ISSN: 2695-2556 (Online)
ISSN: 2651-5679 (Print)

AKSU Journal of Agriculture and Food Sciences 10(2) 122-145, 2026

Effect of Commercial Bank Credit on Agricultural Production in Nigeria (1991 – 2023): An Empirical Analysis

Aniekan J. Akpaeti*, Nsikan E. Bassey, Matthew N. Ekaette and Daniel N. Archibong

Department of Agricultural Economics, Akwa Ibom State University, Obio Akpa Campus, P.M.B. 1167, Uyo, Aka Ibom State, Nigeria

*Corresponding Author's Email: aniekanakpaeti@aksu.edu.ng

Abstract

Access to formal agricultural finance remains a major constraint to increasing agricultural productivity in Nigeria despite numerous government credit interventions. This study examined the effect of commercial bank credit on agricultural production in Nigeria using annual time-series data from 1991 to 2023. Specifically, the study evaluated the trend and growth patterns of agricultural production and credit to agriculture, estimated their short- and long-run relationships, and examined the causal relationship between the two variables. Secondary data were obtained from the Central Bank of Nigeria (CBN), the Food and Agriculture Organization (FAO), and the National Bureau of Statistics (NBS). Trend analysis, compound growth estimation, the Autoregressive Distributed Lag (ARDL) model, and Granger causality techniques were employed. The results showed significant positive trends in agricultural production and commercial bank credit, with compound growth rates of 21.04% and 2.84%, respectively. The ARDL bounds test confirmed a long-run relationship among the variables (F-statistic = 7.133). In the long run, commercial bank credit exerted a significant negative effect on agricultural production ($\beta = -0.427$, $p < 0.01$), whereas government expenditure on agriculture positively influenced output and higher interest rates reduced production. In the short run, lagged commercial bank credit significantly enhanced agricultural production, while the error correction coefficient (-1.470, $p < 0.01$) indicated rapid adjustment toward long-run equilibrium. Granger causality results revealed no causal relationship between commercial bank credit and agricultural production. The study concludes that expanding agricultural credit alone is insufficient to sustain agricultural growth and recommends improving credit efficiency, *strengthening agricultural investment, and providing complementary institutional and infrastructural support.*

Keywords: Agricultural production, Commercial bank credit, ARDL model, Agricultural finance, Credit efficiency, Government expenditure, Interest rate, Nigeria

1.0 Introduction

Agriculture remains a critical sector in Nigeria, contributing significantly to employment, food security, and economic development (NBS, 2023). Historically, before the oil boom of the 1970s, agriculture was the mainstay of the Nigerian economy, accounting for a substantial share of GDP and export earnings. However, the sector has experienced fluctuations due to policy inconsistencies, underinvestment, and structural challenges, including poor infrastructure, limited access to finance and crucial farming inputs like fertilizers and improved varieties (Okoro & Amaefule, 2021; Ekwere et al., 2023a; Ekwere et al., 2023b). Access to credit remains one of the most significant constraints facing agricultural production in Nigeria, particularly among smallholder farmers who dominate the sector (CBN, 2022). These farmers often lack collateral, formal financial records, and institutional support required to access commercial bank loans. Despite several interventions such as the Agricultural Credit Guarantee Scheme Fund (ACGSF) and the Nigerian Incentive-Based Risk Sharing System for Agricultural Lending (NIRSAL), access to formal credit remains limited and uneven.

The Nigerian agricultural sector is characterized by a large number of smallholder farmers who often lack the collateral and financial history required to access formal credit from conventional financial institutions (Oladejo & Ambali, 2020). While government-backed agricultural credit schemes and specialized agricultural banks exist, their reach and effectiveness in translating into tangible increases in agricultural production remain questioned. Reports often highlight issues such as bureaucratic bottlenecks, high interest rates, and a mismatch between the types of credit offered and the specific needs of farmers (Nnaji et al., 2023). Consequently, a significant portion of the agricultural population remains financially excluded, limiting their capacity to invest in productivity-enhancing measures and potentially hindering overall agricultural output.

Okunlola and Ayetigbo (2024) assess the impact of agricultural financing on agricultural growth sustainability in Nigeria. The study utilized the ARDL bounds test to analyze the short- and long-term effects of agricultural financing on agricultural growth sustainability. The findings of this study revealed that agricultural financing has both short-term and long-term impacts on agricultural growth sustainability. Domestic financing of agriculture significantly influences agricultural growth sustainability in Nigeria. Bank credit to the agricultural sector stimulates agricultural GDP. Similarly, the interest rates set by banks exhibit a negative relationship with agricultural growth sustainability in Nigeria, both in the short and long term. On the other hand, the Agricultural Credit Guarantee Scheme Fund (ACGSF) positively affects Nigeria's agricultural GDP in both the short and long term.

Udoette et al. (2024) examined agricultural financing and agricultural output in Nigeria, focusing on the moderating effect of interest rates from 1978 to 2020. Using vector error correction model estimation, the results indicate that an increase in agricultural bank credit generally leads to an increase in agricultural output.

Adewale et al. (2022) examined the impact of credits on agricultural output in Nigeria over the period of 1978 to 2016. The data are sourced from various editions of the Central Bank of Nigeria Statistical Bulletin. Johansen cointegration test and Multivariate Ordinary Least Squares regression estimation were applied to the data to achieve the objective of the study. The findings of the study reveal no long-run relationship between deposit money bank credit to the agriculture sector in Nigeria and agriculture sector output.

Mosinmileoluwa et al. (2021) evaluated the influence of agricultural credit on Nigeria's economic growth for the period of 1981-2017. Data are sourced from the Central Bank of Nigeria (CBN) statistical bulletin and the World Development Indicator (WDI). The detailed objectives are to analyze the effect of the ACGSF and the deposit money bank credit to the agricultural sector (DMBCA) on Nigeria's Economic Growth. Data are analyzed using the test for stationarity and the Auto-Regressive Distributed Lag (ARDL) model. ARDL is adopted due to the mixed order of stationarity of the variables at levels and first differences. From the research results, it is established that, in the long run, DMBCA is significant and there exists a direct relationship only in the short run. Conversely, the ACGSF is insignificant in both the short and long run but has a direct relationship in the short run and an inverse relationship in the long-run.

Udoka et al. (2016) assessed the effect of commercial banks’ credit on agricultural output in Nigeria. Four research hypotheses are formulated to guide and direct the study. The ex-post facto research design is adopted for the study. Data for the study are collected from published articles and the Central Bank of Nigeria Statistical Bulletin. To estimate the specified equation, the ordinary least squares regression technique is employed. Based on the results obtained, the estimated results show that there is a positive and significant relationship between the ACGSF and agricultural production in Nigeria, meaning that an increase in the ACGSF leads to an increase in agricultural production in Nigeria. Furthermore, there is a positive and significant relationship between commercial banks' credit to the agricultural sector and agricultural production in Nigeria.

Empirical studies on the relationship between agricultural credit and output in Nigeria present mixed findings. While some studies report a positive relationship (Adekunle & Olomola, 2019), others find weak or insignificant effects, suggesting that credit may not always translate into increased production due to inefficiencies, diversion of funds, or structural constraints (Eze &

Okike, 2022). This inconsistency in empirical evidence underscores the need for further rigorous investigation into the specific mechanisms and conditions under which agricultural credit effectively translates into increased output in the Nigerian context.

This study seeks to address the existing gaps in the literature by providing a more nuanced understanding of the effect of credit on agricultural production in Nigeria. Specifically, it aims to analyze the relationship between aggregate agricultural credit and agricultural output (e.g. total production value). Most existing studies employing the ARDL framework focus primarily on establishing long-run relationships without adequately reconciling short-run dynamics and causality outcomes. This study contributes to the literature by jointly examining short-run dynamics, long-run relationships, and causality between commercial bank credit and agricultural production using updated data (1991–2023).

The study, therefore, seeks to address the following objectives, which are to:

i. evaluate the trend and growth rate of Agricultural production and Credit to Agriculture (1991–2023).
ii. examine the effect of commercial bank credit on agricultural production in Nigeria (1991–2023).
iii. assess the causal relationship between credit to agriculture and agricultural production in Nigeria (1991–2023).

2.0 Methodology

2.1 The Study Area

This study was conducted in Nigeria. Nigeria is a country in West Africa that has western borders with the Republic of Benin, eastern borders with Chad and Cameroon, and northern borders with Niger. Its southern beach also runs along the Gulf of Guinea. Nigeria is a tropical nation with a consistently humid and wet environment. Nigeria, which has a surface area of 923,768 km^2, has two main rivers: the Niger, from which it derives its name, and the Benue, which is the Niger's forerunner. The highest peak in the country, Chappal Waddi (or Gangirwal), which is found in Taraba State's Gashaka-Gumti Public Park in the Adamawa Mountains, just beyond the Cameroonian border. Its elevation is 2,419 m (7,936 ft.). Abuja, the nation's capital, is situated in the country's centre, and Lagos, the main port, the largest metropolis, and the financial hub, are both located nearby. Nigeria is thought to include over 250 other ethnolinguistic groups in addition to the official languages of English, Hausa, Yoruba, and Igbo, with an estimated population of 219.7Million people as of January 2022 (Country Meters, 2022). The favourable soil and weather condition of Nigeria makes it possible for about 70% of the total population to engage in agriculture (Country Reports, 2021).

3.2 Sources and Types of Data

For this investigation, secondary data were used. The information was gathered from the Food and Agriculture Organisation (FAO), the National Bureau of Statistics (NBS), and the Central Bank of Nigeria's (CBN) statistical bulletin. Due to the long-term series data, the data spans the years 1991 through 2023. The choice of 1991 as the starting period is informed by the availability of consistent and reliable macroeconomic and sectoral data following the implementation of structural adjustment reforms in Nigeria. These reforms marked a shift towards market-oriented policies, including financial sector liberalization, which significantly influenced credit allocation to agriculture.

3.3 Method of Data Collection

Secondary data on Credit to Agriculture (CA), Agricultural production (AGP), Government Expenditure on Agriculture (GEA), Interest Rate (INTR), and Official Exchange Rate (EXR) were obtained from the CBN statistical bulletin and FAO statistical bulletin.

3.4 Analytical Technique

The data obtained were specifically analyzed based on objectives.

Objective one: to evaluate the trend and growth rate of Agricultural production and Credit to Agriculture for the period under review, a time series analysis was conducted utilizing Ordinary Least Squares (OLS). Fitting the exponential function to the time series data allowed for the calculation of the growth rate following Antia-Obong (2019), Antia-Obong et al. (2019), Akpaeti et al. (2018a), and Akpaeti et al. (2014a). The function is specified as follows:

$$Q = b_0 e^{bt} \quad \text{--Equation 2.1}$$

Linearizing the equation in logarithms, it becomes

$$lnQ = b_0 + b_1 t + u_t \quad \text{--- Equation 2. 2}$$

Where:

Y = Agricultural production

b_0 = estimated constant regression line

b_1 = estimated growth coefficient

t = Time trend variable (years in number)

u=Error term

This metric is more realistic in calculating growth rates since it considers the full observation, unlike other alternative approaches that tend to overlook important information by using data from the start and end of a period (Akpaeti et al., 2024; Antia-Obong *et al.*, 2013; Antia-Obong & Bhattarai, 2012).

Equation 3.2 was estimated for credit. The indicator was as follows:

CA = Credit to Agriculture (~~N~~)

The value of the Agricultural production was fitted to equation 2.2. A compound exponential growth rate was derived using the equation's coefficients as specified by Akpaeti et al. (2014a), Akpaeti et al. (2018b), and Akpaeti et al. (2019).

$$r = (e^{b1} - 1) \times \frac{100}{1} \quad \text{-- Equation 2.3}$$

Where: e is Euler's exponential constant (2.71828), b_1 = estimated growth coefficient or slope, and r represents the growth rate of Agricultural production and credit in agriculture. The data for the periods were fitted with a quadratic equation in time variables to examine whether the growth rate of agricultural production and credit were accelerating, decelerating, or stagnating as follows (Antia-Obong et al., 2024; Akpaeti et al., 2024; Antia-Obong *et al.*, 2025; Akpan, 2022; Akpaeti et al., 2014b; Akpaeti et al., 2013):

$$log_e AGP_t = \beta_0 + \beta_1 T + \beta_2 T^2 + U_t \quad \text{---Equation 2.4}$$

$$log_e CA_t = \beta_0 + \beta_1 T + \beta_2 T^2 + U_t \quad \text{---Equation 2.5}$$

The quadratic time term T^2 allows for the possibility of acceleration, deceleration or stagnation in growth patterns during the period of study. If the coefficient of T^2 is positive and statistically significant at a conventional level, there is an annual acceleration in the growth of the Agricultural Production and Credit to Agriculture; if the coefficient of T^2 is negative and statistically significant at the conventional level, there is a significant deceleration; however, if T^2 is either negative or positive but not statistically significant, which implies stagnation in the growth of Agricultural Production and Credit to Agriculture. Equations 2.2 to 2.5 were estimated for all specified dependent variables as defined in equation 2.2.

Objective two: Examine the effects of credit to Agriculture on Agricultural production. An Autoregressive Distributed Lag (ARDL) model was employed to conduct cointegration tests after testing for stationarity. All variables were transformed into their natural logarithmic forms (LN) to stabilize variance, interpret coefficients as elasticities, and reduce heteroskedasticity. The optimal lag length for the ARDL model was selected using the Akaike Information Criterion (AIC) to ensure model efficiency and avoid over-parameterization.

The ARDL bounds test for cointegration is expressed thus:

$$\Delta LNAGP_t = \varphi_0 + \alpha_1 \sum_{i=1}^{n_1} \Delta LNAGP_{t-i} + \alpha_2 \sum_{i=1}^{n_2} \Delta LNCA_{t-i} + \alpha_3 \sum_{i=1}^{n_3} \Delta EXR_{t-i} + \alpha_4 \sum_{i=1}^{n_4} \Delta LNGEA_{t-i} + \alpha_5 \sum_{i=1}^{n_5} \Delta INTR_{t-i} + \beta_1 LNAGP_{t-i} + \beta_2 LNCA_{t-i} + \beta_3 EXR_{t-i} + \beta_4 LNGEA_{t-i} + \beta_5 INTR_{t-i} + \varepsilon_t$$ ---Equation 2.6

Once co-integration is established, the long-run relationship was estimated using the conditional ARDL model as follows:

$$LNAGP_t = \beta_0 + \beta_1 LNAGP_{t-i} + \beta_2 LNCA_{t-i} + \beta_3 EXR_{t-i} + \beta_4 LNGEA_{t-i} + \beta_5 INTR_{t-i} + \mu_t$$ -------Equation 2.7

The short-run dynamic relationship was estimated using the Error Correction Model (ECM) as specified in equation 2.8:

$$\Delta LNAGP_t = \alpha_0 + \alpha_1 \sum_{i=1}^{n_1} \Delta LNAGP_{t-i} + \alpha_2 \sum_{i=1}^{n_2} \Delta LNCA_{t-i} + \alpha_3 \sum_{i=1}^{n_3} \Delta EXR_{t-i} + \alpha_4 \sum_{i=1}^{n_4} \Delta LNGEA_{t-i} + \alpha_5 \sum_{i=1}^{n_5} \Delta INTR_{t-i} + \vartheta ECM_{t-i}\ \mu_t$$ --Equation 2. 8

Where:

LNAGP = Log of Agricultural Production (gross production value in ₦)

LNCA = Log of Credit to Agriculture (₦)

EXR = Exchange Rate (₦)

LNGEA = Log of Government Expenditure in Agriculture (₦)

INTR = Interest Rate (₦)

φ_0 ,α_1 = constant
$\alpha_1 - \alpha_5$ = short-run elasticities (coefficients of the first-differenced explanatory variables)
$\beta_1 - \beta_5$ = long-run elasticity (coefficients of the explanatory variables)
ϑ = Error Correction term
ε_t, μ_t = Stochastic Error term

Objective three: Assess the causal relationship between credit to agriculture and agricultural production (1991 – 2023).Granger causality analysis was employed following Pula and Elshani (2018). The model is specified below:

$LNAGP_t = \alpha_0 + \sum_{i=1}^{n} \alpha_{1i} LNAGP_{t\text{-}1} + \sum_{i=1}^{n} \delta_{1i} LNCA_{t\text{-}1} + U_{1t}$ --Equation 2.9

$LNCA_t = \beta_0 + \sum_{i=1}^{n} \beta_{1i} LNCA_{t\text{-}1} + \sum_{i=1}^{n} \phi_{1i} LNAGP_{t\text{-}1} + U_{2t}$ --Equation 2.10

$LNAGP_t = \alpha_0 + \sum_{i=1}^{n} \alpha_{1i} LNAGP_{t\text{-}1} + \sum_{i=1}^{n} \delta_{1i} EXR_{t\text{-}1} + U_{1t}$ -- -----Equation 2.11

$EXR = \beta_0 + \sum_{i=1}^{n} \beta_{1i} EXR_{t\text{-}1} + \sum_{i=1}^{n} \phi_{1i} LNAGP_{t\text{-}1} + U_{2t}$ --Equation 2.12

$LNAP_t = \alpha_0 + \sum_{i=1}^{n} \alpha_{1i} LNAGP_{t\text{-}1} + \sum_{i=1}^{n} \delta_{1i} LNGEA_{t\text{-}1} + U_{1t}$ --Equation 2.13

$LNGEA_t = \beta_0 + \sum_{i=1}^{n} \beta_{1i} LNGEA_{t\text{-}1} + \sum_{i=1}^{n} \phi_{1i} LNAGP_{t\text{-}1} + U_{2t}$ ---Equation 2.14

$LNAP_t = \alpha_0 + \sum_{i=1}^{n} \alpha_{1i} LNAGP_{t\text{-}1} + \sum_{i=1}^{n} \delta_{1i} INTR_{t\text{-}1} + U_{1t}$ --Equation 2.15

$INTR_t = \beta_0 + \sum_{i=1}^{n} \beta_{1i} INTR_{t\text{-}1} + \sum_{i=1}^{n} \phi_{1i} LNAGP_{t\text{-}1} + U_{2t}$ --Equation 2.16

Where:

LNAGP = Agricultural Production (gross production value in ₦)
LNCA = Log of Credit to Agriculture (₦)
EXR = Exchange Rate (₦)
LNGEA = Log of Government Expenditure in Agriculture (₦)
INTR = Interest Rate (₦)

3.0 Results and Discussion

3.1 Trend Analysis of Credit to Agriculture and Agricultural Production in Nigeria

The linear trend regression finding of a highly significant positive trend (as displayed in Figure 3.1) in both Agricultural Production (AGP) and Credit to Agriculture (CA) over the 1991–2023 study period is primarily attributable to a series of major government policy reforms and administrative changes aimed at boosting sectoral output and financing. Key administrative interventions, such as the initial support provided by the Agricultural Credit Guarantee Scheme Fund (ACGSF) and programs like the National Fadama Development Project in the 1990s, laid the foundation for the long-term upward trend in both variables. However, the most potent drivers were the strategic policy shifts in the 2010s, notably the Agricultural Transformation Agenda (ATA) (2011–2015). This reform fundamentally treated agriculture as a business, not a development project, and introduced mechanisms like the Nigerian Incentive-Based Risk Sharing System for Agricultural Lending (NIRSAL). NIRSAL effectively de-risked lending for commercial banks, directly accounting for the substantial positive coefficient for Credit to Agriculture (CA) (144023.07), while the accompanying e-Wallet system for subsidy disbursement fueled the growth in agricultural production (Alabi & Oshobugie, 2020). Subsequent policies like the Agricultural Promotion Policy (APP) and the current National Agricultural Technology and Innovation Policy (NATIP) have continued to consolidate these efforts, ensuring the sustained, parallel upward movement in both agricultural output and the volume of credit disbursed over the entire study period.

The finding that the coefficients for AGP (0.0256) and CA (144023.07), respectively, are positive and significant at the 1% level carries critical policy implications, primarily validating the necessity of sustained, targeted financial intervention as an engine for agricultural growth. The significant coefficient for credit underscores that financial capital remains a major binding constraint; thus, government policy must focus on ensuring the sustained and increasing flow of credit, preferably through established de-risking institutions like NIRSAL. Furthermore, the strong R^2 values (0.65 for AGP and 0.61 for CA) highlight the importance of policy stability and continuity to avoid disrupting the positive long-term trend, demanding that policy attention shifts to improving the efficiency and judicious use of credit to maximize its real impact on agricultural production. This analysis is strongly supported by the findings of Ogbonnaya *et al*. (2022); Biala and Galadima (2024), which confirm a significant positive effect of bank credit on agricultural performance in Nigeria.

Table 3.1: Estimated trend regression analysis for agricultural production and credit to agriculture (1991-2023)

Dependent Variable (LN)	B_0 (Constant)	B_1	R^2	Adjusted-R^2	F-Ratio
Agricultural Production (AGP)	0.278828 (4.251708)	0.025617*** (7.611117)	0.651408	0.640163	57.92910***
Credit to Agriculture (CA)	-387576.1 (-3.142627)	144023.07*** (6.955327)	0.609457	0,596858	48.37657***

***indicates 1% level of significance. Source: Computed by Author, 2025. The figures in brackets represent the t-values.

The compound growth rate (CGR) analysis result presented in Table 3.2 provides a crucial comparison of the intensity of growth between the two variables. The estimated growth rate of 21.04% for agricultural production reflects changes in the nominal value of output rather than real production levels. This relatively high growth rate may therefore capture the effects of inflation, price changes, and exchange rate movements over the study period. In stark contrast, Credit to Agriculture (CA) posted a CGR of only 2.84%. The disparity between these rates is a key insight: the growth in the value of agricultural output has massively outpaced the growth in financial credit directed to the sector. This suggests two possibilities: first, that non-credit factors (such as favorable commodity prices, population growth, or non-financial government programs like infrastructure or research) were the primary drivers of the high value growth in AP; or second, that the credit supplied, though small in its growth rate, was highly productive and leveraged effectively by the receiving farmers. The main finding from this table, however, is the asymmetry of growth, with output value surging while credit volume lagged far behind. The primary policy implication is the urgent necessity to aggressively scale up formal credit flows to match the sector's growth potential, as the current low credit growth suggests an over-reliance on volatile, non-credit factors.

Table 3.2: Compound growth rate for agricultural production and credit

S/N		Period (1991-2023)
1	Agricultural Production (AGP)	21.04%
2	Credit to Agriculture (CA)	2.84%

Source: Computed by Author, 2025

The quadratic regression analysis result presented in Table 3.3 yields two critical, asymmetric policy implications: first, the decelerating growth rate of Agricultural Production (AGP), indicated by its positive linear term ($\beta_1 > 0$) and significant negative quadratic term ($\beta_2 = -0.001076$), implies that current growth methods are encountering diminishing returns, necessitating a policy pivot toward sustained innovation, technology injection, and infrastructure investment to raise the output ceiling and reverse the slowdown. Second, the fluctuating growth pattern for Credit to Agriculture (CA) which is in line with figure 3.1, defined by a negative linear term ($\beta_1 < 0$) followed by a highly significant positive quadratic term ($\beta_2 = 3461.866$), signals that credit experienced an initial decline before entering a phase of strong acceleration in later years, likely due to major financial reforms like NIRSAL (Osa-Afiana & Kelikume, 2016); the policy imperative here is to institutionalize and secure the permanence of these successful de-risking financial mechanisms to ensure the high-speed credit growth is sustained and strategically directed toward the high-impact projects (e.g., value chains and processing) required to alleviate the structural bottlenecks causing the deceleration in agricultural production.

Table 3.3: Quadratic regression analysis for Agricultural Production and Credit to Agriculture (1991-2023)

Dependent Variable (LN)	B_0 (Constant)	B_1	B_2	R^2	Adjusted-R^2	F-Ratio
Agricultural Production (AGP)	0.065384 (0.720687)	0.0662207*** (5.056415)	-0.001076*** (-3.065849) DECELERATION	0.734571	0.716875	41.51218***
Credit to Agriculture (CA)	299027.3 (2.783097)	-73680.37 (-5.057025)	3461.866 (8.327443) ACCELERATION	0.882066	0.874204	112.1898***

***indicates 1% level of significance. Source: Computed by Author, 2025. The figures in brackets represent the t-values.

The trend lines shown in Figure 3.1 display the patterns of both Agricultural Production (LNAGP) and Credit to Agriculture (LNCA). Based on the line graph, it can be deduced that both trend lines show an upward slope; this suggests a positive relationship between agricultural credit and agricultural production over the observed period, confirming the result in Table 3.1. This implies that, generally, as agricultural credit increased, agricultural production also tended to increase, but this may not mean causality. The findings on Granger causality explain that the two variables do not Granger-cause each other.

3.2 Effects of Credit to Agriculture on Agricultural Production

The empirical investigation into the effect of commercial bank credit on agricultural production in Nigeria from 1991 to 2023 yields a complex and nuanced picture, characterized by both significant short-run relationships and an absence of direct causality. The initial step in the analysis involved determining the stationarity of the time series data using the Augmented Dickey-Fuller (ADF) test. The results, as presented in Table 3.4, established that all variables, except Government Expenditure on Agriculture (LNGEA), were non-stationary at levels but became stationary after first differencing, classifying them as integrated of order one (I(1). LNGEA was found to be stationary at level, I(0). This mix of integration orders necessitated and justified the use of the Autoregressive Distributed Lag (ARDL) bounds testing approach to co-integration, as recommended by Pesaran et. al. (2001), to reliably examine long-run associations without requiring all variables to be integrated of the same order.

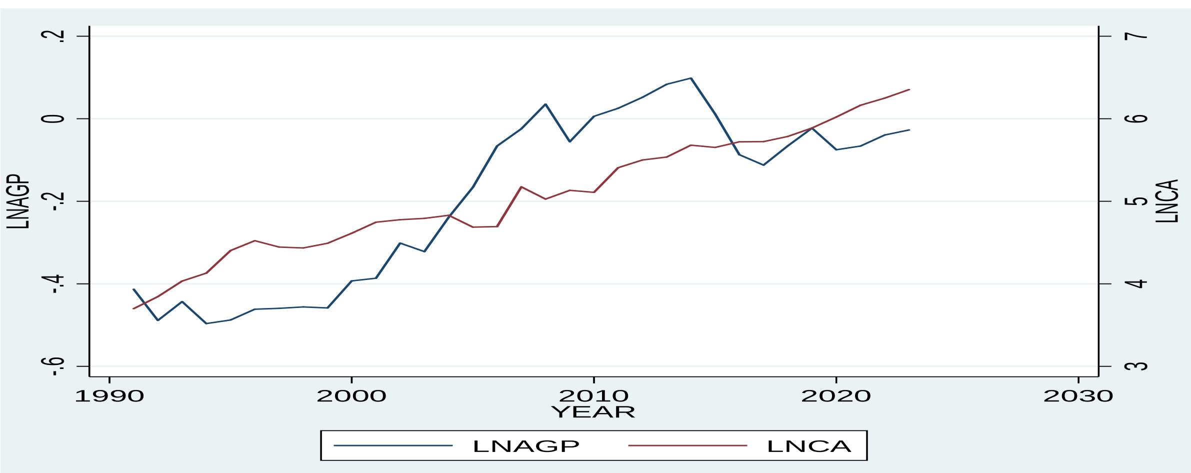

Figure 3.1. Trends of Credit to Agriculture and Agricultural Production in Nigeria

Table 3.4: Unit Root Tests using Augmented Dickey-Fuller (ADF)

Variables	Deterministic Component	Level	Lags	First Difference	Lags	Remark
LNAGP	Constant and linear trend	-1.1344	0	-5.2883***	0	1(1)
LNCA	Constant and linear trend	-3.4081	0	-6.4927***	0	1(1)
EXR	Trend	2.3514	0	-3.2666***	0	1(1)
LNGEA	Constant and linear trend	-4.7169***	8			1(0)
INTR	Constant and linear trend	-2.5791	0	-7.1614***	0	1(1)

Source: Computed by the author, 2025, from E-views 12. ***indicates 1% level of significance

3.3 Co-Integration Test

The subsequent co-integration test, detailed in Table 3.5, provided a critical foundation for the analysis by confirming the existence of a stable, long-run equilibrium relationship between agricultural production and its determinants, including commercial bank credit, government expenditure, and the exchange rate. The statistically significant F-statistic leads to the rejection of the null hypothesis of no co-integration, implying that despite short-term deviations and shocks, these variables move together in a synchronized manner over the long term, consistently drifting towards a common equilibrium path. This finding is pivotal as it suggests that sustained policies targeting these financial and macroeconomic variables can have a permanent impact on the trajectory of agricultural output in Nigeria, a notion supported by similar long-run findings in the work of Okunlola and Ayetigbo (2024).

3.4 Long Run Test

Table 3.6 presents the Long-Run Levels Equation for a cointegrating relationship, where Agricultural Production (LNAGP) is implicitly the dependent variable. The equation confirms the long-run equilibrium relationship by showing how CA, EXR, LNGEA, and INTR sustainably influence AGP over time. The negative and highly significant coefficient of Credit to Agriculture (-0.427119) suggests that, over the long run, a sustained increase in Credit to Agriculture leads to a reduction in Agricultural Production. The negative long-run coefficient of credit may suggest inefficiencies in credit utilization (Okunlola and Ayetigbo, 2024). However, alternative explanations such as omitted variables, structural breaks, or multicollinearity cannot be ruled out and warrant cautious interpretation. The statistically significant negative long-run impact of

Credit to Agriculture on Agricultural Production necessitates a fundamental shift in policy from increasing credit volume to ensuring credit efficiency. The current policy implication is that merely supplying more credit is detrimental, likely due to misallocation, diversion for non-agricultural consumption, or excessive debt burden.

Table 3.5: Co-integration Bond Test

F-Bounds Test		**Null Hypothesis is: No levels relationship**		
Test Statistics	Value	Signif.	I(0)	I(1)
F-statistic	7.132835	10%	3.03	4.06
K	4	5%	3.47	4.57
		2.5%	3.89	5.07
		1%	4.4	5.72

Source: Computed by the author, 2025 from E-views 12

Therefore, policies must focus on targeted credit monitoring and control. This involves implementing strict, purpose-specific loan disbursement protocols with mandatory follow-up mechanisms to verify investment in productive agricultural assets. Furthermore, financial literacy and farm business planning should be mandatory components of the loan process to improve borrowers' capacity to utilize funds productively, ultimately transforming credit from a sector burden into a sustainable growth engine.

The positive and marginally significant coefficient (0.058099) indicates that LNGEA has a positive and constructive influence on AGP in the long run. According to Omitogun (2018), sustained increase in LNGEA leads to higher output, suggesting that public investment in infrastructure, research, and extension services does eventually pay off. The positive, though marginally significant, long-run coefficient of LNGEA confirms that public investment is constructive for sustained agricultural growth. The primary policy implication is the need to sustain and strategically increase high-impact LNGEA. Instead of broad allocations, future spending must be concentrated on essential public goods that the private sector under-provides. Key areas for sustained investment include Agricultural Research and Development (R&D) to enhance productivity, the revitalization of modern, technology-driven Extension Services to effectively disseminate knowledge, and critical rural infrastructure development, specifically irrigation, storage, and road networks. To maximize the long-run payoff, policies must simultaneously improve expenditure efficiency and transparency by linking budget allocations to measurable performance indicators.

The negative and highly significant coefficient (-0.001994) shows that a sustained increase in the INTR leads to a reduction in Agricultural Production in the long run. Higher long-term borrowing costs restrict investment in long-lived assets (like machinery and irrigation systems), hindering capital formation and sector expansion (Iliyasu, 2019). The highly significant negative long-run effect of the INTR on AP confirms that high borrowing costs actively restrict long-term capital formation in the sector. Since agricultural investment in fixed assets (like machinery and irrigation) requires long payback periods, high commercial rates act as a deterrent to necessary modernization. The policy implication is to mitigate borrowing costs for long-term agricultural investments. This requires implementing a specialized, low-cost financing window—often through interest rate subsidies or guarantees—specifically for investments in long-lived agricultural assets. By reducing the effective cost of borrowing for capital expenditure, policy can encourage farmers and agribusinesses to undertake the modernization needed for sustained sector expansion, rather than being confined to short-term, low-yield operations.

Table 3.6: Long-run Relationship

Levels Equation Case 5: Unrestricted Constant and Unrestricted Trend				
Variable	Coefficient	Std. Error	t-Statistics	Prob.
LNCA	-0.427119	0.055517	-7.693494	0.0001
EXR	-9.19E-05	0.000266	-0.345409	0.7399
LNGEA	0.058099	0.027519	2.111206	0.0727
INTR	-0.001994	0.000348	-5.728945	0.0007
EC = AP – (-0.4271*CREDIT -0.0001*EXR +0.0581*GEA -0.0020*INTR)				

3.5 Short Run Test

The model includes variables in first difference (D) to capture short-run dynamics, lagged differences (D (AGP (-1)), an unrestricted trend (@TREND), and an error correction term (CoinEq(-1)*). The ECM regression results result presented in Table 3.7 reveal a dynamic interplay between financial, monetary, and government policy variables that govern the short-run changes in the dependent variable (implied to be an agricultural sector metric) and its return to long-run equilibrium. The model confirms a robust, self-correcting long-run relationship, validated by the highly significant, large negative coefficient on the Error Correction Term (CoinEq (-1) * at -1.469876). This coefficient signifies an exceptionally rapid speed of adjustment, with over 147% of the previous period's disequilibrium corrected in the current period. This strong mechanism implies that any short-run policies designed to shift the dependent variable's trajectory will be highly effective and swift, as the underlying market structure quickly pushes the system toward its long-run path. Reinforcing this is the highly significant positive coefficient on the unrestricted trend (@TREND at 0.091799), which confirms a strong, inherent long-term deterministic growth rate in the sector, independent of short-run fluctuations. The primary policy implication here is to protect this underlying growth by ensuring that short-run crises (like foreign exchange or interest rate shocks) do not cause permanent damage, such as forcing viable agricultural businesses to exit the market. Credit to agriculture demonstrates a strong, sustained positive short-run impact.

Changes in credit volume from the previous three periods (D(CA(-1)), D(CA(-2)), and D(CA(-3)) all show highly significant positive coefficients, collectively confirming that short-term increases in credit volume provide a vital and persistent boost to the sector's growth rate (Cecchetti and Kharroubi, 2019). The largest immediate effect comes from the one-period lag (D(CA(-1)) at 0.487486), which indicates that policies leading to a sudden, targeted injection of credit such as CBN interventions or loan guarantee schemes, should be strategically implemented for an immediate sectoral lift. The persistence of the effect over three periods highlights that credit policy should prioritize sustained, multi-year funding cycles rather than fragmented, one-off disbursements. The policy implication is that policy should leverage credit for short-term gains by implementing strategic, substantial, and targeted credit schemes (e.g., loan guarantees or special funds) to deliver an immediate lift. Crucially, given the persistence of the effect, these interventions must prioritize sustained, multi-year funding cycles rather than fragmented, one-off disbursements to maximize the growth momentum.

The sector exhibits deep vulnerability to monetary instability, particularly through the exchange rate. Exchange rate depreciation (EXR) exerts a significant and sustained negative effect across four consecutive periods (current and three lags). The immediate impact (D(EXR)at -0.002031) and the sustained effect over multiple lags underscore that foreign exchange instability instantly depresses the sector, likely by increasing the cost of essential imported inputs like fertilizer and machinery (Demir & Razmi, 2022). This could imply that long-term exchange rate stability is paramount, and the government must prioritize policies to boost local production of agricultural inputs to decouple the sector's cost structure from foreign exchange volatility (Umeaduma & Dugbartey, 2023), while providing targeted foreign exchange windows for necessary imports in the interim. Similarly, monetary tightening via interest rate hikes is problematic: an immediate increase in the Interest Rate (D(INTR)) significantly dampens the sector, demanding that the Central Bank consider a differential interest rate policy to shield agriculture (Alazaki & Okumuş, 2024). However, the positive rebound in the one- and two-period lags (D(INTR (-1)) and D(INTR(-2)) suggests that while initial rate hikes hurt, they may force a beneficial efficiency or rationalization in capital use, implying that supporting financial education and business advisory services is necessary to help the sector adapt and benefit from stability.

A critical finding is the unexpected negative and significant coefficient on lagged Government Expenditure on Agriculture (D(LNGEA (-1)) at -0.047857). This suggests that government spending, as currently executed, may be ineffective, misallocated, or actively crowding out private sector investment (Omitogun, 2018). This outcome compels an urgent efficiency audit of all agricultural expenditure programs. The policy must shift spending away from generalized, low-impact subsidies toward targeted, high-impact public goods—such as research, irrigation infrastructure, and extension services—that demonstrably crowd in private capital and align with the sector's true growth needs.

3.6 Diagnostics Test

Finally, the reliability and robustness of these empirical conclusions are affirmed by a series of diagnostic checks. As shown in Table 3.8, the model is free from serial correlation and heteroskedasticity, indicating that the parameter estimates are efficient and unbiased. Normality test (Jarque-Bera) and the Ramsey RESET test strongly validate the reliability and appropriate structure of the ECM regression model. The Jarque-Bera test, with its illustrative P-Value of 0.2400 (which is far greater than the 0.05 significance level), leads to the acceptance of the null hypothesis that the residuals are normally distributed. This is a crucial diagnostic confirmation, as the assumption of normally distributed error terms ensures that the standard statistical tests used to evaluate the model—specifically the t-statistics and F-statistics—are reliable and that the inferences drawn about the long-run coefficients and short-run dynamics are statistically sound

3.7 CUSUM and CUSUM Square Stability Test

The CUSUM and CUSUM of squares tests (Figures 3.2 & 3.3) confirm the stability of the regression coefficients throughout the study period. This structural stability is essential, as it validates that the inferred relationships between credit, government spending, exchange rate, and agricultural production have remained consistent over the 33-year sample, thereby lending strong credibility to the policy recommendations derived from this analysis.

3.8 The Causal Relationship between Credit to Agriculture and Agricultural Production

A paramount and intriguing finding of this study emerges from the Granger causality test in Table 3.9, which establishes that there is no causal relationship between commercial bank credit and agricultural production in either direction. The absence of Granger causality between credit and agricultural production suggests that credit alone does not drive agricultural output in Nigeria (Eze and Okike, 2022; Adewale et.al., 2022). While credit may support production activities in the short run, its effectiveness is likely conditioned by other complementary factors such as infrastructure, extension services, and market access. This finding implies that policy interventions should adopt a more integrated approach rather than relying solely on credit expansion.

Table 3.7: ECM- Short Run Test

Levels Equation Case 5: Unrestricted Constant and Unrestricted Trend				
Variable	Coefficient	Std. Error	t-Statistics	Prob.
C	1.138234	0.144075	7.900282***	0.0001
@TREND	0.091799	0.012257	7.489313***	0.0001
D(LNAGP(-1))	0.156741	0.121546	1.289562	0.2382
D(CA)	-0.093088	0.028885	-3.222669***	0.0146
D(CA(-1))	0.487486	0.078464	6.212878***	0.0004
D(CA(-2))	0.246699	0.058007	4.252915***	0.0038
D(CA(-3))	0.207543	0.055563	3.735298***	0.0073
D(EXR)	-0.002031	0.000349	-5.810755***	0.0007
D(EXR(-1))	-0.002474	0.000674	-3.670935***	0.0080
D(EXR(-2))	-0.000784	0.000311	-2.523702**	0.0396
D(EXR(-3))	-0.001189	0.000396	-3.000788**	0.0199
D(LNGEA)	0.006315	0.013356	0.472787	0.6508
D(LNGEA(-1))	-0.047857	0.021685	-2.206905**	0.0631
D(LNGEA(-2))	-0.023586	0.015868	-1.486366	0.1808
D(INTR)	-0.000648	0.000128	-5.062211***	0.0015
D(INTR(-1))	0.001612	0.000338	4.762606***	0.0021
D(INTR(-2))	0.000405	0.000186	2.173353	0.0663
CointEq(-1)*	-1.469876	0.196344	-7.486234****	0.0001
R-squared	0.966986	Mean dependent var	0.016176	
Adjusted R-squared	0.915965	S.D dependent var	0.050953	
S.E. of regression	0.014771	Akaike info criterion	-5.320383	
Sum squared resid	0.002400	Schwarz criterion	-4.471717	
Log likelihood	95.14555	Hannan-Quinn criter	-5.054591	
F-statistic	18.95272	Durbin-Watson stat	3.122554	
Prob(F-statistic)	0.000009			

*p-value incompatible with t-Bounds distribution. ****, ** represents 1% and 5% levels of significance respectively. Source: Computed by the author, 2025, from E-views 12

.Table 3.8: Diagnostics Table

Test	F-Statistic	P-Value
Ramsey RESET test	0.52	0.4700
Normality test (Jarque-Bera)	2.85	0.2400
Serial Correlation	5.481045	0.0549
Heteroskedasticity Test	1.150526	0.4538

Source: Computed by the author, 2025, from E-view 12

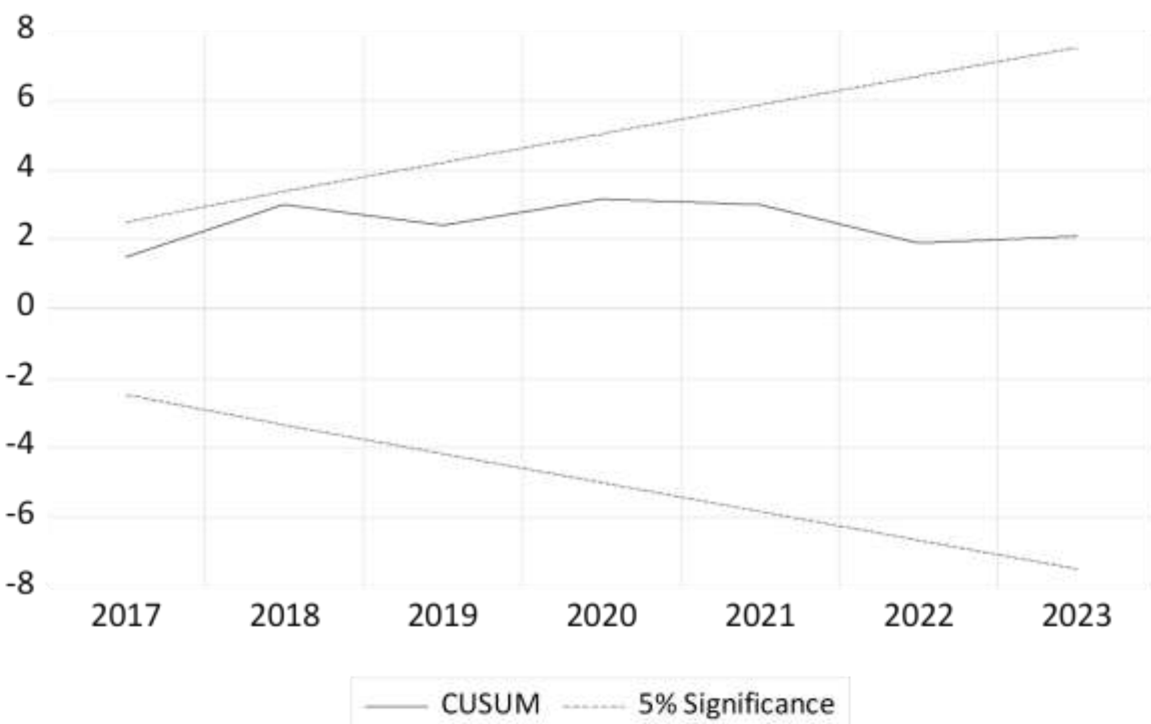

Figure 3.2. CUSUM Stability Test

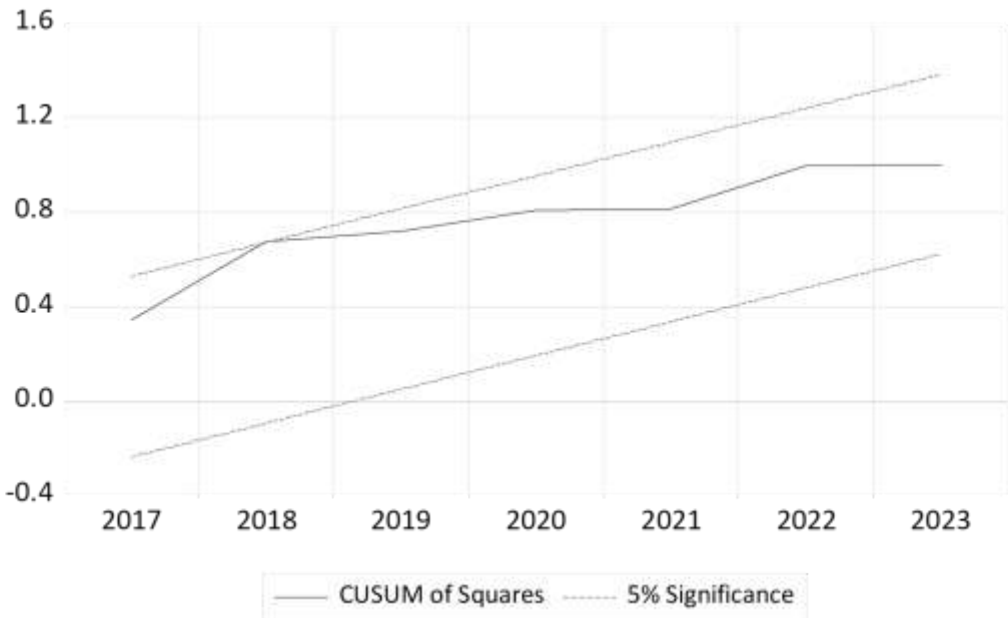

Figure 3.3 CUSUM Square Stability Test

Table 3.9 Pair wise Granger Causality Test

Lags: 2

Null Hypothesis:	**Obs**	**F-statistic**	**Prob.**
LNCA does not Granger Cause LNAGP	31	0.22290	0.8017
LNAGP does not Granger Cause LNCA		0.34779	0.7095
EXR does not Granger Cause LNAGP	31	0.24074	0.7878
LNAGP does not Granger Cause EXR		1.68757	0.2046
LNGEA does not Granger Cause AGP	31	2.00232	0.1553
AGP does not Granger Cause LNGEA		0.59663	0.5580
INTR does not Granger Cause LNAGP	31	0.04024	0.9606
LNAGP does not Granger Cause INTR		1.55159	0.2309

Source: Computed by the author, 2025, from E-view 12

4.0 Conclusion

This study examined the effect of commercial bank credit on agricultural production in Nigeria using annual time-series data covering the period 1991–2023. By integrating trend analysis, ARDL estimation, and Granger causality techniques, the study provides new evidence on the dynamic relationship between agricultural finance and production. The empirical findings reveal that although both agricultural production and commercial bank credit have increased over time, agricultural production has expanded considerably faster than formal agricultural credit. More importantly, the results demonstrate a clear distinction between the short-run and long-run effects of commercial bank credit. While credit significantly stimulates agricultural production in the short run by easing liquidity constraints and supporting farm operations, its long-run effect is negative, suggesting that increased credit supply alone does not guarantee sustained productivity gains. This finding points to persistent structural weaknesses, including inefficient credit allocation, diversion of borrowed funds, inadequate monitoring, weak institutional support, and high financing costs, which diminish the long-term productivity of agricultural credit.

The study further shows that government expenditure on agriculture contributes positively to agricultural production, whereas persistently high interest rates constrain investment and sectoral growth. Equally important, the absence of Granger causality between commercial bank credit and agricultural production indicates that agricultural growth is not driven by credit expansion alone but by a broader ecosystem comprising productive public investment, macroeconomic stability, effective extension services, rural infrastructure, technology adoption, and efficient financial intermediation.

Overall, the study advances the agricultural finance literature by demonstrating that the effectiveness of commercial bank credit depends less on the volume of lending than on the efficiency with which financial resources are allocated, utilized, and complemented by supportive institutional and macroeconomic conditions. Consequently, sustainable agricultural transformation in Nigeria requires a coordinated policy framework that integrates agricultural finance with investments in productivity-enhancing public goods and institutional reforms.

Recommendations

1. Shift policy emphasis from credit expansion to credit effectiveness. Agricultural financing programmes should prioritize productive utilization of loans through rigorous project appraisal, digital loan tracking, post-disbursement monitoring, and periodic performance evaluation rather than focusing solely on increasing loan volumes.

2. Strengthen targeted agricultural financing mechanisms. The Central Bank of Nigeria should deepen concessionary agricultural lending through instruments such as the Agricultural Credit Guarantee Scheme Fund (ACGSF) and NIRSAL while strengthening risk-sharing arrangements that encourage commercial banks to finance productive agricultural investments without compromising credit quality.

3. Increase strategic public investment in agriculture. Government expenditure should be directed towards high-return public goods—including irrigation infrastructure, rural roads, storage facilities, mechanization, agricultural research, extension services, and digital agricultural technologies—that complement private credit and enhance long-term productivity.

4. Promote affordable agricultural finance. Monetary authorities should develop differentiated financing windows with lower lending rates and longer repayment periods for agricultural investments, particularly for capital-intensive activities with long gestation periods.
5. Improve farmers' financial and managerial capacity. Financial literacy, enterprise management, and business development services should be integrated into agricultural credit programmes to strengthen borrowers' capacity to utilize loans efficiently, improve repayment performance, and increase farm profitability.
6. Enhance institutional coordination across the agricultural value chain. Agricultural credit programmes should be implemented alongside complementary interventions that improve input delivery, market access, extension services, climate resilience, and value-chain development, recognising that credit alone cannot sustainably increase agricultural production.
7. Strengthen monitoring, transparency, and accountability in agricultural lending. Financial institutions and regulatory agencies should establish robust monitoring systems to minimize loan diversion, reduce default risk, and ensure that agricultural credit achieves its intended developmental objectives.
8. Future research should extend the analysis beyond aggregate credit. Subsequent studies should examine the efficiency of agricultural credit across commodity groups, geopolitical zones, and categories of farmers while incorporating institutional quality, climate variability, financial inclusion, and technological adoption to better explain the heterogeneous effects of agricultural finance on productivity.

References

Adekunle, O. A., & Olomola, P. O. (2019). Agricultural credit and crop yield in Nigeria: A time series analysis. *Journal of Agricultural Economics and Development*, *8*(1), 1-15.

Adewale, A. T., Lawal, O. A., Aberu, F., & Toriola, A. K. (2022). Effect of credit to farmers and agricultural productivity in Nigeria. *East Asian Journal of Multidisciplinary Research*, *1*(3), 377-388.

Akpaeti, A. J., Agom, D. I. & Frank, N. N. (2018b). Analysis of the Effects of Inflation on Farmers' Income in Nigeria (1970 to 2017). *AKSU Journal of Agricultural Economics, Extension and Rural Development*, 1 (1), 110 – 120.

Akpaeti, A. J., Agom, D. I. & Michael, U. S. (2019). Insulating Young Agricultural Entrepreneurs against Insulation in Nigeria: An Econometric Method. *Farman Journal*, 19(1), 36-50.

Akpaeti, A. J., Bassey, N. E., Okoro, U. S. & Nkeme, K. K. (2014a). Trends and Drivers of Agricultural Investments and Growth in Nigeria: The Pre and Financial Sector Reforms Experience. *Asian Journal of Economic Modelling*, 2(3), 115-127.

Akpaeti, A. J., Bassey. N. E. & Okon, U. E. (2014b). Trend Evaluation of Agricultural Export Crops in Nigeria. *International Journal of Food and Agricultural Economics* (UFAE), 2(l),165-175.

Akpaeti, A. J., Frank, N. N., & Luke, U. H. (2018a). Petrol Pump Prices Fluctuation and Agricultural Productivity in Nigeria (1970-2016): A Vector Error Correction Approach. *London Journal of Research in Science: Natural and Formal, 18*(2), 1-18.

Akpaeti, A. J., Ibok, O.W., William, K.U. and Archibong, M. N. (2024). Is Naira Depreciation Having any Effect on Agricultural Productivity in Nigeria? Evidence From 1972-2020.*AKSU Journal of Agriculture and Food Science*, 8(1) 1-13.

Akpaeti, A. J., Nwosu. A. C., Nwaru, J. C. & Ebong, I. O. (2013). Economic Assessment of Trends in Loanable Funds in Nigeria. *The Journal of Economics Photon*, 113,157-162.

Akpaeti, A., Offor, O., & Archibong, M. (2023). Effect of Naira Depreciation on Nigerian Agricultural Export Volume and Farmers' Income in Nigeria. *International Journal of Agriculture and Rural Development*, *26*, 6660-6669.

Alazaki, Z., & Okumuş, N. (2024). Monetary Policy and Interest Rates. *A General Overview of the Syrian Economy*, 1.

Antia-Obong, E. A. (2019). Trends in Export and Import of Beer of Barley in Nigeria: 1961-2014. *Asian Journal of Advances in Agricultural Research, 9*(4), 1-6.

Antia-Obong, E. A., Akpaeti, A. J., Atairet, E. A., & Marcus, S. R. (2025). Analysis Of Trends In Production, Consumption And Trade In The African Onions Market. *Journal of Bio-Based Marketing, 2*, 6-20.

Antia-Obong, E., Wisdom, E. N. O., & Akaninyene, O. B. O. T (2024). Analysis of Coconut Production Trends under Three Policy Phases in Nigeria. *KahramanmaraşSütçü İmam Üniversitesi TarımveDoğa Dergisi,* 27(3), 665-673.

Antia-Obong, E.A.; Bhattarai, K.R. (2012). Growth Trends and Sources of Output Growth for Oil Palm and Groundnut Production in Nigeria (1961-2007). *Trends in Agricultural Economics, 5*(3), 96-103.

Antia-Obong, E.A.; Ibok, O.W.; Udoh, E.S.; Daniel, E.E.;. (2013). Insights on Oil Palm Production variation and trade growth rates in Nigeria. *Greener Journal of Agricultural Sciences, 3*(7), 536-541.

Antia-Obong, Essien Akpan; Otung, Idorenyin Antigha. (2019). Growth Rate Analysis for the domestic production and Import of Beer of Barley in Nigeria. *Middle East Journal of Agriculture Research, 08*(01), 21-27.

Biala, M. I., & Galadima, H. M. (2024). Microfinance Institutions and the Performance of Agricultural Sector in Nigeria. *Journal of the Management Sciences, 61*(9), 235-257.

Cecchetti, S. G., & Kharroubi, E. (2019). Why does credit growth crowd out real economic growth? *The Manchester School, 87*, 1-28.

Central Bank of Nigeria. (2022). *Agricultural Credit Guarantee Scheme Fund: Statistical Bulletin*. Abuja, Nigeria. Retrieved from https://www.cbn.gov.ng/documents/statbulletin.asp on 28th April, 2025.

Demir, F., & Razmi, A. (2022). The real exchange rate and development theory, evidence, issues and challenges. *Journal of Economic Surveys*, *36*(2), 386-428.

Eze, S. O., &Okike, E. C. (2022). Does agricultural credit really matter? Evidence from Nigerian smallholder farmers. *African Journal of Agricultural Research*, *17*(2), 201-209.

Ekwere, O. J., Efretuei, A. O., Udounang, P. I., & Akpaninyang, F. E. (2023a). Evaluation of Some Growth and Yield Traits of Nine Cultivars of White Guinea Yam (Dioscorea rotundata Poir.). *AKSU Journal of Agriculture and Food Sciences*, *7*(2), 83-96.

Ekwere, O. J., Udounang, P. I., Efretuei, A. O., & Umoh, F. O. (2023b). Evaluation of Rabbit Urine as Bio-fertilizer for the Growth and Yield of Cowpea (Vigna unguiculata (l.) walp). *AKSU Journal of Agriculture and Food Sciences*, *7*(3), 37-48.

Iliyasu, A. S. (2019). An empirical analysis of the impact of interest rate on agriculture in Nigeria. *Journal of Economics and Sustainable Development*, *10*(22), 106-112.

Jagannath; Tayade, P M; Nandeshwar, N S; Shende, N V; Mallesh; Vinodakumar, S N;. (2013). Decomposition analysis of agricultural growth. *Ecology, Environment & Conservation*, 19(4), 1-6.

Mosinmileoluwa A., Ochei A. I., Godswill O. O., Grace E. (2021). Impact of agricultural credit on economic growth in Nigeria. *WSEAS Transactions on Business and Economics*, *18*(52), 511-523.

Nnaji, C. C., Ujah, O. D., & Chukwuezi, C. O. (2023). Constraints to accessing agricultural credit by smallholder farmers in Nigeria: A review. *Nigerian Journal of Agricultural Extension*, *27*(1), 105-116.

Ogbonnaya, C. M., Nwachukwu, A. C., & Uwazie, U. I. (2022). Agricultural credit financing and agricultural output performance in Nigeria. *Lafia Journal of Economics and Management Sciences*, *7*(2), 38-59.

Okoro, E. O., &Amaefule, C. C. (2021). The role of credit in agricultural financing: Evidence from Nigeria. *International Journal of Finance and Banking Research*, *7*(1), 1-8.

Okunlola, O. C., &Ayetigbo, O. A. (2024). Impact of agricultural financing on agricultural growth sustainability in Nigeria. *The Journal of Developing Areas*, *58*(3), 171-203.

Oladejo, J. K., & Ambali, O. I. (2020). Financial inclusion and agricultural development in Nigeria: Challenges and opportunities. *Journal of Development and Agricultural Economics*, *12*(1), 1-10.

Omitogun, O. (2018). Investigating the crowding out effect of government expenditure on private investment. *Journal of Competitiveness*, *10*(4), 136-150.

Osa-Afiana, L. O., & Kelikume, I. (2016). The impact of banking sector reforms and credit supply on agricultural sector: Evidence from Nigeria. *The Journal of Developing Areas*, *50*(5), 71-84.

Pula, L., & Elshani, A. (2018). The relationship between public expenditure and economic growth in Kosovo: Findings from a Johansen co-integrated test and a Granger causality test. *Ekonomika*, *97*(1), 47-62.

Udoette, U. S., Nwachukwu, U. G., Joseph, T., Stephen, S. A., Idris, A., & Etim, S. E. (2024). Agricultural Financing and Agricultural Output in Nigeria. *Applied Journal of Economics, Management and Social Sciences*, *5*(3), 1-18.

Udoka, C. O., Mbat, D. O., & Duke, S. B. (2016). The effect of commercial banks' credit on agricultural production in Nigeria. *Journal of Finance and Accounting*, *4*(1), 1-10.

Umeaduma, C. M. G., & Dugbartey, A. N. (2023). Effect of exchange rate volatility on export competitiveness and national trade balances in emerging markets. *International Journal Computation Applied Technology Research*, *12*(11), 57-71.