Effect of Fiscal Policy Measures on Agricultural Output in Nigeria

[1]Salami Khadijat, [2]Udenwa Theresa Agbonma, & [3]Abdul, Zainab Husseini
[1,2&3]*Department of Banking & Finance,*
Nasarawa State University, Keffi- Nasarawa State

Abstract

This study sets out to determine the effect of fiscal policy measures on agricultural output in Nigeria. Employing an ex-post facto research design and leveraging secondary data spanning from 1990 to 2022 obtained from the Central Bank of Nigeria (CBN) and the National Bureau of Statistics (NBS), the study used the Autoregressive Distributed Lag (ARDL) methodology using Agricultural output, government capital expenditure and government recurrent expenditure as variables. The findings reveal that both government capital expenditure and recurrent expenditure have significant effects on agricultural output so the study recommends that policymakers should consider increasing investment in capital projects and prioritize sustained funding for recurrent expenditures related to agriculture.

Keywords: *Agriculture, Government Capital expenditure, Government Recurrent expenditure*

Corresponding Author: **Salami Khadijat**

Background to the Study

Globally, fiscal policy instruments are targeted at improving industrial capacity through agricultural development. Therefore, there are ways in which nations help to improve their agricultural output. Governments often provide subsidies and grants to farmers to encourage agricultural production and these can take the form of direct payments, price supports, or input subsidies (e.g., fertilizers, seeds, machinery) these subsidy programs can help reduce production costs and encourage farmers to increase output (Kasie & Emeka, 2023).

Tax policies can be designed to support agricultural activities and for example, governments may offer tax breaks or exemptions for agricultural inputs or machinery purchases and these incentives can reduce the financial burden on farmers and promote investment in the sector (Onakoya & Afintinni, 2016). Fiscal policies that allocate funds for rural infrastructure development, such as roads, irrigation systems, and storage facilities, can have a positive impact on agricultural output and improved infrastructure can enhance market access, reduce post-harvest losses, and increase overall efficiency (Igwe *el at.,* 2015).

Governments allocate funds for agricultural research and innovation to improve crop yields, develop drought-resistant varieties, and enhance agricultural practices. Research and Development (R&D) investments can lead to technological advancements that boost output. Governments may intervene in agricultural markets to stabilize prices and ensure a steady income for farmers. This can involve purchasing excess supply during bumper harvests and releasing it during periods of scarcity, thereby supporting stable prices and income (Lawrence & Victor, 2016).

Thus, Nigeria has grappled with the challenge of achieving food security amidst a rapidly growing population and the uncertainties imposed by climate change. Against this backdrop, government interventions through capital expenditure have become central to fostering resilience, innovation, and sustainability within the agricultural sector. Agriculture in Nigeria has great potential and it is broadly divided into four sectors in Nigeria, crop production, fishing, livestock and forestry with high economic contribution potentials. Crop production remains the largest segment and it accounts for about 87.6% of the sector's total output (Central Bank of Nigeria, 2021). This is followed by livestock, fishing and forestry at 8.1%, 3.2% and 1.1% respectively. Agriculture remains the largest sector in Nigeria contributing an average of 24% to the nation's GDP over the past seven years (2013 – 2019). In addition, the sector employs more than 36% of the country's labour force, a feat which ranks the sector as the largest employer of labour in the country. In four years (2016–2019), Nigeria's cumulative agricultural imports between 2016 and 2019 stood at N3.35 trillion, four times higher than the agricultural export of N803 billion within the same period. CBN (2020) reported that the share of agriculture in Nigeria's total export earnings remains small compared to crude oil exports. For instance, in 2019, agriculture accounted for less than 2% of total exports relative to crude oil (76.5%). Nigeria's major agricultural imports include wheat, sugar, fish and milk, while the main

agricultural exports include sesame seeds, cashew nuts, cocoa, beans, ginger, frozen shrimp and cotton. Sesame, cashew nuts and cocoa account for more than half of the nation's agricultural exports. While wheat dominates agricultural imports. Agricultural exports declined by about 11% from N302.2 billion in 2018 to N269.8 billion in 2019. Nigeria's agricultural imports rose by 12.7% from N851.6 billion to N959.5 billion during the same period, the highest value ever recorded in the country. Nigeria remains a net food importer the agricultural trade deficit has widened with imports exceeding exports by N689.7 billion in 2019 compared to N549.3 billion in 2018 (Oyaniran, 2020).

Nigeria, endowed with vast agricultural potential, faces a critical juncture in its pursuit of sustainable development, particularly within the agricultural sector. While the sector serves as a crucial contributor to the national economy and a source of livelihood for a substantial portion of the population, persistent challenges continue to impede its full realization. Abula & Ben (2016) opined that a stable and productive agricultural sector ensures that a country can meet the nutritional needs of its population and food security is a fundamental requirement for human well-being and economic stability. One of the pivotal factors influencing the agricultural landscape is the level and effectiveness of government capital expenditure. Despite ongoing efforts to promote agricultural development through fiscal interventions, several issues persist, prompting the need for a comprehensive examination. On this premise, therefore, some of the pertinent questions to be addressed by the study are as follows: How has government capital expenditure affected agricultural output in Nigeria? and What is the effect of government recurrent expenditure on agricultural output in Nigeria? Primarily, the objective of this research is to systematically examine the effect of Fiscal policy measures on agricultural output in Nigeria. Specifically, the study aims to analyze the effect of government capital expenditure on agricultural output in Nigeria and examine the effect of government recurrent expenditure on agricultural output in Nigeria. To statistically answer the economic questions as stated above, the following null hypotheses are formulated: Ho_1 - government capital expenditure has no significant effect on agricultural output in Nigeria, and Ho_2 - government recurrent expenditure has no significant effect on agricultural output in Nigeria.

Literature Review
Conceptual Framework
Fiscal Policy on Agricultural Output
The concept of agricultural output refers to the quantity and quality of agricultural products or goods produced by farming activities within a given period and this is a measure of the total agricultural production and is often expressed in terms of the number of crops harvested or livestock raised. The conceptual framework for understanding agricultural output involves a multifaceted interplay of factors, ranging from climatic conditions and technological advancements to policy interventions and macroeconomic variables. Achieving sustainable growth in agricultural output is paramount for ensuring food security, alleviating rural poverty, and contributing to overall economic stability (Udeaja et al., 2021).

Capital Expenditure

Capital expenditure refers to the funds allocated by a business, government, or organization for investments in long-term assets or projects that are expected to generate benefits over an extended period. It involves the acquisition, construction, improvement, or expansion of capital assets that are essential for the operations, growth, or development of an entity. Capital expenditures are typically made to enhance productive capacity, replace ageing infrastructure, or undertake strategic initiatives (Ele et al., 2014). Capital expenditure involves the deployment of financial resources for acquiring or upgrading assets that are expected to provide benefits over an extended period, usually beyond one year. These investments can include purchases of land, buildings, machinery, equipment, vehicles, technology systems, and other capital assets (Idenyi et al., 2016).

Recurrent Expenditure

Recurrent expenditure refers to the regular or ongoing expenses incurred by a business, government, or organization in its day-to-day operations. It includes expenses necessary for maintaining current operations, providing essential services, and covering regular obligations. Recurrent expenditure typically includes costs related to salaries and wages, utilities, rent, maintenance, consumables, administrative expenses, and other operational expenses (Idenyi et al., 2016). Recurrent expenditure covers the operational costs necessary to sustain the normal functioning of an entity. This includes expenses such as employee salaries, wages, and benefits, as well as costs associated with utilities like electricity, water, heating, and communication services (Olasusi & Akodu, 2019).

Empirical Review

Ukpong *et al.,* (2022) investigated the impact of Government Spending on Agricultural Sector Output in Nigeria. The study used Real Gross Domestic Product (GDP) as the dependent variable while the independent variables included Government Expenditure on Administration, Government Expenditure on Social and Community Services and Government Expenditure on Economic Services. The study utilized data sourced from the Central Bank of Nigeria's Statistical Bulletin, providing a comprehensive overview of government spending and agricultural sector output from 1990 to 2020. The study employed the Ordinary Least Square (OLS) multiple regression method to analyze the data. The empirical analysis yielded the following key findings, the variables were found to be positively insignificant in relation to agricultural sector output at a 5% level of significance. The study concluded that government expenditure does not have a significant impact on the agricultural sector output in Nigeria. The study recommended that the federal government of Nigeria, in collaboration with the Central Bank, should focus on strengthening the banking sector to ensure improved and efficient credit flow to the agricultural sector. The study employed Ordinary Least Square and multiple regression method to analyze the data which cut across 1990 - 2020, while this study used Autoregressive Distributed Lag (ARDL) model to analyze the data spanning through 1990 - 2022.

Adetule & Olakunle (2022) examined the causal relationship between government expenditure and agricultural sector productivity in Nigeria from 1986 to 2019. The study employs a time series data from the Central Bank of Nigeria (CBN) Statistical Bulletin (2020) and World Bank Development Indicators (2020). The variables used are agricultural output, agricultural exports, agricultural employment, government expenditure, capital, trade openness, foreign direct investment and interest rates. The study used the vector autoregressive (VAR) framework to examine the causal relationship between government expenditure and agricultural performance. The study found for agricultural output and exports, government agricultural spending has no causal links with the two variables. Meanwhile, it was agricultural employment that caused government agricultural expenditure feedback. The study recommends that it is highly imperative to encourage and motivate the young unemployed groups, especially in the rural and semi-urban areas to become gainfully employed in agriculture. This will help to provide employment opportunities, reduce the incidence of vices and illegal adventure and consequently increase agricultural performance as a result of the rise in agricultural employment. Adetule & Olakunle (2022) examined the causal relationship between government expenditure and agricultural sector productivity in Nigeria from 1986 to 2019, while this study examined the fiscal policy measures on agricultural output in Nigeria from 1990-2022.

Utitofon *et al.,* (2022) determined how government spending affects the output of the agricultural sector in Nigeria from 1990 - 2020. The study relied on past data from secondary sources - Central Bank of Nigeria Statistical Bulletin 2020. Real gross domestic product on Agricultural output (AO) was used as the dependent variable while government expenditure on administration (GEA), Government expenditure on social and community services (GES), and Government expenditure on economic services (GEE) as independent variables for the periods 1990-2020. The study adopted the Ordinary Least Square (OLS) regression method to analyze the data collected. From the findings, it was discovered that the variables were positively insignificant to agricultural sector output at a 5% level of significance. Therefore, the study concludes that government expenditure does not affect the agricultural sector output in Nigeria. Hence, it was recommended that the federal government of Nigeria through the Central Bank, should strengthen the banking sector to ensure an improved and efficient credit flow to the agricultural sectors because of its strategic importance in stimulating the growth and development of an economy. The variables used in the study under review are Agricultural output (AO) as the dependent variable and Government expenditure on administration (GEA), Government expenditure on social and community services (GES), and Government expenditure on economic services (GEE) as independent variables, while this study used Agricultural Output in Nigeria (AGON) as the dependent variable, Government Capital expenditure in Nigeria (GCXE) and Government Recurrent expenditure in Nigeria (GRXE) as the independent variables.

Mile et al., (2021) examined the relationship between government agricultural spending and agricultural output in Nigeria using annual time series data from 1981 to 2019. This

study used annual time series data from CBN Statistical Bulletin, World Development Indicators and United Nations Conference on Trade and Development. The variables are agricultural output, agricultural land, government agricultural spending, interest rate on bank credit to the sector, value of loans guaranteed by ACGF to agricultural sector, commercial bank loans to agricultural sector and agricultural labour force. This study used descriptive and analytical techniques such as descriptive statistics, Augmented Dickey-Fuller test, VEC Granger Causality/Block Exogeneity Wald test, Johansen co-integration test, vector error correction test, impulse response and variance decomposition. The study found that all variables were not stationary at level but became stationary at first difference. The study also revealed that there is a positive effect of government agricultural spending on agricultural output in Nigeria, though, significant in the long-run only. Therefore, the study recommends that government expenditure on agriculture should be improved upon the funds allocated to the sector and should be made available to real farmers through the provision of fertilizers, improved seedlings and grant aiding to farmers through farmers cooperatives while farmers in Nigeria should form farmers' cooperative societies to be able to easily access credit facilities from banks as well as enhancing their easy access to farm inputs provided by the government. The study under review used descriptive and analytical techniques for the data analysis and this study used Autoregressive Distributed Lag (ARDL) model for data analysis.

Abubakar *et al.,* (2020) examined the Impact of Government Expenditure on Agricultural Growth in Kogi State from 2000 to 2018. For the dependent variable, Agricultural Growth was adopted by the study, while the independent variables are Government Capital Expenditure and Recurrent Expenditure. The study employed Vector Autoregressive (VAR) Model for data analysis. The results from the VAR Model revealed that there is no significant relationship between government capital and recurrent expenditure and agricultural growth in Kogi State. Based on the findings, the study recommends that Kogi State government should prioritize and increase agricultural expenditure to meet the 10% benchmark set and ensure timely release of funds for the procurement of agro-equipment. The study did not cover a wide range but just a State in Nigeria, while this study covered the entire nation, Nigeria.

Keji & Efuntade (2020) examined Agricultural output and government expenditure in Nigeria between 1981 to 2018. The variables used in this study are Agricultural Output for the dependent variable and the independent variables are Government expenditure (GEX), Gross capital formation (GCF), Exchange rate (EXC), Interest rate (INT), Industrial value (IDV), Inflation rate (INF) and Gross domestic product (GDP). Autoregressive distributed lag (ARDL) and Bound cointegrating techniques were employed for the analysis. The outcome disclosed that government spending has a long run significant effect on agricultural output performance in Nigeria. As a result of the findings, the study recommends that the government should improve on seedlings for farmers, provision of modern mechanized tools and government should equally improve on spending on critical infrastructure that could fast track the conveyance of agricultural produce to

appropriate quarters such as road, transport, market, industrial zone etc. The study reviewed used macroeconomic variables like Interest rate, exchange rate, inflation rate, gross domestic product, capital formation and industrial value while this study used Agricultural Output, Government Capital expenditure and Government Recurrent expenditure as variables.

Atayi *et al.,* (2020) examined the effect of Government Expenditure on Agricultural Output in Nigeria. *Time series data on agricultural output, recurring government spending on agriculture, agricultural government capital expenditure, and gross domestic product were collected over a period of 37 years from the statistical bulletin of the Central Bank of Nigeria (CBN) from 1981 - 2018. Descriptive and econometric analysis methods such as the Augmented Dickey-Fuller test, the Johanson co-integration test and Ordinary Least Square (OLS) were applied in this research.* The results show that agricultural production, government spending and GDP are positively related. The result showed that rapid economic development cannot be accomplished without well-focused agricultural productivity enhancement programmes being placed in place. Therefore, this study recommends among other things that the Nigerian government should preserve continuity in the level of its agricultural capital expenditure. The study reviewed covered 37 observations i.e. from 1981 – 2018, while this study covered 33 observations with more recent period from 1990-2022.

Akinwale & Ayodele (2019) analyzed the relationship between government expenditure components and agricultural productivity in Nigeria by estimating the effects and their causal interaction over the period 1981-2017. The study used secondary data obtained from government publications such as the Central Bank of Nigeria Statistical Bulletin and the National Bureau of Statistics. The variables are real agricultural output (AOP), Government Expenditure on Health (GEH), Government Expenditure on Education (GEE), Government Expenditure on infrastructure; which include expenditures on transportation, construction and communication (GEI), Credit to Agricultural sector (CRAS) and Inflation rate (INFL). The study employed the Autoregressive Distributed Lag (ARDL) technique to analyze the data. The ARDL results revealed that there exists a long-run relationship among the variables and showed that various components of government expenditure can positively improve agricultural productivity in Nigeria. The study recommends effective policy implementation through a complete overhaul of the various government institutions and agencies responsible for implementation, revenue collection and monitoring of government projects as it relates to agricultural development as well as encourage effective manpower development in the agricultural sector to boost productivity. The study analyzed the relationship between government expenditure components and agricultural productivity in Nigeria by estimating the effects and their causal interaction. And this study analyzed the effect of fiscal policy measures on agricultural output in Nigeria.

Ukpai and Dkhar (2018) investigated Government Expenditure and Agricultural Output in Meghalaya (India) with a time series data from 1984 – 2014. The variables used included Agricultural Output as the dependent variable, while the independent variables are

Government Expenditure on Agriculture and Allied Activities, Government Expenditure on Education, Government Expenditure on Transport and Government Expenditure on Healthcare. The study employed the Autoregressive Distributed Lag (ARDL) approach to cointegration and an error correction representation of the ARDL model. The empirical analysis results reveal that in the long run, the effect of public expenditure through agriculture and allied activities, on agricultural output is significantly negative, while expenditures on education and transport on agricultural output are significantly positive that is in line with several earlier studies. Public expenditure in healthcare however does not significantly affects agricultural output. Based on the results, the study recommended a more judicious allocation of government spending to prioritize sectors such as education and transport, while also emphasizing the need for targeted and effective utilization of resources within the agriculture and allied sectors to optimize agricultural output in Meghalaya. The study was carried out in Meghalaya (India) outside the African Continent with 30 observations. But this study covered Nigeria which is within African Continent with 33 recent observations.

Aina and Omojola (2017) assessed the effect of Government expenditure on agricultural output in Nigeria from 1980 to 2013. The dependent variable adopted by the study is Agricultural Production Output, while the independent variables includes; Government Expenditure on Agriculture, Interest Rate and Exchange Rate. Secondary data from the Central Bank of Nigeria Statistical Bulletin were used, and the econometrics methods of Ordinary Least Squares (OLS) and Error Correlation Model (ECM) were applied for the analysis. From the study, the short-run analysis revealed a significant and positive relationship between government expenditure on agriculture and agricultural production output. The regression coefficient of interest rate had a significant impact on agricultural sector output, and the coefficient of exchange rate was equally significant. While the long-run dynamic result indicated that the coefficient of government expenditure on agriculture, as well as the check variables (interest and exchange rates), were significant. The study recommends an increase in budgetary allocation to the agricultural sector to further support and boost agricultural production output. The study under review employed Ordinary Least Square (OLS) and Error Correlation Model (ECM) method of analysis, while this study used Autoregressive Distributed Lag (ARDL) method of analysis.

Theoretical Framework
This paper adopted the Keynesian Theory of Public Expenditure as the theoretical framework of the study. The Keynesian school of thought suggested that government spending can contribute positively to sectoral growth (like the agricultural sector) in the economy. Thus, an increase in government expenditure is likely to lead to an increase in employment, profitability and investment through multiplier effects on aggregate demand. Consequently, government expenditure increases the aggregate demand which brings about an increased output depending on expenditure multipliers. Keynes regards public expenditures as an exogenous factor which can be utilized as a policy instruments to promote growth. This school of thought also believed that government intervention

would help correct market failures. Keynes argued that during depression, increasing saving will not help but spending. Government will increase public spending, giving individuals purchasing power and producers will produce more. Thus, creating more employment for people. This is the multiplier effect that shows causality from public expenditure to national income (Keynes, 1936). Critics argue about the effectiveness of government intervention, potential inflation, crowding out private investment, and long-term consequences such as deficits and debt. Despite criticism, Keynesian ideas remain influential and have evolved to address modern economic challenges. The relevance of this theory to the Nigerian economy is that it describes how the government of the country can help bring about growth in the agricultural sector through its expenditure on the sector. This study, therefore, adopts the Keynesian theory because according to the Keynesian theory, an increase in government expenditure leads to an increase in output through the multiplier effects and by extension economic development. Therefore, this established that there is a functional relationship between government expenditures and agricultural output in Nigeria.

Methodology
This study employed an *ex-post facto* research design to investigate the relationship between government capital expenditure, government recurrent expenditure and agricultural output in Nigeria. Secondary data was sourced from Central Bank of Nigeria (CBN) and National Bureau of Statistics (NBS) for the study. The selected timeframe spanned from 1990 to 2022 an annual time series data.

Model Specification
The study adopted and modified the model of the work of Oluwaseun et al., (2020) who examined the impact of fiscal policy on agricultural output in Nigeria and the functional model of the study was stated as:

$$AGR_t = f(GEA_t, DBA_t, GCE_t) \tag{1}$$

Where; AGR is Agricultural output in Nigeria, GEA is the Government Capital Expenditure on Agriculture, DBA is the Deposit Money Banks Loan, GCE is the Government Capital Expenditure on Agriculture in Nigeria, and the subscript t denotes the period. The model was modified to have the functional representation of the model for this study aimed to examine the effect of fiscal policy measures on agricultural output in Nigeria. The model specifies that Agricultural Output in Nigeria (AGON) being the dependent variable is significantly influenced by Government capital expenditure (GEX) and Government recurrent expenditure constituting the independent variables. Mathematically,

$$AGON = f(GCEX, GREX) \tag{2}$$

The econometric model becomes:

$$AGON_t = \beta_0 + \beta_1 GCEX_t + \beta_2 GREX_t + \mu_t \tag{3}$$

Where;

$AGON_t$ = Agriculture Output in Nigeria

$GCEX_t$ = Government capital expenditure in Nigeria

$GREX_t$ = Government recurrent expenditure in Nigeria

β_0 = Intercept

$\beta_1 - \beta_2$ = Coefficient of the independent variables

μ = Error Term

Aligned with the study's research objectives, the Autoregressive Distributed Lag (ARDL) methodology will be deployed to discern the intricate relationship between government expenditure and agricultural output in Nigeria. Consequently, the application of the ARDL model will be instrumental in elucidating the study's specific research goals, encompassing both the short-run and long-run impacts of government expenditure measures on agricultural output in the Nigerian context and it specified as:

$$\Delta agon_t = \alpha_0 + \sum_{i=1}^{n} \beta_1 \Delta agon_{t-i} + \sum_{i=1}^{n} \beta_2 \Delta gcex_{t-i} + \sum_{i=1}^{n} \beta_3 \Delta grex_{t-i} + \beta_4 \Delta agon_{t-i} + \beta_5 \Delta gcex_{t-i} + \beta_6 \Delta grex_{t-i} + \mu_t \quad (4)$$

Therefore, equation (4) was used to estimate and analyse the long-run and short-run effect of government expenditure measures on agricultural output in Nigeria. From equation (4), Agriculture Output in Nigeria (AGON) is the dependent variable while the following are the independent variables: Government capital expenditure in Nigeria (GCEX) and Government Recurrent expenditure in Nigeria (GREX).

Presentation and Discussion of Results
Descriptive Statistics
Table 1: Descriptive Statistics

	AGON	GCEX	GREX
Mean	10359.31	740.9273	2573.088
Median	10222.50	552.4000	1390.200
Maximum	19091.10	2522.500	11497.00
Minimum	3464.700	24.00000	36.20000
Std. Dev.	5585.372	656.8669	2938.079
Skewness	0.123782	1.114233	1.410017
Kurtosis	1.505511	3.592992	4.382175
Jarque-Bera	3.155331	7.311837	13.56162
Probability	0.206456	0.025838	0.001135
Sum	341857.2	24450.60	84911.90
Sum Sq. Dev.	9.980000	13807172	2.760000
Observations	33	33	33

Source: Researcher's E-Views Computation, 2024

Table 1 presents the descriptive statistics which gives a clear understanding of the central tendency, spread, and distribution of the data for each variable adopted for the study. The

mean across board stands at 10359.31, 740.9273 and 2573.088 billion naira for AGON, GCEX and GREX respectively. The median, maximum and minimum value for each variable were also presented in Table 1. The Jarque-Bera test for normality is also presented, If the value is low, it suggests that the data is normally distributed.

Correlation Analysis
Table 2: Correlation Analysis

Correlation Probability	AGON	GCEX	GREX
AGON	1.000000		

GCEX	0.875354	1.000000	
	0.0000	-----	
GREX	0.892136	0.918528	1.000000
	0.0000	0.0000	-----

Source: Researcher's E-Views Computation, 2024

Table 2 presents the correlation analysis between the dependent variable and the independents. The correlation coefficients between AGON, GCEX and GREX shows that all pairs of variables have strong positive correlations, with AGON showing the strongest correlations with both GCEX and GREX. Additionally, all correlations are statistically significant given the p-values of 0.

Stationarity Test of Variables
Table 3: Unit Root Test Result

	Augmented Dickey-Fuller (ADF) Test		
Variable	**ADF**	**Critical Value**	**Status**
AGON	-4.875425**	-3.562882	I(1)
GCEX	-4.258324**	-3.562882	I(1)
GREX	-8.459947**	-3.574244	I(1)

* implies significance at 1% level, **implies significance at 5% level and *** implies significance at 10%

Source: Author's Computation, using E- views 12, 2024

Table 3 presents unit root test results for three variables (AGON, GCEX, and GREX) and from the result the three variables were stationary at first difference that is the AGON, GCEX, and GREX were integrated at order 1(1) which allows the use of ARDL bound testing for the co-integration test.

ARDL Bound Test
Table 4: F-Bounds Test

Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	6.439632	5%	3.1	3.87

Source: Researcher's EViews Computation, 2024

Table 4 presented the nature of the relationship between the dependent variable and independent variables. Given the value of 6.43 which is greater than the lower bound I(0) 3.1 and the upper bound I(1) 3.87, this indicated a long-term relationship exist between the dependent variable and the independent variables.

ARDL Error Correction Regression
Table 5: ARDL Regression Results

Independent variable ($AGON_t$)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
Long Run				
GCEX	-0.160310	0.046953	-3.414270	0.0026
GREX	0.466923	0.033055	14.12581	0.0000
C	6.990033	0.149822	46.65555	0.0000
R-squared	0.653597			
Durbin-Watson stat	1.720414			
Short Run				
D(GCEX)	-0.050631	0.027684	-1.828893	0.0817
D(GCEX(-1))	0.070052	0.027534	2.544188	0.0189
D(GREX)	0.075627	0.034212	2.210562	0.0383
D(GREX(-1))	-0.222971	0.050152	-4.445889	0.0002
D(GREX(-2))	-0.164256	0.046578	-3.526479	0.0020
ECM(-1)*	-0.646976	0.091178	-7.095777	0.0000

Note: ***, **, * indicate the statistical significance of coefficients at 1%, 5%, and 10% respectively, and the values in parentheses and block brackets are the probabilities

Source: Author's Computation, using E- views 12, 2024

The error correction term, ECM (-1), displays a negative relationship with Agriculture Output in Nigeria (AGON), with a coefficient of -0.646976 (p < 0.0001), suggesting that deviations from the long-run equilibrium between the variables are corrected over time. The R-squared value is 0.65, indicating that 65% of the variance in (AGON) is explained by the independent variables and the Durbin-Watson statistic is 1.72, suggesting minimal autocorrelation in the residuals. However, the long run results revealed that government capital expenditure in Nigeria has a negative effect on agriculture output in Nigeria and the probability value of 0.0026 revealed that government capital expenditure in Nigeria has a negative and significant effect on agriculture output in Nigeria which implies that a unit increase in government capital expenditure in Nigeria will lead to 0.16 decrease in the

agriculture output in Nigeria. On the other hand, the government recurrent expenditure in Nigeria has a positive effect on agriculture output in Nigeria and the probability value of 0.00 revealed that government recurrent expenditure in Nigeria has a positive and significant effect on agriculture output in Nigeria which implies that a unit increase in government recurrent expenditure in Nigeria will lead to 0.467 increase in the agriculture output in Nigeria.

Table 6: Heteroskedasticity Test: Breusch-Pagan-Godfrey

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	1.992975	Prob. F(19,8)	0.1600
Obs*R-squared	23.11626	Prob. Chi-Square (19)	0.2323
Scaled explained SS	1.288595	Prob. Chi-Square (19)	1.0000

Source: Researcher's E-Views Computation, 2024

Table 6 provides the results of the Breusch-Pagan-Godfrey test, which is a test for heteroskedasticity in the residuals of a regression model. Based on the results of the Breusch-Pagan-Godfrey test, there is no strong evidence to reject the null hypothesis of homoskedasticity in the residuals of the regression model.

Discussion of Hypotheses

The coefficient for GCEX is statistically significant with a p-value of 0.0026, indicating that there is evidence to reject the null hypothesis (H_{01}) which stated that government capital expenditure has no significant effect on agricultural output in Nigeria. Therefore, we would accept the alternative hypothesis, that government capital expenditure has a significant effect on agricultural output in Nigeria.

The coefficient for GREX (representing government recurrent expenditure) has a statistically significant effect on agricultural output in Nigeria, with a p-value of 0.000. Therefore, there is evidence to reject the null hypothesis (H_{02}) which stated that government recurrent expenditure has no significant effect on agricultural output in Nigeria. Consequently, we would accept the alternative hypothesis, that government recurrent expenditure does have a significant effect on agricultural output in Nigeria.

Discussion of Findings

The regression analysis conducted reveals important insights into the relationship between government expenditures and agricultural output in Nigeria. Firstly, the study finds that government capital expenditure (GCEX) exhibits a complex relationship with agricultural output (AGON). On one hand, an increase in current government capital expenditure is associated with a decrease in agricultural output, as evidenced by a negative coefficient of -0.016 (p = 0.0026). On the other hand, government recurrent expenditure (GREX) demonstrates a significant effect on agricultural output. An increase in government recurrent expenditure is associated with a corresponding increase in agricultural output in Nigeria, as indicated by a positive coefficient of 0.467 (p = 0.0000).

Overall, the regression model explains a substantial portion of the variance in agricultural output, with an R-squared value of 0.65. The Durbin-Watson statistic of 1.7 suggests minimal autocorrelation in the residuals, indicating that the model adequately captures the relationship between the variables.

Conclusion and Recommendations

In conclusion, the specific objectives were to examine the impact of government capital expenditure on agricultural output in Nigeria and investigate the effect of government recurrent expenditure on agricultural production in Nigeria. Therefore, findings provide strong evidence to support the alternative hypotheses that both government capital expenditure and government recurrent expenditure have significant effect on agricultural production in Nigeria. Policymakers should consider these findings when formulating strategies to promote agricultural development and enhance food security in the country.

i. Given the significant effect of government capital expenditure on agricultural output in Nigeria, policymakers should consider increasing investment in capital projects related to agriculture. Allocation of funds towards infrastructure development, such as irrigation systems, rural roads, and agricultural research facilities, can enhance productivity and efficiency in the agricultural sector. Targeted investment in technology and mechanization can also help modernize agricultural practices, leading to increased output and improved livelihoods for farmers.

ii. Acknowledging the significant effect of government recurrent expenditure on agricultural output, policymakers should prioritize sustained funding for recurrent expenditures related to agriculture. Continuous support for agricultural extension services, farmer training programs, and access to inputs such as seeds, fertilizers, and pesticides is essential for promoting agricultural productivity and sustainability. Investment in market infrastructure, storage facilities, and value chain development can facilitate better market access for farmers, leading to increased profitability and income generation in the agricultural sector.

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