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Impact Of Credit Facilities On Agricultural Productivity In Nigeria

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ABSTRACT
The study examined the relationship between agricultural credit facilities and stock agricultural development in Nigeria over the period 1994 to 2023. Secondary data were collected from Food and Agricultural Organization, World Development Indicators and Central Bank of Nigeria (CBN) annual statistical bulletin. The variable in the model include; Agricultural Output, Agricultural Credit from Commercial Banks (AGCR),Interest Rate (INTR), Arable Land (ARL), Government Recurrent Expenditures on Agriculture (GREXP). Agricultural Credit from Commercial Banks is used as credit variable (core variable) and the others are used as control variables. In evaluating these objectives, the study employed the ordinary least squares method of estimation. The Augmented Dickey-Fuller Test was employed to check for stationarity of the variables. The Engle Granger Cointegration test was adopted to check for the long run relationship between Agricultural Credit Facilities and Agricultural Output in Nigeria. Among others, the findings indicated that Agricultural Credit from Commercial Banks has a positive and significant relationship with Agricultural Output/Productivity while interest rate has a negative and significant relationship with Agricultural Output/Productivity. The study discovered that the agricultural credit variable outperforms government recurrent expenditure in explaining the variations in agricultural output; it also discovered a bi-directional relationship between agricultural credit from commercial banks and agricultural productivity/output. The study therefore recommends that the Nigerian government adopt policies that enables favourable investment environment in the agricultural sector such as the provision of timely agricultural credit at subsidized rate of interests, to ensure easy accessibility to credit by farmers, extension workers and agricultural business ventures.
Keywords: Agricultural Credit, Interest Rate, Arable Land, Government Recurrent Expenditures, Commercial Banks.

INTRODUCTION

The agricultural sector has long been vital to Nigeria's economy, but it has suffered significant neglect, especially since the discovery of crude oil in the 1970s. Despite Nigeria's abundant arable land and favorable climate, agricultural resources remain underutilized. This underperformance has contributed to major national challenges, including unemployment, food insecurity, insurgency, and poverty. Agricultural credit refers to funds borrowed from financial institutions for activities related to farming, including production, storage, processing, and marketing (Sanusi et al., 2025). Credit is essential for

acquiring inputs, hiring l abor, and investing in machinery that modernizes production. However, in Nigeria, access to such credit is limited, especially for smallholder farmers who often lack the collateral demanded by banks. This lack of financial support has constrained the sector's growth and productivity (Iliyasu, 2025).

In the 1960s, agriculture was the backbone of Nigeria's economy, contributing nearly 70% of GDP and providing over 65% of employment (Olajide, Akinlabi & Tijani, 2022). It also met over 90% of national food demand (Oyewale & Alliu, 2018). However, the shift to oil dependence resulted in a steady decline. By 2021, agriculture accounted for only about 30% of GDP (Varrella, 2021). The sector remains largely subsistence-based, limiting its capacity to contribute meaningfully to national development. Credit is one of the most powerful tools for transforming agriculture. It enables farmers to expand operations, adopt improved technologies, and increase yields. Yet, farmers face delays, inadequate disbursements, and difficult application processes. Emenuga (2024) observed that low income among farmers contributes to reduced credit access, reinforcing a cycle of low productivity and poverty. Before oil dominated Nigeria's economy, agriculture was the primary source of national revenue. Ogen (2003) emphasized that in the 1960s, agriculture drove growth, despite farmers relying on traditional tools. Lawal (1997) added that these farmers produced up to 70% of exports and met 95% of food needs. Today, however, modern agriculture requires capital-intensive investment—improved seeds, machinery, and irrigation—which many farmers cannot afford without credit. The lack of financial support forces them into small-scale, low-output farming.

Nigeria has underperformed in adopting effective agricultural credit policies compared to other African nations. While countries like Sierra Leone, Mali, and Togo have implemented national fertilizer standards and credit systems, Nigeria's policy landscape remains inadequate. Although 71.2 million hectares of Nigeria's 98.3 million hectares of land are arable, only 34 million are cultivated. This underutilization is largely due to inadequate credit access. Despite crude oil being Nigeria's main revenue source, agriculture remains its foundational resource base. Effective utilization of this base is necessary for economic diversification and food self-sufficiency. High foreign exchange spent on food imports could be redirected to capital goods if agriculture met local demand.

Historically, Nigeria ranked among the world's top producers of cocoa, palm oil, palm kernel, cotton, and rubber (Alkali, 1997). However, the oil boom of the 1970s led to the sector's neglect. This shift triggered rising poverty and food shortages. Olagbaju and Falola (1996) noted that agriculture now contributes less than 5% to GDP, far below its historical significance.

Thus, the stagnation of Nigeria's agricultural sector is rooted in neglect and poor access to credit. Most farmers lack the capital to modernize or expand, trapping them in a cycle of low productivity. Revitalizing agriculture requires deliberate financial intervention through accessible credit facilities. This study explores the impact of agricultural credit on productivity in Nigeria, aiming to provide evidence-based recommendations for reversing the sector's decline and supporting inclusive economic growth.

Review of Related Literature

Conceptual Review

Concept of Agriculture

Agriculture is a foundational sector in most developing countries due to its strong linkages with other parts of the economy. It involves the cultivation of crops and rearing of livestock for food, clothing, export, and essential products. In Nigeria, agriculture plays a vital role, providing about 35% of total employment as of 2020 (Wikipedia, 2022). According to the Food and Agriculture Organization (FAO, 2020), it is the main source of livelihood for most Nigerians, especially in rural areas. The sector comprises four key sub-sectors: crop production, livestock farming, forestry, and fishing. Its importance to national development lies in its contribution to food security, income generation, and rural employment.

Agricultural Credit Facilities

Agricultural credit refers to funds borrowed by farmers, farm businesses, and extension workers to support production, storage, processing, and marketing of agricultural products. These credits may be short-term (up to 1 year), medium-term (1–3 years), or long-term (over 3 years), tailored to meet specific needs such as purchasing equipment or inputs (James, 2021; Fabian, 2021). In Nigeria, credit sources include formal institutions like commercial banks and the Nigerian Agricultural Cooperative and Rural Development Bank, semi-formal institutions like cooperatives, and informal lenders such as moneylenders and RoSCAs (Badiru, 2020). Despite initiatives like the Agricultural Credit Guarantee Scheme, smallholder farmers still face limited access to timely credit, often due to high collateral demands, interest rates, and administrative bottlenecks (Nwosu et al., 2010; Somajina, 1981).

Agricultural Productivity (Development)

Agricultural development is essential for economic growth, especially in agrarian nations. It involves creating a stable environment that enhances agricultural potential through access to credit, quality inputs, skilled manpower, effective marketing, storage facilities, favorable policies, and modern technology. According to Barret (1966), cited in Okpara (2019), productivity is often measured by yield per unit of land or labor and is closely tied to profitability. Juan (2024) defines agricultural development as the process of enabling the full realization of a sector's potential through knowledge, technology, and resource allocation. However, agricultural productivity in Nigeria is hindered by inadequate and untimely credit, poor storage, lack of technical knowledge, mismanagement of loans, and limited access to markets.

Theoretical Review

Cobb-Douglas Production Function Theory

This study adopts the Cobb-Douglas production function, where output (Q) is determined by inputs of labor and capital: $Q = AL^{\beta} K^{\alpha}$, with β and α representing output elasticities. Here, agricultural output (AGO) serves as the dependent variable, while agricultural credit facilities (AGCF) represent the main input. According to economic theory, increased input should lead to higher output. To enhance model robustness and minimize endogeneity, additional variables—interest rate (INTR), commercial bank credit to agriculture (AGCR), arable land (ARL), and government recurrent expenditure on agriculture (GREXP)—are introduced as alternative proxies for AGCF. This approach helps assess the extent to which credit and related factors influence agricultural output and development in Nigeria.

Lewis Growth model

Sir Arthur Lewis, in his 1954 article *"Economic Development with Unlimited Supplies of Labor,"* introduced the Dual Sector Model. He proposed that developing economies consist of two sectors: a large traditional agricultural sector and a small modern capitalist (manufacturing) sector. The agricultural sector, marked by low productivity and surplus labor with zero marginal productivity, supplies excess labor to the modern sector. The modern manufacturing sector offers higher wages, greater productivity, and capital-intensive production. As surplus labor shifts, the manufacturing sector expands through reinvested profits. Meanwhile, improvements in agricultural productivity remain a low priority, as investment focuses on capital formation in the industrial sector. Thus, the agricultural sector acts as a labor reservoir for economic transformation.

The Supply Leading Theory

J.A. Schumpeter's theory, as explained by Agu and Chukwu (2024), asserts that financial development positively drives economic growth. It emphasizes that improvements in capital accumulation, savings, and investment efficiency stimulate real capital formation at early development stages. The creation of new financial services offers fresh opportunities for savers and investors, thereby boosting economic growth. The financial system plays an active role in industrialization by mobilizing resources and allocating investment to underdeveloped sectors. Over time, this process promotes job creation and sustained economic growth. When credit facilities are extended to productive sectors like agriculture at affordable interest rates, the broader economy benefits, highlighting the importance of a well-functioning financial system in driving development.

Demand Following Hypothesis

The demand-following hypothesis, unlike the supply-leading theory, argues that financial development is a response to real sector growth. It views the financial and real sectors as interconnected but suggests the real sector drives financial expansion. Robinson (1952) stated that economic growth creates the need for financial services, not the other way around. As the economy grows, so does the demand for money and financial products, prompting financial sector development. According to this view, improvements in sectors like agriculture lead to increased demand for credit and banking services. Consequently, as agricultural output and business activities expand, financial institutions grow to meet the rising needs of farmers and agribusinesses, making financial development a result of real sector progress.

Pecking Order Theory

The pecking order theory, popularized by Myers and Majluf (2019), states that firms prefer internal financing first, then debt, and lastly equity due to information asymmetry. Issuing equity may signal to investors that the firm is overvalued, leading them to devalue the stock. Thus, firms avoid equity unless necessary. Debt is preferred over equity as it doesn't dilute ownership. This theory applies to agriculture, where farmers or agribusinesses may choose informal credit sources, like cooperatives or moneylenders, over banks. Despite possibly higher costs, informal sources may offer faster and easier access to funds. This reflects the theory's core idea—financial decisions are shaped by availability, cost, and control, not just optimality of the source.

Empirical Review

Several empirical studies have examined the relationship between credit facilities and agricultural productivity in Nigeria and beyond. Lawal et al. (2019) investigated the effect of credit facilities on agricultural productivity in Nigeria from 1981 to 2015. Using CBN statistical bulletins and econometric techniques, their findings showed that bank credit had a positive impact on agricultural output. They recommended a reduction in interest rates, expansion of the Agricultural Credit Guarantee Scheme (ACGS), and increased agricultural spending.

Similarly, Sanusi et al. (2025) employed the NARDL model using data from 1981 to 2022. The study found that commercial bank credit significantly boosted agricultural output, while ACGSF had a negative impact. Interest rates were found to be insignificant. The authors called for incentives for banks and reforms to make credit schemes more accessible.

Mbata (1991) evaluated the impact of the Supervised Agricultural Credit Scheme (SACS) in Rivers State. Farmers who accessed formal credit had higher yields and profits than those relying on informal sources. The study recommended extending credit schemes via extension services.

Emenuga (2024) applied OLS to assess commercial bank credit between 1992 and 2023. He found a positive and significant relationship between bank credit and agricultural productivity but noted high lending rates deter borrowing. Similar concerns were raised by Iliyasu (2025), who concluded that interest rate reductions would enhance productivity.

Adedamola and Babatunde (2024) used Propensity Score Matching in Southwest Nigeria. Their analysis of 225 credit beneficiaries and 630 non-beneficiaries revealed that Bank of Agriculture (BOA) credit positively affected productivity. They recommended collaboration between governments and financial institutions.

International studies, such as Louyindoula et al. (2023) in the Republic of the Congo, used an Endogenous Switching Regression model and found that access to credit raised productivity by 92.2%. Literacy, age, and group membership were key determinants of credit access.

Awotide et al. (2015), focusing on Nigerian cassava farmers, used the ESR model and found that access to credit improved productivity. However, variations existed due to farm size, livestock units, and access to information.

Jonathan and Cynthia (2017) found that high lending rates negatively impacted agricultural productivity in Nigeria in the long run, using an error correction model. They recommended reduced lending rates and credit expansion.

Adewale et al. (2022) confirmed the positive effect of bank credit on agricultural output in Nigeria using OLS and World Bank data. Though exchange and lending rates had minimal impact, policy efforts should focus on closing the lending–savings gap to promote investment.

Obilor (2013) revealed that while commercial bank credit had no significant impact, ACGSF and government allocations to agriculture did. He urged better loan administration and stronger savings culture among farmers.

Adaeze (2020), using OLS, affirmed that commercial bank credit and government agricultural spending significantly influenced output, while interest rates had a minimal effect.

Nwadioha and Igoni (2021) found that credit to food and cash crops positively influenced economic growth, although not sufficiently. They recommended increasing credit allocations and monitoring of input distribution.

Ihegboro (2014) showed that ACGSF loans significantly boosted output in crops, livestock, and fisheries. However, challenges such as delayed loan disbursement and incomplete applications hindered effectiveness. She recommended more efficient loan processing.

Abubakar and Muhammad (2023) used ARDL to assess the period 1981–2020 and concluded that commercial bank credit enhanced output, while inflation and interest rates had adverse but insignificant effects.

Sogo-Temi and Olubiyo (2004) highlighted the short-term nature of bank credit as a constraint, suggesting long-term agricultural financing and policy reorientation.

Aliyu (2012) established a strong positive relationship between formal credit and productivity in livestock, fishing, and crops, recommending expanded formal credit access.

Ekwere and Edem (2014) used survey data from 136 farmers and found that credit improved inputs, output, and income. They emphasized the need for sustained and timely credit access, especially for small-scale farmers.

Across borders, Adeleke and Damilola (2013) found in 10 African countries that interest rates negatively affected agricultural credit, while land availability had a positive effect. They encouraged cooperatives and lower lending rates.

Gabriella (2016) showed that reduced agricultural productivity in India led to lower industrial output and employment, reflecting agriculture's wider economic implications.

Studies from Ghana, such as Patrick (2024) and Kwarase (2023), affirmed agriculture's role in economic growth, while noting challenges like lack of technology and misaligned priorities.

Overall, these studies consistently affirm that credit access—when affordable, timely, and well-structured—significantly boosts agricultural productivity. However, issues such as high interest rates, administrative delays, poor monitoring, and inadequate policy support hinder credit effectiveness. Most studies recommend expanding credit access, reforming interest rates, and aligning agricultural finance with sector-specific needs to foster productivity and economic development.

RESEARCH METHODOLOGY

This study adopted an ex-post-facto research design, which involves the analysis of existing data that the researcher cannot manipulate (King & Levine, 2022; Gujarati, 2011). Secondary data were sourced from the World Bank Development Indicators (WDI), Central Bank of Nigeria Statistical Bulletin (2023), and the Food and Agricultural Organization (FAO), covering the period 1994–2023. Data analysis was conducted using E-Views 9.0.

Descriptive statistics were first used to summarize the data characteristics. Pre-estimation tests included the Augmented Dickey-Fuller (ADF) Unit Root Test to ensure stationarity and the Engle-Granger Co-integration Test to identify long-run relationships among variables.

Post-estimation diagnostics validated model reliability. The Jarque-Bera Test assessed normality, while the Durbin-Watson and Breusch-Godfrey tests checked for autocorrelation. Multicollinearity was examined using a correlation matrix, and the Breusch-Pagan-Godfrey Test assessed heteroscedasticity.

Additionally, the Pairwise Granger Causality Test evaluated predictive relationships between variables. These tests ensured the robustness of the Ordinary Least Squares (OLS) multiple regression analysis, the primary method for hypothesis testing.

Together, these methodological steps ensured valid, reliable inferences about the impact of credit facilities on agricultural productivity in Nigeria, reinforcing the integrity of the research findings.

The model is specified in a functional form, mathematical/deterministic form and econometric.

The Functional Form of Model Specification

AGO =*f*(INTR, AGCR, ARL, GREXP)----------(3.1)

The Mathematical/Deterministic Form of Model Specification

$AGO = \beta_0 + \beta_1 INTR + \beta_2 AGCR + \beta_3 ARL + \beta_4 GREXP$----------(3.2)

The Econometric Form of Model Specification

$AGO = \beta_0 + \beta_1 INTR + \beta_2 AGCR + \beta_3 ARL + \beta_4 GREXP + \mu$----------(3.3)

Where;

AGO = Agricultural Productivity/Output

INTR = Interest rate/Lending rate

AGCR = Agricultural Credit from Commercial Banks

ARL = Arable Land

GREXP = Government Recurrent Expenditure on Agriculture

RESULTS AND DISCUSSION

The data here is being presented the way it is, without carrying out in-depth analysis and manipulations. This comprises of the mean, median, standard deviation, kurtosis, skewness, the Jarque-Bera statistic etc., the result of the descriptive statistics is displayed below. The data set for the study is presented below followed by its descriptive statistics.

Table 4.1: Descriptive Statistics

Variables	AGO	INTR	AGCR	ARL	GREXP
Mean	10019.43	18.98063	30092.55	34040000	25.84401
Median	9869.733	17.87167	17339.48	35000000	20.17712
Maximum	18348.18	31.65000	81294.13	37000000	76.60099
Minimum	3590.837	13.64202	2220.820	30000000	0.208700
Std. Dev.	5255.970	3.585301	26951.07	1874254.	23.54201
Skewness	0.138852	1.646179	0.297410	-0.833585	0.598532
Kurtosis	1.529589	6.457980	1.439100	2.982519	2.176876
Jarque-Bera	2.799035	28.49656	3.487775	3.474701	2.638122
Probability	0.246716	0.000001	0.174839	0.175986	0.267386
Sum	300583.0	569.4189	902776.4	1.02E+09	775.3202
Sum Sq. Dev.	8.01E+08	372.7770	2.11E+10	1.02E+14	16072.56
Observations	30	30	30	30	30

Source:*Author's Computation Using E-views.*

Table 4.1 above is the shows the descriptive statistics which summarizes the data as it exists at the face value. For the variables, there are 30 observations each. The probability values (P-values) of the Jarque-Bera statistic for AGO, AGCR, ARL and GREXP are greater than 0.05 level of significance showing that these variables are not normally distributed. However, for INTR, its P-value is below 0.05 level of significance, indicating that the variable is normally distributed. The assumption of normality moreover, is not a serious OLS assumption and can therefore be bypassed since it does not obstruct the progress of this research work.

Pre-Estimation Test

The pre-estimation tests are usually carried out to avoid having spurious or nonsensical regression results. The pre-estimation test comprises of the unit root test and the co-integration test.

Unit Root/Stationarity Test

The unit root or stationarity test basically, is carried out for the purpose of determining whether the variables in the series are consistent with the order of level zero (that is, if the variable is integrated at levels) I (0) process with a stochastic trend, or if it is consistent at the first order of difference (that is, if the variable is integrated at order 1) I (1) or the second difference (that is, if it is integrated at order 2) I (2), that it is stationary, with a deterministic trend. This test is carried out, because most macroeconomic variables are usually non-stationary at series and estimating such data would result to a spurious regression which will be misleading in terms of prediction. To test for stationary or unit root, the Augmented Dickey-Fuller (ADF) test is used. Therefore, the hypotheses are stated thus:

Table 4.2: Result for Unit Root Test

Variables	ADF Stat at Levels	5% Critical Values	Stationary Status	ADF Stat at First Difference	5% Critical Value	Stationary Status	Order of Integration
LAGO	-1.498618	-2.976263	NS	-6.134153	-2.976263	S	I(1)
INTR	-2.311094	-2.981038	NS	-4.556889	-2.981038	S	I(1)
LAGCR	-1.097401	-3.580623	NS	-4.098864	-3.587527	S	I(1)
LARL	-2.876102	-3.580623	NS	-4.653377	-3.580623	S	I(1)
LGREXP	-2.471182	-2.967767	NS	-6.028393	-2.976263	S	I(1)

Source: *Author's Computation Using E-views.*

Table 4.2 presents the results of the Augmented Dickey-Fuller (ADF) unit root test using a 5% significance level. The dependent variable is the log of agricultural output (LAGO). The results are interpreted based on absolute values. For LAGO, the ADF statistic at level is $|-1.4986|$, which is less than the 5% critical value of $|-2.9763|$. Hence, the variable is non-stationary at level. After first differencing, the statistic becomes $|-6.1342|$, exceeding the critical value, confirming stationarity at first difference (I[1]). Interest rate (INTR) shows a similar trend. At level, it is $|-2.3111|$ (non-stationary), but becomes $|-4.5569|$ after first differencing, confirming stationarity at I[1]. Agricultural credit from commercial banks (LAGCR) has a level ADF value of $|-1.0974|$ and first difference value of $|-4.0989|$, confirming stationarity at I[1]. Log of arable land (LARL) has a level statistic of $|-2.8761|$ and becomes $|-4.6534|$ at first difference, indicating I[1] integration. Government recurrent expenditure (LGREXP) has a level value of $|-2.4712|$ and becomes $|-6.0284|$ after differencing, also confirming it is stationary at first difference. All variables are thus integrated at order one (I[1]) and suitable for further regression analysis.

Co-Integration Test for the Model

Having obtained the order of integration and as well made the model stationary at first difference, we proceed to test for the existence of a long-run relationship the dependent variable Agricultural Output (AGO) and the independent variables; Interest Rate (INTR), Agricultural Credit from Commercial Banks (AGCR), Arable Land (ARL) and Government Recurrent Expenditure on Agriculture (GREXP). The purpose of this test is to check whether a group of non-stationary series or variables are co-integrated or not. Since the series are integrated at order one or first difference, there is therefore a need to check for the existence of a stable linear steady-state relationship using the trace test. Engle and Granger (1987) noted that if the linear combination of non-stationary linear series exists, then the non-stationary time series are said to be co-integrated. The co-integrating equation also called the stationary linear combination may be interpreted as a long-run equilibrium relationship among the variables.

Table 4.3: Johansen Co-integration Test Results for the Model

Number of Cointegrating equations	Eigen Values	Trace Statistics	5% Critical Values	P-values
None *	0.782447	111.0950	79.34145	0.0000
At most 1 *	0.732356	69.91148	55.24578	0.0015
At most 2	0.600924	34.32282	35.01090	0.0592
At most 3	0.270329	9.520541	18.39771	0.5274
At most 4	0.036758	1.011163	3.841466	0.3146

Source:*Author's Computation Using E-views.*

The table above presents the Johansen co-integration test result, which examines whether a long-run equilibrium relationship exists among the variables. Although both the Trace Statistic and Max-Eigen values are shown, interpretation focuses on the Trace Statistic. Co-integration is confirmed when the trace statistic exceeds the 5% critical value or the p-value is below 0.05. In the first equation, the trace statistic is 111.0950, greater than the critical value, and the p-value is 0.000—indicating significance. In the second equation, the trace statistic is 100.2901, also higher than the 5% critical value of 69.91148, with a p-value of 0.0000. These results confirm that some variables are co-integrated at the 5% level. Therefore, we reject the null hypothesis of no co-integration and conclude that a long-run relationship exists among the variables, justifying the estimation of a long-run model as outlined in research methodology.

PRESENTATION AND ANALYSIS OF REGRESSION RESULT

Model: $\mathbf{LAGO_t = \beta_0 + \beta_1 INTR_t + \beta_2 LAGCR_t + \beta_3 LARL_t + \beta_4 LGREXP_t + \mu_t}$

Presentation of the empirical result for the first hypothesis that there is no significant relationship between agricultural credit facilities and agricultural productivity.

Table 4.3 Summary of Regression Result for the Model (Dependent Variable: $LAGO_t$)

Variables	Coefficients	Std. Errors	T-statistics	Prob.
CONSTANT	-6.578054	5.494624	19.718076	0.0000
INTR	-0.001328	0.001350	-9.183154	0.0006
LAGCR	0.547048	0.033214	8.148326	0.0108
LARL	1.100404	0.731019	1.605302	0.4800
LGREXP	0.104090	0.046052	5.206020	0.0230
R^2 =0.970561	AdjR^2 =0.965803	Prob (F-Stat) =0.0000	Durbin-Watson stat =1.5295	

Source: *Author's Computation Using E-views*

Evaluation of the Regression Result Based on Economic (A priori Criterion) Criteria

In this section, the result of the regression would be evaluated based on a priori expectation. The purpose of this evaluation is check whether the time series data of the variables used, conforms to or are in line with the principles of the established economic theories.

Constant Term (C): From the table above, the coefficient of the constant is -6.578054. This implies that on an average, holding other factors that affect agricultural productivity/output constant, Agricultural Output decreases by 6.578054 units.

Interest Rate (INTR): The coefficient of the INTR is -0.001328 and its sign is negative. This shows that the interest rate has a negative or indirect relationship with agricultural output. Thus, holding all other independent variables constant, on the average a one percent increase in the interest rate will lead to a 0.1328 decrease in agricultural output. This conforms to economic theories as an increase in interest or lending rate will discourage local farmers and other agricultural businesses from taking credit and since credit facilities plays a key role in capital formation, investment in agricultural output will be reduced which further, will reduce agricultural output. The variable however, tends to have a very little impact on agricultural output and thus is not a very good and indispensable variable in the determination of agricultural output in Nigeria.

Log of Agricultural Credit from Commercial Banks (LAGCR): The sign of the coefficient of LAGCR is positive and its coefficient is 0.547048. This shows that commercial bank credit to agriculture has a direct and positive relationship with agricultural output. Thus, holding other variables constant, a one percent increase in agricultural credit from commercial banks, will cause a 54.7048 percent increase in agricultural output. This is in line with the a priori expectation that an increase in agricultural credit from commercial banks definitely, will increase agricultural output. This is true because when commercial bank increases the supply of credit facilities to the agricultural sector, local farmers and agricultural businesses can increase their capital and investments in agriculture which also will increase the productivity in the sector.

Log of Arable Land (LARL): The sign of the coefficient of LARL is positive and its coefficient is 1.100404. This shows that the variable arable land also has a direct and positive relationship with agricultural output. Thus, holding other variables constant, a one percent increase in the availability of arable or farm land, will cause a 110.0404 percent increase in agricultural output. This is in line with the a priori expectation that an increase in the availability of arable land (that is, land available for plantation, mowing and grazing) will increase agricultural output. Because when lands are set aside for agricultural purposes, there will an increase in the supply of land which will be used for various agricultural activities by local farmers and agricultural businesses and this will increase agricultural productivity and output.

Log of Government Recurrent Expenditure on Agriculture (LGREXP): The sign of the coefficient of LGREXP is positive and its coefficient is 0.104090. This implies that government recurrent expenditure on agriculture as well has a direct and positive relationship with agricultural output. Thus, holding other variables constant, a one percent increase in government recurrent expenditure on agriculture, will cause a 10.4090 percent increase in agricultural output. This is in line with the a priori expectation that an increase in government recurrent expenditure on agriculture, will increase agricultural output. This is true because when government institutions increase their expenditures on the agricultural sector, local farmers, extension workers would be employed and agricultural businesses can be able to employ more workers, also the facilities provided would assist in the storage and conveyance of agricultural products to the market which as well will reduce wastage of these products. Provision of fertilizers will as well increase agricultural produce and through these means, the Nigerian agricultural sector would become productive and further develop.

F-test: This test is used in determining the overall significance of the model. The value of the f-stat shows the test of the null hypothesis that the true slope coefficients are simultaneously zero. It is used in checking the joint significance of the variables used in the model.

The hypotheses are further stated thus;

H_0: $\beta_0 = \beta_1 = \beta_2 = \beta_3 = \beta_4 = 0$ (the overall model is not significant)

Against

H_1: $\beta_0 \neq \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq 0$ (the overall model is significant)

At $\alpha = 5\%$

Decision Rule: Reject H_0 if the probability value of the F-stat is less than 0.05 and do not reject if otherwise.

From the result of the regression displayed, the probability value of the F-stat is 0.0000 which is less than 0.05, hence we reject the null hypothesis that the overall model is insignificant and conclude that the model is statistically significant.

The Coefficient of Determination (R-Squared): The coefficient of determination, R^2 is useful in the measurement of the proportions of the level of variations in the dependent variable that are explained by the independent or explanatory variables. It is a summary of the goodness of fit. Thus, it tells us how well the INTR, LAGCR, LARL and LGREXP have been able to explain the variations in LAGO. The R^2 of the model is 0.970561 and further implies that the independent variables have been able to explain the variations in LAGO up to 97%; this is a good fit.

The Adjusted Coefficient of Determination (Adjusted R-Squared): The adjusted R-squared assists in checking if the R-squared overestimated the success of the explanatory variable in explaining the variations in the dependent variable. From the result shown, since the value of the adjusted r-squared is 0.965803 and is quite close to the value of the R^2, we can conclude that the success of the model is not overestimated.

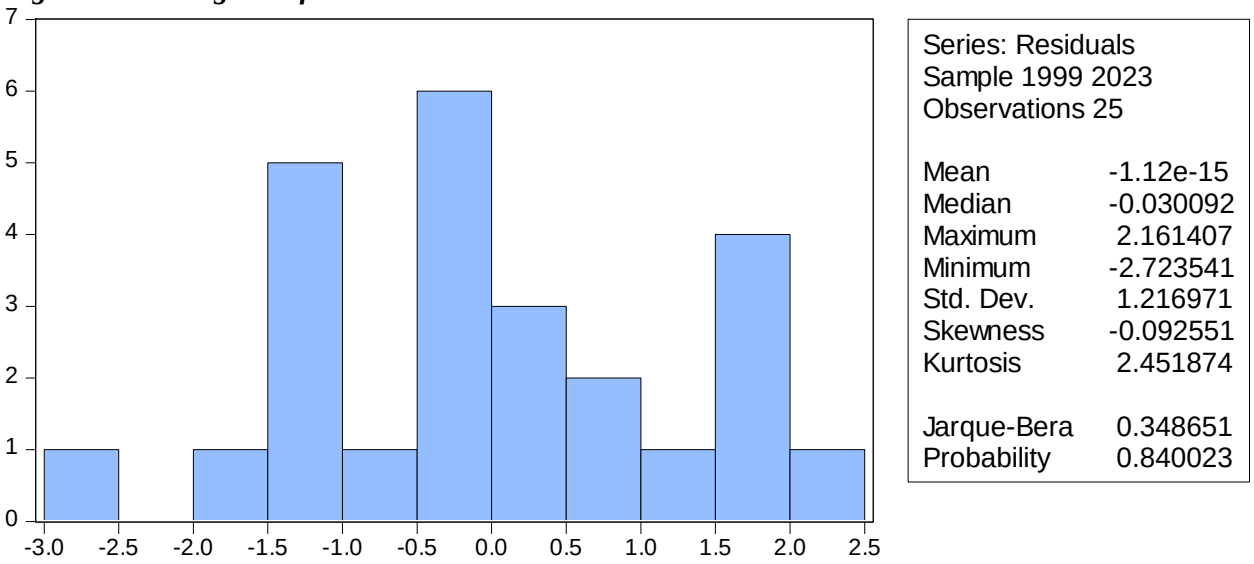
Evaluation of the Regression Result Based on Econometric criteria (Second Order Condition)

The various tests under the econometric criteria are used to checkmate if the necessary assumptions of the classical linear regression model of the error term stated, have been well satisfied. It comprises of the normality test, test for auto-correlation, heteroscedasticity test and test for multicollinearity.

Normality Test

This test is carried out on the error or residual term of the regression. This is done to know if the error term is normally distributed with zero mean and constant variance. To do this, the Jacque-Bera is used to test the normality of the error term. Thus, the figure below shows the histogram of the residual.

Figure 4.1: Histogram of Residual Term



Source: E-View 9.0 Output, 2025

From the histogram displayed above, the error term can be seen to be normally distributed since it is not skewed to the far left or far right sides of the graph and as well having a bell shape. However, for proper analysis, the Jacque-Bera test will be used with the hypotheses stated below;

H_0: Error term is normally distributed

H_1: Error term is not normally distributed

Where α = 5% level of significance

Decision Rule: Reject H_0 if the probability value of Jarque-Bera is less than 0.05, accept if otherwise.

Conclusion: From the test conducted, the probability value of the Jarque-Bera is 0.582943 and is greater than 0.05, thus we fail to reject the null hypothesis and conclude that the error term is normally distributed.

Auto-Correlation Test

The residual term is said to be serially correlated when there is presence of auto-correlation in the model estimated. The purpose of this test is to ascertain whether the errors corresponding to different observations are serially correlated or not. The Breusch-Godfrey serial correlation LM test will be used to test for auto-correlation in the model.

The hypotheses are stated thus;

H_0: No auto-correlation

H_1: Auto-correlation

Decision Rule: Reject H_0 if the probability value of the observed chi-square is less than 0.05, accept if otherwise.

The summary of the result is shown below;

Table 4.7: Summary of theBreusch-Godfrey Serial Correlation LM Test

Obs*R-squared	14.79354
Prob. Chi-Square(2)	0.0006

Source:*Author's Computation Using E-views*

Conclusion: Since the observed chi-squared probability value is less than 0.05, reject the null hypothesis and conclude that there is auto correlation. However, the problem is corrected using the Newey West HAC method or re-estimating the equation, taking the lag of the dependent variable.

Multicollinearity Test: Another assumption of the classical linear regression model is that there exists no multicollinearity among the explanatory or independent variables in the model. The correlation matrix is used to test for multicollinearity. When the correlation coefficient is up to 0.8 and above, we conclude that there exists high multicollinearity among the variables and no high multicollinearity when below 6.0 in the model. However, it is expected that the explanatory variables be highly correlated with the dependent variable. The correlation matrix is shown below.

Table 4.8 Summary Result of Correlation Matrix for Multicollinearity

Variables	**LAGO**	**INTR**	**LAGCR**	**LARL**	**LGREXP**
LAGO	1.0000				
INTR	-0.6853 M	1.0000			
LAGCR	0.9409 M	-0.6826 M	1.0000		
LARL	0.6367 M	-0.6445 M	0.6349 M	1.0000	
LGREXP	0.8759 M	-0.6132 M	0.8742 M	0.7724 M	1.0000

Source: *Author's Computation Using E-views*

From the above table, it can be deduced that there exists relatively high multicollinearity among the pair of variables LAGCR and LAGO, LGREXP and LAGO, LGREXP and LAGCR, LGREXP and LGREXP and LARL. While the pairs of variables INTR and LAGO, LAGCR and INTR, LARL and LAGO, LARL and INTR, LARL and LAGCR, LGREXP and INTR do not possess high multicollinearity amongst them. The variables LAGCR and LGREXP are highly correlated with the dependent variable and this is desirable while the variables INTR and LARL are not highly correlated with the dependent variable LAGO. The Variables can also be seen to be perfectly correlated with their selves, having the value of 1 correspondingly. The existence of multicollinearity in the model, possess no serious threats, since it does not violate the BLUE property of the OLS estimator. Moreover, one of the ways in resolving multicollinearity is to do nothing.

Heteroscedasticity Test: This test is carried out on the error term to check if the error term has a constant variance (that is homoscedastic) or not, which is one of the core assumptions of the classical linear regression model. The Breusch Godfrey Heteroscedasticity test will be used at the 5% level of significance.

The hypotheses, is stated thus;
H_0: error term is homoscedastic
H_1: error term is heteroscedastic

Decision Rule: Reject H_0 if the probability value of the observed chi square is less than 5% level of significance, accept if otherwise.

Table 4.9: Summary of Breusch-Pagan-Godfrey Test for Heteroscedasticity

Obs*R-squared	1.583651
Prob. Chi-Square(4)	0.8117

Source:*Author's Computation Using E-views*

Conclusion: From the table above, the probability value of the observed R-squared is seen to be 0.8117, which is greater than 0.05 (that is, 0.8117>0.05). Therefore, since the p-value of the observed R-squared is greater than the 5% level of significance, we fail to reject the null hypothesis and conclude that the error term is homoscedastic.

4.4 Granger Causality Test for the Second Null Hypothesis in the Model

This is done to investigate the degree of causation between Agricultural Output/Productivity and Agricultural Credit from Commercial Banks. This will inform us on the ability of both variables to predict each other. The result is shown in the table below

Table 4.10 Pairwise Granger Causality Result

Null Hypothesis:	Obs	F-Statistic	Prob.
LAGCR does not Granger Cause LAGO	28	1.87716	0.1757
LAGO does not Granger Cause LAGCR		2.95919	0.0718

Source:*Author's Computation Using E-views*

Decision Rule: Reject H_0 if the probability value is less than 0.05 and accept if otherwise.

Conclusion

For the first null hypothesis, since the p-value of 0.1757 is greater than 0.05, we fail to reject the null hypothesis and conclude that Agricultural Credit from Commercial Banks granger causes Agricultural Output/Productivity.

For the second null hypothesis, since the p-value of 0.0718 is greater than 0.05, we fail to reject the null hypothesis and conclude that Agricultural Output/Productivity granger causes Agricultural Credit from Commercial Banks.

Therefore, we conclude that there exists a bi-directional causal relationship between the variables, moving from Agricultural Output/Productivity to Agricultural Credit from Commercial Banks and vice versa.

4.5 Evaluation of Research Hypothesis

The following research hypothesis were in this work:

- There is no significant impact of agricultural credit facilities onagricultural productivity in Nigeria.
- There is no significant impact of agricultural credit variables on the economic performance of agricultural sector in Nigeria.

The hypothesis stated above having being evaluated economically, statistically and econometrically, the result is presented below as follows;

Research Findings

From the results, it was discovered that if agricultural credit from commercial banks increases by one percent, agricultural output/productivity will be increased by 54.7048%. This validates the existence of a positive and direct relationship between the variables. This variable conforms to the *a priori* expectations. The coefficient of the interest rate is -0.001328, and this implies that if interest rate rises by one percent, agricultural output/productivity will be reduced by 0.1328% and thus validates the existence of an indirect or negative relationship with agricultural output/productivity. This variable conforms to the *a priori* expectations. The coefficient of arable land is 1.100404. This means that a percentage increase in arable land will lead to a 1,100.404% increase in agricultural output/productivity. Thus, arable land is said to contribute more to agricultural output and further has a positive and direct relationship with agricultural output/productivity. This variable conforms to the *a priori* expectations. The coefficient government recurrent expenditure on agriculture is 0.104090. This suggests that government recurrent expenditure on agriculture has a positive-direct relationship with agricultural output/productivity and a one percent increase in government recurrent expenditure on agriculture will increase agricultural output/productivity by 104.090%. This variable is also conforming to the *a priori* expectations.

All the variables except arable land are statistically significant, which implies that interest rate, agricultural credit from commercial banks and government recurrent expenditures on agriculture have significant effects on agricultural output/productivity. All the variables also conform to the *a priori* expectation. The granger causality result also shows that agricultural credit from commercial bank does not granger causes agricultural output/productivity and agricultural output/productivity does not granger causes agricultural credit from commercial banks with the probability values of 0.1757 and 0.0718 respectively, indicating that there is a bi-directional causality moving from agricultural credit from commercial banks to agricultural productivity/output.

CONCLUSION

This research work, evaluated agricultural credit facilities and agricultural productivity/development in Nigeria. It further established a long run relationship between the dependent variable - agricultural productivity/output and the independent variables; agricultural credit from commercial banks, interest rate, arable land and government recurrent expenditures on agriculture. Nigeria although resourcefully endowed, has a poor agricultural base. To combat this problem, there is therefore a need to support local farmers, extension workers agricultural business firms, etc., financially by ensuring that the accessibility to agricultural credits is made is easy and timely to boost agricultural productivity and thus promote the development of the sector.

RECOMMENDATION

Based on the findings, the study concludes that agricultural credit facilities significantly and positively impact agricultural productivity and development in Nigeria. This indicates that effective and timely access to agricultural credit is essential for boosting the sector's performance. A bi-directional relationship was also found between commercial bank credit and agricultural output, suggesting that increased productivity can further stimulate credit availability and vice versa.

Despite existing government policies, the agricultural sector continues to face major challenges that hinder its full contribution to national development. To address these, the study recommends the following:

1. **Timely credit delivery**: Credit should be disbursed promptly to address farmers' immediate needs, boosting productivity.
2. **Increased public investment**: The federal government should raise both recurrent and capital expenditures in agriculture, including infrastructure, equipment, and storage facilities.
3. **Policy reforms**: Agricultural credit policies must prioritize accessibility for rural and smallholder farmers, with long-term frameworks and consistent follow-up.
4. **Subsidized lending rates**: Interest rates should be lowered to encourage borrowing and investment.
5. **Loan monitoring**: Financial institutions should track loan utilization to ensure funds are properly invested for agricultural growth.

REFERENCES

Abbas, A. C., Yuansheng, J., Abdul, R. & Luan, J. (2016). Impact of government expenditure agricultural sector and economic growth in Pakistan. *International Journal of Advanced Biotechnology and Research* (IJBR), *7*(3), 1046-1053.

Abubakar, M. M., & Muhammad, M. Y. (2023). Impact of Agricultural Financing on Agricultural Output: The Role of Commercial Banks. *Journal of Global Social Sciences, 4*(14), 103–117.

Adaeze, O. C. (2020). Commercial Banks Credit and Agricultural Development in Nigeria. *International Journal of Business and Law Research*, *8*(3), 89–99.

Adedamola, R. W., & Bababtunde, O. A. (2024). Impact of Bank of Agriculture Credit's on Agricultural Productivity in South Western Nigeria. *Agriculture and Food Sciences Research*, *11*(2), 87–95.

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

Agu, C. C. and Chukwu, J.O. (2024). Multivariate causality between financial depth and economic growth in Nigeria. *African Review of Money Finance and Banking*: 7-21.

Awotide, B. A., Abdoulaye, T., Alene, A., &Maryong, V. M. (2015). Impact of access to credit on agricultural productivity, evidence from smallholder cassava farmers in Nigeria: A paper prepared for oral presentation at the International Conference of Agricultural Economists (ICAE) Milan, Italy.

Badiru I. O. (2020). Review of small farmer access to credit in Nigeria; Nigeria strategic support program. *International Food Policy Research Institute* (IFPRI). Abuja, Nigeria. Policy Note, No.25.

Baxter, N. D. (2023). Leverage, the risk of ruins and the cost of capital. *Journal of Finance* 22(3), 395-403.

Brennon & Connel (2022). A historical comparism of resources based theory and five school of thought within industrial organization economics: do we have a new theory of the firm? *Journal of Management*, 17(1), 121-154.

CED. (2022). Cambridge English Dictionary. United Kingdom. Cambridge University press.

Dawarti, S. (2018). Agricultural production and its implications on economic growth and poverty reduction in Indonesia. *Academic Research International*, 21(1), 309-320.

De angelo, B. &Masulis, J. (1980). The difference between economic growth and economic development. North Carolina: Boson Books LTD, December 2018.

Douglas, I. (2010). Agricultural productivity and economic development in Uganda: an inclusive growth analysis. Unpublished PhD., Thesis. Department of Economics, Mabara, University of Science & Technology, Uganda.

Ejemezu, C. I., & Agu, B. O. (2021). Impact of Commercial Banks' Credit on Financing Agricultural Productivity in Nigeria, 1986–2020. *Global Scientific Journals, 9(*11), 1518–1532.

Ekwere, G. and Edeme D. (2014). Effects of agricultural credit facility on agricultural production and rural development. *International Journal of Environment*, 3(2), 192-204.

Emenuga, P. E. (2024). Effect of Commercial Banks' Credit on Agricultural Productivity in Nigeria. *Acta Universitatis Danubius. Œconomica*, *15*(3), 417–428.

FAO. (2020). Nigeria at a glance: food and agricultural organization of the united nations. (available at http://fao.org).

Gabriella, S. (2023). Firms and farms: the impact of agricultural productivity on the local Indian economy. London: Hillhouse publishers.

Gujarati, D. (2011). *Econometrics by Example*, 1st Edition, Palgrave Macmillan, United Kingdom.

Humberto, F. S. S., and Terry, L. R. (2012). The role of agriculture on the recent Brazilian economic growth. Paper prepared for presentation at the international association of agricultural economists (iaae) triennial conference at Foz do Iguaçu, Brazil.

Ihegboro, I. (2014). The impact of agricultural credit on agricultural productivity in Nigeria. Retrieved from http://www.unn.edu.ng/publications/files/IHEGBORO%20IFEOMA.pdf (Accessed 7 November, 2024).

Iliyasu, A. S. (2025). Impact of Interest Rate on Agricultural Productivity in Nigeria: Analysis of Policy Implication. *British Journal of Agricultural Science*, *23*(6), 906–914.

Jacobs and Juliet (2022). Rostow's stages of growth development model. Retrieved from http://www.thoughtco.com/rostow-stages-of-growth-development-model-1434567 (Accessed 18 December, 2024).

Juan, R. L. (2024). Institutional bottlenecks for agricultural development: a stock-taking exercise based on evidence from Sub-Saharan Africa. Policy analysis on the institutional requirements for advancing peace and development in Sub-Saharan Africa, OECD Development Centre.

King, R. & Levine, R.G. (2022). Finance, entrepreneurship and growth: Theory and evidence. *Journal of Monetary Economics*, 32, 513-542

Kwarase, P. K. (2023). Analyzing trends in agricultural output in Ghana: underlying causes and options for sustainable growth. Unpublished Bsc. Project. Department of Business Administration, Ahesi University College, Ghana.

Lawal, A. I., Olanyanju, A. T., Ayew, J. &Olaniru, O. S. (2019). Impact of bank credit on agricultural productivity. *International Journal of Civil Engineering and Technology*, 10 (2), 113-123.

Louyindoula, H. Z., Bouity, C. A., & Owonda, F. (2023). Impact of Agricultural Credit on Productivity. *Theoretical Economics Letters*, *13*, 1434–1462.

Mbanta, J. N., (2024). Comparative study of supervised and non-supervised agricultural credit

Myers, S. C. &Majluf, N. S. (2019). Cooperate finance and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, 13(2), 187-221.

Nwadioha, N. A. &Igoni S. (2021). Impact of agricultural credits on the Nigerian economic growth: *Journal of Research in Business and Management*, 9(2), 31-39.

Nwosu F. O., Oguoma N. N., Ben-chendo N. G., & Henry-Ukoha A. (2010). The agricultural credit guarantee scheme fund: its roles, problems and prospects in Nigeria's quest for

Obilor S. I. (2013). The impact of commercial banks credit to agriculture on agricultural development. *Research*, No 2, 87-90.

Ogbuabor, J. E. and Nwosu, C. A. (2017). The impact of deposit money bank's agricultural credit on agricultural productivity in Nigeria: evidence from an error correction model. *International Journal of Economics and Financial Issues*, 7(2), 513-517.

Olajide A, Akinlabi T.O, &Tijani T.E, (2022). Effect of credit extension on farmers productivity in Ondo state, *International Journal of Agriculture*, 3(2), 210-220.

Olorunsola, E. O., Adeyemi, A. A., Valli, T. A., Kufre, J. B., & Ochache, A. (2022). Agricultural Sector Credit and Output Relationship in Nigeria. *CBN Journal of Applied Statistics*, *8*(1), 101–122.

Onumah G. (2023). Improving access to rural finance through regulated warehouse receipt systemsin Africa. Retrieved from http://www.basis,wise.edu/live/rfc/cs-09.pdf (Accessed 13 December, 2024).

Oyewale, K., & Alliu, K. (2018). The Impact of Banks' Credit on Agricultural Productivity in Nigeria. *Gusau International Journal of Management and Social Science*, *4*(1), 206–223.

Patrick, E. (2024). Analysis of the agricultural sector of Ghana and its economic impact on economic growth. *Academic Research International*, 5(4), 267-277.

Sanusi, A., Duru, M., & Alexander, A. A. (2025). Impact of Commercial Bank Credit on Agricultural Output in Nigeria. *Impressive Journal of Management and Social Sciences*, *1*(1), 127–138.

Simona-Varrella (2021). Contribution of Agriculture to GDP in Nigeria 2019-2021. Retrieved from http://www.statista.com/statistics/1193506/contribution-of-agriculture- to-gdp-in-nigeria/ (Accessed 13 December, 2021).

Sogo-Temi J. S. &Olubiyo S. O. (2004). The role of agricultural credit in the development of agriculture sector: the Nigerian case. *African Review of Money Finance and Banking*,101-116.

Suwannarat, P. (2011). Agricultural productivity and poverty reduction in Thailand. Unpublished B.E International Undergraduate Program, Faculty of Economics, Thammasat University.

Swaen, B. (2017). Developing a Conceptual Framework for Research. Scribbr. Retrieved from https://www.scribbr.com/methodology/conceptualframwork/ (Accessed 4 May,2022).

Usman, M. (2016). Contribution of Agricultural Sector in the GDP Growth of Pakistan. *Journal of Global Economics*, *4*(2). 1-2.