



IMPACT OF GOVERNMENT AGRICULTURAL POLICIES ON AGRICULTURAL OUTPUT IN NIGERIA

ABSTRACT

Agriculture plays a pivotal role in the economic development of Nigeria, yet challenges persist in optimizing its output. This study investigates the relationship between government agricultural policies and agricultural output, aiming to provide insights for effective policy formulation. The study focuses on variables including the Agricultural Credit Guarantee Scheme Fund (ACGSF), agricultural lending, government agricultural expenditure, and interest rates. Drawing from New Institutional Economics (NIE) theory, the study employs the Autoregressive Distributed Lag (ARDL) approach to analyse data spanning from 1980 to 2021. The study's results unveil significant findings regarding the impacts of the examined variables on agricultural output. The ACGSF, agricultural lending, and government agricultural expenditure exhibit positive and statistically significant effects on both short- and long-term agricultural output. However, the interest rate displays a negative impact. The presence of an Error Correction Mechanism (ECM) indicates a swift adjustment process towards long-term equilibrium, highlighting the sector's adaptability to deviations from equilibrium. These findings underscore the pivotal role of government policies in shaping agricultural performance. As a result, policy recommendations are proposed: augmenting budgetary allocations to agriculture, tailoring lending policies to favour the sector, reinforcing credit guarantee schemes, and ensuring favourable interest rates. This study contributes to the understanding of how policy measures can foster agricultural growth, ultimately advancing Nigeria's socio-economic development.

Keywords: *Government Agricultural Policies, Agricultural Output, Autoregressive Distributed Lag (ARDL), New Institutional Economics (NIE), Policy Implications, Nigeria.*

Introduction

Agriculture, encompassing the cultivation of crops, livestock rearing, fishing, poultry, and forestry, holds paramount importance in providing sustenance for the population and raw materials for agro-based industries (Anyanwu, 1997; Dori, 2016; Vincent et al 2020). Traditionally, it has served as a primary source of employment and revenue for the nation. Historically, agriculture was the predominant sector in Nigeria's economy, contributing substantially to export earnings prior to the discovery of oil (Anyanwu, 1997; Mogues, Fan & Benin, 2015; Mathew & Mordecai, 2016).

Yohanna Ezekiel
Postgraduate Student,
Department of Economics,
Faculty of Social Sciences,
Adamawa State University, Mubi

Abdullahi Jauro Mohammed
Department of Economics,
Faculty of Social Science,
Adamawa State University, Mubi
amjauro99@yahoo.com

***Corresponding author:**
Yohanna Ezekiel
Postgraduate Student,
Department of Economics,
Faculty of Social Sciences,
Adamawa State University, Mubi

This sector's prominence dwindled in the aftermath of the oil boom, leading to a decline in agriculture's contribution to the GDP, which fell from 60% in the 1960s to 31% by the early 1980s (Anyanwu, 1997). Consequently, Nigeria transformed from being a net agricultural exporter to an importer, due to insufficient visionary planning and the adverse effects of the oil boom.

The importance of agriculture persists, as it significantly contributes to Nigeria's GDP and engages a substantial portion of the population, especially small-scale farmers (Rahji & Fakayode, 2009; Chandio et al, 2016). These farmers encounter challenges related to limited access to credit facilities, constraining their productivity and growth potential. Access to agricultural credit plays a pivotal role in the advancement of the agricultural sector. However, credit availability is hampered by issues inherent to imperfect financial markets, particularly within the agricultural context (Stiglitz, 1993; Douong & Izumida, 2002).

To address these challenges, the Nigerian government established the Agricultural Credit Guarantee Scheme (ACGSF) in 1977. The scheme aimed to incentivize commercial banks to enhance lending to the agricultural sector by offering guarantees against the inherent risks of agricultural lending (Anyanwu, 1997; Kareem et al, 2015). Despite this effort, the issue of inadequate agricultural credit and suboptimal yields persists.

Nigeria's demographic profile underscores the importance of agriculture, as it houses a vast rural population heavily dependent on farming for livelihood (Dori, 2016). The Agricultural Credit Guarantee Scheme (ACGSF), as the primary policy under consideration, assumes a central role in facilitating access to credit for these rural farmers. Its effectiveness, however, needs careful evaluation given the persistence of challenges in credit accessibility and poor agricultural productivity.

This study seeks to delve into the impact of the ACGSF, a significant government agricultural policy, on agricultural output in Nigeria. The scheme was designed to stimulate credit lending by providing guarantees against the inherent risks associated with agricultural financing (Ayeomoni & Aladejana, 2016; Kenny, 2019). However, the continued presence of challenges such as limited credit access and subdued agricultural productivity raises questions about the scheme's effectiveness. Therefore, this research aims to address the following key research questions: To what extent has the ACGSF and other government agricultural policies impacted on agricultural output in Nigeria? Is there any equilibrium relationship between government agricultural policies and agricultural output in Nigeria?

In line with these questions, the primary objectives of this study are to critically assess the impact of the ACGSF on agricultural output, and analyse the relationship between ACGSF implementation and changes in agricultural output. By shedding light on the effectiveness of the ACGSF and its implications for agricultural development, this research holds significant importance for policymakers, financial institutions, and stakeholders in refining strategies, improving credit mechanisms, and fostering sustainable agricultural growth in Nigeria.

The structure of the paper is as follows: Section 1 provides an introduction, outlining the context and rationale of the study. Section 2 delves into the existing literature, reviewing relevant research and scholarly discourse on agricultural policies, credit accessibility, and their impact on agricultural output. Section 3 details the methodology employed for this research, elucidating the research design, data collection methods, and analytical techniques utilized. Section 4 presents the findings of the study and

engages in a comprehensive discussion, linking the empirical results with the research questions and existing literature. Finally, Section 5 encapsulates the study's conclusions and provides policy recommendations based on the research outcomes.

2. Literature Review

Agriculture stands as a pivotal pillar of Nigeria's GDP, with small-scale farmers wielding a prominent influence over this contribution (Rahji & Fakayode, 2009). Nevertheless, their productivity and growth trajectory encounter impediments arising from restricted access to credit facilities (Odoemenem & Boinne, 2010). The crucial role of agricultural credit in fostering agricultural development is widely acknowledged (Douong & Izumida, 2002). Over time, farm credit has been unequivocally recognized as a pivotal catalyst for propelling growth within the Nigerian agricultural sector. Notably, agricultural credit assumes a multifaceted role, encompassing the financing of essential inputs such as seeds, fertilizers, pesticides, tools, livestock feed, and water - all essential contributors to enhanced farmer productivity (Chen, 2018).

Ayunku and Etale (2015) emphasize the critical role of the agricultural sector in Nigeria's economic diversification goals. They highlight that recent research has identified agricultural transformation as a key factor for economic growth in developing countries. This transformation often arises from the interplay between agriculture and other sectors of the economy, underlining the sector's multifaceted significance (Oluwatoyese, Applanaidu & AbdulRazak, 2015).

Swinnen et al. (1999) focus on the challenges of accessing agricultural credit in developing countries, attributing these difficulties to the imperfections and high costs associated with information problems within financial markets, particularly those specific to agriculture (Stiglitz, 1993). They further stress that credit constraints limit production, increase unemployment, and suppress income generation. Their findings underscore the importance of credit availability for enhancing agricultural productivity and overall economic growth.

The establishment of the Agricultural Credit Guarantee Scheme (ACGSF) in 1977 aimed to address challenges in agricultural credit access (Ademola et al 2013). However, despite initiatives like the ACGSF and the existence of institutions like the Nigerian Agricultural Cooperative and Rural Development Bank (NACRDB), the persisting issues of inadequate credit availability and subpar agricultural yields remain a concern (Anyanwu, 1997).

The economic characteristics of Nigeria further emphasize the pivotal role of agriculture. The country's substantial labour force, abundant natural resources, and expansive domestic market contribute to agriculture's prominence in the national economy. This sector not only sustains the population but also serves as a major supplier of raw materials to industries, playing a central role in foreign exchange earnings (Dkhar & De, 2018; Megbowon et al 2019).

Credit policies emerge as a crucial instrument for sectoral development, particularly in agriculture (Dori, 2016). Nwankwo (2013). and Vincent et al (2020) highlight the significance of improving farm credit accessibility, while Idris (2010) underscores the establishment of various credit schemes by the Nigerian government to ensure farmer access to credit, ultimately fostering agricultural enterprise development and sustainability.

Numerous studies have explored the intricate relationships between agricultural credit, government spending, and economic growth in Nigeria (Ayeomoni & Aladejana, 2016; Vincent et al, 2020; Dori, 2016; Anderu et al, 2020). Nwosu et al. (2010) stress the importance of government support and publicity for the agricultural credit guarantee system. Ebere and Osundina (2012) reveal a positive link between government agricultural expenditure and overall economic development. Similarly, Itodo et al. (2012) identify positive associations between government spending, loans, foreign direct investment, rainfall, and the Agricultural Credit Guarantee Fund, all influencing agricultural output.

Imoisi and Ekpeyoung (2012) provide insights into the essential relationship between loans from Deposit Money Banks and agricultural production. Ihugba et al. (2013) employ co-integration techniques to explore the dynamics between government agricultural expenditure and the agricultural sector's contribution to GDP.

Dori's (2016) study evaluates the efficacy of the Agricultural Credit Guarantee Scheme Fund in augmenting credit flow to farmers. The results indicate that the scheme contributes to adopting modern farming practices, enhancing productivity, and improving living standards.

Ewubare and Udo's (2017) investigation highlights the impact of public sector financing on agricultural output. Their findings emphasize the significance of public sector interventions in fostering agricultural growth. Ayeomoni and Aladejana (2016) focus on the relationship between agricultural credit and economic growth, advocating for policy measures to enhance credit accessibility and stimulate growth. Okoh's (2015) study explores the relationship between fiscal policy and the growth of the agriculture sector. The findings emphasize the importance of increased budgetary allocation to agriculture, with careful monitoring to ensure optimal utilization.

This study is based on the New Institutional Economics (NIE) theory which offers a comprehensive framework to understand the relationship between government agricultural policies, such as the Agricultural Credit Guarantee Scheme (ACGS), and their impact on agricultural output in Nigeria. NIE focuses on how institutions shape economic behaviour, making it suitable for analysing how the ACGS influences credit access and agricultural outcomes. The theory has been applied successfully in various global contexts, showcasing its versatility (Bardhan, 2002; Feder & Feeny, 1991).

In this context, the ACGS functions as an institutional arrangement within a broader environment of formal regulations and informal norms. NIE emphasizes that institutions play a crucial role in shaping economic decisions. By providing credit guarantees, the ACGS reduces transaction costs and risk perceptions for financial institutions, incentivizing them to lend to credit-constrained farmers. This dynamic highlights how the ACGS operates within a web of institutional factors that influence farmers' choices regarding credit access and agricultural investments.

NIE's lens on information asymmetry and transaction costs sheds light on challenges highlighted by Swinnen et al. (1999) regarding limited credit access due to imperfect financial market information. The ACGS addresses this by mitigating information asymmetry between lenders and borrowers, facilitating credit provision. Within the NIE framework, the ACGS serves as a mechanism to bridge the gap between credit-constrained farmers and lenders, fostering increased agricultural productivity.

Hence, the New Institutional Economic theory provides a comprehensive perspective to examine how government agricultural policies like the ACGS interact with institutions, information asymmetry, and

transaction costs to influence agricultural output in Nigeria. This theoretical framework underscores the intricate interplay between policy mechanisms and institutional contexts, shedding light on the complex dynamics shaping agricultural outcomes and offering insights into potential areas for policy enhancement.

3. Methodology

The methodology section outlines the approach taken to investigate the relationships between agricultural output and government agricultural policies in Nigeria. It discusses the research design, data collection, and data analysis techniques employed to address the research questions and objectives of the study. This section provides a comprehensive framework for understanding how the study was conducted and the rationale behind the chosen methods.

3.1 Research Design

This study adopted a quantitative research design, focusing on the relationships between variables related to agricultural output and government agricultural policies. Specifically, a time-series research design was employed, utilizing historical data from 1980 to 2021. This design allowed for the exploration of trends and patterns over the 41-year period.

3.2 Data Collection

The primary data sources for this study were the Central Bank of Nigeria (CBN) and the National Bureau of Statistics (NBS). The key variables under investigation included agricultural output, the Agricultural Credit Guarantee Scheme (ACGS) fund, agricultural lending rates, and the government's budget allocations to the agricultural sector.

3.3 Model Specification

The following ARDL model specification because the variables exhibit different orders of integration between 0 and 1.

$$\Delta AGO_t = \alpha_0 + \alpha_1 ACGSF_{t-i} + \alpha_2 AGLR_{t-i} + \alpha_3 GAE_{t-i} + \sum \alpha_4 \Delta AGO_{t-i} + \sum \alpha_5 \Delta ACGSF_{t-i} + \sum \alpha_6 \Delta AGLR_{t-i} + \sum \alpha_7 \Delta GAE_{t-i} + e_t$$

Where AGO_t is the agricultural output.

$ACGSF_{t-i}$ is the lag of Agricultural Credit Guarantee Scheme Fund, $AGRL_{t-i}$ is the lag of agricultural lending rate, GAE_{t-i} is the lag of government agricultural expenditure. e_t it the error term. The model includes both the short run and long run variables.

$\alpha_0, \alpha_1, \alpha_3, \alpha_4, \alpha_5, \alpha_6, \alpha_7$ are the parameters that have been estimated. Δ signifies the change.

3.4 Data Analysis

The collected data underwent a comprehensive analysis involving various techniques. Descriptive statistics, such as means, standard deviations, and ranges, were computed for the variables to provide a succinct overview of their central tendencies and variations. This initial analysis offered insights into the data's distribution and characteristics.

Correlation analysis was conducted to identify potential relationships among the variables. The Pearson correlation coefficient was employed to measure the strength and direction of linear associations. This analysis aimed to uncover significant patterns and connections between the variables.

Unit root tests, specifically the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests, were performed to assess the stationarity properties of the variables. These tests determined whether the variables were integrated of order one (I(1)) or stationary. The outcomes guided the selection of the appropriate time-series modelling approach.

Based on the unit root test results, the variables demonstrated mixed orders of integration (I(0) or I(1)), therefore, the Autoregressive Distributed Lag (ARDL) method was applied. This approach facilitated the exploration of long-run relationships among variables with different integration orders, enabling an examination of short- and long-term impact within a single model. The model was specified as follows.

4. RESULTS AND DISCUSSION

4.1 Summary Statistics

Table 4.1 displays summary statistics for the study's variables, shedding light on key characteristics of the data over the 41-year period. The mean agricultural output of 8473.149 serves as a reference point for the sector's average productivity, while the median of 5024.540 indicates the midpoint of the distribution. The standard deviation of 5702.712 reveals substantial variations around the mean, hinting at the sector's susceptibility to multiple influences.

Skewness values, with agricultural output at 0.496468, point to a slightly positively skewed distribution, suggesting occasional higher output due to policy interventions or favourable conditions. Kurtosis values above 3, like the 1.687839 for agricultural output, indicate a peaked distribution with heavy tails, implying instances of extreme values related to policy shifts or external shocks.

The Jarque-Bera statistic, yielding a value of 4.625634 with a probability of 0.098982 for agricultural output, highlights non-normality, attributing this deviation to the sector's inherent volatility. In essence, the summary statistics provide valuable insights into the variability and distribution characteristics of agricultural output, setting the stage for deeper analysis of how government policies interact with these dynamics to influence agricultural performance.

Table 4.1: Summary statistics of the Study variables

	Agric. output	ACGSF	Agric. Lending	Govt. Agric. Expenditure	Interest Rate
Mean	8473.149	3144279.	1.93E+08	20694440	17.30976
Median	5024.540	808820.1	48561500	7537355.	17.50000
Maximum	18738.41	12997004	1.46E+09	76600993	29.80000
Minimum	2303.510	25154.90	590600.0	12769.89	7.750000
Std. Dev.	5702.712	3850996.	3.18E+08	24380102	4.637929
Skewness	0.496468	1.005692	2.293067	0.916470	0.269160
Kurtosis	1.687839	2.770889	8.304833	2.523509	3.517307
Jarque-Bera	4.625634	7.001017	84.00537	6.127299	0.952215
Probability	0.098982	0.030182	0.000000	0.046717	0.621197

Sum	347399.1	1.29E+08	7.90E+09	8.48E+08	709.7002
Sum Sq. Dev.	1.30E+09	5.93E+14	4.04E+18	2.38E+16	860.4154
Observations	41	41	41	41	41

Source: Author’s computation using Eviews 10.

4.2 Correlation Analysis

In Table 4.2, the correlation analysis offers valuable insights into the relationships between the study's variables, providing a glimpse into how government agricultural policies impact agricultural output in Nigeria. Notably, the New Institutional Economics (NIE) theory provides a lens to interpret these findings.

Firstly, a strong positive correlation (0.820380) between agricultural output and the Agricultural Credit Guarantee Scheme Fund (ACGSF) signifies the potential efficacy of institutional support in enhancing agricultural production. This alignment with NIE's focus on institutions shaping economic behaviour highlights how the ACGSF can mitigate credit constraints and drive growth.

Secondly, the positive correlations between agricultural lending, agricultural output (0.823675), and government agricultural expenditure (0.808871) are coherent with NIE's emphasis on property rights and transaction costs. These correlations suggest that effective institutions, such as credit facilities and targeted government spending, can positively influence agricultural investments and productivity.

Lastly, the weaker correlations involving interest rates and the other variables suggest that market dynamics alone might not be the dominant driver of agricultural output. This underscores NIE's viewpoint that institutions, including policy frameworks, play a crucial role in shaping economic behaviour beyond market forces.

In essence, the correlation analysis underscores NIE's applicability in explaining the relationship between government agricultural policies and agricultural output, highlighting the role of institutions in shaping economic outcomes.

Table 4.2: Result of correlation analysis between the study variables

Probability	Agric. output	ACGSF	Agric. Lending	GAEX	Interest Rate
Agric. Output	1.000000				
ACGSF	0.820380	1.000000			
Agric. Lending	0.823675	0.483814	1.000000		
GAEX	0.866632	0.625317	0.808871	1.000000	
Interest Rate	-0.084902	-0.081929	-0.235383	-0.147711	1.000000

Source: Author’s computation using Eviews 10. Note: P-values below correlation coefficients.

4.3 Unit Root Test

Table 4.3 presents the unit root test outcomes, shedding light on the stationarity characteristics of the study's variables. These findings hold vital implications for selecting an appropriate estimation method, especially given the mixed orders of integration observed among these variables. Interpreting these

results through the lens of the New Institutional Economics (NIE) framework underscores the dynamic nature of these variables, heavily influenced by institutional forces and policy interventions.

Starting with agricultural output, the initial level exhibits nonstationarity, reflected by an ADF test statistic of -1.9190, a p-value of 0.6260, and exceeding the critical value of -3.5270. In contrast, its first difference ($\Delta(\text{Agricultural output})$) is stationary (ADF test statistic: -5.6190, p-value: 0.0000). This shift emphasizes that analysing changes in agricultural output over time, accounting for past variations, might yield more meaningful insights.

Likewise, the Agricultural Credit Guarantee Scheme Fund (ACGSF) displays mixed orders of integration. Its initial level is nonstationary (ADF test statistic: -0.763, p-value: 0.9590), while its first difference ($\Delta(\text{ACGSF})$) achieves stationarity (ADF test statistic: -4.4310, p-value: 0.0070). This underlines the importance of exploring changes in ACGSF to better understand its interplay with other variables, particularly in the context of government agricultural policies.

The interest rate variable exhibits stationarity, with an ADF test statistic of -3.3990 and a p-value of 0.0170. This suggests that the interest rate is stationary at its initial level, indicating that its historical changes may hold valuable information for our analysis. On the other hand, the variable for agricultural lending demonstrates nonstationarity, as evidenced by an ADF test statistic of 5.9090 and a p-value of 1.0000. However, its first difference ($\Delta(\text{Agricultural Lending})$) becomes stationary (ADF test statistic: -9.7950, p-value: 0.0000). Similarly, government agricultural expenditure shows nonstationarity at its initial level (ADF test statistic: -4.6230, p-value: 0.0030), but becomes stationary when differenced ($\Delta(\text{Govt. Agric. Expenditure})$): ADF test statistic: -3.5270, p-value: 0.0000).

These findings underscore the complex and dynamic nature of these variables, influenced by institutional factors and government policies. With the mixture of stationary and nonstationary variables, it is pertinent to choose an estimation method that can effectively capture these dynamics. Given this combination, the Autoregressive Distributed Lag (ARDL) approach is suitable for exploring the potential short- and long-term relationships among these variables and their collective impact on agricultural output. This choice aligns with the theoretical framework of New Institutional Economics, which recognizes the significance of institutional arrangements and policy interventions in shaping economic outcomes.

Table 4.3: Unit Root Test Result for the Study Variables

Variables	ADF Test Statistics	5% Critical Values	P-values	Status
Agricultural Output	-1.9190	-3.5270	0.6260	Nonstationary
$\Delta(\text{Agricultural output})$	-5.6190	-3.5290	0.0000	Stationary
Agricultural Credit Guarantee Scheme Fund	-0.763	-3.563	0.9590	nonstationary
$\Delta(\text{Agricultural Credit Guarantee Scheme Fund})$	-4.4310	-3.3630	0.0070	Stationary
Agricultural Lending	5.9090	-3.5480	1.0000	Nonstationary
$\Delta(\text{Agricultural Lending})$	-9.7950	-3.5330	0.0000	Stationary
Govt. Agricultural Expenditure	-4.6230	-3.5270	0.0030	Stationary
Interest rate	-3.3990	-2.9370	0.0170	Stationary

Source: Extracted from Eviews output. Note: Δ denote first difference.

4.4 Equilibrium Relationship between Agricultural Policy and Agricultural Output in Nigeria

Table 4.4 introduces the outcomes of the Bound Test for the Long Run Equilibrium Relationship between Agricultural Policy and Agricultural Output in Nigeria. This test is essential within the context of the New Institutional Economics (NIE) theoretical framework as it explores the presence of a stable and enduring equilibrium connection between variables influenced by institutional factors and policy interventions.

The F-Bounds Test statistic, calculated at 8.025882, is a pivotal measure to assess the significance of the levels relationship. In the NIE lens, this statistic serves as a quantitative indicator of the persistence and durability of the relationship between agricultural policy and agricultural output. The critical values provided at different significance levels (10%, 5%, 2.5%, and 1%) guide the determination of the statistical significance of the calculated F-statistic, thus aiding in the evaluation of the hypothesized equilibrium relationship.

Remarkably, the calculated F-statistic surpasses the critical values at all significance levels, signifying strong statistical evidence to reject the null hypothesis of no levels relationship. In concordance with the NIE framework, this substantiates the notion that institutional arrangements and policy interventions exert a lasting influence on the relationship between agricultural policy variables and agricultural output in Nigeria.

Consequently, these findings extend support to the understanding that shifts in agricultural policy parameters are not merely transient but yield persistent consequences on the agricultural sector. The Bound Test results underscore the NIE's emphasis on institutions and their impact on shaping long-term economic outcomes. Policymakers and researchers keen on comprehending the enduring ramifications of agricultural policies can draw valuable insights from this analysis, guiding effective policy formulation and strategic decision-making processes.

Table 4.: Bound Test for Long Run Equilibrium Relationship

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Significance	I(0)	I(1)
F-statistic	8.025882	10%	2.2	3.09
k	4	5%	2.56	3.49
		1%	3.29	4.37

Source: Author's computation using Eviews 10

4.5 ARDL Regression Result of the Impact of Government Agricultural Policy on Agricultural Output

The analysis of the short-term impact of various factors on agricultural output yields noteworthy insights. The Δ (Agricultural Credit Guarantee Scheme Fund) demonstrates a statistically significant positive impact, with a coefficient of 0.7823 and a corresponding t-value of 5.3470. This indicates that a one-unit increase in the change of the ACGSF leads to an approximate 0.7823 unit increase in

agricultural output during the short term. This finding aligns with the notion that targeted financial support, such as credit guarantees, can stimulate agricultural production in the immediate period.

Furthermore, the $\Delta(\text{Agricultural Lending})$ variable also shows a significant positive short-term impact, with a coefficient of 0.1024 and a t-value of 3.2710. This suggests that a one-unit increase in the change of agricultural lending results in an increase of about 0.1024 unit in agricultural output during the short term. This observation highlights the potential role of accessible credit in driving immediate agricultural activities and productivity.

Interestingly, the $\Delta(\text{Government Agricultural Expenditure})$ variable exhibits a positive short-term impact, with a coefficient of 0.3381 and a t-value of 0.8970. Although the t-value is not statistically significant at conventional levels, the positive coefficient implies that a one-unit increase in government agricultural expenditure leads to a minor increase of approximately 0.3381 unit in agricultural output in the short run.

Conversely, the $\Delta(\text{Interest Rate})$ variable shows a significant negative short-term impact, with a coefficient of -0.9211 and a t-value of -5.0061. This implies that a one-unit increase in the change of interest rates results in a decrease of about 0.9211 unit in agricultural output during the short term. This aligns with the general understanding that higher interest rates can discourage borrowing and investment, potentially affecting agricultural activities negatively.

Table 4.5: ARDL Regression Result of the Impact of Agricultural Policies on Agricultural Output in Nigeria

Dependent Variable: Agricultural Output	Short Run impact	Long Run Impact
$\Delta(\text{Agricultural Credit Guarantee Scheme Fund})$	0.7823 (5.3470)	
$\Delta(\text{Agricultural Lending})$	0.1024 (3.2710)	
$\Delta(\text{Government Agricultural Expenditure})$	0.3381 (0.8970)	
$\Delta(\text{Interest rate})$	-0.9211 (-5.0061)	
Agricultural Credit Guarantee Scheme Fund		0.0097 (3.4952)
Agricultural Lending		0.0810 (4.0826)
Govt. Agricultural Expenditure		0.0867 (10.2783)
Interest rate		-0.0271 (2.0910)
Constant		0.6810 (7.1013)
Error Correction Mechanism (ECM)	-0.7601 (-7.8219)	
Observations	38	38
R-squared	0.7462	0.8632
Residual Diagnostic Test		
Normality Test - JB statistic		1.8444[0.3976]
Heteroskedasticity test - LM statistic		8.9622[0.2823]
Serial correlation test - LM Statistic		3.9724[0.1372]

Source: Extract from Eviews output. Note: Values in () are t-values while values in [] are p-values.

The long-term impact analysis delves into the persistent influence of various factors on agricultural output, providing insights into their lasting contributions to the agricultural sector's performance. The variable Agricultural Credit Guarantee Scheme Fund displays a statistically significant positive long-run impact, with a coefficient of 0.0097 and a corresponding t-value of 3.4952. This implies that, in the long

run, a one-unit increase in the ACGSF is associated with an approximate 0.0097 unit increase in agricultural output. The result underscores the role of credit guarantee schemes in sustaining agricultural productivity over extended periods.

Furthermore, the Agricultural Lending variable exhibits a significant positive long-run impact, with a coefficient of 0.0810 and a t-value of 4.0826. This indicates that a one-unit increase in agricultural lending results in a lasting increase of about 0.0810 unit in agricultural output. The observation emphasizes the importance of accessible credit in contributing to the sector's enduring growth.

Similarly, the variable Govt. Agricultural Expenditure demonstrates a highly significant positive long-run impact, with a coefficient of 0.0867 and an impressive t-value of 10.2783. This implies that a one-unit increase in government agricultural expenditure leads to a substantial and sustained increase of approximately 0.0867 unit in agricultural output. The strong statistical significance emphasizes the enduring role of government investment in fostering the long-term growth and performance of the agricultural sector.

On the other hand, the Interest Rate variable shows a statistically significant negative long-run impact, with a coefficient of -0.0271 and a t-value of -2.0910. This indicates that, in the long run, a one-unit increase in interest rates is associated with a decrease of about 0.0271 unit in agricultural output. This result aligns with the understanding that higher interest rates can pose a persistent challenge to borrowing and investment, potentially constraining agricultural activities over time.

Lastly, the Constant term is statistically significant, with a coefficient of 0.6810 and a t-value of 7.1013. The constant term represents the expected agricultural output when all the independent variables are zero in the long run. Its statistical significance highlights the presence of a baseline level of agricultural output even when other factors are absent.

Hence, the long-term impact analysis provides insights into the sustained effects of various factors on agricultural output in Nigeria. The findings underscore the enduring roles of credit support, lending rates, government expenditure, and interest rates in shaping the agricultural sector's performance over extended periods.

Error Correction Mechanism

The Error Correction Mechanism (ECM) coefficient of -0.7601, with a corresponding t-value of -7.8219, is a critical component of the ARDL regression results and holds significant implications for understanding the dynamic relationship between agricultural policies and agricultural output in Nigeria.

The ECM coefficient captures the speed at which the system adjusts towards its long-term equilibrium when deviations occur from the short-term equilibrium. A negative ECM coefficient indicates that any deviation from the equilibrium in the previous period is corrected at a rate of -0.7601 in the current period. This suggests that about 76.01% of any short-term disequilibrium is corrected within the same period, indicating a relatively rapid adjustment process. The associated t-value of -7.8219 signifies that this coefficient is statistically significant, reinforcing the robustness of this adjustment mechanism.

Furthermore, the R-squared values provide insights into the goodness of fit of the model. The R-squared value of 0.7462 in the short run and 0.8632 in the long run reflect the proportion of the variation in the dependent variable (agricultural output) that is explained by the independent variables (agricultural

policies). These relatively high R-squared values suggest that the model captures a substantial portion of the variability in agricultural output, indicating that the chosen independent variables contribute significantly to explaining changes in agricultural output.

Residual Diagnostic Tests

The residual diagnostic tests conducted on the regression model provide insights into the reliability and validity of the analysis regarding the impact of agricultural policies on agricultural output in Nigeria.

Firstly, the normality test, measured by the Jarque-Bera (JB) statistic, yields a p-value of 0.3976. This result indicates that the residuals follow a reasonably normal distribution, which aligns with the assumption of normality in the regression model.

Secondly, the test for heteroskedasticity, measured by the LM statistic, shows a p-value of 0.2823. This suggests that there is no significant evidence of varying residual variance across different levels of the independent variables. Therefore, the assumption of constant variance in the residuals is not strongly violated.

Lastly, the serial correlation test, using the LM statistic, generates a p-value of 0.1372. This outcome implies that there is no substantial indication of autocorrelation among the residuals, confirming that the assumption of independence of residuals is reasonably met.

In summary, the residual diagnostic tests collectively support the validity of the regression model's findings. The residuals exhibit a relatively normal distribution, a consistent variance, and no substantial serial correlation. These results enhance confidence in the analysis, suggesting that the chosen model provides reliable insights into the relationships between agricultural policies and agricultural output in Nigeria.

5. Conclusion and Recommendations

In conclusion, this study has explored the multifaceted relationship between government agricultural policies and agricultural output in Nigeria, shedding light on critical dynamics that shape the sector's performance. The findings underscore the crucial role of the Agricultural Credit Guarantee Scheme Fund (ACGSF) and other variables in influencing agricultural output. Through a comprehensive analysis, the study illuminated the effectiveness of government interventions and the intricate web of institutional factors that interact to shape agricultural outcomes.

The New Institutional Economics (NIE) theory has provided a robust framework to analyse the impact of the ACGSF and related policies. NIE's lens on institutions, information asymmetry, and transaction costs has enriched the understanding of how policies like the ACGSF, government agricultural spending and agricultural lending rates operate within complex economic contexts. The mixed orders of integration among the variables and the utilization of the Autoregressive Distributed Lag (ARDL) model have allowed us to navigate the short- and long-term relationships, uncovering how changes in the ACGSF, agricultural lending, government agricultural expenditure, and interest rates collectively influence agricultural output.

Based on the comprehensive analysis conducted, several recommendations emerge for policymakers, financial institutions, and stakeholders aiming to enhance agricultural output and sustainable growth in Nigeria:

1. **Strengthen Implementation of Agricultural Credit Policies:** While the Agricultural Credit Guarantee Scheme Fund has shown positive impacts on agricultural output, there is room for further strengthening its implementation. Ensuring efficient disbursement of funds and minimizing bureaucratic hurdles can enhance the accessibility of credit for small-scale farmers.
2. **Enhance Financial Literacy and Inclusion:** Promoting financial literacy among farmers can empower them to make informed credit decisions, fostering responsible borrowing and productive investment. Additionally, efforts to enhance financial inclusion, especially among rural communities, can expand the reach of credit facilities.
3. **Promote Diversification and Modernization:** Encouraging farmers to diversify their crops and adopt modern farming practices can contribute to increased yields and resilience against market fluctuations. This can be supported through training programs, access to high-quality inputs, and technology adoption.
4. **Foster Supportive Institutional Environment:** Policymakers should focus on creating an enabling environment that supports farmers' access to credit, reduces information asymmetry, and minimizes transaction costs. Collaborative efforts involving government agencies, financial institutions, and farmer associations can contribute to such an environment.
5. **Continuous Monitoring and Evaluation:** To ensure the sustained effectiveness of agricultural policies, it's imperative to establish robust monitoring and evaluation mechanisms. Regular assessments of policy outcomes and impacts can guide necessary adjustments to align policies with evolving agricultural dynamics.
6. **Facilitate Research and Data Availability:** Encouraging research initiatives that focus on assessing the impacts of agricultural policies and credit schemes can generate evidence-based insights for informed decision-making. Furthermore, improving data availability and accuracy can enhance the precision of policy evaluations.

In conclusion, this study provides a comprehensive examination of the impact of government agricultural policies on agricultural output in Nigeria. By unravelling the intricate interactions among variables and employing rigorous analytical methods, this research contributes valuable insights to inform evidence-based policies and strategies for fostering sustainable agricultural growth and rural development.

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