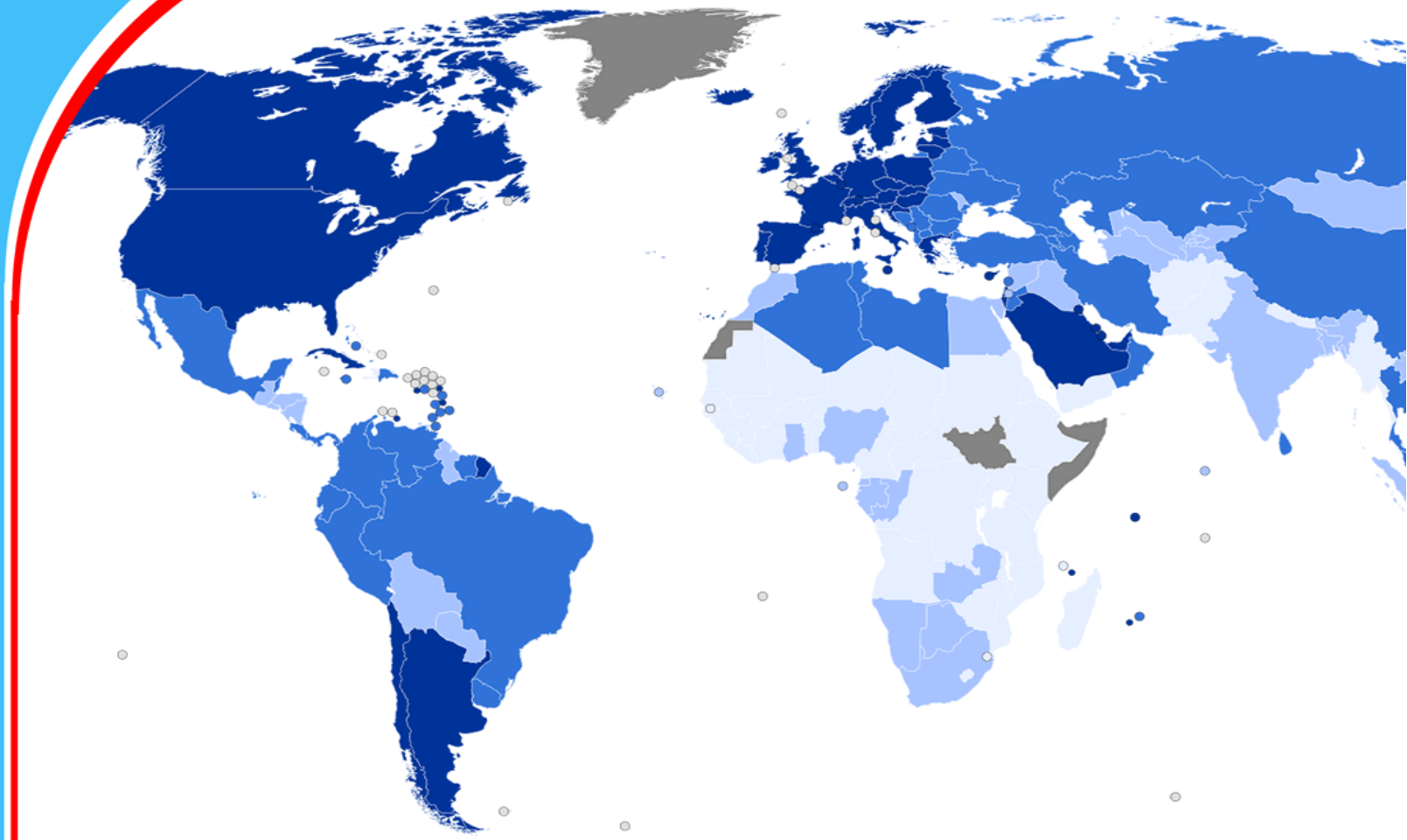
Journal of
Developing Economies
(JDE)



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AJP

Journal of Developing Economies
ISSN 2790 - 6957 (Online)
Vol.7, Issue 1, pp 28 - 48, 2026

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Effect of Farm Input Facilitation of Non-Governmental Organization Agricultural Credit Facilitation on Food Security among Smallholder Farmers in Kenya

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Article history
Submitted 06.05.2026 Revised Version Received 02.06.2026 Accepted 01.07.2026

Abstract

Purpose: The uniqueness of agricultural sector and perception of the sector as high-risk by financial institutions cut off the smallholder farmers from the much-needed agricultural credit financial services. The difficulty in accessing and absence of customized agricultural credit financing products for smallholder farmers is characterized by high level of uncertainty resulting from drought, unreliable input, price fluctuations, screening models, and lack of storage facilities compels the traditional commercial banks to shy away from availing agricultural credit and in the rarest circumstance charge high interest rate.

Methodology: This study examined the effect of farm input facilitation of non-governmental organizations agricultural credit facilitation on food security among smallholder farmers in Kenya. A cross-sectional descriptive survey of 343 smallholder farmers selected through purposive and stratified proportionate sampling from a population of 417,494 farmers registered under One Acre Fund across seven counties of Kakamega, Bungoma, Kisii, Siaya Busia, Vihiga and Trans Nzoia. This Study is predominantly grounded in the Sustainable Livelihoods Framework (SLF) and the Transaction Cost Theory. These theories provide a comprehensive understanding of how farm input facilitation influence household food security in Kenya. The Sustainable Livelihoods Framework emphasizes the role of livelihood assets in achieving food security while Transaction Cost Theory explains how the reduction of logistical and transaction barriers in farm input facilitation increases productivity, thereby improving food security.

Findings: Descriptive results showed general agreement that inputs are timely available, certified, and of acceptable quality, though affordability remains a concern. Correlation findings indicated a positive association between quality of input and meal frequency ($r = 0.141$, $p < 0.01$), while input availability was negatively associated with children's food availability ($r = -0.210$, $p < 0.01$). Regression results revealed that the model for children's food availability was significant ($F = 6.970$, $p = 0.001$; $R^2 = 0.039$), with quality of input positively influencing food security ($\beta = 0.139$, $p = 0.011$) and availability of input exerting a negative effect ($\beta = -0.172$, $p = 0.002$). The adult model was not significant. The study concludes that while access to quality farm inputs enhances food security, financial constraints associated with acquiring inputs may reduce short-term household food access, particularly for children. The findings highlight the need for integrated interventions that balance input access with household consumption needs.

Recommendations: The study recommends enhancing local farm input production and distribution systems to ensure affordability to improve food security through affordable farm input access. Additional research on farm input facilitation could focus on exploring the relationship between the manufacture and local production of agricultural inputs and their availability and accessibility to smallholder farmers.

Keywords: *Farm Input Facilitation, Food Security, Smallholder Farmers, Agricultural, Credit Facilitation, Non-Governmental Organization*

JEL Codes: *H81, Q18, Q12, Q14, O13, L31*

Journal of Developing Economies
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INTRODUCTION

Agriculture remains the backbone of most Sub-Saharan African economies, contributing significantly to gross domestic product (GDP) and serving as a critical pillar for food security (Zorrilla-Miras, Lisboa, López-Gunn & Giordano, 2024; Balcilar, Olasehinde-Williams & Tokar, 2025). In Kenya, the sector encompasses crops, livestock, fisheries, and agro-forestry, supporting approximately 75% of the population while contributing substantially to national output (Njora & Yilmaz, 2021). Globally, smallholder farmers, typically operating on less than two hectares of land, account for nearly 80% of food production in developing countries, underscoring their indispensable role in rural livelihoods, agricultural transformation, and national food systems (FAO, 2023; Todaro & Smith, 2023). Despite their significant contribution, smallholder farmers continue to face persistent constraints, particularly limited access to affordable agricultural finance, which restricts their ability to adopt improved technologies, acquire quality farm inputs, and enhance agricultural productivity.

Within this context, non-governmental organizations (NGOs) play a critical intermediary role by bridging the gap between formal financial institutions and the financing needs of smallholder farmers who are often excluded from conventional credit markets. Unlike commercial lenders that primarily rely on collateral-based lending and strict creditworthiness requirements, NGOs employ inclusive agricultural credit models that combine financial services with complementary interventions such as farm input facilitation, extension services, capacity building, and market linkages. By reducing financial, informational, and institutional barriers, NGOs enable resource-constrained farmers to access productive agricultural inputs and technologies that would otherwise remain beyond their reach, thereby strengthening agricultural productivity, household resilience, and food security.

Nevertheless, the global agricultural financing gap exceeds USD 170 billion annually, reflecting persistent systemic underinvestment in smallholder agriculture (GPFI, 2023). In Kenya, this challenge is compounded by low public expenditure on agriculture, which remains consistently below the 10% benchmark established under the Maputo and Malabo Declarations, and by limited participation of commercial banks, which allocate only a small proportion of total lending to the agricultural sector (Central Bank of Kenya, 2023). Structural barriers including high perceived lending risks, inadequate collateral, climate variability, high transaction costs, and limited financial literacy continue to constrain smallholder farmers' access to formal agricultural credit.

Consequently, NGOs, alongside microfinance institutions and other development partners, have become important facilitators of inclusive agricultural finance by designing integrated credit models that address both financial and non-financial constraints faced by smallholder farmers. Programmes implemented by organizations such as One Acre Fund and BRAC demonstrate how agricultural credit can be complemented with quality farm input provision, farmer training, extension support, and market access to improve farm productivity, household incomes, and food security. However, concerns regarding affordability, scalability, long-term sustainability, and the effectiveness of specific intervention components such as farm input facilitation remain inadequately understood.

Against this backdrop, this study examined the effect of farm input facilitation under non-governmental organization agricultural credit programmes on food security among smallholder

farmers in Kenya. It further examined the moderating influence of socio-demographic characteristics on this relationship, thereby contributing empirical evidence to inform inclusive agricultural finance policies and rural development strategies.

Statement of the Problem

Despite growing evidence that non-governmental organization (NGO) agricultural credit interventions contribute to improved smallholder productivity, household incomes, and food security in Sub-Saharan Africa, food insecurity and low agricultural productivity remain persistent among smallholder farmers. While considerable attention has been devoted to improving credit access, defined as the provision of financial capital to enable agricultural production, access to credit alone does not necessarily translate into improved agricultural outcomes. The realization of productivity gains depends on whether the available credit is effectively converted into farm input facilitation, including timely access to quality seeds, fertilizers, agrochemicals, and the logistical support required for their acquisition and utilization. Programmes implemented by organizations such as One Acre Fund have expanded access to credit alongside farm inputs, extension services, and flexible financing arrangements, resulting in improved yields and household welfare (Mutonyi, Mudi, & Juma, 2022; Deutschmann, Duru, Siegal & Tjernström, 2025). Nevertheless, many smallholder farmers continue to experience limited access to modern agricultural inputs despite the availability of agricultural credit, suggesting that the critical challenge extends beyond credit provision to the effectiveness of farm input facilitation in enabling productive agricultural investment (Amankwah, Ambel, Gourlay, Kilic, Markhof & Wollburg, 2025; Liverpool-Tasie, Omonona, Sanou & Ogunleye, 2017). This inability to convert available credit into meaningful access to productive farm inputs continues to constrain agricultural transformation and weaken household food security outcomes.

Furthermore, although existing studies recognize the contribution of agricultural credit interventions to agricultural development, they rarely isolate farm input facilitation as an independent intervention influencing food security. Instead, farm input facilitation is frequently subsumed within broader constructs such as agricultural credit, extension services, input subsidy programmes, or integrated rural development interventions, making it difficult to determine its distinct contribution to household food security. Existing studies therefore provide limited empirical evidence on how farm input facilitation, independent of other programme components, influences food security among smallholder farmers in Kenya. In addition, available studies pay insufficient attention to how institutional capacity, market access, and farmer socio-demographic characteristics shape the effectiveness of NGO-led farm input facilitation programmes across different contexts (Fwamba, Sifuna & Dudi, 2021; Maindi, Nyarindo, Ndirangu, & Isaboke, 2024). Consequently, the specific effect of farm input facilitation under non-governmental organization agricultural credit programmes on food security among smallholder farmers in Kenya remains inadequately understood (Wanyonyi, Mutsotso, Anangwe & Kariuki, 2025). This knowledge gap constrains the development of evidence-based agricultural financing policies and targeted interventions that enhance the capacity of NGO agricultural credit programmes to improve smallholder productivity and household food security.

Objective of the Study

To establish farm input facilitation effects of non-governmental organization agricultural credit facilitation on food security among smallholder farmers in Kenya.

LITERATURE REVIEW

Theoretical Framework

Sustainable Livelihood Approach and Transaction Cost Theory

Collectively, the Sustainable Livelihood Approach and Transaction Cost Theory provide a robust theoretical framework for explaining how non-governmental organization (NGO) agricultural credit facilitation influences food security among smallholder farmers. The Sustainable Livelihood Approach posits that households achieve sustainable livelihood outcomes through the accumulation and effective utilization of five interdependent forms of capital financial, human, physical, natural, and social which collectively determine their capacity to pursue productive livelihood strategies, withstand external shocks, and improve long-term well-being (Chambers & Conway, 1992; Carney, 1998; Natarajan, Newsham, Rigg & Suhardiman, 2022; Omotor, 2021). Within this framework, financial capital is a critical enabling asset that facilitates investment in improved agricultural technologies, quality farm inputs, irrigation, and other productivity-enhancing resources (Marco, 2022; Niles, Rudnick, Lubell & Cramer, 2021). However, its effectiveness depends on complementary livelihood assets. Human capital enhances farmers' knowledge and technical capacity to adopt improved farming practices; physical capital provides access to agricultural infrastructure and production technologies; natural capital supports sustainable management of land and other productive resources; while social capital promotes collective action, information sharing, trust, and access to farmer networks and institutional support. The interaction of these livelihood assets strengthens agricultural productivity, diversifies household incomes, enhances resilience to climatic and economic shocks, and ultimately improves household food security (Sherifa, 2021; Khaemba & Sifuna, 2024).

Transaction Cost Theory complements this perspective by explaining the institutional and market barriers that constrain the acquisition and effective utilization of these livelihood assets. The theory posits that smallholder farmers incur substantial transaction costs in accessing agricultural credit and productive inputs, including information search, transportation, collateral requirements, loan processing, contract negotiation, monitoring, market coordination, and compliance costs (Ketokivi & Mahoney, 2020; Rahat, Rahman, Ahmmed & Palash, 2025). In developing countries, these costs are further amplified by weak institutions, inadequate infrastructure, information asymmetry, and the high risks associated with agricultural lending (Mulbah, Ritho & Mburu, 2021; Kaiser & Barstow, 2022; Kehinde, Adesiyan, Hassan & Familusi, 2024). Through interventions such as group lending, decentralized input distribution, flexible repayment arrangements, extension services, farmer training, and local information-sharing networks, NGO agricultural credit programmes reduce these financial, administrative, and logistical barriers, thereby improving farmers' access to affordable agricultural credit and productive farm inputs (Dogeje, Ngaruko & Lyanga, 2023).

The interaction between the two theories provides a stronger explanation of how NGO agricultural credit facilitation translates into improved food security. Transaction Cost Theory explains the mechanism through which NGOs reduce the costs of accessing credit and farm inputs, while the Sustainable Livelihood Approach explains how the resulting improvements in access to financial capital strengthen the broader portfolio of livelihood assets. By lowering transaction costs, NGO agricultural credit programmes enable smallholder farmers to access and effectively utilize financial capital, which serves as a catalyst for acquiring quality farm inputs and investing in productivity-enhancing technologies (Scoones, 2015, Gichure, Njeru & Mathi, 2020; Kiconco, Alinda, Mwebaza & Ssemata, 2025). This process simultaneously strengthens human capital through training and extension services, physical capital through improved farm investments and infrastructure, natural capital through sustainable resource management practices, and social capital through farmer organizations, collective marketing, and peer learning networks. The combined effect is greater agricultural productivity, increased household incomes, enhanced resilience to climatic and economic shocks, and improved household food security. Thus, Transaction Cost Theory explains how access barriers are reduced, whereas the Sustainable Livelihood Approach explains how the resources unlocked by these interventions are transformed into sustainable livelihood outcomes. Their integration therefore provides a comprehensive theoretical foundation for examining the effect of farm input facilitation under NGO agricultural credit programmes on food security among smallholder farmers in Kenya.

Conceptual Framework

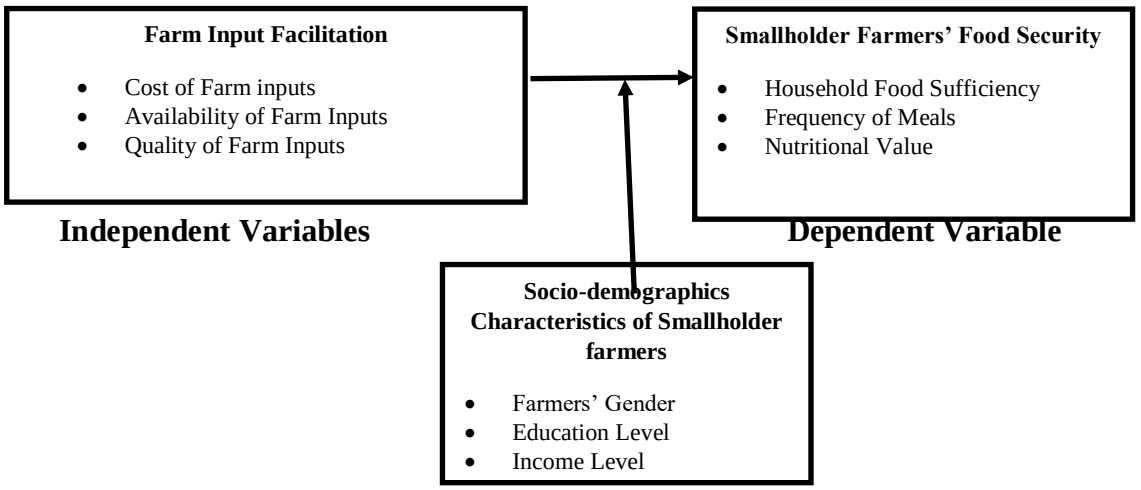

Figure 1: Conceptual Framework

Empirical Review

Farmers can purchase inputs like seed, fertilizer, pesticides, diesel, machinery required, labor and technical services through the availability of sufficient finances (Chandio, Jiang, Rehman, Twumasi, *et al*., 2021). Farm input facilitation encompasses the institutional, financial, and logistical interventions designed to enhance smallholder farmers' access to essential agricultural production resources such as improved seeds, fertilizers, agrochemicals, irrigation technologies, and extension services. These inputs are widely acknowledged as fundamental drivers of

agricultural productivity, rural livelihoods, and household food security. Access to quality farm inputs significantly improves crop yields, enhances farm efficiency, and strengthens resilience against poverty and food insecurity among rural households (Ndhlovu, 2025; Holden, 2019; Kuteya, Kalinda, & Kuntashula, 2025).

In Sub-Saharan Africa, persistent low agricultural productivity has been strongly linked to inadequate utilization of modern agricultural inputs. Studies by (Amankwah, Ambel, Gourlay, Kilic, Markhof & Wollburg, 2025; Liverpool-Tasie, Omonona, Sanou, & Ogunleye, 2017) established that limited access to fertilizers and improved seed varieties continues to undermine agricultural transformation and weaken food security outcomes among smallholder farming communities. These findings underscore the centrality of farm input facilitation in advancing sustainable agricultural development and strengthening food systems. Despite the recognized importance of agricultural inputs, affordability and accessibility constraints continue to limit their utilization among smallholder farmers. Many rural households operate under severe financial limitations that restrict their capacity to purchase improved seeds, fertilizers, and agrochemicals in sufficient quantities.

Consequently, governments, development partners, and non-governmental organizations (NGOs) have increasingly implemented farm input facilitation programmes aimed at reducing financial barriers and expanding access to productivity and enhancing technologies through credit support, organized distribution systems, farmer cooperatives, and donor-funded agricultural interventions. Empirical evidence indicates that such interventions positively influence agricultural productivity, household welfare, and food security when effectively implemented (Teka & Lee, 2020; Ricome, Barreiro-Hurle & Fall, 2024). Wu, Zhang, Yang & Wu (2024) posit that the provision of credit to farmers is the best remedy to complement the on-farm and off-farm income of smallholder farmers to enhance food production as provision of credit to farmers is widely perceived as an effective strategy for promoting adoption of improved and risky technologies through relaxation of liquidity constraint as well as boosting of household ‘s-risk bearing ability.

Relatedly, Sibande, Bailey & Davidova (2015) observed that facilitated access to farm inputs improved household welfare and food availability among farming households in Malawi, while Ray (2025) found that agricultural input facilitation programmes significantly contribute to food production and household food security across Africa. Similarly, Ngugi, Maitho & Kyalo (2025) established that access to improved seeds and fertilizers positively enhances household food security in Kenya through increased agricultural production and improved household food availability.

Conversely, However, the effectiveness of farm input facilitation programmes extends beyond the mere availability of agricultural inputs and is heavily influenced by institutional efficiency, farmer awareness, implementation structures, and complementary support systems. Wanyonyi, Mutsotso, Anangwe & Kariuki (2025) argue that weak implementation mechanisms, inadequate communication, and low farmer awareness significantly reduce participation in farm input facilitation programmes. Likewise, Pretty, Benton, Bharucha, *et al.* (2018) emphasize that sustainable agricultural interventions require integrated support systems involving extension services, institutional coordination, farmer training, and community participation. Agricultural cooperatives have also emerged as critical mechanisms for improving farm input access and reducing transaction costs associated with acquiring seeds and fertilizers while simultaneously

strengthening market access and household incomes (Blekking, Gatti, Waldman, Evans, & Baylis, 2021). Further, Ahmad, Chani & Afzal (2018) applied Autoregressive Distributed Lag (ARDL) bound testing approach on annual time series data between1973 and 2014 on long term relations between agricultural credit disbursed through formal institutions and agricultural GDP. The study found out that long-run relationship between agricultural credit and agricultural GDP and further found a positive and vital connection between agricultural credit and agricultural output (Dirir & Aden, 2024).

Nevertheless, the agricultural sector continues to face emerging external shocks that threaten the sustainability of farm input facilitation initiatives. The Russian invasion of Ukraine in 2022 triggered sharp increases in global agricultural input prices, particularly fertilizers, thereby worsening affordability challenges for many Sub-Saharan African countries that rely heavily on imported agricultural inputs (Hebebrand & Laborde, 2023; Vos, Glauber, Hebebrand & Rice, 2025). These overlapping crises further highlight the urgent need for resilient, affordable, and institutionally coordinated farm input facilitation systems to safeguard food security and rural livelihoods. Equally, Shuaibu & Nchake (2021) found out that lack of access to credit causes setbacks to productivity of farmers as farmers do not have resources to procure improved seeds, fertilizer, chemicals, and hire skilled labor would improve productivity, welfare help achieve economically sustainable production (Wang, Xu & Chen, 2023). Wongnaa, Abudu, Abdul-Rahaman, Akey & Prah (2023) found agricultural credit financing of farm inputs raises productivity with very few smallholders' farmers use of agricultural inputs captures benefits of food security, thus need for this study on effects of farm input facilitation of non-governmental agricultural credit facilitation on smallholder farmers' food security in Kenya.

Research Gap

Existing literature consistently recognizes that access to quality farm inputs, including improved seeds, fertilizers, and agrochemicals, is fundamental to enhancing smallholder agricultural productivity, household incomes, and food security in developing countries (Lowder, S´anchez & Bertini, 2021; Ritchie, 2022). Despite substantial investments by governments, donors, and development agencies to expand access to agricultural inputs and credit, the adoption of improved farm inputs among smallholder farmers remains persistently low, particularly in Sub-Saharan Africa (Lazaro & Alexis, 2021). Previous studies largely attribute this challenge to low household incomes, limited financing opportunities, high credit accessibility costs, collateral requirements, and inadequate agricultural support systems (Khan, Nouman, Negrut, Abban, Cismas & Siddiqi, 2024; Oke, Kehinde & Akindele, 2019; Abilla & Wanyonyi, 2024). However, although agricultural credit accessibility and subsidy programmes have been widely studied, limited empirical attention has been given to farm input facilitation as a distinct intervention mechanism through which non-governmental organization (NGO) agricultural credit programmes influence household food security. Little is known about how the timely provision of quality farm inputs, improved input availability, affordability, and logistical support enables farmers to convert agricultural credit into productive investments that enhance agricultural productivity, household incomes, food availability, and ultimately household food security.

In Kenya, existing studies have largely examined agricultural credit as a broad financing mechanism or embedded farm input facilitation within broader interventions such as extension services, input subsidy programmes, or general agricultural credit, providing limited evidence on its independent contribution to household food security (Singoro, 2025; Nakazi & Sunday, 2020; Murungi, Alhassan & Zeka, 2023). As a result, these studies rarely distinguish between credit access, which provides financial capital, and farm input facilitation, which provides quality agricultural inputs and the logistical support required for their timely acquisition and utilization. This makes it difficult to explain how available agricultural credit is translated into effective access to productive farm inputs and, ultimately, improved household food security.

Furthermore, existing studies rarely account for the geographic and socio-economic diversity of smallholder farmers participating in NGO agricultural credit programmes across different agro-ecological zones, production systems, and livelihood contexts. As such, limited empirical evidence exists on whether the effectiveness of farm input facilitation varies across farming populations with differing resource endowments, market access, institutional support, and socio-demographic characteristics. This limitation is particularly important in the context of One Acre Fund, whose beneficiaries are distributed across seven counties representing diverse agro-ecological and socio-economic settings.

Therefore, the pathways through which farm input facilitation contributes to household food security across these heterogeneous contexts remain insufficiently understood, despite increasing policy emphasis on strengthening smallholder agriculture under Kenya's Bottom-Up Economic Transformation Agenda (Wanyonyi, Mutsotso, Anangwe & Kariuki, 2025). This knowledge gap, in turn, constrains the formulation of targeted, evidence-based agricultural financing policies and rural development interventions. Accordingly, this study examined the effect of farm input facilitation under NGO agricultural credit programmes on food security among smallholder farmers registered with One Acre Fund across seven counties in Kenya, generating context-specific empirical evidence that isolates the contribution of farm input facilitation to household food security across diverse farming environments.

METHODOLOGY

This study adopted a cross-sectional descriptive survey design grounded in positivist and pragmatic research orientations to examine the effect of agricultural credit facilitation factors, particularly farm input facilitation on food security among smallholder farmers in Kenya (Creswell & Creswell, 2022; Saunders, Lewis, & Thornhill, 2022). The study targeted a population of 417,494 smallholder farmers registered with One Acre Fund across seven counties namely Kakamega, Bungoma, Busia, Kisii, Siaya, Vihiga, and Trans Nzoia (One Acre Fund, 2017), from which a sample of 384 respondents was determined using Cochran's formula and selected through purposive and stratified proportionate random sampling techniques to ensure representativeness across regions and agro-ecological zones (Cochran, 1977; Dubey & Kothari, 2022). Primary data were collected using semi-structured questionnaires with Likert-scale items administered with the support of trained research assistants, while a pilot study involving 39 respondents was conducted to refine the research instruments (Ayiro, 2024).

Validity and reliability were established through expert review and Cronbach's alpha coefficients exceeding the acceptable threshold of 0.7, confirming internal consistency and robustness of the

measures (Cronbach, 1951; Creswell & Creswell, 2022). Data were systematically coded, edited, and analyzed using both descriptive and inferential statistical techniques, including frequencies, means, Spearman Rank Correlation, multiple regression, hierarchical regression, and factor analysis at a 95% confidence level ($p<0.05$) (Field, 2018; Singh, 2021). In addition, diagnostic tests for normality, linearity, heteroscedasticity, multicollinearity, autocorrelation, validity, and reliability were conducted to ensure statistical accuracy and analytical rigor (Gujarati & Porter, 2009), thereby enabling the study to generate reliable and generalizable insights into the influence of farm input facilitation of non-governmental agricultural credit facilitation mechanisms on food security among smallholder farmers in Kenya.

FINDINGS/RESULTS

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 Farm Input Facilitation on Smallholder Farmers Food Security

This study sought to establish the effects of farm input facilitation on food security among smallholder farmers in Kenya. To attain this objective, the variable was assessed using three (3) indicators; cost of farm inputs, availability of farm inputs and quality of farm inputs was analyzed through descriptive statistics, factor analysis, correlation analysis and regression. Table 2 displays the descriptive statistics and results.

Table 2: Descriptive Statistics for Farm Input Facilitation

Statement	N	Mean	Std. Deviation
Prices from one acre fund are affordable	343	2.3586	.92858
One acre fund always provides input	343	2.0262	.96240
One acre fund guarantee yields	343	1.8688	.93204
Inputs are timely available	343	1.6531	.82667
I get certified farm inputs	343	1.8367	.88334
Farm input prices are fair	343	1.9825	.93329
Farm, inputs are of high quality	343	2.1545	1.18816
Farm inputs are of different varieties	343	2.1574	1.17167
Farm inputs are reasonably priced	343	2.0117	.92710
Valid N (listwise)	343		

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 the table the respondents generally agreed that farm inputs are available and accessible. For instance, they strongly agreed (mean=1.6531) that inputs are timely available further qualifying with (mean=1.9825) that farm input prices are fair. The means for receiving certified inputs (mean=1.8367) and for dependability in guaranteeing yields (mean=1.8688) further imply that farmers generally trust the quality and reliability of the products they obtain. The mean score for affordability of inputs (mean=2.3586) indicates that farmers are somewhat leaning slightly toward agreement that prices are manageable, though not overwhelmingly affordable. This is in line with the efforts to improve food security as availability of the inputs is key to these efforts quite in line with Maindi, Nyarindo, Ndirangu & Isaboke, (2024) whose research showed a relation between input access and food security and the need to avail it to more smallholder farmers.

The means for input variety (mean=2.1574) and input quality (mean=2.1545) also suggest that while farmers have access to different products and of high quality, the range and quality meet their expectations, echoing the sentiments by Anglade, Swisher & Koenig (2021) about how improved input diversity and quality of available agricultural inputs contribute to production gains and eventually to the realization of food security. This measured perception reflects broader discussions in agricultural credit facilitation, where researchers such as Murungi, Alhassan & Zeka (2023) explain that improvements in agricultural credit and input facilitation often ease constraints, but do not entirely remove cost-related challenges. Largely, the mean scores ranging from 1.6531 to 2.3586 paint a picture of smallholder farmers appreciate improvements in access, timing, and certification, yet still experience practical constraints related to affordability and yield outcomes. This is further elaborated by Maindi, Nyarindo, Ndirangu & Isaboke, (2024) whose research showed a relation between input access and food security and the need to avail it to more smallholder farmers.

Correlation Analysis of Farm Input Facilitation and Smallholder Farmers Food Security

The scores for both variables, which were collected in form of frequencies, were converted into ratio scaled data by computing mean responses per respondent, where high scale ratings implied high farm input facilitation and high smallholder farmers' food security and vice versa. The findings are indicated in table 3.

Journal of Developing Economies
ISSN 2790 - 6957 (Online)
Vol.7, Issue 1, pp 28 - 48, 2026

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Table 3: Correlation Analysis of Farm Input Facilitation Cost and Smallholder Farmers Food Security

Spearman's rho		Quality of Farm Inputs	Farm Inputs Availability
How many meals do you have in a day	Correlation Coefficient	.141**	-.131*
	Sig. (2-tailed)	.009	.015
	N	342	342
You and other house member always had enough of all food you wanted to eat	Correlation Coefficient	-.085	.081
	Sig. (2-tailed)	.118	.135
	N	343	343
Children food availability discrepancy level	Correlation Coefficient	.077	-.210**
	Sig. (2-tailed)	.156	.000
	N	343	343
Adults food availability discrepancy level	Correlation Coefficient	.102	-.063
	Sig. (2-tailed)	.060	.241
	N	343	343

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

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

From table 3 farm input availability with a correlation coefficient of -0.210 had a significant correlation with only one of the dependent variable Children food availability statuses. The negative correlation implies that the efforts towards ensuring farm inputs are procured that reduces the ability of the household heads to provide meals for the children. This can be explained in that rural households are low-income earners and therefore have to sacrifice household consumption to ensure purchase of these inputs. This is in line with the findings of Michelson, Gourlay, Lybbert & Wollburg (2023) that in several African countries, input market participation is strongly correlated with household wealth, and that the poorer farmers often face sharper trade-offs between immediate consumption and productivity-enhancing investments.

Regression Analysis for Credit Accessibility Cost and Smallholder Farmers Food Security

To estimate the effect of farm input facilitation on smallholder farmers' food security, a coefficient of determination was computed. This was done using regression analysis and the results were as shown in Table 4.

Journal of Developing Economies
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Table 5: Model Summary on Farm Input Facilitation and Smallholder Farmers Food Security

	Model 1			Model 2		
Independent	**Beta**	**T**	**Sig.**	**Beta**	**T**	**Sig.**
(Constant)	2.663	32.411	.000	2.200	21.325	.000
Quality of Farm inputs	.139	2.564	.011	.056	1.020	.308
Farm inputs Availability	-.172	-3.170	.002	-.047	-.850	.396
Dependent	Children food availability discrepancy level			Adults food availability discrepancy level		
R – squared	.039			.004		
Adj. R squared	.034			-.002		
Std. Error	.45311			.56900		
F – ratio (2, 263)	6.970			.738		
Prob. > F	.001a			.479a		

Dependent Variable: Children Food Availability: Model 1: $Y=2.663+0.139X_1+-0.172X_2$

Dependent Variable: Adults Food Availability: Model 2: $Y=2.200+0.056X_1+-0.047X_2$

From the table above only the regression model of Children food availability status was significant (with F-ration -6.970, Prob. – 0,001). This implies that access to meals is positively affected by Quality of farm inputs (0.139) but negatively influenced by farm inputs availability (-0.172). The positive influence of quality of farm input can be explained in that the higher the quality of input the higher the expected production levels and food security outcomes. The higher the produce, the better the chances that the household can have resources to feed the family for the longer part of the season before the next harvest. The regression equation is presented as follows: $Y=2.663+.139X_1-.172X_2$ for models 1, where Y: Small-holder farmers food security, X_1: Farm inputs of quality, X_2: farm inputs available. The higher the produce, the better the chances that the household can have resources to feed the family for the longer part of the season before the next harvest. This is in line with the work of Calloway, Carpenter, Gargano, Sharp & Yaroch, (2023) who noted that families that had access to quality inputs reported better nutrition status for their dependents and reinforces this relation of access to meals being influenced with quality of farm input that households adopting improved agricultural technologies including high-quality seeds and fertilizers experienced higher production levels and better child nutrition outcomes compared to non-adopters.

The findings demonstrate that access to quality inputs is associated not only with increased yields but also with improved dietary intake among dependents. The negative influence of farm input available implies that the juggling between purchasing of inputs and ensuring the children have the meals under tight budgets implies limited resources to provide meals for the children. This was observed by Haryanto, Wardana, Jamil, Brintanti, & Ibrahim (2023) who show that cash flow constraints significantly limit farmers' ability to invest in inputs, often leading to reduced

agricultural productivity and difficult consumption trade-offs. Further, this is supported by (Hirvonen, de Brauw & Abate, 2021; Ntakyo & van den Berg, 2019) where adults adjust their own consumption patterns by reducing their own food intake or dietary quality to ensure children maintain more stable access to meals.

Adults food availability status was not significantly influenced by farm inputs it can further be explained that adult have different ways of ensuring they have access to meals and employ adaptive livelihood strategies to secure food access beyond agricultural production. This is in line with the (Zulu, Hlatshwayo, Ojo, Slotow, Cele & Ngidi, 2024; Sibhatu, Songsermsawas, & Puri, 2026) that income diversification enhances resilience by reducing dependence on agriculture and enhancing household consumption during production shocks enabling adults to maintain access to food even when agricultural inputs are limited or yields are affected.

Hypothesis Test Results

The dimension and elucidation of hypothesis relied on *F*-tests against *F*-critical values. The criteria are if *F*-statistic is greater than *F*-critical values, reject the null hypothesis and accept alternate hypothesis if converse (Field, 2024). Hypothesis one stated that '*Farm input facilitation effect of non-governmental organization agricultural credit facilitation has no significant relationship on food security among smallholder farmers' in Kenya.'* From table 4.17 regression model for children's food availability status was statistically significant $F(2,263) = 6.970$, $p < 0.05$, indicating that the independent variables jointly explain variations in children's food availability patterns. However, the regression model for adults' food availability status was not statistically significant $F(2,263) = 0.738$, $p > 0.05$, suggesting that the predictor variables did not significantly explain variations in adults' food availability status.

The findings suggest that the determinants examined in the study have a stronger influence on children's food availability status than on that of adults. This aligns with observations made by Mbhenyane, Makuse, Tambe & Zuma (2025) assert that during periods of food insecurity, households frequently adjust adult consumption before reducing food intake for children. These results provide an explanation why the factors examined in the regression model appear to have a stronger statistical influence on children's food availability status compared with adults. The null hypothesis (**Ho_1**) was thus rejected, and it was concluded that farm input facilitation has a significant effect on smallholder farmers' food security. These findings help explain why the factors examined in the regression model appear to have a stronger statistical influence on children's food availability status compared with adults.

Summary of Findings

The study assessed the effect of farm input facilitation through NGO agricultural credit programs on food security among smallholder farmers in Kenya, using input cost, availability, and quality as indicators. Descriptive statistics on the variable postulate that farm input facilitation had great effect on response variables. Inferential statistics designate quality of farm inputs and farm inputs availability greatly impelling criterion variable, but cost of farm input pointer was trivial. Farm input facilitation is the only independent variable that has an overall negative influence implying that ensuring farm inputs are available, they are at a general cost which influences access to daily meals and temporarily reduce food consumption particularly during planting seasons when cash requirements are highest.

Hence a struggle to balance consumption needs with production costs. This is consistent with the findings by Hammond, Pagella, Caulfield, Fraval, Teufel, Wichern, Kihoro, Herrero, Rosenstock & van Wijk, (2023) that fertilizer and improved seed adoption among smallholder farmers is frequently constrained by poverty and seasonal income shortages, leading households to reallocate limited resources in ways that may temporarily reduce food consumption particularly during planting seasons when cash requirements are highest. Given that the regression results demonstrated the existence of stronger influence on children's food availability than on that of adults. The null hypothesis was thus rejected, and it was concluded that farm input facilitation has a significant effect on smallholder farmers' food security. These findings help explain why the factors examined in the regression model appear to have a stronger statistical influence on children's food availability status compared with adults.

CONCLUSION

The study concludes that farm input facilitation through non-governmental organization agricultural credit programs has a significant and positive effect on food security among smallholder farmers in Kenya. Access to high-quality and availability of farm inputs enhances production levels, stabilizes household food supply, and improves children's food availability. While input cost was less influential, seasonal cash constraints highlight the trade-offs households face between purchasing inputs and meeting immediate food needs. These findings underscore that ensuring affordable, accessible, and high-quality farm inputs is critical for improving household food sufficiency, supporting productivity, and advancing the objectives of SDG 2 (Zero Hunger) among smallholder farming communities.

RECOMMENDATIONS

The study confirms that non-governmental organization led farm input facilitation plays a critical role in enhancing food security among smallholder farmers in Kenya, contributing to improved household well-being. Based on the findings, it is recommended that policies and programs focus on strengthening local production and distribution of farm inputs to ensure affordability, consistent availability, and wider reach to rural farmers, thereby enhancing agricultural productivity and household food sufficiency.

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