

Agricultural Credit Guarantee Scheme and Agricultural Sector Performance in Nigeria

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DOI: <https://doi.org/10.29358/sceco.v0i43.653>

How to cite: Adewale, A., Sanni, O., Oyedeji, T. (2026). Agricultural Credit Guarantee Scheme and Agricultural Sector Performance in Nigeria. Studies and Scientific Researches. Economics Edition, 43. <https://doi.org/10.29358/sceco.v0i43.653>

Received: March 2026

Accepted: October 2026

Abstract

This paper examines the impact of the Agricultural Credit Guarantee Scheme on the performance of the agricultural sector in Nigeria. The study is motivated by persistently low agricultural productivity in Nigeria despite the introduction of various credit intervention programmes designed to support farmers and raise output. The study adopts an ex-post facto research design, uses annual time-series data for 2000–2024 obtained from the Central Bank of Nigeria Statistical Bulletin, and employs the Autoregressive Distributed Lag (ARDL) model to estimate the short-run and long-run relationships between the variables. The bounds test results confirm the presence of a long-run relationship between agricultural output and explanatory variables. The short-run estimates show that government expenditure on agriculture, loans fully repaid and the number of loans guaranteed are positively and significantly associated with agricultural output, whereas the value of loans guaranteed has a negative contemporaneous and a positive lagged effect. In the long run, government expenditure on agriculture and loans fully repaid have positive and significant relationships with agricultural output, the value of loans guaranteed has a negative and significant relationship, and the number of loans guaranteed is not statistically significant. The study concludes that the contribution of agricultural financing to agricultural production in Nigeria depends on the dimension of financing considered, not merely on the volume of credit guaranteed. It therefore recommends better-targeted government investment in agriculture, closer monitoring of loan utilization, and more effective loan repayment systems.

Keywords:

Agricultural Credit Guarantee Scheme; Agricultural Financing; Agricultural Output; ARDL; Government Expenditure.

Introduction

Agriculture remains one of the most important sectors of the Nigerian economy and plays a significant role in terms of employment, food security, and gross domestic product. Despite its importance, the sector has experienced long-standing issues that reduce productivity such as lack of adequate financing, poor infrastructure, ineffective policy execution, and low usage of modern farming methods (Adukwu & Haruna, 2026; Osabohien et al., 2022). Access to credit is a key constraint because most smallholder farmers lack collateral and face high interest rates, which prevents them from obtaining vital inputs such as seeds, fertilisers, irrigation equipment, and machinery (Hussain & Thapa, 2012; Adewale et al., 2024). The limited availability of adequate and timely credit has continued to limit agricultural production, negatively impacting rural livelihoods and food security in the country (Rasheed et al., 2024).

To address these problems, the Nigerian government established the Agricultural Credit Guarantee Scheme Fund (ACGSF), which guarantees loans granted to farmers by commercial banks. The scheme aims to reduce lending risks, encourage banks to lend more to agriculture and, ultimately, increase agricultural output (Raufu et al., 2025; Onyiriuba et al., 2020). Other sources of agricultural financing, namely commercial bank loans and government expenditure on agriculture, are also intended to raise production in the sector (Abdullahi & Gupta, 2022). Empirical studies on the effectiveness of these interventions report mixed results. For example, Adukwu and Haruna (2026) find that the ACGSF has a positive and significant effect on agricultural output in the short run but a statistically insignificant effect in the long run, whereas commercial bank loans to agriculture have no immediate effect and may even affect output adversely at other lags. In a similar manner, Chukwu, Onoh and Umoh (2023) report a negative but statistically insignificant association between ACGSF and agricultural value-added growth, indicating inconsistencies in the effectiveness of credit schemes.

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Other studies emphasize the importance of appropriate management and use of credit facilities. Olaniyan and Dube (2026) show that small-scale farmers achieved better loan repayment performance than large-scale farmers, even though the latter were older, more educated and more experienced, which suggests that monitoring and policy design are key to the success of agricultural financing. Fasasi et al. (2024) also show that the loans provided to individuals and cooperatives make a strong difference in total disbursement, and thus, specific strategies of credit allocation are needed.

In addition, commercial bank loans and government spending on agriculture may complement each other. As Aigbovo and Edohen (2025) indicate, commercial bank lending can positively affect agricultural productivity, whereas government spending and ACGSF are not as effective in this way, which means that financial interventions should be supported by proper policy regulation and supervision. In the same vein, Samaila and Idris (2023) demonstrate that the ACGSF has a positive and significant effect on real output growth in the long run, which supports the potential of agricultural credit to improve economic development when properly implemented.

Although agriculture is of critical importance to the economy of Nigeria, the sector continues to face problems of poor financing, low production and limited access to credit facilities. Even with the establishment of the ACGSF, there are concerns about the impact of its credit guarantees on the performance of the agricultural sector in Nigeria. For example, the value of guaranteed loans, the number of guaranteed loans and the repayment performance of beneficiaries could have different impacts on agricultural production. Additionally, government spending on agriculture could be complementary to guaranteed credit in providing infrastructure and public services for productive agriculture. The individual contributions of these factors to agricultural production, in both the short and the long run, still require empirical investigation. This study therefore examines the impact of the value of guaranteed loans, the number of guaranteed loans, loans fully repaid and government spending on agriculture on agricultural sector performance in Nigeria for the period 2000-2024.

The primary aim of the study is to analyze the effect of Agricultural Credit Guarantee Scheme Fund (ACGSF) on agricultural production in Nigeria. The specific objectives are to: test the impact of value of loans guaranteed under the ACGSF on agricultural GDP in Nigeria; test the relationship that exists between the number of loans guaranteed and agricultural productivity; test the effect of full repayment of loans on the performance of the agricultural sector; test the impact of government spending on agriculture on the agricultural output in Nigeria. This research is important because it provides evidence on how effective the Agricultural Credit Guarantee Scheme Fund is in improving agricultural productivity and agricultural output in Nigeria. The research will inform policymakers and financial institutions on how guaranteed loans can enhance agricultural growth. It will also support the design of more efficient credit schemes and resource allocation to farmers, with a view to higher repayment rates, higher productivity and the sustainable development of the agricultural sector, ultimately contributing to national food security and economic growth.

Literature Review

The Concept and Evolution of Agricultural Credit Guarantee Schemes

Government-led agricultural credit guarantee schemes aim to provide farm operators, particularly smallholders, with financial assistance when they lack the collateral required for a traditional bank loan (Kolawole, 2025). The key to this strategy, in Nigeria, has been the Agricultural Credit Guarantee Scheme Fund (ACGSF), which was established to close the financing gap in agriculture and foster food security and rural development (Okunlola & Ayetigbo, 2024). The scheme ensures that the lending institutions are repaid and this motivates the banks to lend to the agricultural sector (Abhishek et al., 2021). Research indicates that these schemes can have a considerable impact on agricultural output. For example, Adukwu and Haruna (2026) found that in the short term, ACGSF has a positive significant impact on agricultural production, but commercial bank lending to agriculture has delayed or non-significant impacts. Equally, Raufu et al. (2025) established that after 1999, there was a significant rise in ACGSF funding, which contributed significantly to crop and livestock production, and as such, it can be said to be a tipping point to agricultural productivity in Nigeria.

Agricultural Financing and Agricultural Productivity

Agricultural funding, such as credit provided by commercial banks and government-assisted schemes, is important for improving agricultural productivity (Thaher et al., 2025). Timely and adequate access to funds would enable the farmers to acquire inputs, invest in better technologies, and increase their operations (Langyintuo, 2020). Empirical data on Nigeria has shown that direct

lending in addition to guaranteed loans do have a big impact on agricultural output. Aigbovo and Edohen (2025) found that loans made by commercial banks to the agricultural sector have a significant effect on agricultural output, whereas government expenditure and the ACGSF have no significant effect. Likewise, Samaila and Idris (2023) found that the ACGSF has a positive and significant long-run effect on real output growth, which supports the relevance of credit support. Nevertheless, there are issues in the efficient use of agricultural finance, which is usually caused by some bottlenecks in the bureaucratic system, ineffective monitoring, or slow payments. Hence, agricultural financing is an important instrument for raising productivity, but to be effective it must be efficiently administered, disbursed on time and properly targeted.

Empirical Evidence on the Effectiveness of ACGSF in Nigeria

The effects of ACGSF on the performance of agricultural sectors have been studied on several occasions in Nigeria. Okoye et al. (2024) found that ACGSF financing of cash crops has a strong positive impact on agricultural production, whereas livestock and food crop financing have minimal or no impact. Raufu et al. (2025) affirmed that the scheme has a positive contribution to livestock, crop production, and fisheries, especially after it received an increase in funding since in 1999. On the other hand, Chukwu et al. (2023) found that there was a non-significant and negative effect on agricultural value-added growth, thus suggesting that the effect of ACGSF is not the same across all sectors and time. These inconclusive outcomes highlight the importance of appropriate implementation, monitoring, and targeting in the scheme. Generally, these studies show that although ACGSF can be a good way to increase agricultural productivity, its effectiveness in the long term depends on the effective allocation of funds, on-time payments, and creating awareness among the farmers so as to maximize participation and use.

Challenges and Constraints in Agricultural Credit Utilization

Despite its potential, agricultural credit faces a number of challenges that limit its performance. Loan repayment is one of the most pressing problems, and it depends on farm income, education, loan amount and interest rates (Olaniyan & Dube, 2026). Weak returns in the farms, market prices and family demands also influence repayment behaviors. Fasasi, Osuntoki, and Salau (2024) emphasized that the loans to individuals and cooperatives have a major effect on disbursement patterns, although the violation of the linearity assumption in their model may point to inefficiencies in the utilization of funds. Poor monitoring, slowness in making payments and the ignorance of farmers diminishes the desired effect of agricultural financing programs. Some researchers also argue that credit does not necessarily result in value-added growth unless it is adequately supplemented by technical aids, market access, or government interventions (Chukwu et al., 2023). These issues show that in addition to finances, capacity building, oversight and systemic reforms are important in order to guarantee that agricultural credit is transformed into productivity gains.

The Role of Government Expenditure and Policy in Agricultural Development

Government spending in the agricultural sector supplements credit schemes by providing infrastructure, subsidies and favorable policies that help to boost productivity. The study by Okpala, Nwaolisa, and Chijindu (2022) indicates that in Nigeria, the impact of government expenditure on agricultural output is positive but insignificant, which reveals the gaps in effectiveness. Aigbovo and Edohen (2025) also found that commercial bank loans to agriculture have a significant effect on agricultural output, whereas government expenditure on agriculture and the ACGSF do not. Research on agricultural credit in Nigeria also shows the need to monitor closely how guaranteed loans are utilized and managed. Yusuf et al. (2016) found no significant effect of ACGSF loans on cash crops and livestock production and suggested better tracking of ACGSF loans. Likewise, Ogbanje and Ihemezie (2024) have revealed that the impacts of allocation of ACGSF varied across the agricultural subsectors suggesting that the linkage between guaranteed credit and agricultural production could be contingent on the manner of allocation and utilization of the fund. The results indicate that assessing agricultural credit programmes should focus not only on the volume of credit, but also on its use and the sectoral impacts.

Theoretical Framework

The research is based on the Financial Intermediation Theory, which focuses on how financial institutions mobilize funds from surplus units (savers) to deficit units (borrowers) in order to boost economic activities such as agriculture. According to this theory, rooted in Schumpeter

(1911/1934), financial intermediaries such as banks and credit guarantee schemes enable the allocation of capital, minimize transaction costs and offer risk management systems. When applied to the agricultural development, the theory suggests that farmers have access to resources needed to produce, adopt better technologies and even grow farming operations with the availability of credit, guarantees and other financial services. This theory is particularly relevant in Nigeria, where access to agricultural finance remains a significant constraint. Programmes such as the Agricultural Credit Guarantee Scheme Fund (ACGSF) act as intermediaries, connecting banks with credit-constrained but productive agricultural actors. By reducing credit risk and thereby encouraging banks to lend to farmers, the scheme is expected to increase agricultural output and sectoral growth.

In addition, the theory offers a framework through which various types of financial aids including loans guaranteed by ACGSF, commercial bank lending, and government spending can be used to impact agricultural productivity. The theoretical point of view is supported by empirical research, such as Adukwu and Haruna (2026) and Samaila and Idris (2023), which show that financial facilitation has a positive effect on agricultural production in Nigeria, thus validating the relevance of the Financial Intermediation Theory to the analysis of agricultural credit intervention. In sum, the Financial Intermediation Theory is suitable for this research because it describes how agricultural credit, loan guarantee, and government financial interventions influence agricultural production, productivity, and the general economic development.

Empirical Review

Adukwu and Haruna (2026) studied the effect of banking sector participation on agricultural development in Nigeria. They found that agricultural credit through the Agricultural Credit Guarantee Scheme Fund (ACGSF) had a positive and significant effect on agricultural output in the short run, but a positive and statistically insignificant effect in the long run. This result indicates that the relationship between agricultural credit and long-term improvement of sectoral performance is not necessarily statistically significant. The present study builds on this theme and explores the separate contributions of value of guaranteed loans, number of guaranteed loans, and loans fully repaid, and the contribution of government expenditure on agriculture. Disaggregated analysis can help determine whether different aspects of the credit-guarantee scheme are associated with various aspects of agricultural output.

Olaniyan and Dube (2026) investigated the factors that determined the agricultural loan repayment among the beneficiaries of the Bank of Agriculture in Anambra State, Nigeria, in 2010–2016. The research applied multistage sampling method in identifying 256 respondents and both the primary and secondary data were gathered using questionnaires and records of the loan transactions respectively. Data analysis was done by use of descriptive statistics and multiple regression analysis. The results indicated that large-scale farmers were mostly older, more educated and more experienced, whereas small-scale farmers showed better loan repayment performance. Educational level, income, loan amount and interest rate were key determinants of repayment among large-scale farmers, while gender, income, loan amount and interest rate were key determinants among small-scale farmers. The main constraints were poor farm returns, low market prices and family commitments. The study recommended reducing bureaucracy and lowering interest rates on agricultural loans in order to improve repayment.

Raufu et al. (2025) studied the impact of the Agricultural credit guarantee scheme fund (ACGSF) on the agricultural performance in Nigeria, using time-series data for 1981–2021 obtained from the National Bureau of Statistics and the Central Bank of Nigeria. The research used descriptive statistics, the trend analysis and the Augmented Dickey Fuller (ADF) test as the measure of relationship between the ACGSF disbursements and the agricultural output in the livestock, crop, and fishery sectors. The results have shown that ACGSF has played a significant role in agriculture performance whose positive impacts have been seen in livestock, crop production and fisheries. The findings also reveal that more financing of the scheme was done after 1999 with livestock and crop sectors getting the greatest loan guarantees. Regression estimates show that the models explain well, which proves that ACGSF is significant in improving agricultural output. The study recommends greater investment in agriculture, timely loan disbursement by participating banks, increased allocation of funds to key agricultural subsectors and wider publicity for the scheme so that more people can participate and create higher agricultural output in Nigeria.

Aigbovo and Edohen (2025) analyzed the correlation between agricultural funding and agricultural production in Nigeria based on quarterly agricultural data between the period 2009Q1 and 2023Q4. The Agricultural Credit Guarantee Scheme Fund (ACGSF), commercial bank loans to

agriculture (CBLA), and government expenditure on agriculture were used as proxies to agricultural financing, and the agricultural GDP was used to measure agricultural output. Autoregressive Distributed Lag (ARDL) model was used in conducting the study. The results indicate that commercial bank loans to agriculture have a significant impact on agricultural production in Nigeria, whereas government expenditure on agriculture and the ACGSF have no significant impact. Also, the agricultural productivity was observed to be significantly enhanced by the annual rainfall that was a control variable. The paper finds that agricultural financing is significant in increasing agricultural production. It therefore suggests that commercial banks should lend more to the agricultural sector and that loan use should be monitored to ensure that funds are applied to agricultural activities.

Okoye, Okere, and Ozulumba (2024) studied how the Agricultural Credit Guarantee Scheme Fund (ACGSF) influenced the growth of agricultural production in the Nigerian green industry. The research design employed in the study was ex-post facto research design where time series data between the period of 1999 and 2022 were collected through the National Bureau of Statistics and the Central Bank of Nigeria. Based on Ordinary Least squares (OLS) regression and Granger Causality test, the research evaluated the effects of ACGSF financing to livestock, food crops, and cash crops on agricultural GDP. According to the findings, the financing of cash crop has a significant positive impact on agricultural production, the financing of livestock has a positive effect although insignificant, and there is also a negative but insignificant effect of financing of food crops. The paper suggests the increased support of ACGSF support programmes especially in training, incentive, and specific programmes to enhance productivity and build up agricultural development in Nigeria.

Fasasi et al. (2024) analyzed the correlation between loan disbursement in Agricultural Credit Guarantee Scheme Fund (ACGSF) and the various types of loan beneficiaries in Nigeria. The research utilized secondary data of 2003 to 2022 retrieved in ACGSF database. To determine the association between total loans given and loans awarded to individuals, cooperatives and companies, the statistical analysis was performed through SPSS and RStudio. The findings indicated that loans to individuals and cooperatives played an important role in the model since they caused an explanation of approximately 79.2% in the total loan disbursed. The diagnostic tests revealed that heteroscedasticity and autocorrelation were absent, and the distribution of the residues was normal. The linearity test however showed that the linear assumption was broken. The research has found that individual and cooperative loans have a significant effect on ACGSF disbursement pattern.

Chukwu et al. (2023) tested the impact of the Agricultural Credit Guarantee Scheme Fund (ACGSF) on the agricultural value-added growth rate in Nigeria by analyzing annual time series data on the topic in 2003-2022, using the sources of Central Bank of Nigeria Statistical Bulletin and World Bank Development Indicators. The study employed the Autoregressive Distributed Lag (ARDL) model to determine the correlation between ACGSF and agricultural value-added growth. The results showed agricultural value-added growth rate had a negative and insignificant relationship with ACGSF in Nigeria over the period in question. This is an indication that the scheme has not contributed much in enhancing value addition in the agricultural sector. The paper hence suggested an increment on the amount of money allocated per year on ACGSF to boost agricultural value added and improve marketing distribution and productivity to the agricultural sector of Nigeria.

Samaila and Idris (2023) studied Agricultural Credit Guarantee Scheme Fund (ACGSF) on the real output growth in Nigeria. The analysis used time series data, and econometric analysis such as the Augmented Dickey Fuller (ADF) unit root test, Autoregressive Distributed Lag (ARDL) model, bounds test and diagnostic tests to test the relationship in the short and long-run. The results show that the positive effect of ACGSF on the real growth in the long run is statistically significant with a coefficient of 3.1678 and probability value of 0.007. This implies that agricultural credit support is an important factor in improving agricultural productivity and economic growth in Nigeria. The research established that ACGSF had a positive impact on the agricultural sector and suggested that the government and other relevant agencies should monitor agricultural funding schemes better to avoid the misappropriation of funds and proper utilization of funds in agricultural development.

Okpala et al. (2022) examined the impact of the Agricultural Credit Guarantee Scheme Fund (ACGSF) and government spending in agriculture on agricultural production in Nigeria using time-series data for 1990–2020 obtained from the Central Bank of Nigeria Statistical Bulletin. Ordinary Least Squares (OLS) estimation method was used in the study to estimate the relationship between the study variables. It was found that, ACGSF positively affects the contribution of the agricultural sector to the real gross domestic product, which is statistically significant, meaning that credit support increases the agricultural production. Conversely, government spending on agriculture depicts positive effect, which is not statistically significant on the output in the agricultural sector. The

research established that agricultural funding is very important in the enhancement of agricultural growth and it suggested that there should be increased funds and efficient disbursement of agricultural credit programs as well as enhanced governmental budgetary allocation to the agricultural sector.

Osabohien et al. (2022) analyzed the performance of the agricultural sector in Nigeria in terms of the impact of access to credit by using time series data derived by the sources of Central Bank of Nigeria Statistical Bulletin and the World Development Indicators. The time frame in the study was 1981- 2018 and the study used a model known as Autoregressive Distributed Lag (ARDL) to analyze the data. The Agricultural Credit Guarantee Scheme Fund (ACGSF) and commercial bank credit to agriculture were the proxies of agricultural credit. The findings showed that the ACGSF and commercial bank credit significantly enhanced agricultural performance, by 10.30% and 17.05%, respectively. Moreover, agricultural worker and arable land were also identified to have a positive impact on the performance of the agricultural sector. The research has found out that credit access is vital in improving agricultural production and it was also suggested that farmers must be equipped with sufficient credit facilities so that they can acquire farm inputs needed and increase agricultural production.

There is also comparative evidence from other developing economies that access to agricultural finance may have an impact on farm productivity. Houensou, Goudjo and Senou (2021) investigated the impact of access to finance on the productivity of smallholder family farmers in Benin, using nationally representative survey data for the 2016–2017 agricultural season and an Endogenous Switching Regression (ESR) model. The study concluded that the availability of credit had a positive impact on the productivity of smallholder farms, with an estimated productivity increase of 15%. The results indicate that agricultural finance can help boost farm productivity and agricultural growth.

Research Gap and Contribution of the Study

The empirical evidence on the relationship between agricultural credit and agricultural sector performance in Nigeria is inconclusive. Onwumere, Ibe and Ihegboro (2012) concluded that the Agricultural Credit Guarantee Scheme Fund (ACGSF) significantly and positively impacted on agricultural subsectors and overall agricultural productivity in Nigeria. However, Yusuf, Owuru, Gold and Akanbi (2016) in their study of the impact of agricultural credit on cash crop and livestock production in Nigeria on the basis of data spanning 1981-2012, reported that the Agricultural credit for both the cash crop and livestock production had no significant impact on the output of these subsectors, which implies inefficiencies in the utilization and monitoring of agricultural credit.

More contemporary evidence is mixed. In their study, Aigbovo and Edohen (2025) examined the quarterly Nigerian data for the period 2009Q1 – 2023Q4 with the help of ARDL model and concluded that the agricultural output is not affected by ACGSF and government expenditure on agriculture, but it is significantly influenced by commercial-bank lending to agriculture. On the other hand, Fagbemi, Nzeribe and Oke (2025) found positive and significant impacts of both ACGSF and banks' agricultural lending on agricultural productivity both in short and long run, using the Nigerian data between 1991 and 2023. The different results suggest that the agricultural credit-productivity link may vary according to the credit category analyzed, the time span and credit utilization efficiency.

The importance of agricultural credit to agricultural performance is also evident from other developing economies. Based on cross-country panel and instrumental-variable methods, Seven and Tumen (2020) concluded that agricultural credit has a positive impact on the levels of agricultural productivity, especially in the developing countries through agricultural GDP. In Vietnam, Tuan Anh, Gan and Anh (2020) concluded that agricultural credit positively affects both short and long-run agricultural GDP, and it is essential to enhance the efficiency of utilizing agricultural credit. Likewise, Manoharan and Varkey (2022) observed that direct agricultural credit showed a positive impact on the agricultural productivity of the states in India while indirect showed a negative effect.

However, there has been limited research focusing specifically on credit guarantee schemes for agriculture. While there is a great deal of literature on partial credit guarantee schemes in developing agriculture, rigorous empirical evidence on the actual impact of agriculture-specific guarantee schemes is limited with many assessments providing only descriptive analysis (Benni, 2021).

More importantly, most of the available literature on Nigeria has analyzed agricultural credit or the ACGSF only in aggregate form. As a result, limited empirical work has been directed at whether there are differences in the relationship between the agricultural output and the various dimensions of the ACGSF, including the value of loans guaranteed (VLG), number of loans guaranteed (NLG),

and loans fully repaid (LFR) when measured in a common empirical framework. Previous research, then, offers little evidence on whether supplying more guaranteed credit, greater numbers of beneficiaries, and better repayment rates lead to similar or different agricultural-sector outcomes.

This study aims to fill this gap by breaking ACGSF into VLG, NLG and LFR and at examining the relationship of these components with Agricultural Gross Domestic Product (AGDP) after controlling for Government Expenditure on Agriculture (GAE). The study employs the bounds-testing approach of the ARDL framework, using annual data for Nigeria over the period 2000–2024, to distinguish short-run dynamics from long-run relationships.

The contribution of the study is not only in the re-examination of the question of whether agricultural credit influences agricultural output, but also in the question of whether the value of guaranteed loans, the number of guaranteed loans and their repayment performance have different effects on the performance of the agricultural sector. Such an approach allows for more disaggregation of evidence to help understand the effectiveness of the ACGSF and serve as the basis for determining whether it is enough to simply increase the amount of guaranteed credit to boost agricultural production.

Methodology

This study adopts an ex-post facto research design, which is suitable for investigating relationships between variables. Annual time-series data for 2000–2024 were obtained from the Central Bank of Nigeria Statistical Bulletin. The variables to be considered are the Agricultural Gross Domestic product, Value of Loan Guaranteed by the Agricultural Credit Guarantee Scheme Fund, the Number of Loans Guaranteed, Loans Repaid in full and Government Expenditure on Agriculture. The research used Autoregressive Distributed Lag (ARDL) model to determine the short-run and long-run impacts of agricultural credit on the performance of the sector. The stationarity of the variables was tested before estimation by use of the Augmented Dickey Fuller test. Moreover, the diagnostic tests in normality, serial correlation, and heteroskedasticity were also performed in order to support the strength and credibility of the findings. This approach provides a rigorous framework for analyzing the effect of credit interventions on agricultural productivity in Nigeria.

Model Specification

To test the relationship between agricultural credit and performance of the agricultural sector in Nigeria, the study model is as follows: Agricultural Gross Domestic Product (AGDP) is the dependent variable, and the Value of Loans Guaranteed (VLG), Number of Loans Guaranteed (NLG), Loans Fully Repaid (LFR) and Government Expenditure on Agriculture (GAE) are the independent variables. The expression of the relation is:

$$AGDP_t = f(VLG_t, NLG_t, LFR_t, GAE_t)$$

Converting this to an estimable econometric model which can be analyzed using time-series, the paper uses the Autoregressive Distributed Lag (ARDL) model to include both the short-run dynamics and long-run equilibrium relations:

$$\Delta AGDP_t = \alpha_0 + \sum_{i=1}^p \alpha_i \Delta AGDP_{t-i} + \sum_{j=0}^{q_1} \beta_j \Delta VLG_{t-j} + \sum_{k=0}^{q_2} \gamma_k \Delta NLG_{t-k} + \sum_{l=0}^{q_3} \delta_l \Delta LFR_{t-l} + \sum_{m=0}^{q_4} \theta_m \Delta GAE_{t-m} + \lambda EC_{t-1} + \epsilon_t$$

where Δ denotes the first-difference operator; α_0 is the intercept; α_i , β_j , γ_k , δ_l and θ_m capture the short-run dynamics of the respective variables; λ is the coefficient of the error correction term $EC(t-1)$, which measures the speed of adjustment towards long-run equilibrium; p and q_1 – q_4 are the lag orders; and ϵ_t is the stochastic error term.

The Akaike Information Criterion (AIC) was used to select the optimal lag structure. The selected specification was ARDL (1,2,1,2,2), corresponding to one lag for AGDP, two lags for GAE, one lag for LFR, two lags for NLG and two lags for VLG.

The lag structure was kept sparse, since annual observations were limited to 25 (for the period 2000–2024) and was not meant to be too complicated, or it would cause unnecessary loss of degrees of freedom and over-parameterization of the model. The AIC selected model was thus considered the best model, and it was retained as the preferred model. The ARDL bounds-testing

approach is suitable for the study because it performs well in relatively small samples and is valid whether the regressors are $I(0)$ or $I(1)$. The results of the unit root tests show that none of the variables is integrated of order two, which is an important pretest condition for the ARDL bounds-testing procedure. The method also allows for the determination of both short run dynamics and long run relationships in one system.

One drawback of the study is the limited number of annual observations over the study period (2000–2024). While the ARDL model is applicable to relatively smaller samples, the fewer number of observations might result in less precision of the estimated coefficients and statistical inference. Thus, the findings must be considered as applicable to the Nigerian context and period of study.

Table 1. Definition, Measurement and Sources of Variables

Variable	Definition/Measurement	Unit	Source
AGDP	Agricultural Gross Domestic Product	Logarithmic value	CBN Statistical Bulletin
GAE	Government Expenditure on Agriculture	Logarithmic value	CBN Statistical Bulletin
LFR	Loans Fully Repaid under ACGSF	Logarithmic value	CBN Statistical Bulletin
NLG	Number of Loans Guaranteed under ACGSF	Logarithmic value	CBN Statistical Bulletin
VLG	Value of Loans Guaranteed under ACGSF	Logarithmic value	CBN Statistical Bulletin

Source: Authors' compilation from CBN Statistical Bulletin.

All variables were log transformed before being estimated. The adoption of the logarithmic transformation was justified to minimize scale differences between variables and to deal with possible heteroskedasticity, as well as to facilitate the elasticity interpretation of estimated coefficients. Study time range: 2000–2024 (25 annual observations).

Ethics Statement

This study employs secondary time series data which were obtained from the Central Bank of Nigeria (CBN) Statistical Bulletin for the period 2000–2024 on an annual basis. It does not include any human interaction, survey, interview, experiment or collection of personally identifiable information. Thus, this study did not need an ethical approval from a human research ethics committee. The analysis was done for academic purposes and with consideration of the accuracy, transparency and responsible interpretation of the data.

Results and Discussion

The descriptive statistics in Table 2 provide a preliminary picture of the nature and distribution of the variables used in this research, which is useful for studying how the Agricultural Credit Guarantee Scheme influences the performance of the agricultural sector in Nigeria. The variables are Agricultural Gross Domestic Product, Government Expenditure on Agriculture, Loans Fully Repaid, Number of Loans Guaranteed and Value of Loans Guaranteed. All variables are expressed in natural logarithms, so the reported values describe log levels rather than absolute amounts or percentages.

Over the period 2000–2024, (log) Agricultural Gross Domestic Product had a mean of 9.52 and a median of 9.67. The proximity of the mean and the median indicate the presence of a rather symmetric distribution, with some years experiencing a slightly lesser agricultural production as indicated by the lowest value of 7.32 and the highest value of 10.94. The standard deviation of 0.98 shows that there were moderate changes in agricultural output over the years and as such, changes in production were not drastic. The skewness value of -0.51 states that the distribution had a slight inclination to the left implying that there were a few years that performed below the average. The value of the kurtosis is 2.57 which is slightly less than that of a normal distribution, and it gives us a somewhat flat distribution with less extreme peaks. The Jarque-Bera probability of 0.53 indicates that the normality of Agricultural Gross Domestic Product cannot be rejected.

Table 2. Descriptive Analysis Results

	AGDP	GAE	LFR	NLG	VLG
Mean	9.52	3.508	14.9884	10.5832	15.3828
Median	9.67	3.6	15.15	10.67	15.6
Maximum	10.94	5.89	16.07	11.19	16.38
Minimum	7.32	1.85	12.26	9.9	12.78
Std. Dev.	0.981508	0.942811	1.033931	0.364586	0.891336
Skewness	-0.50637	0.089828	-1.1354	-0.29127	-1.42042
Kurtosis	2.569387	3.153584	3.464013	2.203921	4.485436
Jarque-Bera	1.261523	0.058192	5.595696	1.013642	10.70506
Probability	0.532186	0.971323	0.060941	0.602408	0.004736
Sum	238	87.7	374.71	264.58	384.57
Sum Sq. Dev.	23.1206	21.3334	25.65634	3.190144	19.0675
Observations	25	25	25	25	25

Source: Authors' computation from CBN Statistical Bulletin.

Note: Agricultural Gross Domestic Product (AGDP), Value of Loans Guaranteed (VLG), Number of Loans Guaranteed (NLG), Loans Fully Repaid (LFR), and Government Expenditure on Agriculture (GAE)

The median value of (log) government spending on agriculture was 3.6 and the mean was 3.51 during the study period. The highest spending was 5.89 and the lowest 1.85, and these represent the times when the spending was mostly more excessive and also the times when the spending was rather restrained. The standard deviation of 0.94 shows a moderate level of variation of government expenditure. The skewness of 0.09 indicates that the distribution is almost symmetric and the kurtosis of 3.15 is slightly above the normal distribution of 3 which indicates that the distribution is more peaked. The Jarque-Bera probability of 0.97 indicates that normality cannot be rejected for this variable. This government expenditure stability brings to the fore a long-term effort of investing in the agricultural sector.

The Loans Fully Repaid variable, which reflects repayment performance under the Agricultural Credit Guarantee Scheme, had a mean of 14.99 and a median of 15.15 (in logs). The highest and lowest levels 16.07 and 12.26 respectively indicate that the repayments were usually high with few occasional deficits. The low to moderate variability with a standard deviation of 1.03 points supports the fact that loan repayments were relatively stable. Skewness of -1.14 indicates that the skewness was left, meaning that there are years when the repayments were lower than average whereas the kurtosis was 3.46 which implies that the distribution was slightly peaked with extreme values. The Jarque-Bera probability of 0.061 is above 0.05, so normality is not rejected at the 5% level, although only marginally.

In the case of the Number of Loans Guaranteed, the mean and median values were 10.58 and 10.67, respectively, indicating that the number of loans guaranteed did not change rapidly over the research time. The highest and lowest values, 11.19 and 9.9 respectively, prove the presence of small annual changes. The standard deviation of 0.36 shows that the number of loans guaranteed varied little over the period. The left skewness of -0.29 and kurtosis of 2.20 indicate that the curve is not very steep with a few extreme deviations. A Jarque Bera probability of 0.60 supports the assumption of normality.

The Value of Loans Guaranteed has a mean of 15.38 and a median of 15.6. The values of loans were between 12.78 and 16.38 and revealed a gradual rise in loan disbursements with time. The standard deviation at 0.89 indicates a moderate variability and the skewness of -1.42 indicates the strong left skewness, that is there were years when loan disbursements below average were made. The kurtosis of 4.49 indicates the presence of extreme values in some years, probably associated with certain large-scale interventions. The Jarque-Bera test probability of 0.0047 indicates that the normality hypothesis is rejected at the 5% significance level. This non-normal distribution of VLG is noted as a distributional characteristic of the variable and is considered when interpreting its estimated long-run effect in the ARDL model.

Overall, the descriptive statistics show that there is a gradual increase in agricultural production, the active assistance of the government, and the successful record of loan repayment according to the Agricultural Credit Guarantee Scheme. The number of loans guaranteed did not change much, but the value of loans guaranteed varied more, which can be attributed to intermittent policy intercessions or economic shocks.

To check whether the variables contain unit roots or if any of them is of order two, $I(2)$, to make the ARDL bounds-testing procedure valid, the Augmented Dickey-Fuller (ADF) unit root test was performed. The results in Table 3 show that none of the variables is stationary at level. Specifically, the level p-values for AGDP (0.1085), GAE (0.8986), LFR (0.1678), NLG (0.2682), and VLG (0.1447) are all greater than the 5% significance level. Therefore, the null hypothesis of a unit root cannot be rejected for any of the variables at level.

Table 3. Unit Root Test Summary (Augmented Dickey–Fuller Test)

Variable	Level ADF Statistic	Level p-value	First Difference ADF Statistic	First Difference p-value	Order of Integration
AGDP	-2.5943	0.1085	-3.8348	0.0083	$I(1)$
GAE	-0.3755	0.8986	-5.0431	0.0005	$I(1)$
LFR	-2.3436	0.1678	-3.0218	0.0477	$I(1)$
NLG	-2.0419	0.2682	-3.6023	0.0140	$I(1)$
VLG	-2.4312	0.1447	-3.7635	0.0098	$I(1)$

Source: Authors' computation from CBN Statistical Bulletin.

If the variables are first differenced, however, they are all stationary. The first-difference ADF statistics are -3.8348 for AGDP ($p = 0.0083$), -5.0431 for GAE ($p = 0.0005$), -3.0218 for LFR ($p = 0.0477$), -3.6023 for NLG ($p = 0.0140$), and -3.7635 for VLG ($p = 0.0098$). All the corresponding p-values are less than 0.05, so the null hypothesis of a unit root is rejected first difference. The results of the Augmented Dickey–Fuller (ADF) unit root test show that all five variables (agricultural gross domestic product (AGDP), government expenditure on agriculture (GAE), loans fully repaid (LFR), number of loans guaranteed (NLG) and value of loans guaranteed (VLG)) are non-stationary at level but stationary after first differencing. The results then suggest that all 5 variables are integrated once or are $I(1)$. The results show that none of the variables is integrated of order 2 $I(2)$, thus meeting the integration order requirement for using the autoregressive distributed lag (ARDL) bounds-testing approach.

ARDL Bounds Test was done to establish whether there is any long run relationship amongst the variables under study that include Agricultural Gross Domestic Product, Government Agriculture Expenditure, Loans Fully Repaid, Number of Loans Guaranteed, and Value of Loans Guaranteed. The null hypothesis of the test indicates that the relationship between the variables does not exist in the long run. Using the data in Table 4, the statistical value of F is 12.537, which is well above the upper-bound critical values at all conventional significance levels (10%, 5%, 2.5% and 1%). Specifically, the upper-bound critical values are 3.56 (10%), 4.223 (5%), 4.37 (2.5%) and 5.84 (1%). Given that the F-statistic is more than these upper limits, the null hypothesis of no long run relationship is rejected.

Table 4. ARDL Bounds Test for Cointegration

Test Statistic	Value	Significance	$I(0)$ Critical Value	$I(1)$ Critical Value
F-statistic	12.537	10%	2.525	3.560
K (Number of regressors)	4	5%	3.058	4.223
		2.5%	3.290	4.370
		1%	4.280	5.840

Source: Authors' computation from CBN Statistical Bulletin.

Note: The F-statistic exceeds the upper-bound critical values at the 10%, 5%, 2.5% and 1% levels, indicating the presence of a long-run relationship among the variables.

This result indicates that there is a stable long-term equilibrium relationship between agricultural output and agricultural credit, the government spending on agriculture, and the loan repayment. In other words, the key financial and policy variables affecting the agricultural sector in Nigeria move together over time. It is therefore appropriate to estimate the long-run coefficients and the short-run dynamics of the model in the ARDL method since there is cointegration of the variables.

Table 5 reports the complete short-run ARDL estimates, including the coefficient, standard error, t-statistic and p-value for each estimated variable. It discusses the effect of short-term changes in government expenditure on agriculture and the agricultural credit variables on the agricultural output and demonstrates the rate at which the system gets back to the long-run equilibrium when there is any

short-term deviation.

Table 5. Short-Run ARDL Estimates - Dependent Variable: D(AGDP)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
COINTEQ*	-0.32771	0.030851	-10.6221	0.0000
D(GAE)	0.173543	0.029235	5.936079	0.0000
D(GAE(-1))	-0.17862	0.046946	-3.80477	0.001726
D(LFR)	0.304797	0.08819	3.456135	0.003527
D(NLG)	0.272173	0.098649	2.759018	0.014619
D(NLG(-1))	0.259438	0.102213	2.538199	0.022723
D(VLG)	-0.43592	0.076491	-5.69894	0.0000
D(VLG(-1))	0.262901	0.073323	3.585498	0.002705
R-squared	0.889081	Mean dependent var		0.144348
Adjusted R-squared	0.837318	S.D. dependent var		0.135003
S.E. of regression	0.054452	Akaike info criterion		-2.7148
Sum squared resid	0.044475	Schwarz criterion		-2.31984
Log likelihood	39.22016	Hannan-Quinn criter.		-2.61547
F-statistic	17.17618	Durbin-Watson stat		2.518303
Prob(F-statistic)	0.000006			

Source: Authors' computation from CBN Statistical Bulletin.

Note: * p-value incompatible with t-Bounds distribution.

The coefficient of the error correction term, which is represented as COINTEQ*, is -0.328 and it is significant at the level of 1 percent ($p = 0.000$). The negative and significant value confirms the existence of a stable long-run relationship between agricultural output, government expenditure on agriculture and the ACGSF credit variables. It also suggests that about 32.8 percent of any deviation of agricultural output from its long-run equilibrium is corrected within one year, indicating a moderate speed of adjustment.

The current change in government spending on agriculture, D(GAE), is positively associated with agricultural output, with a coefficient of 0.174 that is significant at the 1% level ($p < 0.01$). This suggests that agricultural production responds quickly to increases in government expenditure on agriculture. The previous year's change in government spending, D(GAE(-1)), however, has a negative coefficient of -0.179, also significant at the 1% level, which may indicate that part of the initial effect is reversed or that spending is translated into output with short-term inefficiencies.

The change in loans fully repaid, D(LFR), has a positive coefficient of 0.305 that is statistically significant at the 1% level ($p < 0.01$). This implies that full loan repayment is positively associated with agricultural output in the same year, possibly through renewed access to credit or greater confidence among farmers and financial institutions. Likewise, the guaranteed number of loans (NLG) has a positive contribution to output in the current ($D(NLG) = 0.272$, $p < 0.05$) and the previous ($D(NLG(-1)) = 0.259$, $p < 0.05$) period. This shows that both current and lagged increases in the number of guaranteed loans are significantly associated with higher agricultural production.

Interestingly, the value of loans guaranteed (VLG) has an ambivalent short-run effect. The current-period value, D(VLG), has a negative coefficient of -0.436, significant at the 1% level, suggesting that large loan disbursements may temporarily disrupt production or create adjustment problems. By contrast, the previous period's value, D(VLG(-1)), has a positive coefficient of 0.263, also significant at the 1% level, indicating that past financial assistance contributes positively to production, possibly by providing farmers with the resources needed to invest effectively.

Overall, the short-run ARDL model has high explanatory power ($R-Sq = 0.889$ and adjusted $R-Sq = 0.837$) which means that the explanatory variables explain more than 83 percent of the short-term fluctuation in agricultural output. The Durbin-Watson statistic (2.52) is reported for completeness only, since it is not reliable in models with a lagged dependent variable; serial correlation

is therefore assessed with the Breusch-Godfrey LM test (Table 7). The F-statistic of 17.18 ($p < 0.01$) indicates that the model is jointly significant.

In sum, the short-run findings show that agricultural production in Nigeria is sensitive to government expenditure and agricultural credit. Current government expenditure and loans fully repaid are positively associated with output in the same year, while the effects of the number and value of guaranteed loans depend on their timing. The error correction mechanism indicates that deviations from the long-run equilibrium are corrected over time.

Table 6 shows the ARDL estimates of the long-run of the determinants of Agricultural Gross Domestic Product in Nigeria. The long-run estimates describe the equilibrium relationships between agricultural output, government expenditure and the agricultural credit variables, after short-term fluctuations have been corrected.

Table 6. Long-Run ARDL Estimates

Variable *	Coefficient	Std. Error	t-Statistic	Prob.
GAE(-1)	1.392708	0.305775	4.554685	0.000246
LFR(-1)	1.674301	0.573996	2.91692	0.0092
NLG(-1)	0.991757	1.047727	0.946579	0.3564
VLG(-1)	-2.84367	1.240286	-2.29276	0.034125
C	13.20644	2.177585	6.064718	0.0000

Source: Authors' computation from CBN Statistical Bulletin.

The long-run coefficient of government expenditure on agriculture (GAE) is positive (1.393) and statistically significant at the 1% level ($p = 0.0002$). Since both variables are expressed in logarithms, the coefficient is an elasticity: a 1% increase in government expenditure on agriculture is associated with an increase of about 1.39% in agricultural GDP in the long run, highlighting the importance of public spending for the sector.

The loan repayment variable (LFR-1) also has a positive and significant long-run effect, with a coefficient of 1.674 ($p = 0.0092$). This suggests that full recovery of agricultural loans is positively associated with long-term agricultural production, possibly through better access to future credit, greater confidence among farmers and lenders, and more efficient use of financial resources in later periods.

The coefficient of the number of loans guaranteed (NLG-1) is positive but statistically insignificant (coefficient = 0.992; standard error = 1.048; t-statistic = 0.947; $p = 0.356$). This may indicate that a mere increase in the number of guaranteed loans, without adequate monitoring and support, does not necessarily translate into higher agricultural output.

The value of guaranteed loans (VLG-1) has a negative and statistically significant coefficient of -2.844 (standard error = 1.240; t-statistic = -2.293; $p = 0.034$). The negative coefficient does not necessarily imply that agricultural credit is inherently detrimental to agricultural production. Rather, it may indicate that increases in the value of guaranteed loans do not automatically translate into proportional increases in agricultural output. Where credit expansion is not accompanied by effective loan utilization, adequate monitoring, productive investment, and timely repayment, the additional financial resources may have a limited or adverse association with agricultural output. Thus, the finding suggests that the effectiveness of agricultural credit may depend not only on the amount guaranteed but also on how effectively the guaranteed funds are allocated and utilized. Given the non-normal distribution of VLG identified in the descriptive statistics, this finding is interpreted cautiously as an estimated long-run association rather than definitive evidence of a causal adverse effect.

The constant (13.206) is positive and statistically significant ($p = 0.000$). Overall, the long-run ARDL findings support the role of government spending and loan repayment in supporting agricultural productivity in Nigeria. The negative and significant coefficient of VLG further suggests that expanding the value of guaranteed loans alone may not be sufficient to improve agricultural output, highlighting the importance of effective credit allocation, utilization, monitoring and repayment mechanisms.

Table 7. Diagnostic Tests for the ARDL Model

Statistics	Normality (Jarque-Bera)	Serial Correlation (Breusch-Godfrey LM)	Heteroskedasticity (Breusch-Pagan-Godfrey)
Test statistic	0.3162	1.5616	18.448

Probability (p-value)	0.8537	0.268	0.103
Decision	Residuals are normal	No serial correlation	Homoskedasticity not rejected

Source: Authors' computation from CBN Statistical Bulletin.

Note: Jarque-Bera: test statistic; Breusch-Godfrey LM: F-statistic; Breusch-Pagan-Godfrey: Obs*R-squared (χ^2).

Diagnostic tests were conducted to determine whether the estimated ARDL model meets the conventional assumptions of classical regression analysis and to rule out unreliable or biased results.

The Jarque-Bera test of residual normality yields a statistic of 0.316 with a p-value of 0.854. This p-value, well above 0.05, indicates that the residuals are approximately normally distributed. The result therefore provides no evidence against the normality of the residuals at the 5% significance level. The Breusch-Godfrey LM test reports a statistic of 1.562 with a p-value of 0.268, indicating no statistically significant serial correlation at the 5% level. The Breusch-Pagan-Godfrey test reports a statistic of 18.448 with a p-value of 0.103, indicating that heteroskedasticity is not statistically significant at the 5% level. Overall, the diagnostic results indicate normally distributed residuals, no statistically significant serial correlation, and not statistically significant heteroskedasticity at the 5% level.

The CUSUM stability test in Figure 1 indicates that the estimated ARDL model is stable during the study period. The CUSUM line remains within the 5% critical bounds throughout the sample period, indicating no evidence of significant structural instability of the estimated parameters.

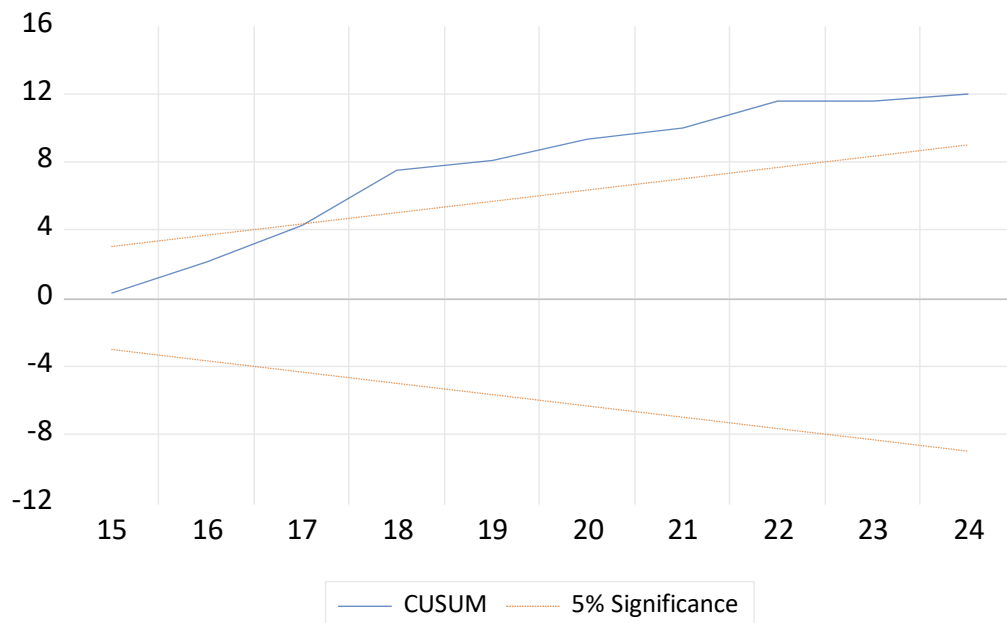


Figure 1. CUSUM Stability Test

Source: Authors' computation from CBN Statistical Bulletin.

The CUSUM of Squares test for the stability of the estimated ARDL model is presented in Figure 2. The plotted statistic remains within the 5% critical bounds over the sample period, indicating no significant evidence of structural change or instability in the variance of the model.

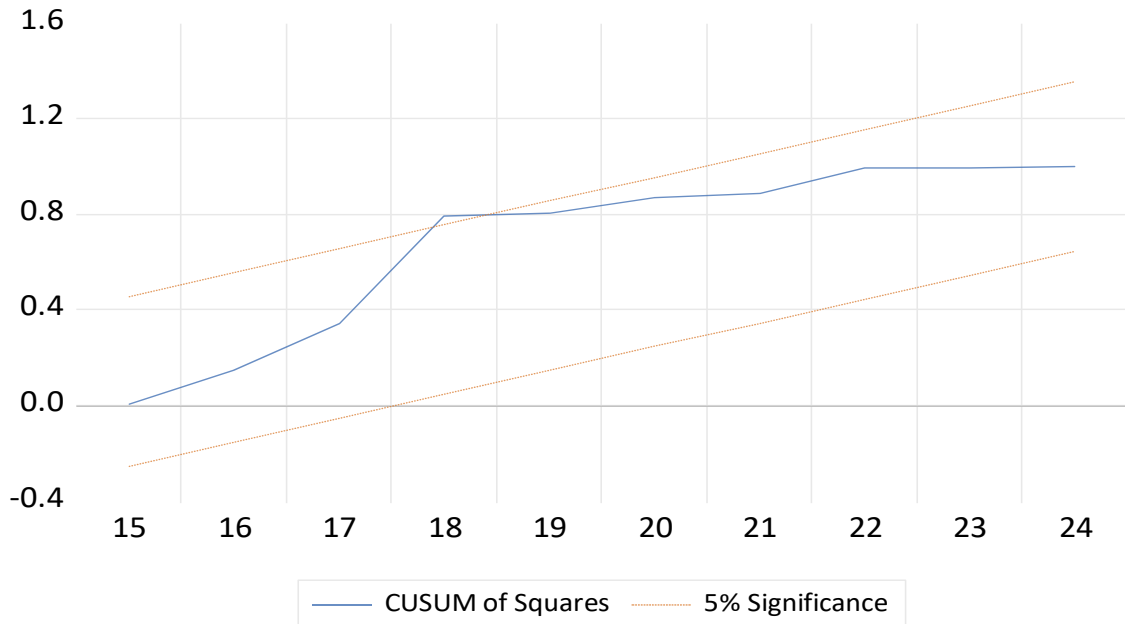


Figure 2. CUSUM of Squares (CUSUMSQ) Stability Test
Source: Authors' computation from CBN Statistical Bulletin.

Figure 3 shows the histogram and normality test of the model residuals for the relationship between Agricultural Credit Guarantee Scheme Fund (ACGSF) and the performance of the agricultural sector in Nigeria. The normality test assesses whether the residuals of the estimated model are normally distributed, an important assumption for sound statistical inference. The mean of the residuals is about $1.43\text{E-}15$, i.e. effectively zero, which indicates that the residuals are centred on zero and that the model has no systematic bias. The median value of 0.000206 is also very near to the mean which once again confirms the fact that the values of the residuals are symmetric about the mean.

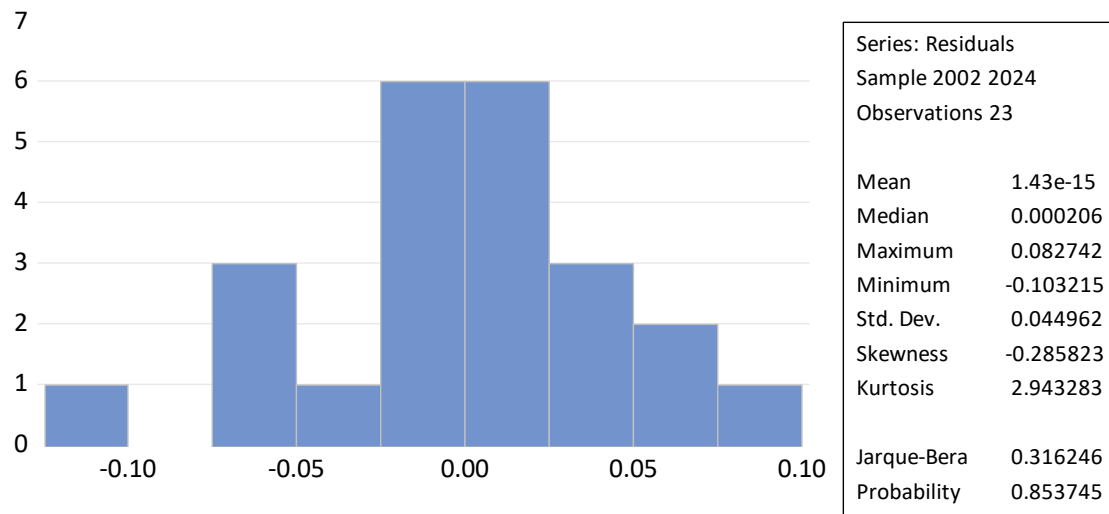


Figure 3. Residual Normality Test
Source: Authors' computation from CBN Statistical Bulletin.

The highest and lowest values of the residuals are 0.082742 and -0.103215 respectively. These values show that the residuals are clustered around zero without extreme deviations, which means that the model errors are small and stable. Also, the standard deviation of 0.044962 indicates that the dispersion of the residual values about the mean is not very high and therefore this means that the estimated values of the model are not widely distributed compared to the observed values. The skewness of the residual distribution (-0.285823) is slightly negative but close to zero. The value of the kurtosis (2.943283) is as well very near the benchmark value of 3, which represents a normal distribution. This implies that the distribution of the residuals is neither excessively peaked nor flat and is approximately normal.

In addition, the Jarque-Bera statistic of 0.316246, with a probability value of 0.853745, is consistent with normally distributed residuals. The null hypothesis of normally distributed residuals cannot be rejected because this probability value is larger than the standard level of significance of 0.05. Overall, the histogram and the Jarque-Bera test indicate that the model satisfies the normality assumption, which supports the reliability of the regression results and of the policy conclusions drawn from them.

Figure 4 shows the trends of the key variables used in the study between 2000 and 2024. These variables are: Agricultural Gross Domestic Product (AGDP), Government Expenditure on Agriculture (GAE), Loans Fully Repaid (LFR), Number of Loans Guaranteed (NLG) and Value of Loans Guaranteed (VLG). The figure summarizes how these variables have changed over time in Nigeria and helps identify trends and potential associations between the Agricultural Credit Guarantee Scheme Fund (ACGSF) and the performance of the agricultural sector.

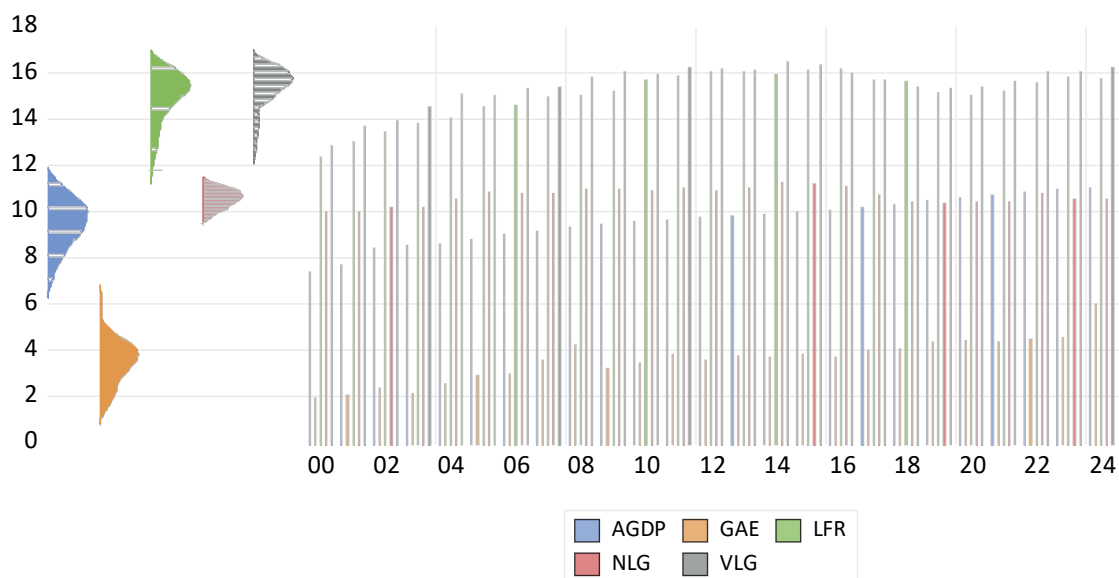


Figure 4. Trends of Agricultural GDP, Loans, and Government Expenditure (2000–2024)
Source: Authors' computation from CBN Statistical Bulletin.

Agricultural Gross Domestic Product (AGDP) shows a generally rising trend during the study period. This positive trend implies that the agricultural sector in Nigeria has been under a gradual growth over the years. The growth in agricultural production may reflect several factors, such as improved access to credit, government support programmes and greater participation in agriculture.

Government Expenditure on Agriculture (GAE) fluctuates but rises slowly over the years. This shows that the Nigerian government has remained committed to invest in the development of agricultural sector even though the amount of expenditure has not been ideal on a consistent basis. Occasional increases in government expenditure reflect policy actions to enhance agricultural productivity, rural development and food security.

The Number of Loans Guaranteed (NLG) under the ACGSF shows varying trends over the years. In some periods the number of guaranteed loans rises, reflecting greater participation of farmers and agricultural investors in the scheme. In other periods there is a slight decrease, which may be attributable to administrative bottlenecks, lack of awareness on the scheme or economic conditions that influence credit demand.

Similarly, the Value of Loans Guaranteed (VLG) shows an overall upward movement over the study period. This implies that the funding provided through the ACGSF has increased over the years, making more finance available to farmers and agricultural businesses for inputs, mechanization and farm expansion.

Loans Fully Repaid (LFR) also varies but rises overall over time. This suggests that beneficiaries of the scheme have been able to repay a growing volume of loans, which supports the sustainability of the credit programme. An increased repayment rate can also make the financial institutions confident in lending to the agricultural sector.

The trend analysis shows that agricultural production, government spending on agriculture and the ACGSF credit variables generally moved upwards over the period 2000–2024. These co-

movements are descriptive only; they do not by themselves establish that agricultural growth is driven by agricultural credit or government intervention, which is assessed with the ARDL estimates.

Discussion of Findings

The study examines the relationship between the Agricultural Credit Guarantee Scheme Fund (ACGSF) and agricultural sector performance in Nigeria using the Autoregressive Distributed Lag (ARDL) approach. The bounds test confirms a long-run relationship between agricultural output, government spending on agriculture, loans fully repaid, the number of loans guaranteed, and the value of loans guaranteed. The estimated short-run and long-run coefficients thus offer insights into the relationship of these agricultural financing variables with the agricultural output during the study period.

The short-run results show that government expenditure on agriculture has a positive and statistically significant relationship with agricultural output. This result suggests that, in the short run, higher levels of government spending on agriculture are correlated with higher levels of agricultural production. Government spending can be used to promote agriculture via public infrastructure, extension services, sectoral inputs, and other interventions in agriculture. The current study does not, however, identify which aspects of government spending are responsible for the relationship found. The result is similar to Okpala, Nwaolisa and Chijindu (2022) who found a positive relationship between government expenditure and agricultural production in Nigeria, but the estimated relationship was not statistically significant. The present finding thus offers further insight into the positive relationship between agricultural output and public agricultural expenditure in Nigeria.

The results also show a positive and statistically significant relationship between loans fully repaid and agricultural output in both the short and the long run, implying a positive association between agricultural output and the repayment of agricultural loans. The result underscores the significance of the repayment performance in agricultural credit interventions. To be successful, a credit scheme must not only provide loans but also recover the loans already issued. The result is like that of Olaniyan and Dube (2026) who revealed that financial and farm related factors are important to determine the performance of farmers' loan repayment. The present study does not, however, prove that loan repayment per se has a positive effect on productivity; it only shows a significant positive association between agricultural output and loans fully repaid.

The long-run relationship between the number of loans guaranteed and agricultural output is positive but not statistically significant. This finding indicates that, in the long run, there is no statistically significant relationship between the number of guaranteed loans and agricultural output, which suggests that increasing the number of beneficiaries of guaranteed credit does not by itself translate into higher output. The finding is in line with the overall thrust of the work of Fasasi, Osuntoki and Salau (2024) on the significance of guaranteed loans in agricultural credit delivery in the policy of ACGSF. However, the statistical insignificance found in the current study cautions against overstating the effect of the number of guaranteed loans.

The value of guaranteed loans, on the other hand, has a negative, and statistically significant, long-run relationship with agricultural output. The estimated coefficient of -2.844 means that, holding the other variables in the model constant, a 1% increase in the value of guaranteed loans is associated with a decrease of about 2.84% in agricultural output in the long run. This finding does not mean that agricultural credit is harmful in itself to agricultural production. Rather, it indicates that, over the study period, larger values of guaranteed loans were associated with lower agricultural output.

One possible interpretation is that the amount of credit guaranteed may not necessarily reflect the productive effectiveness of the credit provided. However, the present study does not directly examine loan utilization, diversion, monitoring quality or the allocation of guaranteed funds. These factors should therefore be regarded as possible explanations of the negative relationship rather than established causes. The finding contrasts with studies reporting a positive effect of agricultural credit on agricultural production, which has important implications for agricultural credit interventions in Nigeria. However, Chukwu, Onoh and Umoh (2023) found a negative albeit non-statistically significant correlation between the ACGSF and agricultural value-added growth for Nigeria. The present study adds to this evidence by showing a statistically significant negative long-run association for the value of loans guaranteed considered separately.

The estimated error correction coefficient is negative and statistically significant, about -0.328 . This indicates the existence of an adjustment mechanism that corrects short-run deviations from the long-run relationship; in particular, about 32.8% of the disequilibrium is corrected within

one period. This is another confirmation of the presence of a stable long-run relationship between the variables in the model. This is in line with the findings of Adukwu and Haruna (2026) in their study on agricultural credit and output in Nigeria, where they found an adjustment mechanism towards long run equilibrium.

Overall, the results indicate that the different dimensions of agricultural financing relate to agricultural output in different ways. The long run relationship between the number of loans guaranteed (NLG) and agricultural output is positive but statistically insignificant with an estimated coefficient of 0.991757 at a probability value of 0.3564. Since the probability value exceeds 5%, the evidence is not sufficient to draw a conclusion about the long-run effect of the number of guaranteed loans on agricultural output. This finding indicates that, on its own, a larger number of guaranteed loans may not be enough to boost agricultural output. The effectiveness of agricultural credit interventions may also vary depending on the size of credit, its timely disbursement, and productive utilization of credit, as well as access to complementary inputs in agriculture.

Conclusion and Recommendations

Conclusion

This study investigated the relationship between the Agricultural Credit Guarantee Scheme Fund and performance of the agricultural sector in Nigeria, over the period of 2000–2024, using the ARDL bounds-testing method. The bounds test showed a long-run relationship between agricultural output, government spending on agriculture, the number of loans guaranteed, the value of loans guaranteed, and loans fully repaid. The empirical findings reveal that government expenditure on agriculture and loans fully repaid have positive and statistically significant relationships with agricultural output in both the short and the long run, although the lagged short-run effect of government expenditure is negative. The results suggest that public agricultural spending and loan repayment performance are significant financial correlates of agricultural production in Nigeria.

The number of guaranteed loans has a positive but statistically insignificant long-run relationship with agricultural output; thus, there is not enough evidence that increasing the number of guaranteed loans alone raises agricultural output in the long run. In contrast, agricultural output is negatively and statistically significantly associated with the value of loans guaranteed in the long-run. This outcome indicates that growth in the value of guaranteed loans did not translate into growth in agricultural production over the study period. It should not, however, be interpreted as evidence that agricultural credit is harmful or that loan funds were misused, since these aspects were not directly studied. The negative and significant error correction coefficient also confirms that short-run disturbances are followed by adjustment towards long-run equilibrium. In general, the results suggest that the relationship between agricultural financing and agricultural output differs according to the dimension of financing considered. They therefore call for attention to the effectiveness and performance of agricultural credit interventions, rather than only to the number and value of credit guaranteed.

Recommendations

The study makes the following recommendations, based on its empirical findings.

1. Improve the impact of government spending on agricultural activities. The results show that in the short run and long run, government spending on agriculture has a positive, and statistically significant, effect on agriculture output. The Federal Government and state governments should therefore improve implementation and monitoring of agricultural expenditure, particularly investments in rural roads, irrigation facilities, agricultural extension services, storage facilities and improved farm inputs. Public expenditure should have measurable output indicators and periodic expenditure reviews to determine the effectiveness of public spending in terms of improved agricultural output.
2. Enhance monitoring and effective use of guaranteed loans. Financial institutions participating in the ACGSF should strengthen borrower assessment, loan monitoring and post-disbursement support, given that there is a positive and statistically significant relationship between loans that were fully repaid and agricultural output. Loan disbursement should be synchronized with the agricultural production cycle, and beneficiaries should receive adequate guidance on the use of credit. Monitoring should concentrate on how the money is spent on the activities they have been approved for and whether the activities generate adequate returns to repay the loan.
3. Improve loan recovery while protecting viable agricultural borrowers. The positive and significant long-run association between loans fully repaid and agricultural output emphasizes

the importance of good credit management. Financial institutions should put in place clear repayment cycles, taking into account the cash flows of agricultural activities, and develop early-warning mechanisms to recognize repayment problems. Borrowers in temporary production and/or market disruption-related difficulties should be evaluated for appropriate restructuring. Such measures should be implemented in conjunction with a transparent recovery programme, while avoiding the needless exclusion of viable smallholder farmers from formal agricultural credit.

4. Evaluate the quality and effectiveness of guaranteed loans, not only their number. The estimated long-run coefficient of the number of loans guaranteed is positive but is statistically insignificant. Therefore, the research does not show that providing more guaranteed loans increases output in the long run. The relevant authorities should therefore evaluate the performance of ACGSF against indicators like value and timing of the disbursement, the number and nature of beneficiaries, loan utilization, repayment behavior and the changes in the agricultural production. This would assist in differentiating an increase in lending activity from real increases in agricultural achievements.
5. Review the design and allocation of guaranteed credit. The value of loans guaranteed has a negative and statistically significant long-run relationship with agricultural output, while its short-run effects are mixed. This is not proof that guaranteed loans reduce agricultural production, but it does suggest that attention should be paid to how credit is sized, allocated and used. Allocation of loans should be examined by the relevant authorities regarding the beneficiaries' production requirements, the agriculture sub-sectors, and the probable returns from the investment. Regular programme assessments should also consider whether high loan exposure, slow disbursement of loans, and the disparity in access to other programme inputs are correlated with poor agricultural performance.
6. Strengthen the monitoring and evaluation system of the ACGSF. The Central Bank of Nigeria and the financial institutions should improve collection and reporting of data on guaranteed loans, such as when the loans are disbursed, the beneficiaries, the type of the agriculture activities supported, repayment status and production results if available. Periodic monitoring of the scheme would help policymakers to determine the successful groups of borrowers and the most successful agricultural activities. This could lead to better programme administration and better-informed credit-guarantee policies in the future.

Agricultural credit-guarantee policies should be evaluated not only in terms of the number or value of guarantees issued, but also in terms of the extent to which they are actually used, the ability of borrowers to repay, and their impact on agricultural output. Public investment, responsible agricultural financing, borrower support as well as evidence-based programme evaluation would, if pursued in a coordinated manner, form the foundation of effective agricultural financing in Nigeria.

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