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Government Expenditure and Agricultural Sector Performance in Nigeria (1980–2022)

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Abstract

This study investigates the impact of government agricultural expenditure on the performance of Nigeria's agricultural sector from 1980 to 2022. Using annual time series data from secondary sources (CBN and NBS), the analysis applies stationarity tests, Johansen cointegration, and Vector Error Correction Modelling (VECM) to explore both short- and long-run relationships. The findings reveal that all variables are integrated of order I(1), and a long-run equilibrium relationship exists among them. Government capital and recurrent expenditures show a statistically significant and positive impact on agricultural output in the long run. The VECM further confirms that the system adjusts toward equilibrium over time. Based on these results, the study recommends increased and well-monitored funding for agriculture, particularly in capital expenditure, to enhance sector performance and drive sustainable economic development.

Keywords: Agricultural GDP, VECM, Nigeria, Capital Expenditure, Recurrent Expenditure.

1. Introduction

Agriculture is widely regarded as a key driver of economic development in developing countries such as Nigeria. A strong and efficient agricultural sector can ensure food security, generate employment, earn foreign exchange, and supply raw materials for industries (Ihugba, 2013).

In the 1960s, agriculture accounted for approximately 70% of Nigeria's GDP. However, the discovery of crude oil led to a period of prolonged neglect of the sector. Despite several agricultural transformation policies introduced since the return to democracy in 1999, the sector continues to underperform.

Nigeria has consistently failed to meet international benchmarks, such as the Comprehensive Africa Agriculture Development Programme (CAADP) recommendation of allocating at least 10% of the national budget to agriculture. In practice, allocations have ranged between 1.6% and 2.2%.

Although government spending on agriculture has increased over time, its impact remains limited. These issues reflect deeper structural problems, including inefficiency in fund utilisation, weak policy implementation, and misalignment between government priorities and sectoral needs.

This study evaluates the dynamic relationship between government expenditure and agricultural performance in Nigeria over a 42-year period.

2. Objective of the Study

The objective of this study is to investigate the effect of government expenditure on agricultural sector performance in Nigeria from 1980 to 2022.

Nigeria faces a severe food shortage due to low agricultural productivity (Okoiliya, 2003). The growth of the agricultural sector has been minimal, with rates ranging from 1.3% to 5.8% between 1988 and 2004 (Gbosi, 2015). Moreover, budgetary allocation to agriculture remains disproportionately low compared to other sectors, despite its pivotal role in addressing poverty, hunger, and unemployment while driving economic development.

Given the foregoing, it becomes imperative to conduct a systematic investigation into the impact of government expenditure on the performance of Nigeria's agricultural sector. The central problem this study addresses is the persistent underperformance of Nigeria's agricultural sector despite decades of government expenditure and policy interventions.

From a research perspective, few studies have concurrently examined government expenditure and agriculture, or disaggregated government expenditure into capital and recurrent components to determine their individual impacts on agricultural output. Furthermore, these studies have often failed to explore the long-run relationships and effects of both capital and recurrent expenditures on agricultural performance. This research intends to address these gaps. An additional observed gap is the limited number of studies investigating the short- and long-run effects on the agricultural sector in Nigeria. Some studies have focused exclusively on the impact of these factors, alongside natural variables such as annual rainfall and soil fertility.

3. Theoretical Framework

3.1 The Neo-Classical Growth Theory

The Neo-classical Growth Theory was introduced by Robert Solow and Trevor Swan in 1956. Neo-classical economists argue that government expenditure is detrimental to long-term economic growth, primarily through the crowding-out effect. During budget deficits, taxes are raised, which

increases production costs, raises prices, and reduces demand; alternatively, the government resorts to borrowing. Government spending is also seen as discouraging private investment.

In the Solow-Swan model, saving/investment rates and population growth are critical determinants of economic growth. Higher saving and investment rates result in the accumulation of more capital per worker, leading to higher output per worker. However, in the absence of technological change and innovation, an increase in capital per worker may not produce a proportional increase in output per worker, due to diminishing returns. Neo-classical economists believe that market forces bring the economy to long-run equilibrium through adjustments in the labour market, rendering government intervention ineffective owing to the crowding-out effect.

3.2 Keynesian Theory

This study is primarily underpinned by the theoretical framework of Keynesian economics, developed by the British economist John Maynard Keynes in the 1930s, which advocates government intervention through fiscal policy to stimulate aggregate demand and output.

Keynes advocated increased government expenditures and lower taxes to stimulate demand and pull the economy out of depression. According to Keynes, during periods of recession, when aggregate demand is insufficient, monetary and fiscal expansion can boost demand, output, and employment (Begg, 1994). The Keynesian school of thought suggests that government spending can contribute positively to sectoral growth. Thus, an increase in government consumption is likely to lead to an increase in employment, profitability, and investment through multiplier effects on aggregate demand. Keynes regarded public expenditure as an exogenous instrument that could be deployed as a policy tool to promote growth.

4. Conceptual Framework

The conceptual framework of this study is grounded in Keynesian theory. Keynesian economists recommend government intervention to maintain a stable economy (Wheelock, 2008; Todaro & Smith, 2012). Keynes (1936) argued that full employment is achieved when the state regulates the level of aggregate demand through fiscal policy, encompassing government spending and taxation. The theory views total spending as the primary determinant of total output and employment.

Within this framework, government expenditure takes two principal forms: capital expenditure, such as the construction of physical infrastructure (roads, pipelines, and irrigation systems); and recurrent expenditure, such as salary payments and debt servicing. Both are financed through government revenue, including tax and non-tax sources such as borrowing, grants, and donations.

Capital expenditure can translate into productive economic activity, including government investment in mining and agriculture. Agricultural spending on research, irrigation services, and transport infrastructure promotes export production, increases GDP, and raises tax revenue. Economic growth, in turn, contributes to poverty reduction through higher household incomes. Key determinants of revenue allocation to specific sectors include the government's financial capacity, prevailing policies, and institutional commitment to development goals.

5. Methodology

The research adopts an ex-post facto research design using annual time series data from 1980 to 2022. This design is particularly appropriate because the variables of interest — government expenditure on agriculture and agricultural sector performance — have already occurred and cannot be manipulated by the researcher. The study employs statistical tools including unit root tests, Johansen cointegration, Vector Error Correction Modelling (VECM), impulse response functions, variance decomposition, and Granger causality analysis to evaluate the effects of government expenditure on agricultural output.

Data were obtained from the Central Bank of Nigeria (CBN) and the National Bureau of Statistics (NBS), which provided figures on agricultural gross domestic product (AGDP), national accounts, and consumer price indices. Where gaps or inconsistencies were encountered, the World Bank's World Development Indicators (WDI) were consulted, particularly for agricultural value-added and complementary macroeconomic variables. Reports from the Federal Ministry of Agriculture and Rural Development (FMARD) were also reviewed to validate figures and gain contextual insight into the implementation of public agricultural expenditures.

5.1 Unit Root Tests

To ensure the robustness of results, two stationarity tests were employed: the Augmented Dickey-Fuller (ADF) test and the Phillips-Perron (PP) test. The ADF equation is specified as follows:

$$\Delta Y_t = \alpha + \beta T + (\rho - 1)Y_{t-1} + \Sigma_i \alpha_i \Delta Y_{t-i} + \varepsilon_t \quad \ldots\ldots\ldots\ldots\ldots\ldots (3.1)$$

5.2 Cointegration Test

The Johansen cointegration test was employed to establish whether a long-run association exists among the economic variables. Before proceeding to the cointegration test, a lag selection criterion based on the Schwarz Information Criterion (SIC) was applied using E-Views 10 to determine the optimal lag length. The Johansen test assesses the validity of cointegrating relationships using a maximum likelihood estimation (MLE) approach.

5.3 Vector Error Correction Model (VECM)

Having established a long-run relationship among the series through the cointegration test, a VECM was used to examine the short-run properties of the cointegrated series. The VECM equations are specified as follows:

$$\Delta Y_t = \alpha_1 + \rho_1 e_{t-1} + \Sigma \beta_i \Delta Y_{t-i} + \Sigma \delta_i \Delta X_{t-i} + \Sigma \gamma_i \Delta Z_{t-i} \quad \ldots\ldots\ldots\ldots (3.7)$$

$$\Delta X_t = \alpha_2 + \rho_2 e_{t-1} + \Sigma \beta_i Y_{t-i} + \Sigma \delta_i \Delta X_{t-i} + \Sigma \gamma_i \Delta Z_{t-i} \quad \ldots\ldots\ldots\ldots (3.8)$$

5.4 Model Specification

The study adapts the model specification from Obi and Obayori (2016), expressed as:

$$Log(AGP) = Log(\alpha_0) + \alpha_1 Log(GCX_t) + \alpha_2 Log(GRX_t) + U_t \quad \ldots\ldots\ldots\ldots (3.9)$$

Where:

AGP = Agricultural Production Output

GCX = Government Capital Expenditure on Agriculture

GRX = Government Recurrent Expenditure on Agriculture

Log = Natural Logarithm

U = Error Term

t = Time Period

6. Data Presentation and Analysis

6.1 Unit Root Test Results

The unit root tests were conducted at both level and first difference, using three specifications — none, intercept, and intercept plus trend — for both the ADF and PP tests. The appropriate lag level was determined by the minimum Schwarz Information Criterion (SIC).

Table 4.3(A): Unit Root Test Results — ADF (at Level and First Difference)

	At Level			At First Difference			Order
	Constant	Trend & Constant	None	Constant	Trend & Constant	None	
LAGDP	-0.117337	-1.896311	4.219319	-5.444579*	-5.327494*	-3.646723*	I(1)
LGCE	-1.131253	-0.870738	1.642063	-4.942545*	-4.068513*	-4.671259*	I(1)
LGRE	-2.286899	-0.022824	0.900603	-7.866984*	-4.389444*	-2.176939**	I(1)

*Note: *** = 10%, ** = 5%, * = 1% level of significance. Source: Computed using E-Views 10 (2025).*

Table 4.3(B): Unit Root Test Results — PP (at Level and First Difference)

	At Level			At First Difference			Order
	Constant	Trend & Constant	None	Constant	Trend & Constant	None	
LAGDP	-0.120438	-1.992467	4.199217	-5.444958*	-5.329100*	-3.732973*	I(1)
LGCE	-1.854900	-1.578787	1.852445	-6.119882*	-6.813217*	-5.161289*	I(1)
LGRE	-6.046560*	-2.092678	3.017385	-7.909978*	-17.07424*	-5.097160*	I(1)

Source: Computed using E-Views 10 (2025).

The results from Tables 4.3(A) and 4.3(B) reveal that all variables — Agricultural GDP (LAGDP), government capital expenditure (LGCE), and government recurrent expenditure (LGRE) — were non-stationary at level under all three specifications for both the ADF and PP tests. Upon first differencing, all variables became stationary, leading to the rejection of the null hypothesis of a unit root at the 1% significance level. This confirms that all series are integrated of the same order, I(1), satisfying the precondition for cointegration analysis.

6.2 Generalised Impulse Response Function

The Generalised Impulse Response Function (GIRF) traces the response of a dynamic system to a brief input shock over time. In this study, the GIRF is analysed over a ten-period horizon using the Cholesky ordering approach to examine the reactions of AGDP, GCE, and GRE to shocks.

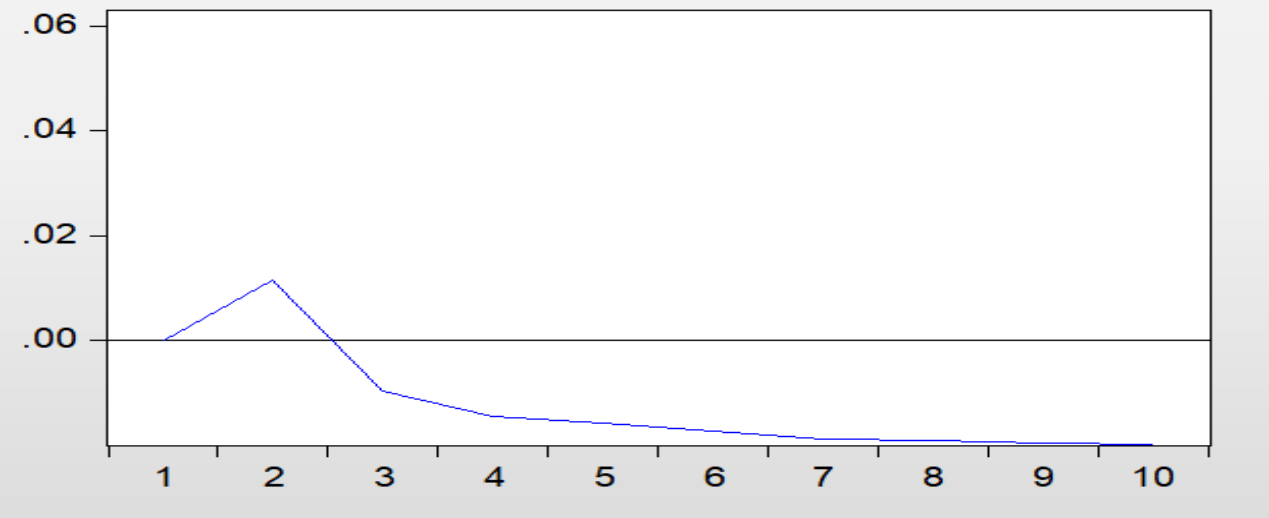


Figure 6.1: Response of Agricultural GDP to Government Capital Expenditure

Source: Extracted from estimation output using E-views 10 (2025)

Figure 6.1 shows the response of Agricultural GDP to a shock in government capital expenditure. Agricultural GDP responds sharply from period one, peaks at period two, and then gradually declines toward equilibrium from period three onward. This pattern reflects the asymptotic effect of capital spending on agricultural output and is consistent with the nature of long-term capital projects, which initially place strain on the budget but subsequently inject resources back into the economy.

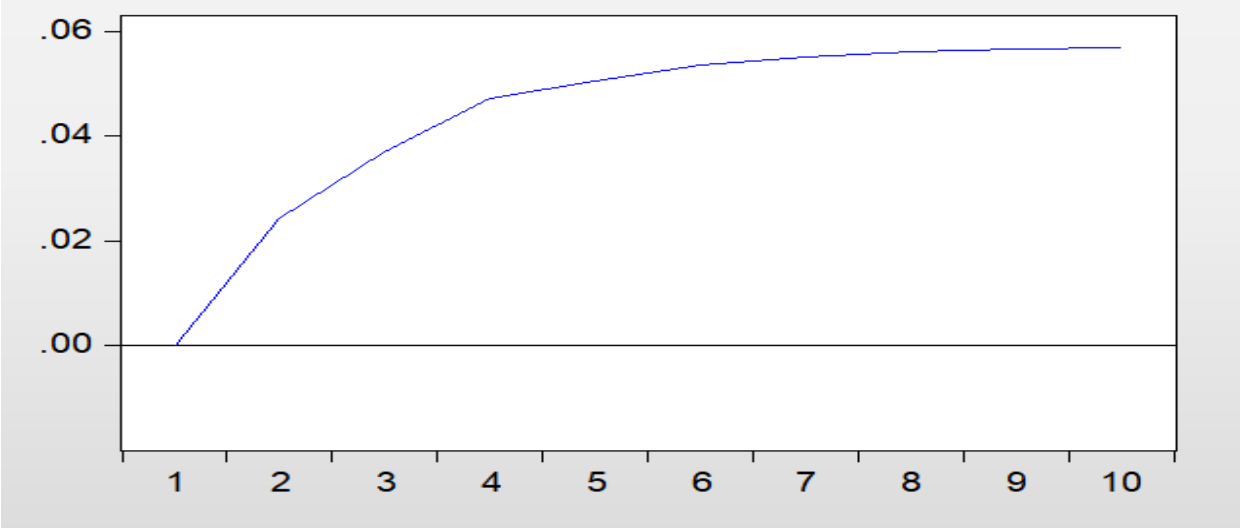


Figure 6.2: Response of Agricultural GDP to Government Recurrent Expenditure,

Source: extracted from estimation output using E-views 10 (2025)

Figure 6.2 depicts the response of Agricultural GDP to a shock in government recurrent expenditure. Recurrent expenditure rises gradually, reaching a peak before stabilising. Agricultural GDP also rises steadily throughout the period. This is consistent with the economic nature of recurrent expenditure, which supports ongoing productive activities without necessarily creating fixed assets. Recurrent spending thus contributes to steady, incremental growth in agricultural GDP in the short run.

6.3 Variance Decomposition Results

Tables 4.8(A) to 4.8(C) present the forecast error variance decomposition for LAGDP, LGCE, and LGRE. These results indicate the extent to which unexpected movements in each variable explain the forecast error variance of the others.

Table 4.8(A): Variance Decomposition of LAGDP

Period	S.E.	LAGDP	LGCE	LGRE
1	0.062875	100.0000	0.000000	0.000000
2	0.088049	84.20673	1.738186	7.579920
3	0.114916	67.47850	1.727411	14.80492
4	0.145334	57.12623	2.066557	19.77617
5	0.173710	51.02703	2.263028	22.25845
6	0.199890	46.93321	2.463089	23.95912
7	0.224197	44.13128	2.652984	25.07665
8	0.246741	42.15158	2.793252	25.86350
9	0.267713	40.68629	2.902368	26.43723

10	0.287344	39.56758	2.989301	26.87404

Source: Extracted from estimation output using E-Views 10 (2025).

Table 4.8(A) shows that LAGDP explains 100% of its own variability in period 1, declining progressively to approximately 39.57% by period 10. The contribution of LGRE increases from the fourth period onward, reaching 26.87% by period 10, while LGCE maintains a relatively weak and stable contribution throughout.

Table 4.8(B): Variance Decomposition of LGCE

Period	S.E.	LAGDP	LGCE	LGRE
1	0.325521	4.086981	95.91302	0.000000
2	0.454619	12.47718	82.78201	4.254834
3	0.562870	13.51351	78.63803	5.446830
4	0.667425	13.57939	75.43385	7.271001
5	0.765812	13.66776	73.07139	8.391226
6	0.855462	13.72762	71.26199	9.283642
7	0.938576	13.72099	69.95053	9.930442
8	1.016075	13.70946	68.94204	10.43540
9	1.088672	13.69774	68.15534	10.82610
10	1.157041	13.68580	67.52909	11.13833

Source: Extracted from estimation output using E-Views 10 (2025).

Table 4.8(B) shows that LGCE explains 95.91% of its own variability in period 1, declining to 67.53% by period 10. LAGDP contributes approximately 13.5% from period 3 onward and remains relatively stable, while LGRE's contribution increases gradually to 11.14% by period 10.

Table 4.8(C): Variance Decomposition of LGRE

Period	S.E.	LAGDP	LGCE	LGRE
1	0.224563	14.55260	3.494642	81.95276
2	0.265517	28.76571	6.761092	64.47162
3	0.313067	29.22323	16.94561	51.13216
4	0.345173	29.28065	22.07296	43.56912
5	0.379367	28.83266	26.11310	37.21796
6	0.411222	28.26414	29.31707	32.29786
7	0.441691	27.60494	31.81713	28.47401
8	0.470398	27.03881	33.75297	25.47069
9	0.497773	26.54407	35.30733	23.05316
10	0.523830	26.11988	36.57515	21.07998

Source: Extracted from estimation output using E-Views 10 (2025).

Table 4.8(C) shows that LGRE explains approximately 81.95% of its own variability in period 1, declining to 21.08% by period 10. The contributions of LAGDP and LGCE increase substantially, reaching 26.12% and 36.58% respectively by period 10.

6.4 Pairwise Granger Causality Analysis

To determine the causal structure among the variables, a pairwise Granger causality test (Granger, 1969) was conducted. Results are presented in Table 4.9.

Table 4.9: Pairwise Granger Causality Test Results

Null Hypothesis	F-Statistic	Prob.
LGCE does not Granger Cause LAGDP	1.77656	0.1841
LAGDP does not Granger Cause LGCE	3.17804	0.0539
LGRE does not Granger Cause LAGDP	3.14690	0.0554
LAGDP does not Granger Cause LGRE	1.61773	0.2128
LGRE does not Granger Cause LGCE	2.30759	0.1144
LGCE does not Granger Cause LGRE	0.44391	0.6451

Source: Extracted from estimation output using E-Views 10 (2025).

The results reveal that LGCE does not significantly Granger cause LAGDP ($p = 0.1841$), suggesting that government capital expenditure does not strongly predict changes in agricultural GDP within the tested period. Notably, LAGDP nearly Granger causes LGCE ($p = 0.0539$), indicating a borderline significant feedback effect from agricultural sector performance to capital spending decisions.

Similarly, LGRE does not Granger cause LAGDP ($p = 0.0554$), though this result is close to conventional significance levels, hinting at a weak predictive relationship. LAGDP does not Granger cause LGRE ($p = 0.2128$), confirming the absence of a feedback loop in this pair.

These findings partially align with Adewumi and Adeleye (2018), who found a unidirectional causal relationship from agricultural credit to agricultural growth and a bidirectional relationship between agricultural expenditure and growth in Nigeria. While this study supports the potential feedback mechanism between agricultural output and expenditure, it finds no strong causal link within the tested period. The absence of significant causality may reflect macroeconomic distortions, implementation lags, or structural shifts in Nigeria's agricultural sector that the Granger test may not fully capture.

7. Summary of Major Findings

The empirical findings of this study reveal that government expenditure plays a significant but differentiated role in shaping agricultural sector performance in Nigeria. Specifically, government capital expenditure on agriculture exhibits a positive and statistically significant impact on Agricultural Gross Domestic Product (AGDP), indicating that investments in infrastructure such as irrigation systems, storage facilities, and mechanisation enhance productivity and output.

In contrast, government recurrent expenditure shows a negative and statistically significant relationship with AGDP. This suggests that recurrent spending — primarily associated with administrative costs, salaries, and overheads — does not translate into productive outcomes within the agricultural sector and may reflect inefficiencies, resource misallocation, or leakages in public fund management.

Furthermore, the cointegration analysis confirms the existence of a long-run equilibrium relationship among the variables, implying that government expenditure and agricultural output move together over time. This reinforces the importance of sustained and well-structured fiscal policy interventions.

Overall, the results underscore the critical importance of expenditure composition, rather than expenditure volume alone. While increased funding is essential, the effectiveness of such spending depends largely on its allocation toward productive capital investments rather than recurrent obligations.

8. Conclusion and Policy Recommendations

This study concludes that government capital expenditure remains a key driver of agricultural performance in Nigeria, whereas recurrent expenditure undermines productivity owing to possible inefficiencies and administrative leakages. While no short-run causality was found among the variables, the existence of long-run relationships affirms that government spending policies, if properly restructured, can play a sustainable role in driving growth in the agricultural sector.

Based on the empirical findings, the following policy recommendations are offered:

- The government should prioritise capital expenditure that directly benefits agriculture, including the construction of dams, farm settlements, rural road networks, storage

facilities, and reliable electricity supply. These investments should be concentrated in rural areas, where the majority of Nigerian farmers are located, to directly enhance farmer productivity and aggregate agricultural GDP.

- Effective monitoring agencies should be established by the Federal Government of Nigeria to ensure that funds allocated to the agricultural sector are transparently and judiciously utilised. Accountability mechanisms are essential to reduce the leakages and inefficiencies currently associated with recurrent spending.

Incorporating these policy recommendations can help Nigeria realise its agricultural potential, promote sustainable growth, and advance broader economic development. By focusing on capital expenditure, facilitating access to agricultural credit, and strengthening monitoring and accountability frameworks, policymakers can play a pivotal role in transforming the agricultural sector and driving economic prosperity.

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