




## Evaluating the role of credit facilities as drivers to small scale rice farmers' productivity in Wukari local government area, Taraba state, Nigeria

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### ABSTRACT

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The role played by credit for sustainable agricultural activities cannot be overemphasized. The study evaluated the role of credit facilities as drivers to small scale rice farmers' productivity in Wukari Local Government Area Taraba State, Nigeria. A multi stage sampling procedure was used to sample 250 respondents from the study area. The study found that seed ( $p = 0.03$ ), fertilizer ( $p = 0.01$ ), and farm size ( $p = 0.01$ ) were the key determinants of productivity for the rice farmers who had access to credit facilities while labour ( $p = 0.056$ ) and seed ( $p = 0.01$ ) were the determinants of productivity for the non-access to credit facilities counterparts. The finding show that years in school, farm size and age are the factors that influenced access to credit facilities. Finally, interest rate (92.8%), lack of collateral security (89.6%), lending criteria (72%) and government regulations (70.8%) are the major problem associated with access to credit facilities. It was therefore recommended that Public and private partnerships should be encouraged to develop innovative financial products and services tailored farmer's activities with a goal of offering competitive interest rates. Continuous review and policies adaptation related to interest rates in agricultural lending to ensure they remain effective and responsive to changing economic conditions and the needs of farmers.

**Contribution/Originality:** Several research works analyzed access to credit and production efficiency; impact of credit demand on productivity; impact of access to credit on productivity using stochastic frontier model but this study focused on the factors influencing productivity of both credit-accessed rice farmers and non credit accessed farmers using ordinary least square.

## 1. INTRODUCTION

Agricultural facilities play a pivotal role in shaping the productivity and sustainability of farming operations around the world. These facilities encompass a wide range of infrastructure, from storage units and processing centers to irrigation systems and greenhouses. Their significance in modern agriculture cannot be overstated, as they directly influence the efficiency of resource use, crop yields, and the economic well-being of farmers. Furthermore, agricultural facilities often serve as enablers of technology adoption and innovation in farming practices. With advancements in precision agriculture, facilities like weather stations and data centers are increasingly integrated into farming operations, facilitating data-driven decision-making for improved crop management and resource allocation (Srinivasan et al., 2017).

The unique relationship between agricultural facilities and farmers' productivity is a complex interplay that has garnered significant attention in academic and practical agricultural research. This is due to the fact that well-designed and adequately maintained facilities have been shown to exert a beneficial influence on various aspects of agricultural production. As He, Yuan, and Liu (2015) aptly put it, "Proper infrastructure facilities are the backbone of any successful agricultural system, ensuring that farmers can efficiently and sustainably produce food and raw materials."

The influence of credit facilities on farming practices in Nigeria has been emphasized by numerous researchers and experts in the field. One fundamental aspect of the connection between agricultural financing sources and farmers' productivity lies in the financial capacity of farmers to invest in essential resources. According to a study by Ologbon, Adejuyigbe, and Adeoye (2020) "Access to agricultural credit empowers farmers to procure improved seeds, fertilizers, and modern farming equipment, which are essential for enhancing crop yields and overall productivity." In a nation where small-scale farmers constitute a substantial portion of the agricultural workforce, access to credit ensures they can afford the inputs and technologies that can revolutionize their output.

Nevertheless, the connection between agricultural financing sources and farmers' productivity is not without its complexities. Farmers' capacity to absorb and effectively utilize credit can depend on various factors, including their level of financial literacy, access to markets, and the presence of support systems (Ewuola & Akintoye, 2018). As highlighted by the study, "Effective utilization of credit is contingent upon farmers' ability to make informed financial decisions and navigate the intricacies of credit management."

Though, there are substantial research Adeola and Akoja (2017); Adepoju, Fasina, and Ayinde (2019); Adewuyi and Akeem (2020) and Ojo, Olofin, and Idowu (2018) on agricultural credit facilities and farmers' productivity in Nigeria, several gaps remain that warrant further investigation. For instance, in-depth, micro-level studies are needed to understand how individual farmers' access to credit influences productivity outcomes in the specific agro-ecological zone. Bridging these gaps is essential to provide comprehensive insights into this critical subject. This study has a local relevance for Nigeria and global significance for countries with agrarian economies. Therefore, the lessons learned can be applied to various regions facing similar agricultural challenges.

Understanding the relationship between credit facilities and farmers' productivity is crucial, as it directly impacts the livelihoods of millions and the nation's food security. This study can inform the design and implementation of agricultural and financial policies. Policymakers can use evidence-based insights to develop strategies that improve credit accessibility and its positive impact on farmers' productivity.

Obtaining financing for agriculture and their impact on farmers' productivity is a multifaceted issue in Nigeria. While credit facilities are considered essential for enhancing agricultural productivity, several challenges and disparities in access persist, posing significant problems for the agricultural sector. A recurrent challenge is that many Nigerian farmers lack the necessary financial literacy to manage credit effectively. Inadequate financial literacy can lead to mismanagement of credit funds, making it challenging for farmers to realize the expected productivity gains (Adewuyi & Akeem, 2020).

Another major problem is the restricted availability of official credit facilities by small-scale and marginalized farmers in Nigeria. Despite the government's efforts to promote agricultural financing, many farmers, particularly those in rural areas, struggle to access affordable credit (Adeola & Akoja, 2017).

Furthermore, the exorbitant interest rates charged by financial institutions does not make credit affordable for many farmers, leading to their exclusion from the formal financial system (Adepoju et al., 2019). In addition, the vulnerability of agricultural practices to climate variability is a pressing issue. Farmers who borrow funds for agricultural purposes face risks associated with unpredictable weather patterns, affecting their ability to repay loans (Ojo et al., 2018).

Also, the absence of innovative credit delivery mechanisms that cater to the unique needs and challenges of agricultural credit remains a problem. Traditional lending approaches may not effectively address the dynamics of farming in Nigeria (Olutunbi & Alimi, 2017).

The purpose of this study is to investigate deeper into the connections between agricultural credit facilities and rice farmers' productivity in Wukari Local Government Area of Taraba State, Nigeria. It aims to explore the ways in which credit facilities impact the agricultural landscape, the challenges faced by farmers in accessing and utilizing credit, and provide the potential for innovative solutions to ensure a more equitable and productive agricultural sector. By drawing upon existing research and practical experiences, we aim to make available a comprehensive comprehension of the connection between credit facilities and the sustainability of farming practices in Wukari Local Government Area of Taraba State, Nigeria.

## 2. LITERATURE REVIEW

The relationship between credit facilities and farmers' productivity in Nigeria has a profound significance due to the nation's heavy reliance on agriculture for livelihoods and economic growth. Several studies have explored this relationship, shedding light on the multifaceted dynamics between credit access, farming practices, and productivity outcomes. For instance, Adeola and Akoja (2017) emphasized that access to credit facilities empowers smallholder farmers to invest in modern farming inputs, including improved seeds, fertilizers, and machinery. This access plays a pivotal role in enhancing crop yields and overall productivity. Adepoju et al. (2019) investigated the factors that affect interest rates and their impact on credit accessibility. They found that exorbitant interest rates pose a substantial barrier to credit accessibility, limiting its positive impact on productivity. Adewuyi and Akeem (2020) investigated the connection between financial knowledge and credit accessibility among rural farmers. Their research highlighted that farmers with increased levels of financial literacy are more likely to manage credit effectively, leading to enhanced productivity. Ewuola and Akintoye (2018) conducted research on microcredit and its influence on crop diversification among farmers in Nigeria. Their findings indicated that farmers who accessed microcredit were more likely to engage in crop diversification, which can contribute to increased productivity by mitigating risks associated with mono cropping. Adewale, Olayemi, and Owolabi (2018) explored the impact of innovative credit delivery mechanisms, such as mobile banking, on farmers' productivity. The research revealed that farmers who accessed credit through mobile banking reported increased agricultural productivity, emphasizing the potential of technology-driven credit solutions. Abdulazeem and Adepoju (2016) explored the connection between credit access and productivity in agriculture among male and female farmers in Nigeria. Their research revealed that while both genders benefited from credit access, female farmers often experienced a more significant increase in productivity, highlighting the importance of addressing gender disparities in credit accessibility. Ogunmola and Ogundipe (2015) investigated the effect of government credit programs on rice production in Nigeria. The empirical evidence demonstrated that farmers who participated in government credit schemes experienced significant improvements in rice yields, indicating the effectiveness of targeted credit interventions in enhancing productivity.

## 3. METHODOLOGY

### 3.1. Study Area

The study area for this research is Wukari Local Government Area of Taraba state. Figure 1 is the map of Wukari Local Government Area showing the study area. The Local Government Area lies between 7° 51' 0" North of the equator and 9° 47' 0" East of the Greenwich Meridian. Wukari covers 4,308 square kilometers with a total population of 241,506. The main occupation is farming and rice, yam, cassava, maize, sorghum, groundnut, and millet are the major crops produced. Credit facilities in Wukari Local Government Area include loans, fertilizer, agro chemicals, and seed among others (Bashir, Mehmood, & Hassan, 2010).

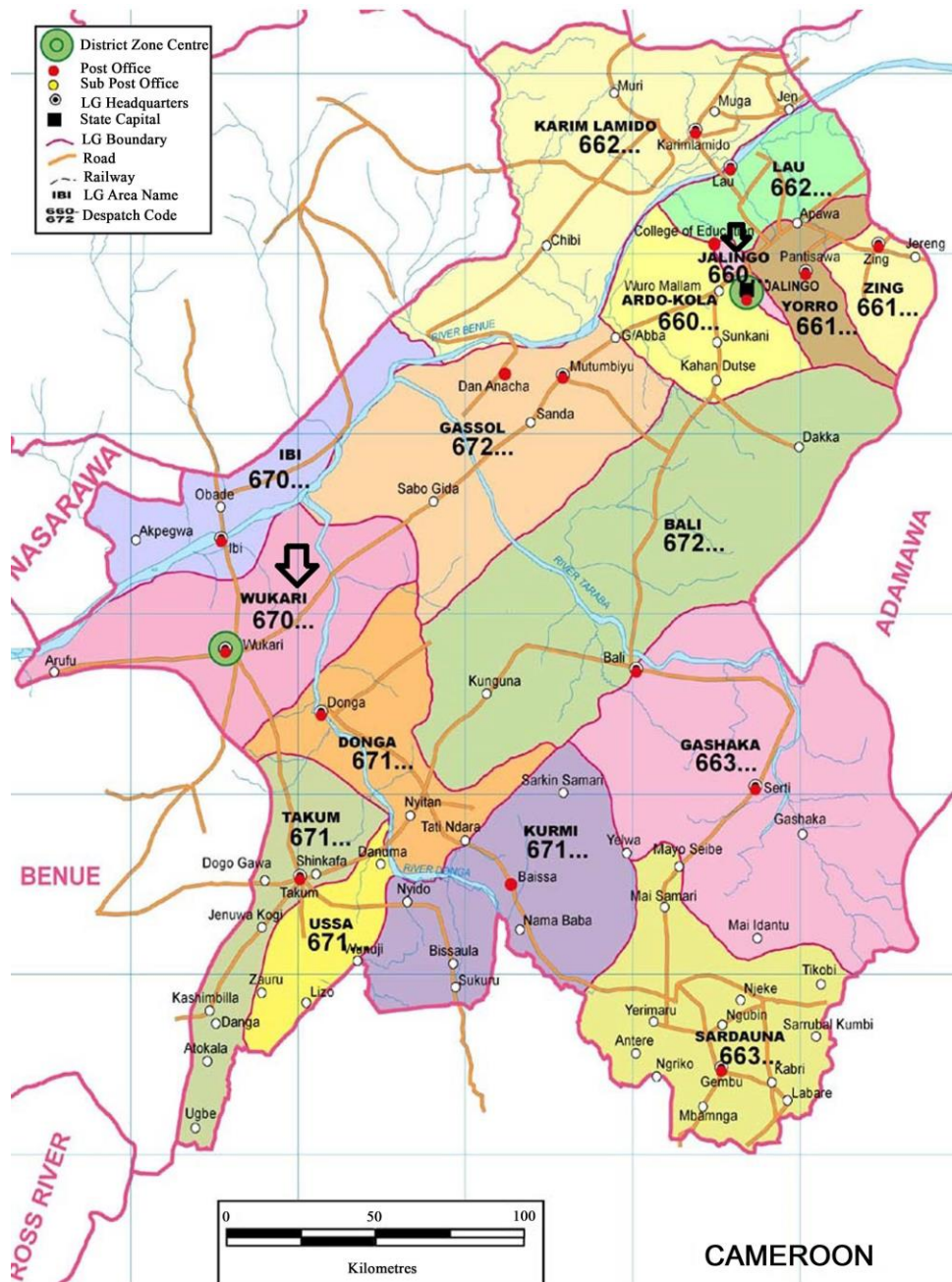


Figure 1. Map of Wukari local government area.

Source: Tyovenda, Ocheje, Terver, and Uttah (2022).

### 3.2. Sampling Techniques

Multi-stage sampling was used to select respondents for this study. In the first stage 5 wards out of 10 wards in the local government area were purposely selected based on the prominence of rice production. The second stage involved the selection of 2 villages from each of the five wards making a total of 10 villages. In the final stage 8% respondents were randomly selected in each of the 10 villages making a total of 250 respondents sampled for the study.

### 3.3. Data Collection Technique

Data for this study were collected using questionnaires. The target respondent for this study were mainly small scale rice farmers in the study area.

3.4. Model Specification

3.4.1. Multiple Linear Regression

The empirical model to assess the role of credit access to farmers' productivity in Wukari Local Government Area is specified as:

$$Y = \beta_0 + \beta_1x_1 + \beta_2x_2 + \beta_3x_3 + \beta_4x_4 + E \dots\dots\dots (1)$$

Where:

Y = Output.

x<sub>1</sub> = Quantity of seed (kg).

x<sub>2</sub> = Labour (man-days).

x<sub>3</sub> =Quantity of fertilizer (kg).

x<sub>4</sub> = Farm size (hectares).

E = Error term.

3.4.2. Logistic Regression

The empirical model for factors that influence access to credit facilities among respondents is specified as:

$$\text{logit}[\theta(x)] = \log \left[ \frac{\theta(x)}{1-\theta(x)} \right] = \alpha + \beta_1x_1 + \beta_2x_2 + \beta_3x_3 + \beta_4x_4 + \beta_5x_5 + \beta_6x_6 + \varepsilon \dots\dots\dots (2)$$

Y= Access to credit facilities (Yes =1 No = 0).

x<sub>1</sub>= Farm size (hectare).

x<sub>2</sub>= Years of school.

x<sub>3</sub>= Experience (years).

x<sub>4</sub>= Age (years).

x<sub>5</sub>=Household size (numbers).

x<sub>6</sub>= Gender (male and female).

4. RESULTS AND DISCUSSION

4.1. Socioeconomic Characteristics

4.1.1. Age of Respondents

The distribution of respondents by age is presented on Table 1. The result shows that a fair percentage 28% of the respondents were within the age range of 25 years old to 34 years old, respectively, 22% of them fell within the age range of 35 years old to 44 years old, respectively. 26% of the respondents were within the age range of 45 years old to 54 years old, 16% of the respondents were within the age range of 55 years old to 64 years old, 6% of the respondents were within the age range of 65 years old to 74 years old. This finding show that there is an indication of that youth are actively engaged into rice farming. This agrees with Asamu, Odagwe, Rasak, Arisukwu, and Igbolekwu (2020).

Table 1. Distribution of respondents by age.

Age	Frequency	Percentage
25-34	70	28
35-44	55	22
45-54	65	26
55-64	40	16
65-74	20	8
Total	250	100

4.1.2. Sex of Respondents

The distribution of respondents by sex is presented on [Table 2](#). The result shows that majority (72%) of the respondents are male and 28% are female. Although, this study is not gender based, the result underlies the laborious nature of farming operations from tillage to harvest especially in the rural areas, where crude farm implements are usually used that their female counterparts cannot easily undertake and the fact that male in the study area have greater access to production resources. This result is line with [Egbeadumah, Djomo, Ewung, and Oben \(2023\)](#) who found that majority of respondents were male.

**Table 2.** Distribution of respondents by sex.

Sex	Frequency	Percentage
Female	70	28
Male	180	72
Total	250	100

#### 4.1.3. Education

The distribution of respondents by level of education is presented on [Table 3](#). The result shows that majority 48% of the respondent's attained secondary education, 16% attained primary education and 32% attained tertiary education, respectively, while only 4.0% of them have no formal education. It can be deduced that majority (80%) of the respondents attained one form of formal education or another. This results agrees with [Asamu et al. \(2020\)](#).

**Table 3.** Distribution of respondents by level of education.

Educational level	Frequency	Percentage
Primary	40	16
Secondary	120	48
Tertiary	80	32
Non formal	10	4
Total	250	100

#### 4.1.4. Land Acquisition

The distribution of respondents by land acquisition method is presented on [Table 4](#). The findings show that 64% inherited their farm lands, 10% obtained their farmland through rent, 6% through Gift, and 10% of the respondents had access to the land by claiming the ownership of the land. This could be explained by the fact that majority of the respondents hail from the study area and therefore have a higher probability for land inheritance. This result agrees with that of [Ajayi and Olalekan \(2018\)](#).

**Table 5.** Distribution of respondents by land acquisition method.

Source of land	Frequency	Percentage
Inherited	160	64
Rent	25	10
Gift	65	26
Total	250	100

#### 4.1.5. Marital Status

The distribution of respondents by marital status is presented in [Table 5](#). The results show that majority 58% of the respondents are married 28% are single, 8% are widowed/widower, and 6% are divorced. The implication of finding is that there is a high tendency of farming household to have greater family responsibility. This could lead to focus on rice farming and become more productive. This results agrees with [Ukpe, Nwalem, and Dzever \(2023\)](#).

**Table 4.** Distribution of respondents by marital status.

Marital status	Frequency	Percentage
Single	70	28
Married	145	58
Widowed/Widower	20	8
Divorced	15	6
Total	250	100

#### 4.1.6. Motive of Rice Farming

The distribution of respondents by the motive of rice farming is presented on Table 6. The findings show that 74% of respondents are involved in rice farming for commercial purpose and 26% are involved for subsistence farming. This could be explained by the high demand of the commodity that has become a staple in Nigeria.

**Table 6.** Distribution of farmers by the type of farming.

Motive of farming	Frequency	Percentage
Commercial purpose	185	74
Subsistence	65	26
Total	250	100

#### 4.1.7. Source of Credit Facilities

The source of credit facilities is presented on Table 7. The results show that 27% of the farmers obtained their credit from Bank of Agriculture, 36% accessed credit from non-financial institutions and 37% the respondents did not access credit facilities. This result agrees with Nathanel, Ukpe, Fani, and Divine (2023).

**Table 7.** Source of credit.

Source of credit	Frequency	Percentage
Bank of agriculture	68	27
Non-financial institution	90	36
None	92	37
Total	250	100

#### 4.2. Non access and Access to Credit Facilities Role in Rice Farmers' Productivity

The non and access to credit facilities rice farmers' productivity is presented on the Table 8. The findings show that the coefficient of determination ( $R^2$ ) for non and access credit facilities farmers are 0.789 and 0.837. This indicates that 78.9% and 83.7% of the non and access credit facilities rice farmers' productivity is explained by farm size, fertilizer, labour, and seed respectively. For the credit access rice farmers' productivity, the findings show that farm size, fertilizer and seed significantly affect their productivity. Specifically, the coefficient of farm size is positive and significant at 1%. This implies that a unit increase in the farm size will increase their productivity. This is an indication that access to credit facilities could serve as a catalyst to expand rice productivity in the locality. This agrees with Fani, Meliko, Tabetando, Ukpe, and Nkwi (2023). Similarly, the coefficients of fertilizer and seed are positive and significant at 5%.

This implies that a unit increase in the quantity of fertilizer and seed will increase rice productivity. That could be explained with the ease access to credit facilities that enable to purchase improved seed varieties and fertilizer. The finding is in concordance with Djomo, Ukpe, Oben, and Gbadebo (2020). For the non-access to credit facilities rice farmers, findings show that the coefficients of labour and seed were positively significant. This implies that a unit increase in labour and seed will increase their productivity. This could be explained by the household size of and the use of seed from the previous harvest.

**Table 8.** Non and access to credit facilities rice farmers' productivity.

Variables	Access to credit facilities farmers		Non access to credit facilities farmers	
	Coefficient	Sig.	Coefficient	Sig.
Constant	2.438	0.000	2.22	0000
Farm size	1.449***	0.01	0.860	0.136
Fertilizer	0.64***	0.0.14	0.010	0.987
Labour	0.13	0.401	0.737**	0.056
Seed	0.92**	0.035	0.632**	0.019
R <sup>2</sup>	0.837		0.789	
Adjusted R <sup>2</sup>	0.778		0.713	
F-statistics	14.22		10.37	

Note: \*\*\* and \*\* are significant at 1% and 5% respectively.

#### 4.3. Factors That Influence Respondent's Access to Credit Facilities

Factors that influenced rice farmers' access to credit is presented on Table 9. The findings show that age, years of schooling, farm size and being a male were the factors that significantly influenced access to credit facilities. Specifically, ageing farmers are experienced enough to access credit given that they have a mastery of the required farming techniques. This could serve as an opportunity to get loan either from the bank of agriculture or from non-financial institutions. This agrees with Nathanel et al. (2023). For the years of schooling, Ijioma and Osondu (2015) explained that educated farmers who borrow money tend to manage the credit facility judiciously and are motivated towards adopting improved technologies. Credit could serve as mean of land expansion to increase farmers' productivity by acquiring more input and the payment of labour. This agrees with Ullah, Mahmood, Zeb, and Kächele (2020). The probability of accessing credit facilities for being male increases by 15.57%.

**Table 9.** Factors that influence respondent's access to credit facilities.

Variables	Coefficient	Sig.
Constant	-5.4	0.031
Age	0.073	0.0237**
Years of schooling	0.0366	0.003**
Farm size	278	0.0440**
Farming experience	-048	0.439
Household size	-259	0.215
Gender (Male =1, Female = 0)	15.576	0.015**
Log likelihood	44.529	
Cox&Snell R square	0.250	
Nagelkerde R square	0.358	
Classification table	75.5	
Chi-square	14.1	

Note: \*\* are significant 5% respectively.

#### 4.4. Major Problems Associated with Accessing Credit Facilities

The major problems associated with accessing credit is presented on Table 10. The findings indicate that 92.8% of the respondents feel that the rate of interest is a major problem to access credit facilities. This could be explained that farmers may perceive agricultural lending as riskier due to volatility of crop yields and external factors like weather and market prices. Consequently, they may charge higher interest rates to mitigate perceived risks, making it more challenging for farmers to access credit. This agrees with Julien, Kossi, and Akléso (2021). 89.6% of the respondents feel that lack collateral security is another major problem associated with accessing to credit facilities. This could be due to the fact that rice farming has a cyclical cash flow, with most income generated during harvest seasons. Collateral requirements often involve regular payments or interest, that may not align with the income cycle of rice farmers. This misalignment makes it challenging for farmers to meet repayment terms. This agrees with this agrees with Ijioma and Osondu (2015). 72% of respondents feel that lending criteria is also a major problem associated with credit facilities. This could be attributed to the fact that many rice farmers may not have an established credit history. Lenders often rely on credit scores and financial histories to assess borrowers' creditworthiness, and farmers



without these records may be at a disadvantage when seeking credit. This agrees with Kiros and Meshesha (2022). Finally, 70.8% of respondents feel that government regulation is also a major problem associated with access to credit facilities. This could be explained by the fact that sometimes government regulations can dictate stringent collateral and guarantee requirements that may be challenging for farmers to meet. These requirements can exclude small-scale farmers who lack sufficient assets to use as collateral.

**Table 10.** Major problem associated with access to credit facilities.

Problems	Frequency	Percentage	Rank
Interest rate	232	92.8	1 <sup>st</sup>
Lack collateral security	224	89.6	2 <sup>nd</sup>
Lending criteria	180	72	3 <sup>rd</sup>
Government regulation	177	70.8	4 <sup>th</sup>

Note: Multiple responses recorded.

## 5. CONCLUSION AND RECOMMENDATIONS

The study evaluated the role of credit facilities as drivers to small scale rice farmers' productivity in Wukari Local Government Area Taraba State, Nigeria. Seed, fertilizer, and farm size were key determinants of productivity of the farmers who accessed credit facilities while labour and seed were the determinants of productivity for the non-access to credit facilities counterparts. Furthermore, years spent in school, farm size and age were the factors that influenced accessing credit facilities. High interest rate, lack of collateral security, lending criteria and government regulations were the major problems associated with accessing credit facilities. It was therefore recommended that:

- i. Public and private partnerships should be encouraged to develop innovative financial products and services tailored farmer's activities with a goal of offering competitive interest rates.
- ii. Continuous review and policies adaptation related to interest rates in agricultural lending to ensure they remain effective and responsive to changing economic conditions and the needs of farmers
- iii. Farmers should group themselves into cooperatives that can pool resources and serves as collateral for their members. These cooperatives can collectively secure loans for various farming activities.
- iv. Promote community based lending models, where local organizations or cooperatives assess and manage credit for farmers. These organizations often have a better understanding of local farming conditions and risks.
- v. Government should regularly consult with agricultural stakeholders, including farmers, financial institutions, and industry experts, to ensure that regulations are responsive to the needs of the sector.

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**Transparency:** The authors state that the manuscript is honest, truthful, and transparent, that no key aspects of the investigation have been omitted, and that any differences from the study as planned have been clarified. This study followed all writing ethics.

**Competing Interests:** The authors declare that they have no competing interests.

**Authors' Contributions:** All authors contributed equally to the conception and design of the study. All authors have read and agreed to the published version of the manuscript.

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