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Abstract

Purpose: This study examined the effect of credit accessibility cost on food security among smallholder farmers in Kenya by focusing on disbursement costs, interest rates, transaction costs, collateral requirements, and credit processing costs. The study sought to determine how the affordability of credit influences farmers' access to and utilization of agricultural credit, and the extent to which this enhances investment in farm production, acquisition of quality inputs, adoption of improved technologies, income generation, and ultimately household food availability, access, and consumption.

Methodology: The study adopted a cross-sectional descriptive survey design and collected primary data using structured questionnaires from a sample of 384 smallholder farmers selected through purposive and stratified proportionate sampling from a population of 417,494 farmers registered under One Acre Fund across seven counties. The Grameen joint liability model and Asymmetric Information theory underpin this study by explaining how credit accessibility costs influence food security among smallholder farmers. The theories posit that non-governmental organizations led group lending mechanisms reduce moral hazard, adverse selection, and transaction costs through peer monitoring, joint liability, and collective accountability, thereby enhancing affordable access to agricultural credit and strengthening household food security outcomes. A high response rate of 89.8% (n = 345) was achieved. Data were analysed by descriptive statistics, Spearman's correlation, multiple regression, and factor analysis.

Findings: The study findings indicate that credit accessibility cost exerts a statistically significant influence on food security, underscoring the importance of affordable credit mechanisms in enhancing household food security among smallholder farmers. Affordable administrative costs were positively associated with children's food availability ($r = 0.162$, $p<0.01$), suggesting that ease of credit access enhances household consumption. However, interest rates ($r = -0.345$, $p < 0.01$) and repayment costs ($r = -0.228$, $p < 0.01$) showed negative relationships, indicating that even relatively affordable borrowing costs can exert financial pressure and reduce food access. For adults, repayment flexibility demonstrated a positive association with food availability ($r = 0.184$, $p < 0.01$). Regression results further confirmed that credit cost significantly influences food security outcomes ($R^2 = 0.070$, $F= 8.54$, $p< 0.05$). Notably, 63.2% of farmers perceived credit costs as fair, while 53.3% considered them cheaper than those of commercial banks. The study concludes that non-governmental organizations led agricultural credit facilitation programs play a significant role in improving food security through enhanced access to affordable inputs, credit and social capital. However, high borrowing costs, limited financial literacy, and inconsistent access constrain effective credit utilization and scalability.

Unique Contribution to Theory, Practice and Policy: The study recommends enhancing credit literacy and financial management training among smallholder farmers to improve their capacity to effectively access, manage, and utilize agricultural credit; while promoting policy and institutional reforms that reduce credit accessibility costs and enhance the flexibility of agricultural financing mechanisms. The study also recommends further research to examine the influence of credit management factors, including borrowing capacity, loan utilization efficiency, repayment behavior, and lending conditions, on the effectiveness of agricultural credit interventions and their subsequent impact on food security outcomes among smallholder farming households.

Keywords: *Credit Accessibility Cost, Food Security, Agricultural Credit Facilitation, Smallholder Farmers, Non-Governmental Organization, Kenya*

JEL Codes: *H81, D24, Q18, Q14, Q12, L31*

INTRODUCTION

Access to agricultural credit is widely recognized as a critical enabler of farm productivity, income generation, and food security among smallholder farmers. Credit facilitates the acquisition of essential farm inputs such as seeds, fertilizers, and technologies, which are necessary for improving agricultural output and resilience (Yulia, Rachmina & Feryanto, 2023). Despite its relevance, access to formal agricultural credit remains limited, particularly in Sub-Saharan Africa, where financial institutions often perceive agriculture as high-risk due to climate variability, price fluctuations, and production uncertainties (Balcilar, Olasehinde-Williams & Tokar, 2025). In Kenya, agriculture plays a central role in the economy, supporting a majority of the population and contributing significantly to GDP, yet only a small proportion of formal lending is directed toward the sector (Central Bank of Kenya, 2023; Njora & Yilmaz, 2021). This financing gap has prompted increased involvement of non-governmental organizations (NGOs) and microfinance institutions, which provide tailored agricultural credit programs targeting smallholder farmers through flexible and inclusive models (Fuseini, Sulemana, Abdulai, Ibrahim & Azure, 2022; One Acre Fund, 2020).

However, beyond access, the cost associated with obtaining credit remains a major constraint. These costs include direct financial cost (high interest rates, administrative charges/processing fees) and indirect/transactional cost (collateral requirements, time spent traveling, bureaucracy, cost of forming groups), which unduly affect smallholder farmers with limited financial capacity (Abilla & Wanyonyi, 2024). High borrowing costs not only limit farmers' ability to access credit but reduce net benefits of borrowing, thus obliging investment in productivity-enhancing inputs and technologies.

While agricultural credit programs are widely promoted as instruments for rural development and poverty reduction, their effectiveness is strongly influenced by affordability and accessibility conditions. In many cases, smallholder farmers either opt out of formal credit systems or underutilize available financing due to perceived or actual cost burdens (Murungi, Alhassan & Zeka, 2023). Consequently, the relationship between credit accessibility cost and food security remains complex and insufficiently understood, particularly within the context of NGO-led agricultural credit facilitation. This study applications on examining effect of credit accessibility cost on food security among smallholder farmers in Kenya, contribute a more nuanced understanding of how financial barriers influence agricultural productivity and household welfare outcomes.

Statement of the Problem

Empirical evidence from Sub-Saharan Africa suggests that non-governmental organization (NGO)-led agricultural credit interventions are associated with improvements in smallholder agricultural productivity and food security outcomes. Programs implemented by organizations such as One Acre Fund provide flexible credit arrangements complemented by training and farm input support, which have been linked to increased agricultural yields, higher household incomes, and improved food self-sufficiency among participating farmers (Opiyo, 2018; Mutonyi, Mudi & Juma, 2022; Deutschmann, Duru, Siegal & Tjernström, 2025). Beyond agricultural productivity, these interventions have been associated with broader livelihood improvements and poverty reduction through enhanced access to agricultural finance and related support services (Maher, 2021). However, the effectiveness of such interventions may be influenced by the costs associated with accessing credit. High interest rates, collateral requirements, transaction costs, and other borrowing expenses can constrain farmers'

participation in credit programs and reduce the potential benefits derived from agricultural financing, thereby limiting their contribution to improved food security outcomes (Fwamba, Sifuna & Dudi, 2022).

Evidence further suggests that variations in credit affordability across different agro-ecological, institutional, and socio-economic contexts in Kenya are associated with differing outcomes among smallholder farmers, raising concerns regarding the inclusiveness, accessibility, and scalability of agricultural credit programs (Maindi, Nyarindo, Ndirangu & Isaboke, 2024). Although the importance of agricultural credit in supporting smallholder agriculture is widely acknowledged, relatively few empirical studies have specifically examined the role of credit accessibility costs in influencing food security outcomes among smallholder farmers (Murungi, Alhassan & Zeka, 2023; Islam, 2024). Consequently, the extent to which affordability-related barriers shape the effectiveness of NGO-led agricultural credit facilitation remains insufficiently understood. This knowledge gap limits the availability of evidence needed to inform the design of affordable and inclusive agricultural financing interventions. Therefore, this study examined the effect of credit accessibility cost on food security among smallholder farmers in Kenya, with the aim of contributing to the agricultural finance and rural development literature and informing policy and practice on inclusive agricultural credit provision.

Objective of the Study

To find out credit accessibility cost effects of non-governmental organization agricultural credit facilitation on food security among smallholder farmers in Kenya.

LITERATURE REVIEW

Theoretical Framework

Grameen Joint Liability Model and Asymmetric Information Theory

The Grameen joint liability model and Asymmetric Information Theory jointly provide a strong theoretical foundation for explaining how non-governmental organization (NGO) agricultural credit facilitation influences food security among smallholder farmers through credit accessibility costs. Pioneered by Muhammad Yunus in Bangladesh, the Grameen joint liability model explains how group-based lending mechanisms reduce credit risks, transaction costs, and financial exclusion among low-income borrowers through collective responsibility and peer accountability (Pratiwi, 2023). The model is founded on the principle of joint liability, whereby smallholder farmers organize themselves into borrowing groups whose members collectively guarantee loan repayment through peer monitoring, social collateral, mutual accountability, and social sanctions (Ba-Tri, Truong, Friday & Pham, 2024; Cornée & Masclet, 2022). Unlike conventional lending systems that rely heavily on physical collateral, the Grameen model leverages trust, reciprocity, social networks, and community relationships to strengthen repayment discipline and improve loan recovery performance (Mohammed, Damba & Amikuzuno, 2020; Ahlin, 2020; Deutschmann, Duru, Siegal & Tjernström, 2025). Through peer screening and monitoring, the model reduces lenders' administrative, screening, and enforcement costs, thereby creating the potential for more affordable and accessible credit. Consequently, lower transaction costs, reduced collateral requirements, and simplified loan processing procedures can enhance farmers' access to agricultural finance and increase opportunities for productive agricultural investment, which may contribute to improved food security outcomes.

The Asymmetric Information Theory, advanced by Joseph Stiglitz, George Akerlof, and Michael Spence, explains how unequal access to information between borrowers and lenders creates inefficiencies in agricultural credit markets through adverse selection and moral hazard (Piuaru, Tescas, Epuran, Mosora & Ivasciuc, 2024). The theory posits that borrowers possess private information regarding their creditworthiness, repayment behaviour, production risks, and loan utilization patterns, making it difficult for lenders to accurately assess and monitor loan performance, particularly among smallholder farmers who often lack formal collateral, stable income streams, documented credit histories, and financial records (Balana & Oyeyemi, 2022; Zulu, Hlatshwayo, Ojo, Slotow, Cele & Ngidi, 2024). To mitigate these information challenges, lenders frequently impose stringent lending conditions such as higher interest rates, collateral requirements, extensive documentation, processing fees, and additional monitoring costs. While these measures are intended to reduce lending risks, they may simultaneously increase the cost of accessing credit and exclude resource-constrained farmers from agricultural financing opportunities (Carli, Cecchi, Fritz, Lensink & Uras, 2025; Abilla & Wanyonyi, 2024). For example, high collateral requirements, introduced as a mechanism to address information asymmetry and repayment uncertainty, may act as a prohibitive cost that limits access to credit primarily to wealthier farmers with sufficient assets. This can reduce the inclusiveness of agricultural credit programs and constrain the ability of poorer smallholders to invest in productivity-enhancing inputs and technologies, thereby limiting potential food security gains.

Together, the Grameen joint liability model and Asymmetric Information Theory provide a comprehensive analytical framework for understanding the relationship between credit accessibility costs and food security among smallholder farmers. The Grameen model suggests that group-based lending arrangements can lower transaction costs, reduce reliance on physical collateral, and improve access to affordable credit through social collateral and peer accountability. In contrast, Asymmetric Information Theory explains why lenders may impose higher interest rates, collateral requirements, and other borrowing costs to manage information-related risks.

The interaction of these theories highlights that credit accessibility costs are not merely financial barriers but are also outcomes of institutional efforts to manage lending risk. Consequently, the affordability of credit is likely to influence farmers' ability to access and utilize agricultural finance, invest in productive farm activities, adopt improved technologies, and enhance household food availability, access, and consumption. The combined theoretical perspective therefore underscores the importance of reducing unnecessary credit accessibility costs while maintaining effective risk-management mechanisms to promote inclusive agricultural financing and improve food security among smallholder farmers in Kenya.

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Conceptual Framework

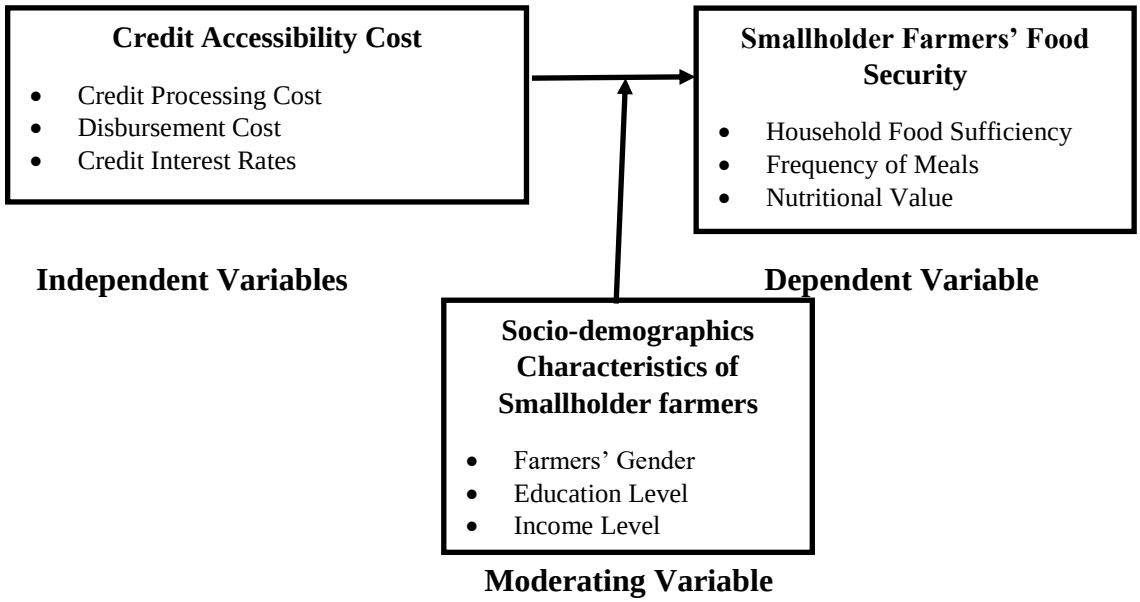

Figure 1: Conceptual Framework

Empirical Review

Agricultural Credit Accessibility and Food Security among Smallholder Farmers

Agricultural credit is widely recognized as a critical catalyst for agricultural development, household income generation, and food security among smallholder farmers. In many developing economies, where a substantial proportion of the population relies on subsistence agriculture and small-scale enterprises for their livelihoods, access to financial resources enables farmers to acquire productive assets, adopt improved technologies, and expand agricultural production (Todaro & Smith, 2023). Empirical evidence indicates that agricultural credit facilitates the acquisition of improved seeds, fertilizers, pesticides, machinery, and other essential farm inputs, thereby enhancing productivity and production efficiency (Djoumessi, Afari-Sefa, Kamdem & Bidogeza, 2018; Zabatantou Louyindoula, Bouity & Owonda, 2023). Furthermore, access to agricultural finance has been associated with increased technology adoption, higher household incomes, improved farm performance, and enhanced food security outcomes among smallholder farming households (Gebeyehu & Bedemo, 2024).

Despite these potential benefits, access to agricultural credit remains limited among many smallholder farmers in Kenya. Although microfinance institutions (MFIs), Savings and Credit Cooperative Societies (SACCOs), and NGO-led financing programs have expanded financial outreach, a significant proportion of rural households continue to be excluded from formal credit markets (Wanyonyi & Ngaba, 2021; Okuku & Ombok, 2024). This limited access constrains agricultural investment, restricts adoption of productivity-enhancing technologies, and undermines opportunities for income growth and improved household welfare.

Credit Accessibility Costs and Barriers to Agricultural Credit Facilitation

Credit accessibility costs constitute a major constraint to agricultural financing among smallholder farmers. One of the most significant barriers is collateral requirements, which financial institutions use to mitigate lending risks and safeguard against loan default. Borrowers are often required to pledge assets such as land, livestock, machinery, buildings, or other

valuable property as security for loans (Alexeev, Nurmakhanova & Polishchuk, 2021; Tiriongo, Njino & Mulindi, 2025). However, many smallholder farmers possess limited assets or lack formal ownership documentation, reducing their eligibility for credit. Empirical studies suggest that collateral requirements influence both the amount of credit granted and the cost of borrowing. Asiseh, Ng'ombe, Quaicoe, Vorsah and Prah (2025) found that collateral affects loan size and may increase borrowing costs through higher interest rates or restrictive lending conditions. Consequently, farmers lacking adequate collateral are frequently excluded from formal credit markets despite having productive investment opportunities (Linh et al., 2020; Okuku & Ombok, 2024).

Interest rates and other borrowing costs similarly influence farmers' decisions to access and utilize agricultural credit. Agricultural financing is most effective when available at affordable rates that enable farmers to generate sufficient returns from productive investments (Haryanto, Wardana, Jamil, Brintanti & Ibrahim, 2023). Conversely, high interest rates increase the cost of capital, discourage borrowing, and reduce the profitability of agricultural investments. Studies indicate that interest rates affect both participation in credit programs and the level of borrowing among smallholder farmers (Tiriongo et al., 2025). Excessive borrowing costs may limit farmers' ability to acquire quality inputs, adopt improved technologies, and expand farm operations, thereby weakening the potential contribution of agricultural credit to productivity growth and food security.

Beyond collateral requirements and interest rates, transaction costs and loan processing costs also affect credit accessibility. Accessing credit often involves administrative procedures, documentation requirements, travel expenses, guarantor arrangements, and lengthy approval processes (Ullah, Verner, Madaki, Adams & Bavoroa, 2024). While financial institutions impose such requirements to reduce information asymmetries and lending risks, they may inadvertently increase the effective cost of borrowing. Excessive bureaucratic procedures and transaction costs can discourage farmers from seeking formal credit, leading many to rely on informal financing mechanisms that often provide inadequate capital for meaningful agricultural investment.

Determinants of Agricultural Credit Accessibility: Credit Sources, Accessibility Costs, and Socio-Demographic Characteristics

Agricultural credit is accessed through both formal and informal financial sources. Formal sources include commercial banks, MFIs, SACCOs, and other licensed financial institutions, while informal sources comprise rotating savings groups, family networks, friends, moneylenders, and community-based financing arrangements (Ullah et al., 2024). Access to formal credit is generally subject to lending conditions such as collateral requirements, proof of repayment capacity, guarantors, and documentation. Consequently, affordability and accessibility challenges have contributed to the continued reliance on informal financial systems among rural households (Saqib, Kuwornu, Panezia & Ali, 2018). Studies suggest that approximately 60 percent of Kenyans experience limited participation in formal credit markets due to affordability constraints and rising living costs (Megersa, 2023). Furthermore, gender disparities persist, with male farmers and male-headed households generally exhibiting greater access to both formal and informal credit than female farmers and female-headed households (Ullah et al., 2024). Such disparities have important implications for agricultural investment, income generation, and household food security.

Access to agricultural credit is also shaped by farmers' socio-demographic characteristics where factors such as education level, farm size, marital status, income, farming experience, and enterprise characteristics significantly influence credit participation and borrowing capacity (Kamanda, Motaung & Okorley, 2023; Lesala, Mujuru, Mdoda & Obi, 2025). More educated farmers are often better positioned to understand lending procedures, evaluate borrowing opportunities, and manage loan utilization effectively. Additionally, access to credit may indirectly influence agricultural productivity through increased investment in skilled labor, improved healthcare, enhanced farm capital, and the adoption of improved agricultural technologies (Poczta-Wajda, Sapa, Stepien & Borychowski, 2020). Consequently, socio-demographic characteristics remain important determinants of both agricultural credit accessibility and the extent to which agricultural financing contributes to improved food security outcomes among smallholder farming households (Sawe & Kibonde, 2024).

Research Gap

Despite growing recognition of agricultural credit as a critical driver of smallholder productivity and food security, limited empirical evidence in Kenya has comprehensively examined how credit accessibility costs influence food security outcomes among smallholder farmers. Existing studies predominantly focus on credit access and availability while paying insufficient attention to the affordability dimensions of agricultural financing such as high interest rates, collateral requirements, transaction costs, loan processing fees, repayment conditions, and administrative barriers that significantly affect smallholders' ability to effectively utilize agricultural credit (Opiyo, 2018; Nakazi & Sunday, 2020; Fwamba, Sifuna & Dudi, 2022; Abilla & Wanyonyi, 2024). Yet, for many rural farmers, access to credit alone does not guarantee improved agricultural productivity or food security if the associated borrowing costs remain prohibitively high. Consequently, many smallholder farmers continue to rely on informal and less reliable financing mechanisms that limit investment in improved farm inputs, modern agricultural technologies, and climate-resilient farming practices necessary for sustainable food production.

Further, the available literature is largely characterized by fragmented, context-specific, and methodologically narrow studies that primarily focus on conventional commercial banking systems, with limited attention given to non-governmental organization (NGO)-facilitated agricultural credit models operating at national scale (Murungi, Alhassan & Zeka, 2023). This creates a significant knowledge gap regarding the effectiveness of NGO agricultural credit facilitation mechanisms such as those implemented by organizations like One Acre Fund in addressing affordability constraints faced by smallholder farmers. Existing empirical studies have inadequately examined how group-based lending arrangements, flexible repayment structures, farm input facilitation, and reduced transaction costs influence household food security outcomes within the Kenyan context (Deutschmann, Duru, Siegal & Tjernström, 2025). Moreover, limited contemporary primary data exists on how credit accessibility costs interact with information asymmetry, transaction costs, and livelihood vulnerabilities to influence smallholder farmers' agricultural productivity, resilience, and food consumption patterns.

This gap in empirical and contextual evidence constrains the development of responsive agricultural credit facilitation policies and limits the ability of policymakers, development agencies, and financial institutions to design inclusive and affordable credit interventions tailored to the realities of smallholder farmers. Therefore, this study sought to address this gap

by examining the effect of credit accessibility costs on food security among smallholder farmers in Kenya, with specific focus on non-governmental organization (NGO) facilitated agricultural credit interventions programmes. By generating contemporary empirical evidence from smallholder farmers supported through agricultural credit facilitation programs, the study contributes to a deeper understanding of how affordability-related credit barriers shape agricultural productivity, household resilience, and food security outcomes in Kenya.

METHODOLOGY

This study adopted a cross-sectional descriptive survey design to examine the effects of key agricultural credit facilitation factors namely credit accessibility cost on smallholder farmers' food security, while considering socio-demographic features as moderating variables. Creswell & Creswell (2022) affirm the use of cross-sectional descriptive survey designs since it allows researchers to gather information, summarize, present data, and interpret for purpose of clarification. Survey studies are concerned with describing characteristics of individual/groups, for instance households (Ayiro, 2024). Grounded on positivist and pragmatic logical orientation, the study integrated both quantitative rigor and contextual construal (Saunders, Lewis & Thornhill, 2022).

Target Population and Sampling

The target population comprised 417,494 smallholder farmers registered with One Acre Fund across seven counties of Kakamega, Busia, Bungoma, Kisii, Siaya, Vihiga and Trans Nzoia were selected due to their long-term exposure to agricultural credit facilitation programs. A sample size of 384 respondents was determined by Cochran's formula and obtained by a combination of purposive and stratified proportionate random sampling to ensure representativeness across regions and agro-ecological zones. A pilot study involving 39 respondents was conducted to refine instruments, while validity and reliability were rigorously tested using expert reviews and Cronbach's alpha coefficients, all exceeding acceptable threshold of 0.7, confirming internal consistency and robustness of the measures (Creswell & Creswell, 2022; Wandera, Namusonge & Sakwa., 2022).

Data Collection Tools

Data was collected using semi-structured questionnaires with likert-scale items, allowing systematic measurement and analysis of perceptions and outcomes with the support of trained research assistants, achieving high response reliability. Likert scales utilize items where certain items are appraised amongst respondents whose total score is high and low, relatively easy to construct, considered more reliable and provides more information and data than other types of scale (Ayiro, 2024).The design was apt in capturing patterns, links, and variations across large population in a specific timeframe, while ensuring clarity and analytical depth (Ma & Ma, 2022).

Data Processing and Analysis

Data processing involves systematic editing, coding, classification, and tabulation to ensure accuracy and consistency. Both descriptive and inferential statistical techniques were employed, using frequency dispersals, means, and regression analysis. Spearman rank correlation and multiple regression models were used to establish relationships mid variables, with a 95% confidence level ($p< 0.05$) guiding statistical significance (Singh, 2021). Axiological tactics were attained by testing outliers, reliability, validity, normality, linearity, heteroscedasticity, multi-collinearity and autocorrelation in data (Ma & Ma, 2022). The study

further applied hierarchical regression and factor analysis to assess joint effect of independent variables on food security outcomes. This full analytical approach enabled the study to generate reliable, generalizable insights into how agricultural credit facilitation mechanisms influence smallholder farmers' food security in Kenya.

FINDINGS

Response Rate

Three hundred and eighty-four (384) questionnaires were distributed to farmers under One Arce Fund and only 345 questionnaires were amply filled, thus signifying an 89.8% response rate in Table 1. This rate is apt, as 75% return rate is rule of thumb on least response rate for any academic study (Sekaran & Bougie, 2020).

Table 1: Response Rate

Response	No.	Percentage
Administered	384	100
Returned	345	90
Unreturned	39	10

Descriptive Analysis of Credit Accessibility Cost on Smallholder Farmers Food Security

This study sought to find out the effect of credit accessibility cost on food security among smallholder farmers in Kenya. To achieve this objective, the variable was gaged by three (3) pointers; credit processing, cost, disbursement cost, and credit interest rates expending factor analysis. Table 2 shows descriptive statistics and results in details.

Table 2: Descriptive Statistics for Credit Accessibility Cost

Statement	N	Mean	Std. Deviation
Credit administrative costs are affordable	344	2.0959	.92556
Administrative costs are lower likened to competitors	344	1.7093	.86211
Credits have low-priced interest to allow repayment	344	2.1657	1.09539
Cheap credit processing charges from one acre fund	344	1.6424	.95835
Credit processing charges are very fair	344	1.9186	.95331
Interest rates are affordable	344	2.4012	1.17386
Ease of lending procedure enhances credit access	344	2.3285	1.26154
Credit repayment is low-priced	344	1.7500	.84429
Credit have fair repayment terms	344	1.8634	.99059
Farm input credit payout are affordable	344	1.7500	.84083
Interest rates are cheaper compared to competitors	344	1.6279	.78315
Cost of credit disbursement is fair	344	1.5378	.84258
Valid N (listwise)	344		

Key: 1.00-1.79=Strongly Agree 1.80-2.59=Agree 2.60-3.39=Neither Agree nor Disagree 3.40-4.19=Disagree 4.20-5.00 =Strongly Disagree

From Table 2 the respondents generally agreed credit accessibility costs are affordable. For instance, they strongly agreed that interest rates are cheaper compared to competitors (mean=1.6279) further qualifying that cost of credit disbursement is fair (mean=1.5378). Similarly, respondents strongly agreed credit administrative costs are lower compared to competitors (mean=1.7093) and inexpensive credit processing charges (mean=1.6424) further justifying that cost structure does not present a major barrier with (mean=1.9186) on credit processing charges being very fair. They reflect a positive perception of credit affordability, accessibility and competitively priced. This is in line with efforts to improve food security as availability of credit to purchase farm inputs and handling other costs of farming is key.

This is in line with finding of Rieber, Kiplagat & Gaesing (2022) that integrated agricultural credit support programs combining input access and manageable credit improve household income stability and food availability among smallholders. These findings are consistent with studies indicating that farmers in low-income settings where food insecurity and poverty prevalent benefit significantly from lower-cost and farmer-friendly credit arrangements (Voeten, Bitzer, Schouten & Rasmussen, 2025). The findings imply that affordable and competitively priced agricultural credit plays a critical role in enhancing smallholder farmers' financial inclusion and food security. The results reinforce a conclusion that agricultural credit facilitation in rural areas that are transparent, low-cost, and farmer-centered credit systems play a critical role in supporting sustainable agricultural production and improving food security outcomes among smallholder households. These grouped means (1.5378-2.4012) indicate smallholder farmers largely view the credit model as accessible and supportive, though not entirely without concern.

Correlation Analysis for Credit Accessibility Cost and Smallholder Farmers Food Security

This section outlines the results of correlation analysis between affordable administrative costs, affordable credit interest rates and fair credit repayment costs on smallholder farmers' food security. Table 3 shows the findings as interpreted and discussed.

Table 3: Correlation Analysis for Credit Accessibility Cost and Smallholder Farmers Food Security

Spearman's rho		Affordable administrative costs for loan disbursement	Affordable credit interest rates	Fair credit repayment costs
How many meals do you have in a day	Correlation Coefficient	.265**	-.243**	.020
	Sig. (2-tailed)	.000	.000	.714
	N	343	343	343
You and other house member always had enough of all food you wanted to eat	Correlation Coefficient	-.273**	.531**	-.019
	Sig. (2-tailed)	.000	.000	.719
	N	344	344	344
Children food availability status	Correlation Coefficient	.162**	-.345**	-.228**
	Sig. (2-tailed)	.003	.000	.000
	N	344	344	344
Adults food availability status	Correlation Coefficient	.077	.092	.184**
	Sig. (2-tailed)	.154	.087	.001
	N	344	344	344

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

On the relation between food security and access to credit a correlation analysis was carried in Table 3, where Children food availability status significantly correlated with credit accessibility costs namely affordable administrative costs for loan disbursement (mean 0.162), affordable credit interest rates (mean -0.345) and fair credit repayment costs (-0.228). Only loan disbursement had a positive relation with children's food availability status implying that the ease of access and use of credit since money is fungible, it may directly be used to feed the children or indirectly by it being invested to increase farm production levels. This has been confirmed by Banerjee, Breza, Duflo & Kinnan, (2019) that access to credit can enhance productive investment, high interest rates and repayment obligations often limit short-term consumption gains and strain household cash flow, particularly among low-income borrowers.

Interest rates and credit repayment had negative correlation with a possible explanation would be that these two are cost that affects the household cash flow negatively and therefore reduces household incomes. This has been demonstrated by Meager (2022), who found out that the effects of credit on household welfare are modest and highly sensitive to loan costs and repayment structures, with high borrowing costs reducing net benefits. Further evidence by Melesse, Regassa & Degnet (2025) show that repayment pressure can offset potential gains from credit by forcing households to reallocate resources towards loan servicing rather than consumption or reinvestment. For the dependent variable meals' availability for adults only one independent variable fair repayment costs had a significant relation with it. Fair and manageable repayment terms tend to ease financial strain and improve households' ability to meet basic needs. Evidence from Banerjee, Breza, Chandrasekhar, Duflo, Jackson & Kinnan, (2024 suggests that flexible repayment arrangements enhance borrowers' capacity to balance production investments with household consumption obligations. This can be understood from

the perspective that having fair terms of repayment implies ability to balance the different financial obligations including feeding oneself.

Regression Analysis for Credit Accessibility Cost and Smallholder Farmers Food Security

To find the level of influence of credit accessibility cost owing to non-governmental organizations agricultural credit facilitation on food security among smallholder farmers in Kenya, a coefficient of determination was computed. This was done using regression analysis and the results were as shown in Table 4.

Table 4: Model Summary on Credit Accessibility Cost and Smallholder Farmers Food Security

	Model 1			Model 2		
Independent	**Beta**	**T**	**Sig.**	**Beta**	**T**	**Sig.**
(Constant)	2.744	35.094	.000	1.900	19.137	.000
Affordable administrative costs for loan disbursement	.149	2.583	.010	.079	1.346	.179
Affordable credit interest rates	-.195	-3.564	.000	-.003	-.046	.963
Fair credit repayment costs	-.124	-2.066	.040	.152	2.490	.013
Dependent	Children food availability status			Adults food availability status		
R – squared		.070			.039	
Adj. R squared		.062			.030	
Std. Error		.43940			.55803	
F – ratio (2, 263)		8.544			4.583	
Prob. > F		.000[a]			.004[a]	

Dependent Variable: Children Food Availability: Model 1: $Y=2.744+0.149X_2+-0.195\ X_2+-0.124X_2$

Dependent Variable: Adults Food Availability: Model 2: $Y=1.900+0.079X_2+-0.003X_2+0.152X_2$

From the Table 4 above both regression models namely Children food availability status was significant (with F-ration 8.544, adults0.000) and adults food availability status (with F-ration 4.583, Prob. 0.004) were significant, implying they can be used to draw conclusions. The influence of the independent variables on the dependent variable children food availability status is such that it was positive for affordable administrative costs for loan disbursement (0.149) and negative for affordable credit interest rates

(-0.195) and fair credit repayment costs (-0.124). The positive influence of affordable administrative costs for loan disbursement can be explained in that ease of access is assured to cater for shortfalls in the household. This finding is corroborated by Karlan, Lambon-Quayefio, Manjeer, & Udry (2026) who demonstrate that when credit is easily accessible and affordable to obtain, households are better positioned to maintain consumption, including food access, during periods of financial strain. The negative influence of affordable credit interest rates, fair credit repayment costs implies that credit access and use is inevitably felt by the children in

terms of meal access as the household is the only source of food. This was observed by Hilmawan, Aprianti, Thi Hong Vo, Yudaruddin, Bintoro, Fitrianto, & Wahyuningsih (2023) that although access to microcredit can support productivity, credit interest rates and repayment obligations often create short-term pressure on household consumption, particularly in low-income settings where income flows are irregular. Their findings suggest that even when credit is accessible, credit interest rates and repayment demands can temporarily tighten household budgets.

Summary of Findings

Credit accessibility cost, measured through processing costs, disbursement costs, and interest rates was found to have a strong, positive, and statistically significant relationship with food security among smallholder farmers in Kenya. Regression results indicated that these cost components significantly influenced household food availability for both children and adults, with respondents generally perceiving interest rates and repayment terms as affordable. Notably, loan disbursement costs showed a positive effect on children's food availability, suggesting that timely and accessible credit can directly or indirectly enhance household nutrition. Overall, credit cost factors significantly affected the frequency of food shortages, leading to rejection of the null hypothesis and confirming that credit accessibility cost is a key determinant of food security, consistent with prior findings (Kehinde, Akinola & Tijani (2026); James, Bakas, Thompson & Ebireri, 2025).

Hypothesis Test Results

Hypothesis suggested that '*Credit accessibility cost effect of non-governmental organization agricultural credit facilitation has no significant relationship on food security among smallholder farmers in Kenya.'*

Credit accessibility cost had coefficients of estimate which had a significant influence on household food availability status for both children and adults as depicted from Table 4. For children's food availability status, the model produced an R^2 of .070 and an adjusted R^2 of 0.062, indicating that approximately 7% of variation in children's food availability status can be explained by the independent variables included in the model. The regression model was statistically significant F (2,263) = 8.544, p< .001, meaning that the predictor variables jointly have a meaningful influence on children's food availability patterns.

Likewise, the regression results for adults' food availability status show an R^2 of 0.039.

Additionally, and an adjusted R^2 of 0.030, show about 3.9% of variation in adults' food availability status is clarified by predictor variables. Even though the expounded variance of adults' food availability status is smaller likened to that of children, the model remains statistically significant F (2, 263) =4.583, p=.004. Since the calculated F-value is significant at 5% significant level. The results of this study suggest that factors examined in the study significantly affect the frequency with which children and adults experience food shortages within households. Based on this result, the null hypothesis (**H_{o2}**) was rejected, and concluded that credit accessibility cost has a vital effect on smallholder farmers' food security. This agrees with Dlamini, Mtintsilana, Craig, Mapanga & Norris (2024) that many households adopt protective consumption plans in which food allocation decisions rank children to lessen nutritional risks linked with food insecurity. Similarly, Meager, (2022) show easing financial constraints enhances households' ability to for food security, consumption and manage seasonal income fluctuations.

CONCLUSION AND RECOMMENDATIONS

Conclusion

The findings of the study showed a strong, positive and statistically significant correlation between credit accessibility costs and food security among smallholder farmers in Kenya indicating affordable and well-structured credit improves smallholder farmers food security in Kenya through ability to access farm inputs and stabilize production. Equally findings of this study validate the statistical significance of credit accessibility cost which has a vital effect on smallholder farmers' food security.

Recommendation

The study recommends both non-governmental entities involved in agricultural credit facilitation and government through extension services, expand credit literacy and management training among smallholder farmers government to ensure dedicated institutions and enabling policy and regulatory frameworks to ensure relevant institutions as the Ministry of Agriculture through national cereals and produce board (NCPB) are strengthened, with clear mandate, authority and resources to fulfil the mandate and accountability for achieving that mandate.

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