



Factors influencing collateral demand among crop farmers

Factores que influyen en la demanda de garantías entre los agricultores

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Abstract

The study examines the factors contributing to collateral demand among crop farmers in agrarian communities in Delta State, Nigeria. The study used a multistage sampling technique to select 135 crop farmers. Data was collected using structured questionnaires and interviews. The results showed that the average age of the respondents was 47 years, most of the respondents were male, and the average household size was 5 persons. The majority of respondents had some level of education, with an average farming experience of 14 years. The average farm size was 3 hectares, and the mean yearly income was N175, 008.30. On average, farmers lived approximately 7.40 kilometers away from financial institutions. A significant portion of respondents had to provide collateral when accessing credit. Common types of collateral used included assets, land title deeds, guarantors, and farm-related assets. Cooperative societies were the primary financial institutions where respondents sought credit. The logistic regression analysis identified several factors that significantly influenced collateral demand at a 5% probability level. These factors include loan size, duration, purpose, borrower-lender relations, and collateral availability. The t-test results indicated that there is a significant level of credit accessibility among the sampled crop farmers. The study recommends the implementation of policies that enable farmers, without appropriate landed properties, to access funds for farming activities. This suggests the need for alternative forms of collateral or credit arrangements to support farmers who lack traditional collateral such as land.

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Resumen

El estudio examina los factores que contribuyen a la demanda de garantías entre los agricultores de las comunidades agrarias del estado de Delta, en Nigeria. El estudio utilizó una técnica de muestreo multietápico para seleccionar a 135 agricultores. Los datos se recopilaron mediante cuestionarios estructurados y entrevistas. Los resultados mostraron que la edad media de los encuestados era de 47 años, la mayoría de ellos eran hombres y el tamaño medio de los hogares era de cinco personas. La mayoría de los encuestados tenía algún nivel de educación, con una experiencia media en agricultura de 14 años. El tamaño medio de las explotaciones agrícolas era de tres hectáreas y los ingresos medios anuales ascendían a 175 008,30 nairas. En promedio, los agricultores vivían a unos 7,40 kilómetros de distancia de las instituciones financieras. Una parte significativa de los encuestados tuvo que aportar garantías para acceder al crédito. Los tipos de garantías más comunes eran activos, títulos de propiedad de la tierra, avalistas y activos relacionados con la explotación agrícola. Las cooperativas eran las principales instituciones financieras a las que los encuestados acudían para solicitar crédito. El análisis de regresión logística identificó varios factores que influían significativamente en la demanda de garantías con un nivel de probabilidad del 5 %. Estos factores incluyen el tamaño del préstamo, la duración, la finalidad, las relaciones entre el prestatario y el prestamista y la disponibilidad de garantías. Los resultados de la prueba *t* indicaron que existe un nivel significativo de accesibilidad al crédito entre los agricultores de la muestra. El estudio recomienda la aplicación de políticas que permitan a los agricultores, que no disponen de propiedades inmobiliarias adecuadas, acceder a fondos para actividades agrícolas. Esto sugiere la necesidad de formas alternativas de garantías o acuerdos de crédito para apoyar a los agricultores que carecen de garantías tradicionales, como la tierra.

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Palabras clave: : garantía; demanda de garantía; crédito; accesibilidad; agricultores

Introduction

Access to credit is indeed crucial for smallholders in developing countries like Nigeria, as it can significantly impact agricultural production and overall livelihoods. Smallholders often lack the financial resources to make significant investments in their farms. Credit provides them with the necessary funds to purchase essential inputs, machinery, and make improvements to their land. Access to credit can lead to increased farm output, improved crop yields, and better livestock management, ultimately contributing to food security and poverty reduction. Agricultural credit can be categorized into institutional and non-institutional sources. Institutional sources include formal financial institutions like commercial banks, microcredit institutions, and NGOs. These organizations provide credit through structured lending processes. Non-institutional sources encompass informal channels such as family members, associates, money lenders, input suppliers, and esusu (Gbigbi 2017). These sources may not have formal lending structures but play a vital role in meeting the credit needs of smallholders (Hussain and Thapa, 2012).In

rural areas of Nigeria, smallholders rely heavily on informal sources of credit due to various reasons, including limited access to formal financial institutions, complex loan application procedures, and stringent collateral requirements. Informal credit sources, such as borrowing from relatives, input suppliers, and fellow producers, provide an alternative means for smallholders to access much-needed funds (Gbigbi 2019). Smallholders often face challenges in accessing credit from formal institutions. These challenges may include insufficient collateral, lack of financial literacy, and limited documentation of their income and assets. Large scale farmers, with higher income and more significant assets, generally find it easier to secure loans from institutional sources. Other major challenges faced by farmers are geographical distance from financial institutions and complex application procedures. Due to the difficulties in obtaining credit from formal institutions, many farmers turn to non-formal or informal credit sources, even though they often come with higher interest rates and less favourable terms. The fact that farmers are resorting to non-formal credit sources indicates a decline in their ability to access credit through formal channels.. Government agencies and non-governmental organizations (NGOs) often play a critical role in facilitating access to credit for smallholders. They may provide training in financial literacy, support the establishment of cooperative societies, and offer subsidized credit programs. Nevertheless, to improve smallholders' access to credit, there is a need for policies that address the specific challenges faced by this group. This includes simplifying loan application processes, reducing collateral requirements, and expanding financial literacy programs. Improving access to credit for smallholders can have a positive economic impact by increasing agricultural production, reducing poverty, and boosting rural development. According to Gbigbi (2017), smallholders rely more on non-institutional credit sources rather than institutional credit. Non-institutional credit, which could include informal lenders or local moneylenders, accounts for a significant portion (90%) of credit for smallholders. This suggests that formal financial institutions like banks are not the primary source of credit for small-scale farmers. Whereas, access to loans with favourable terms and conditions is crucial for global economic development and poverty eradication. This emphasizes the importance of making credit accessible to smallholder farmers on terms that are reasonable and supportive of their agricultural activities.

Generally, access to credit by farmers is influenced by the lending terms of banks and information asymmetry in Nigeria (Njogu et al 2018; Enimu et al 2018; Osano et al 2016). This implies that the lack of information or transparency in the lending process can be a barrier for smallholders in accessing institutional credit. According to Gbigbi et al (2019), access to financial services, including credit, can contribute to the commercialization of smallholder agriculture and help alleviate poverty in rural communities. When farmers have access to credit, they can invest in their farming activities and potentially improve their income and livelihoods. Collateral, such as land or machinery, is pledged by borrowers to secure loans. Collateral provides assurance to lenders that the loan will be repaid. In the

farming sector, the ability to use land or machinery as collateral is particularly important because of their value and resale potential. This reduces the financial risks for lending institutions and can make it easier for farmers to access credit (Calomiris et al 2017; Duarte et al 2017). However, the role of collateral in lending depends on the policies of lending institutions (Manove et al. 2001). Moreover, collateral can have a disciplinary effect on borrowers, encouraging them to meet their loan obligations but it can also reduce the incentive for banks to closely monitor borrowers, potentially leading to riskier lending practices. Smallholders in rural areas, in particular, face various challenges in accessing institutional credit. These challenges include complex documentation procedures, high interest rates, short-term credit availability, and the requirement of mortgages or property as security. These factors can restrict smallholders' access to formal credit sources (Gbigbi, 2019). Previous research (Abdullah, 2016; Hussain and Thapa, 2012; Tagar and Panhwar, 2010) has identified institutional constraints as a barrier to smallholders' access to institutional credit. These constraints may include bureaucratic processes or policies that make it difficult for smallholders to qualify for loans from formal financial institutions.

Collateral serve as a means to deter borrowers from conveniently defaulting on their loans. When borrowers provide collateral, they have a personal stake in repaying the loan since they risk losing the collateral if they default. Thus helping to reallocate risks and to prevent over-investment (Blazy 2020). Collateral also serves as a means for lenders, particularly banks, to access information on borrowers (DeMarzo 2019). By requiring collateral, banks gain insights into the financial health and credibility of borrowers, which can be used for monitoring and risk assessment. Additionally, collateral can influence borrowers' behaviour in the sense that they are more motivated to avoid default when they pledge collateral. Hence, causing changes in their behaviour to ensure timely loan repayment (Le and Nguyen 2019). Furthermore, collateral is more commonly required in formal sources of credit, like banks, as compared to informal sources. Smallholders often struggle to access formal credit due to their limited landholdings and financial standing, which makes it difficult for them to provide sufficient collateral. Institutional lenders, like banks, often require collateral from borrowers to offset the loan in case of default (Wang et al 2020; Liu et al 2020). In the context of agricultural credit, collateral can include land, gold, revenue, wage accounts, and livestock. Farmers' access to credit is impacted by the availability of suitable collateral. The types of collateral required by institutional sources can affect the accessibility of agricultural loans.

Some studies have highlighted the relationship between demand for collateral and access to credits. For instance, Hananu et al (2015) study suggests that there is a negative relationship between the demand for collateral and access to credit. High collateral requirements can hinder credit access, particularly for those who lack substantial assets. Usually, collateral can take various forms, including land mortgages, business assets (equipment and stock), and personal guarantees. The type of collateral

affects how it incentivizes borrowers and influences their risk perception. Entrepreneurs who can provide collateral may be more likely to invest because they have better access to favourable credit conditions (Chapoto and Aboagye, 2017; Kautonen et al 2020) and the investments can, in turn, increase their future access to finance. Also, collateral can act as a means of self-selection, where entrepreneurs who pledge collateral signal that they are less risky borrowers to lenders

The type and availability of collateral can significantly influence the lending process and outcomes. Collateral, such as real assets or personal guarantees, is often required by lenders, like banks, to secure loans. It serves as a form of assurance for the lender in case the borrower defaults on the loan (Liu et al 2020; Zecchini and Ventura 2009)). Many small business owners, including in Italy, use personal collateral or guarantees to access credit. This collateral helps to reduce the potential loss for the lender in case of default. The presence of collateral requirements can affect the accessibility of credit for individuals and small business owners. Social security guarantors may also impact the ability to obtain credit (Addo, et al, 2011). This can make it challenging for some individuals to access credit for investment purposes, potentially limiting economic opportunities. Financial accessibility is often easier for individuals who have higher-value assets that can be used as collateral (Ai et al 2020). This means that those with more valuable assets may find it easier to secure loans and access credit.

This trend can hinder agricultural productivity and overall economic development. To address this problem, it is essential to conduct an analysis of the factors that drive the demand for collateral and lending decisions by financial institutions when dealing with farmers. Understanding these determinants can help develop strategies to make credit more accessible to farmers without compromising the financial stability of lending institutions.

Collateral plays a versatile role in lending, impacting borrower behaviour, risk assessment, and credit access, particularly in the context of smallholders and agricultural credit. There appears to be a lack of comprehensive research on the demand for collateral and credit accessibility, particularly for arable crop farmers in the study area. This gap in research could be due to limited data availability and empirical studies on this issue. An empirical study conducted in Ghana on maize farmers by Stephen and Kwasi (2017) was the closest to this study. This study likely focused on understanding the role of collateral and credit access in the context of maize farming in Ghana. This research aims to fill the gap in existing literature by investigating the determinants of collateral demand and access to credit among crop farmers, with a focus on how these factors impact crop productivity in the study area is apt.

The specific objectives of the study are to:

- i. describe the socio-economic characteristics of respondents.
- ii. identify the types of collateral used by the respondents in the study area.
- iii. identify the credit sources of the respondents.

v. determine the factor influencing collateral demand on access to credit and crop production in the study area.

Research hypothesis

Ho: There is no significant relationship between collateral demand and socioeconomic determinants of farmers in the study area

Theoretical Framework: The study was based on the theories of Moral Hazard, Corporate Liquidity, Pecking Order and A Bird in a Hand.

Materials and methods

The study was conducted in Delta State. This is the geographical area where the research took place. Delta is a part of the Niger Delta states and was created from the defunct Bendel state. Delta state is located between longitude 50.001 and 60.451 East and latitude 50.001 and 60.301 North. The state is 7440 km² in size. Delta state is located in the mangrove swamp and rain forest, and fresh water forest in the south and central agricultural zones respectively. The north agricultural zone is under derived savannah vegetation cover. The state is bounded on the north by Edo State, on the South by Bayelsa State, on the east by Anambra state, on the west by Atlantic Ocean. It consists of twenty five local government areas with a population of 6,037,667 people (NIPC, 2021). The state is divided into three agricultural zones which include Delta North, Delta South and Delta Central agricultural zones. A lot of farming activities are carried out in Delta state which includes arable crop farming, livestock and fish farming. Its climate and soil encourage farming.

A multistage sampling technique was used to select respondents for the study. This technique involves multiple stages of sampling to ensure that the sample is representative of the population. All nine communities in the area were purposively selected as the primary sampling units. This means that all communities were included in the study due to the significance of agriculture in the region. Within each of the nine selected communities, random sampling was used to select 15 farmers who had interacted with both formal and informal financial institutions. This stage resulted in a total of 135 farmers being chosen as respondents. Data for the study was primarily obtained from primary sources. This suggests that the researchers collected data directly from the field rather than relying on existing data. The data collection method mentioned is the use of a structured questionnaire. The study used both descriptive and inferential statistics to achieve its objectives. Descriptive statistics are used to summarize and present data, while inferential statistics are used to make inferences or draw conclusions from the data. Overall, this research

focuses on the financial interactions and practices of farmers in the study area, with a specific emphasis on their engagement with formal and informal financial institutions. The use of a multistage sampling technique and the analysis of primary data through structured questionnaires suggest a rigorous approach to gathering and analysing information for the study.

Model specification

Logistic regression model

The logistic regression model was adopted because the dependent variable is dichotomous and binary in nature. The possibility of a loan being secured or not was investigated using a logit model. Collateral is a dummy or binary dependent variable that takes the value 1 if the loan is backed with collateral and 0 (zero) otherwise.

Allow Y_i to represent the bank's decision to require or not require collateral from borrowers. Y_i is thought to be influenced by a collection of loan features, institutional factors, and relationship factors (X_i). The following is the relationship between dependent and independent variables:

$$Y_i = \beta_1 \beta_2 X_i + \mu_i \tag{1}$$

Since we just want to know whether or not banks require collateral, we therefore define another variable Y^* such that:

$Y^* = 1$ if the farmer secures the loan with collateral

$Y^* = 0$ if the farmer does not secures the loan with collateral.

Hence

$$Y_i^* = \beta_1 + \beta_2 X_i + \mu_i, Y = 1(Y_i^* > 0) \tag{2}$$

This means Y is one when $Y_i^* > 0$ and Y is zero if $Y_i^* \leq 0$.

As a result, it is presumed that μ_i is unrelated to X_i and that μ_i has standard logistic distribution. In addition, μ_i has a symmetric distribution about zero. The probability (π) that the financial institution will accept collateral is estimated using the logistic function

$$\pi_i = \frac{1}{1 + e^{-Y_i^*}} = \frac{1}{1 + e^{-(\beta_1 + \beta_2 X_i + \mu_i)}} \tag{3}$$

The Equation restricts P_i to lie between 0 and 1 as required for probability

$$1 - P_i = \frac{e^{-(\beta_1 + \beta_2 X + \mu_i)}}{1 + e^{-(\beta_1 + \beta_2 X + \mu_i)}} \quad (4)$$

Let $\beta_1 + \beta_2 X + \mu_i = Z$

Then it becomes

$$1 - P_i = \frac{e^{-z}}{1 + e^{-z}} \quad (5)$$

Rearranging

$$e^z = \frac{P_i}{1 - P_i} \quad (6)$$

Taking the log of both sides

$$\ln e^z = \ln \left[\frac{P_i}{1 - P_i} \right] \quad (7)$$

$$Z_1 = \ln \left[\frac{P_i}{1 - P_i} \right] \quad (8)$$

$$\ln \left[\frac{P_i}{1 - P_i} \right] = \beta_1 + \beta_2 X_1 + \mu_i \quad (9)$$

The cumulative logistics probability model is econometrically specified as follows:

$$P_i = Y_i^* = F(\beta_1 + \sum \beta_2 X_i) = F(Z_i) = \frac{1}{1 + e^{-Z_i}} \quad (10)$$

Where, P_i is the probability that a bank will demand collateral or not when giving loan
 X_i represents the i th explanatory variable; and β_1 and β_2 are parameters to be estimated.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + e \quad (11)$$

Where Y = collateral (dummy, if the farmer obtains loan with collateral = 1, otherwise = 0).

X1 = Loan size (N)

X2 = Loan duration (months)

X3 = Interest rate (%)

X4 = Loan purpose (agricultural production loan = 1, Otherwise = 0)

X5 = Debt capacity (High = 1, otherwise = 0)

X6 = Income level (N)

X7 = Borrower-lender relationship (years)

X8 = Household size (number of person)

X9 = Educational status

X10 = Ability to pledge collateral (yes = 1, otherwise = 0)

Results and discussion

Socioeconomic characteristics of the respondents

Age Distribution: The majority of respondents fall in the age group of 41-50 years (43.70%), followed by 31-40 years (22.96%), 51 – 60 years (17.78%), 61 – 70 years (10.37%) and 21 – 30 years (5.19%) respectively. The mean age of respondents is 47 years, indicating that they are relatively young and potentially more active in utilizing loans. These findings concurs with Gbigbi (2017) study on road blocks to credit accessibility in Delta State.

Gender: The study area has a higher proportion of male farmers (56.30%) compared to female farmers (43.70%). This aligns with previous research suggesting that men are more likely to seek credit for farming activities. According to Samuel (2010) men are more likely to go for credit than women. Therefore, women should be advised to engage in agriculture.

Household Size: Most farmers (61.48%) have small household sizes of 1-5 persons, with a mean household size of 5 persons. A smaller household size may contribute to better credit utilization, as loans are less likely to be diverted for consumption purposes. However, large household size could also help to reduce the cost of labour faced during the period or season of farming

Education of Respondents: Over half of the respondents (51.11%) have tertiary education, 22.22% had primary education, and 17.78% had secondary education indicating a relatively educated

farming population. Educated farmers often have better access to credit, which can boost farm production. According to Silong and Gadanakis (2020) and Nwaruet al (2004) high level of education makes them capable to access and utilize available credit sources that encourage increase in farm production.

Marital Status: In the study area, the majority of farmers (88.15%) were married, 3.70% of the farmers were single while 8.15% of the farmers were widow. This information suggests that married individuals are more involved in crop farming in the area, but the text doesn't provide further analysis or implications of this marital status distribution.

Farming Experience: The majority of farmers (53.33%) have between 1-10 years of farming experience, 31.11% had between 11 – 20 years, 8.89 had between 21 – 30 years, 5.19% had between 31 – 40 years and 1.48% had between 41 – 50 years with a mean of 14 years. This suggests that the farmers are experienced and knowledgeable in their agricultural practices. This is in agreement with findings of Gbigbi (2017).

Farm Size: The result showed that 28.15% of the farm had farm size of 0.5 – 1.5 hectares, 27.41% had farm size of 1.6 – 2.5 hectare, 10.37% had farm size of 2.6 – 3.5 hectares 9.63% had farm size of 3.6 – 4.5 hectares while only 24.44% of the farmers had farm size of 4.6 hectares and above with a mean of 3 hectares. The majority of farmers are small-scale farmers with less than 5 hectares of land. This aligns with the characterization of small-scale farming in the region. This implies that majority of the farmers were small scale farmers. This is congruent with Gbigbi and Ovharhe (2017).

Farm Income: The result shows that 25.93% earned between N10,000 and N50,000 26.67% earned between N51,000 and N100,000, 11.11% earned between N101,000 and N150,000, 10.37% earned between N151,000 and N200,000 and 25.93% earn above N201, 000. The mean income was N175,008.30. The income distribution shows that a significant portion of farmers earn above N100,000, indicating a relatively high income level among the study population.

Distance to Credit Source: The study indicates that a significant portion of farmers (51.90%) live within a distance of 5 kilometers or less from the credit source. About 33.30% travelled a distance of 6-10km, 8.90% travelled a distance of 11-15km, 4.40% travelled a distance of 16 – 20km and 1.50 travelled a distance of 21km and above. This proximity is seen as an advantage as it reduces transportation costs and associated risks when obtaining credit. The mean distance travelled by farmers to access credit is 7.40 kilometres.

Collateral Requirement: The study highlights that 80% of the farmers presented collateral when accessing credit, while 20% could not to provide collateral. The result suggests that collateral is a significant determinant for accessing credit, and those who cannot provide collateral may resort to informal money providers despite their higher interest rates. The study supports the idea of (Moahid and Maharjan 2020) that collateral is used by banks to manage the risk of loan defaults.

Table 1
 Socioeconomic attributes of respondents (N=135)

Variable	Frequency	Percentage (%)	Mean/Mode
Age (years)			
21 – 30	7	5.19	47 years
31 – 40	31	22.96	
41 – 50	59	43.70	
51 – 60	24	17.78	
61 – 70	14	10.37	
Gender			
Male	76	56.30	Male
Female	59	43.70	
Household size			
1 – 5	83	61.48	5 persons
6 - 10	52	38.52	
Level of Education			
No formal Education	12	8.89	Tertiary
Primary Education	30	22.22	
Secondary Education	24	17.78	
Tertiary Education	69	51.11	
Marital Status			
Married	119	88.15	Married
Single	5	3.70	
Widow	11	8.15	
Farming Experience			
1 – 10	72	53.33	14 years
11 – 20	42	31.11	
21 – 30	12	8.89	
31 – 40	7	5.19	
41 – 50	135	100.0	
Farm Size			
0.5 – 1.5	38	28.15	3 hectares
1.6 – 2.5	37	27.14	
2.6 – 3.5	14	10.37	
3.6 – 4.5	13	9.63	
4.6 and above	33	24.44	
Income level			
10,000 – 50,000	35	25.93	173,000.30
51, 000 – 100,000	36	26.67	
101,000 – 150,000	15	11.11	
151,000 – 200,000	14	10.37	
201,000 and above	35	25.93	
Distance			
5 and below	70	51.10	7.40km
6.00 – 10.00	45	33.30	
11.00 – 15.00	12	8.90	
16.00 – 20.00	6	4.40	
21.00 and above	2	1.50	
Collateral Requirement			
Yes	108	80.00	Yes
No	27	20.00	

Source: field survey data, 2023

Collateral types

The information presented in Table 2 indicates the various types of collateral used by farmers to secure or acquire credit. The result reveals that 91.0% of farmers use assets as collateral, 70.7% of farmers use land title deeds as collateral, 54.9% of farmers rely on a guarantor to secure credit, 49.6% of farmers use their farm and farmland as collateral, 38.3% of farmers use cash as collateral, 17.3% of farmers use shares as collateral, 15.8% of farmers use insurance coverage as collateral, 12.0% of farmers use payslips as collateral and the least was 11.30% of farmers use employment letters as collateral. Based on these findings, it appears that the majority of farmers in the study area prefer using assets (91.0%) as collateral to secure or acquire credit. This preference is supported by the idea that owning agricultural assets can facilitate access to loans from financial institutions, as suggested by Gbigbi (2017). In their study, Mitra et al (2019) likely found similar trends in the use of collateral by farmers to obtain loans.

Table 2
 Collateral types used by farmers

Collateral Types	N	Percentage (%)	Percent of cases (%)
Cash	51	10.4	38.3
Asset	121	24.6	91.0
Farm and farmland	66	13.4	49.6
Guarantor	73	14.9	54.9
Shares	23	4.7	17.3
Employment Letter	15	3.1	11.3
Insurance cover	20	4.1	15.0
Payslip	16	3.3	12.0
Land Title Deed	106	21.6	79.7
Total	491	100.0	369.2

Source: field survey data, 2023, (Multiple Response recorded)

Credit sources of the farmers

The result shows the various sources from which farmers obtain credit. These sources include co-operative societies, microfinance banks, money lenders, friends and relatives, the Bank of Agriculture, and commercial banks. According to the data, a significant portion of farmers (50%) rely on co-operative societies for their credit needs. Additionally, 17.2% obtain credit from both money lenders and friends/relatives. These figures indicate that a substantial majority of farmers are accessing credit from informal sources. In contrast, formal sources such as microfinance banks (18.0%), the Bank of Agriculture (9.0%), and commercial banks (4.9%) provide credit to a smaller percentage of farmers. This suggests that farmers tend to prefer informal sources over formal financial institutions. The statement by (Gbigbi

2019) also mentions that one of the major reasons formal sources are reluctant to provide credit to farmers is the farmers' inability to provide collateral. This is a common challenge in agricultural lending, as formal institutions often require collateral as a form of security for loans. Many farmers may not have assets to use as collateral, which limits their access to credit from formal sources. In summary, the result indicates that farmers predominantly rely on informal sources of credit, with collateral issues being a significant barrier to accessing credit from formal financial institutions. This information is important for policymakers and organizations involved in agricultural finance to address the challenges faced by farmers in obtaining credit for their agricultural activities.

Table 3
 Credit Sources of Farmers

Credit Source	N	Percent %	Percent of cases %
Co-operative Societies	61	43.0	50.0
Money Lender	21	14.8	17.2
Friends and Relative	21	14.8	17.2
Commercial Banks	6	4.2	4.9
Bank of Agriculture	11	7.7	9.0
Micro finance Bank	22	15.5	18.0
Total	142	100.0	116.4

Source: field survey data, 2023, (Multiple Response recorded)

Logistic regression collateral demand for credit access

The result of the logistic regression analysis using version 23 SPSS is presented in Table 4.

Loan Size: The coefficient for loan size is positive and significant at the 5% level. This suggests that an increase in the loan size taken by farmers is associated with an increase in the demand for collateral. In simpler terms, as farmers request larger loans, financial institutions are likely to require more collateral as security.

Loan Duration: The coefficient for loan duration is also significant and positive. This means that a longer loan duration is associated with a higher demand for collateral. In other words, if farmers opt for loans with longer repayment periods, financial institutions may require more collateral to mitigate the extended risk.

Loan Purpose: The coefficient for loan purpose is significant and negative. This indicates that the purpose of the loan has an impact on collateral demand. Specifically, certain loan purposes are associated with lower collateral requirements, while others may result in higher collateral demands. The direction of this relationship would depend on the specific purposes analyzed in the study.

Income level: Income has a significant influence on collateral demand, but the coefficient has a negative sign. This suggests that as the income of farmers increases, the demand for collateral decreases. In essence, farmers with higher incomes may be seen as less risky borrowers and therefore require less collateral to access credit. This finding aligns with the idea that borrower income is an important determinant of credit access. The finding concurs with Dang et al (2020) that income level of a borrower is a strong determinant of access to credit.

Borrowers-Lender Relationship: A significant and positive relationship is found between the quality of the relationship between borrowers and lenders and collateral demand. This implies that a good relationship between farmers and financial institutions leads to increased recognition by the institution, possibly resulting in reduced collateral requirements. A positive relationship can be seen as a form of trust that financial institutions have in their customers.

Debt Capacity (Wealth Status): Wealth status is significant with a negative effect on collateral demand. This means that farmers with higher wealth status (presumably, more assets) may face lower collateral demands when seeking credit. In other words, their existing wealth can serve as a form of collateral or assurance for lenders. These findings provide valuable insights into the factors that influence collateral requirements for farmers seeking credit. These results can be used to inform lending practices and policies to make credit more accessible to farmers while managing risk effectively.

Table 4
 Logistic regression on determinants of collateral demand for credit access

Variables	Coefficient	Std. Err	Z	P> Z
Loan size	1.36e-06	5.39e-07	2.52	0.012
Loan Duration	.0530658	.0248606	2.13	0.033
Interest	.0527655	0.432539	1.22	0.223
Loan purpose	-1.582144	.6389742	-2.48	0.013
Debt Capacity	-.3035577	.4315728	-0.70	0.482
Income	-5.16e-06	2.02e-06	-2.55	0.011
Borrowers-lender Relationship	.0985326	.0418107	2.36	0.018
Household size	-1.261894	.4640928	-1.00	0.317
Education	-.1940994	.2110659	-0.92	0.358
Ability to pledge/wealth status	-2.911646	.821442	-3.54	0.000
Constant	-2.998997	1.86908	1.60	0.109
LR chi2 (11)	54.21			
Prob> Chi2	0.0000			
Pseudo R ² ,	0.2900,			
Hosmer Lemeshow Goodness of fit	0.24(p=0.62)			

Source: computation from field survey data, 2023

T-test analysis of collateral demand and credit accessibility

The result on Table 3 shows that the calculated t-value is 3.951, and the critical table value is 1.645. This suggests that the calculated t-value is greater than the critical value, indicating that there is a statistically significant difference between collateral requirement and credit accessibility being compared. The null hypothesis was rejected, which suggests that there is no significant relationship between collateral requirement and credit accessibility. Therefore, the alternative hypothesis was accepted, which states that there is a significant relationship between collateral requirement and credit accessibility. This suggests that the statistical analysis supports the idea that collateral requirement does have an impact on credit accessibility for farmers.

The ability to provide collateral is significant in explaining collateral demand for credit access by farmers. This suggests that the presence or absence of collateral significantly influences whether farmers can access credit. This implies that a unit decrease in the ability to present collateral would likely lead to a unit decrease in credit accessibility for farmers. This implies that farmers with less collateral may face greater challenges in obtaining credit. In summary, the t-test results indicate that there is a statistically significant relationship between collateral requirement and credit accessibility for farmers, and this finding has important implications for the availability of credit to smallholder farmers in developing countries like Nigeria. It suggests that addressing collateral requirements may be essential in improving access to credit for these farmers.

Table 5
T-test Analysis of collateral demand and credit accessibility

Category	Mean	Std. Deviation	Std Error	T-test	Prob
Collateral demand – credit accessibility	0.193	0.566	0.049	3.951	0.000

Source: computation from field survey data, 2023

Recommendations

Potential actions and policies that could help address these challenges are stated below:

i. Policy Reforms:

□ Alternative Collateral Arrangements: Advocacy for policy changes that allow farmers without traditional collateral requirements such as land, to access credit By exploring options like crop insurance, livestock, or other forms of movable assets that can be used as collateral.

□ Government Guarantee Programs: Governments can establish guarantee programs that vouch for farmers seeking credit, reducing the need for collateral. These guarantees can help mitigate the risk for financial institutions.

□ Subsidized Interest Rates: Consider implementing interest rate subsidies for agricultural loans, making credit more affordable for farmers.

ii. Support for Formal Credit Sources:

□ Capacity Building: Offer training and capacity-building programs to formal financial institutions to help them better understand the agricultural sector's unique risks and opportunities.

□ Partnerships: Encourage partnerships between financial institutions and agricultural organizations to create specialized lending products tailored to farmers' needs.

iii. Flexibility in Collateral Requirements:

□ Credit Scoring Systems: Develop innovative credit scoring systems that consider a farmer's past performance, agricultural expertise, and potential crop yield in lieu of traditional collateral.

□ Peer Guarantees: Explore the possibility of farmers forming groups or cooperatives where members can vouch for each other's creditworthiness, reducing the need for individual collateral.

iv. Rural Infrastructure Development:

□ Invest in Infrastructure: Improve rural infrastructure, such as roads, irrigation systems, and storage facilities, which can increase the value of farmland and serve as collateral substitutes.

v. Financial Literacy and Education:

□ Financial Literacy Programs: Provide farmers with financial literacy and education programs to help them better manage their finances, understand credit, and make informed borrowing decisions.

vi. Monitoring and Evaluation:

□ Regular Assessment: Continuously assess the impact of policy changes and interventions on farmers' access to credit. This will help identify areas for improvement and refine strategies.

vii. Promotion of Non-traditional Agriculture:

□ Diversification: Encourage farmers to diversify their agricultural activities, which can reduce their reliance on traditional collateral and open up opportunities for credit based on different assets.

viii. Research and Innovation:

□ Innovation Grants: Promote research and innovation in agriculture to enhance productivity and sustainability, making farms more attractive to lenders and reducing the risk associated with lending to farmers.

ix. Market Access:

- Market Linkages: Facilitate market linkages for farmers to ensure that they can sell their products at fair prices, thus increasing their ability to repay loans.
- x. Community-Based Solutions:
 - Community Savings and Loan Groups: Encourage the formation of community-based savings and loan groups where farmers can pool resources and provide credit to each other without the need for collateral.

Conclusions

Farmers are facing difficulties in obtaining credit from financial institutions because these institutions require collateral as security for the loans. This demand for collateral is making it hard for farmers to access the funds they need for their farming activities. The lack of access to credit is negatively impacting farmers' ability to produce at an optimal level. This suggests that farmers may not have the necessary resources to invest in their farms, leading to reduced productivity. Existing methods attempts by farmers to access credit and acquire farm inputs have not been successful. This implies that the means through which farmers try to secure loans or inputs are not effective. The study has uncovered a level of discrimination against farmers who cannot provide collateral to secure loans. This discrimination can hinder the economic progress and development of these farmers. The study has identified the types of collateral that farmers typically use to secure loans. The results of the study provide valuable insights into the specific challenges farmers face in meeting collateral requirements. The logit regression analysis and descriptive statistics in this study clarifies the factors that influence financial institutions' demands for collateral when providing credit to farmers and the magnitude of their effects which could help to understand why and how financial institutions demand for collaterals. This study also identified the alternative sources from which farmers obtain credit and they include banks, cooperatives, government programs, or other sources. Knowing these sources is essential for developing solutions to the credit access problem. The study rejects the hypothesis that there is no significant issue with credit accessibility for farmers. In other words, it confirms that there is indeed a significant problem in farmers' ability to access credit. Overall, the paper highlights a pressing issue in the agricultural sector which is the limited access to credit that small scale farmers face due to the demand for collateral by financial institutions. This issue has implications for agricultural development and the livelihoods of farmers. Finally, implementing these recommendations will require collaboration between governments, financial institutions, agricultural organizations, and the farming community. It is crucial to create a supportive ecosystem that enables farmers to access the credit they need to improve agricultural productivity and contribute to overall rural development.

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