarly, extension visits had a statistically significant coefficient value at 10% level of significance. By interpretation, the more interactions farmers have with extension agents, the higher their possibility of accessing more funding from financial institutions. Elum and Obiajunwa (2022) noted that extension personnel who are knowledgeable and good at communicating can assist farmers in raising the productivity and success of their agricultural enterprises. Also, Micah et al. (2014) discovered a negative but significant relationship between output and technical inefficiency among pepper crop growers with access to institutional funding.

The interest rate and the amount of credit extended showed a negative relationship. This suggests that farmers who considered interest rate as very high received less amount of credit when compared to those who perceived it as low. No doubt, when interest rates are high, financial institutions are more inclined to offer bigger volumes of credit, and when interest rates are low, the volume of credit declines. According to a study by Thabiso, (2023), higher interest rates are linked to bigger loan amounts because financial institutions are more likely to lend when there is a higher chance of making money off the loan.

The negative coefficient of age suggests that as people get older, amount of farm credit received will decline. This outcome is consistent with *a priori* expectations; this could plausibly imply that older farmers are less productive and the propensity to adopt new technologies is lessened as compared to young farmers. Another plausible explanation for this outcome is that financial institutions would prefer to grant credit to young and more active farmers. Also, in consonance with this result are the findings of Ojo and Baiyegunhi (2020), especially in terms of ages, access to farm credit and agricultural output.

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Table 4: Perceived factors limiting access to farm credit

Variables	Std Deviation	Variance	Mean	Rank order
Lack of collateral	2.596	6.740	3.36	1
High interest	1.057	1.118	3.20	2
Crude oil spillage	1.631	1.032	3.18	3
Bureaucracies	1.073	1.151	3.14	4
Lack of mobile networks	1.110	1.232	3.11	5
Late Approval of loans	1.163	1.354	3.09	6
Gender bias	0.983	0.621	3.10	7
Sentiment and tribalism	1.009	1.019	3.09	8
Inadequate insurance	1.002	0.932	3.07	9
Lack of guarantorship	2.087	4.354	3.06	10
Poor government policies	1.48	1.029	3.04	11
Illiteracy	1.74	1.451	3.01	12
Lack of banks in locality	1.118	1.251	2.98	13
Incidence of violence	1.53	0.914	2.95	14
Small scale farming	1.014	1.027	2.87	15
Loan approved too small	0.961	.924	2.95	16
Delay in loan approval	0.984	0.968	2.93	17
Crop failure due to climate	1.002	0.981	2.91	18
Limited awareness	1.047	1.096	2.88	19
No bank account	1.201	1.441	2.33	20
Delay in processing credit	1.027	1.054	2.85	21
Total valid sample size	284			

Source: *field survey data, 2023*

The ranking of limitations related to access to farm credit is presented in Table 4, and it identified and categorized the key constraints confronting cassava-based rural farm families in the study area. According to Saleem et al. (2014), credit constraints imply poor government policies and limited access to formal credit facilities which mostly impede farmers from meeting up with their daily farming obligations and expectations thereby hindering their ability to attain living standard, well-being, and improved farm production process. The mean values of these constraints were further computed and ranked in order of their influence (from highest to lowest means) as follows: no collateral ($\bar{x}$ = 3.36), high interest ($\bar{x}$ = 3.2), bureaucracies ($\bar{x}$= 3.14), lack of mobile networks (($\bar{x}$ = 3.11), late approval of loans ($\bar{x}$ = 3.09), sentiment and tribalism ($\bar{x}$ = 3.09), lack of guarantorship

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($\bar{x}$ = 3.03), lack of banks in rural locality ($\bar{x}$ = 2..98), small scale farming ($\bar{x}$ = 2.98), loan approved identified as variables limiting access to credit in the research area were too small ($\bar{x}$ =2.95).

From the findings, the standard deviation of all the variables were slightly above one, except for 'loan approved too small', implying that the individual responses vary slightly from the mean; hence the respondents had different perception concerning the constraints confronting their ability to access credit facilities. This is in line with the findings of Rahman, et al. (2022) who reported an average standard deviation of 1.2 on the constraints regarding access to farm credit in Bangladesh. In developing economies, farmers could procure farm implements and expand their production outlay, but they are urged by limited credit facilities to confine their expense and production preferences.

Our empirical findings provide evidence on the wide prevalence credit of constraints such as: inadequate collateral, high interest rates, bureaucracies, limited mobile networks, late approval of loans, sentiment and tribalism, lack of guarantorship, and lack of banks in rural locality. These results also agree with the findings of Umeh, et al. (2023); Adewumi et al. (2019); and Amurtiya et al. (2018). The fact that inadequate collateral security occupied the first position in the rank of constraints is in conformity with what is expected because the average farmer in Nigeria is poor and therefore lacks the resources to meet the ambiguous credit conditions required by most financial institutions. Thus, a farmer's output, investment, income, and welfare are distorted and compromised. The prospects of agricultural production in most developing countries is hampered by the consequences of adverse effects of credit constraints on farmers' income and investment. Just like the findings of Gadnakis (2019) on sources, access, and factors influencing credit demand in Nigeria, under the African settings, land is a sacred property that is required to be passed from generation to generations. Hence, most farmers are unwilling to pledge their landed property as collateral security in exchange of bank loans

Table 5: Ways of improving access to formal and informal credit sources

Ways of improving access	**Formal sources**		**Informal sources**	
	Frequency	**Percentage**	**frequency**	**Percentage**
Improve information access	118	78.1	98	73.6
Availability of assets for collateral	129	85.4	124	93.2
Reduce rigidity	106	70.2	107	80.5
Interest rate subsidy	148	98.0	131	98.4
Accessibility of financial institution to rural farmers	131	86.8	102	76.7
Total	**151**	**100**	**133**	**100**

Source: *field survey data, 2023*

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Results on ways of improving access to credit for farmers in the study areas is shown in Table 5. From the result, a major proportion of the respondents would want interest rates subsidized (98.0 and 98.4 percent respectively). Similarly, most of the respondents perceived the need to move financial institutions closer to their rural areas (86.8 percent of formal access category and 76.7 percent of informal access category respectively). Again, availability of collateral remained a major concern to the sampled respondents. As reflected in the result, 85.5 percent of the respondents who obtained credit via formal sources and 93.2 percent of the respondents under the informal sources category perceived the need for government and financial institutions to reduce the collateral requirement condition for accessing farm financing. The study finding conforms to Umeh et al. (2023) and Oboh and Kushwaha (2009). It is sufficing to say that credit access and availability is a critical factor in ensuring and sustaining agricultural productivity.

CONCLUSION

Farm credit is an essential component of agricultural growth and development. In this context, the Heckman two-stage selection model was employed to assess the factors influencing rural credit access in the study area. The study's empirical findings showed that farmers with higher levels of education, large farm households, access to extension services, and longer years of farming experience as well as those who were familiar with the presence of lending institutions in their areas were more likely to access credit facilities for their farms. Furthermore, the amount or level of credit obtainable was found to be significantly influenced by years of farming experience, land area, oil spills, household size, and education level. Also, the study found that the most compelling constraints to farm credit access in the study area were, lack of collateral, exorbitant interest rates, bureaucracies, constrained mobile networks, delayed loan approval, sentiment and tribalism, absence of guarantors, and dearth of banks in rural areas. In concluding, the study infers that, given the significance of arable crop cultivation in rural areas, agricultural credit programs may become the most reliable panacea to facilitating food security and ensuring poverty eradication in the country. Consequently, the study makes the following recommendations.

i. Collateral security requirements in loan applications could be lifted for a certain group of persons, especially for poor and indigent rural farmers, to enable them increase the size of their farms.
ii. Government agencies, and legislators should provide a regulatory framework that supports formation of needed financial institutions and products in rural areas to cater for the needs of poor and low-income earners; promote financial inclusion and enhance farmers' incomes.
iii. Farmers are encouraged to organize into strong groups to enable them get the most out of collective investment, group savings, input access, government organizations and extension service providers.

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iv. To enable farmers to apply for loan from formal sources, the government should embark on lowering the interest rates paid on credit.

v. Farmers should be educated and enlightened on farm financial matters particularly with obtaining credit.

vi. There is need for policy that would ensure that financial institutions release the required amount of credit that farmers apply for.

vii. In order to address the gender gap in credit access, the government should establish supervised credit programs with considerations for gender equality.

viii. Finally, the study provides a foundation for future studies, that could include a robust analysis of the determinants of credit access, and the limitations across gender in the study area.

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