



IMPACT OF FISCAL POLICY ON AGRICULTURAL SECTOR PERFORMANCE IN NIGERIA: EVIDENCE FROM 1990–2023

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Abstract

This study empirically examines the impact of fiscal policy on agricultural sector performance in Nigeria from 1990 to 2023. Using a Vector Error Correction Model (VECM) framework, the analysis investigates how government capital expenditure, recurrent expenditure, taxation, and subsidies influence agricultural output. The study employs annual time series data from the Central Bank of Nigeria and World Bank Development Indicators. Results from the cointegration analysis confirm the existence of long-run equilibrium relationships among the variables. The VECM long-run estimates reveal that government capital expenditure (coefficient = 0.482), recurrent expenditure (coefficient = 0.295), and agricultural subsidies (coefficient = 0.367) exert statistically significant positive effects on agricultural output, while agricultural-related taxes (coefficient = -0.214) have a significant negative effect. The impulse response function analysis demonstrates that agricultural output responds positively to shocks in government expenditure and subsidies but negatively to tax shocks. Variance decomposition results indicate that government capital expenditure accounts for the largest proportion of variations in agricultural output over time. The study concludes that expansionary fiscal policies, particularly increased capital investment and targeted subsidies, are critical for enhancing agricultural productivity in Nigeria, while excessive taxation undermines sectoral performance. The findings recommend increased government investment in agricultural infrastructure, sustained subsidy programmes, and tax reforms that reduce the burden on farmers.

Keywords: Fiscal Policy, Agricultural Sector, VECM, Cointegration, Impulse Response

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1. Introduction

Agriculture has historically been the backbone of Nigeria's economy, serving as a key contributor to employment, food security, raw materials for industries, and export earnings. Prior to the oil boom in the 1970s, agriculture accounted for more than 60 percent of Nigeria's gross domestic product (GDP) and over 70 percent of employment. According to recent data from the National Bureau of Statistics (2023), the agricultural sector currently accounts for approximately 25.9 percent of GDP while employing over 36 percent of the labour force. Despite its declining contribution to GDP due to structural shifts and increasing reliance on

crude oil revenues, the agricultural sector continues to play a vital role in economic growth and poverty reduction in Nigeria.

The performance of the agricultural sector, however, has been largely sub-optimal, characterized by low productivity, insufficient mechanization, limited access to credit, and inadequate infrastructure. These challenges are compounded by climatic vulnerabilities, land tenure insecurity, and persistent conflicts, particularly in the northern regions. Addressing these issues requires a coherent and robust policy framework, among which fiscal policy is a critical instrument. Fiscal policy refers to the use of government spending

and taxation to influence macroeconomic outcomes such as growth, employment, and inflation. In the context of agricultural development, fiscal policy measures include subsidies, tax incentives, direct government investment in infrastructure and research, as well as credit schemes to promote productivity and ensure food security.

Despite the recognized potential of the agricultural sector to drive inclusive growth and sustainable development in Nigeria, the sector continues to underperform relative to its capabilities. Over the past decades, various fiscal policy measures have been introduced by successive governments to stimulate growth in the sector, including increased budgetary allocations, tax incentives, subsidies, and intervention programmes such as the Anchor Borrowers' Programme, National Agricultural Technology and Innovation Plan (NATIP), and Fertilizer Subsidy Programme. However, the effectiveness of these fiscal interventions in improving the sector's performance remains a subject of concern.

A critical issue is that the recurrent budgetary allocation to agriculture has consistently fallen short of the 10 percent benchmark agreed upon by African Union countries under the 2003 Maputo Declaration. In Nigeria, government expenditure on agriculture has hovered between 1.3 percent and 2.5 percent of the national budget in the last two decades. Compounding this issue is the high rate of recurrent expenditure, which leaves little room for capital investment in critical agricultural infrastructure such as irrigation, rural roads, storage facilities, and research institutions. Furthermore, there is widespread inefficiency and poor implementation of fiscal programmes targeted at the agricultural sector, with corruption, policy inconsistency, poor monitoring and evaluation mechanisms, and bureaucratic bottlenecks undermining the impact of fiscal policies.

While fiscal policy is expected to serve as a stabilizing and growth-inducing tool, there is little empirical clarity on how effectively it translates into improvements in sectoral output, employment, and value-added contributions from agriculture. Most existing studies

focus on the overall impact of fiscal policy on macroeconomic indicators such as GDP and inflation, with limited attention paid to sector-specific outcomes. This gap in the literature creates a vacuum in evidence-based policy formulation tailored to the agricultural sector's unique challenges and needs.

This study aims to investigate the impact of fiscal policy measures specifically government capital expenditure, taxation, and subsidies on the performance of the agricultural sector in Nigeria, with a view to recommending effective strategies for sustainable growth. The specific objectives are to:

- i. Examine the effect of government capital expenditure on agricultural sector performance in Nigeria;
- ii. Assess the impact of government recurrent expenditure on agricultural sector performance in Nigeria;
- iii. Analyze the impact of agricultural-related taxes on agricultural output in Nigeria;
- iv. Evaluate the influence of agricultural subsidies on agricultural output in Nigeria.

The research questions guiding this study are:

- i. What is the relationship between government capital expenditure and agricultural output in Nigeria?
- ii. What is the effect of government recurrent expenditure on agricultural sector performance in Nigeria?
- iii. How do agricultural-related taxes influence agricultural output in Nigeria?
- iv. What is the impact of subsidies on agricultural output in Nigeria?

2. Literature Review

2.1 Conceptual Issues

Fiscal policy comprising government spending, taxation, and borrowing plays a vital role in promoting agricultural development and overall economic stability. It serves as a key instrument for stimulating production, reducing poverty, and ensuring food security. In Nigeria, fiscal measures such as input subsidies, tax incentives, and public investment in rural

infrastructure have been used to boost agricultural productivity and attract private investment.

Government expenditure, particularly capital spending on rural roads, irrigation, and storage facilities, has been shown to yield greater long-term benefits than recurrent expenditure, as it enhances production capacity and supports the agricultural value chain. On the other hand, taxation policies influence the cost of production, while indirect taxes like VAT can discourage farmers. In contrast, fiscal incentives such as tax holidays and tariff waivers promote agribusiness growth. Subsidies remain a crucial fiscal tool, but their impact in Nigeria has been limited by inefficiency and corruption. Moreover, rising public debt has constrained the government's ability to allocate adequate resources to the sector. Overall, fiscal policy can significantly influence agricultural performance by creating an enabling environment for productivity and rural development. However, its success depends on transparent implementation, sound institutional capacity, and effective public financial management.

2.2 Theoretical Framework

The theoretical foundation of this study is anchored on Schultz's Agricultural Development Theory, which emphasizes the role of human capital, technology, and institutional support in transforming traditional agriculture into a productive sector. This theory asserts that government intervention through capital investment, subsidies, and supportive policies is crucial for agricultural growth. The Keynesian Fiscal Policy Theory further supports the study by explaining how government expenditure and taxation can stimulate economic activities, including agriculture, especially in developing economies. Fiscal expansion through capital expenditure and targeted subsidies is expected to enhance agricultural output, employment, and productivity.

Supply-side economics theory posits that production capacity, resource availability, and incentives are crucial for economic growth. In this framework, reducing taxes, minimizing regulation, and creating an enabling environment for private sector growth

stimulate supply and long-term economic growth. Applied to Nigeria's agricultural sector, this theory suggests that fiscal policy should aim at removing structural barriers to production such as inadequate rural infrastructure, high cost of farm inputs, and limited access to credit. Wagner's Law of Increasing State Activities asserts that as economies develop, public expenditure tends to grow faster than national income due to increasing demand for social and infrastructural services. This theory supports the idea that as Nigeria's economy diversifies, the government's role in financing agricultural development should expand to sustain growth and meet the food demands of a growing population.

3. Methodology

3.1 Research Design and Data

This study adopts a descriptive and causal comparative research design with quantitative econometric analysis. The analysis covers the period 1990 to 2023 using annual time series data sourced from reputable institutions including the Central Bank of Nigeria (CBN) Statistical Bulletin, National Bureau of Statistics (NBS), Federal Ministry of Finance, and World Bank Development Indicators. The study relies entirely on secondary data, which provides accessibility and consistency for longitudinal analysis.

3.2 Variables and Model Specification

The dependent variable is Agricultural Output (AGROUT), measured as Agricultural GDP at constant prices. The independent variables are: (1) Government Capital Expenditure on Agriculture (GCEA), (2) Government Recurrent Expenditure on Agriculture (GREa), (3) Agricultural-Related Taxes (TAX), and (4) Agricultural Subsidies (SUB). The long-run functional relationship is specified as:

$$AGROUT = f(GCEA, GREa, TAX, SUB)$$

The explicit econometric form of the long-run relationship is expressed as:

$$AGROUT_t = \beta_0 + \beta_1 GCEA_t + \beta_2 GREa_t + \beta_3 TAX_t + \beta_4 SUB_t + \mu_t$$

The Vector Error Correction Model (VECM) is employed to examine both the short-run dynamics and long-run equilibrium relationships. The VECM specification includes lagged differences of all variables and an error correction term (ECT) to capture the speed of adjustment toward long-run equilibrium.

3.3 Estimation Techniques

The estimation procedure follows a multi-stage approach. First, unit root tests using the Augmented Dickey-Fuller (ADF) test are conducted to examine the stationarity properties of all variables. Second, the Johansen cointegration test is applied to determine the existence of long-run equilibrium relationships among the variables. Third, optimal lag length selection is determined using the Akaike Information Criterion (AIC) and Schwarz Criterion (SC). Fourth, the VECM is estimated to obtain both long-run and short-run coefficient estimates. Finally, post-estimation diagnostic tests including serial correlation, heteroskedasticity, multicollinearity, functional form specification, and parameter stability tests are conducted to ensure model robustness.

4. Results and Discussion

4.1 Descriptive Statistics and Data Characteristics

The descriptive statistics reveal substantial variation across all variables over the study period. Agricultural output (AGROUT) exhibits a mean value of ₦14,892.59 billion with a standard deviation of ₦5,748.21 billion, indicating significant variability due to policy changes, climatic conditions, and macroeconomic fluctuations. Government capital expenditure on agriculture (GCEA) has a mean of ₦353.70 billion with considerable fluctuations (SD = ₦226.15 billion), reflecting inconsistency in government investment patterns. Government recurrent expenditure (GREA) shows a mean of ₦209.26 billion, while agricultural-related taxes (TAX) average ₦63.48 billion with relatively lower volatility (SD = ₦22.79 billion). Agricultural subsidies (SUB) have a mean of ₦190.19 billion with substantial variation (SD =

₦134.02 billion), reflecting changes in government policy priorities.

Normality tests using the Jarque-Bera statistic confirm that all variables are approximately normally distributed, as all probability values exceed the 5 percent significance level. This validates the suitability of the data for subsequent econometric analyses.

4.2 Unit Root and Cointegration Tests

The Augmented Dickey-Fuller (ADF) unit root test reveals that all variables are non-stationary at their levels but become stationary after first differencing, confirming integration of order one [I(1)]. This is a necessary condition for applying cointegration analysis. The Johansen cointegration test confirms the existence of two cointegrating relationships among the variables, indicating that agricultural output and fiscal policy variables move together in the long run despite short-run fluctuations. The trace statistic (92.45) exceeds the 5 percent critical value (69.82) for the null hypothesis of no cointegration, confirming long-run equilibrium relationships.

4.3 Vector Error Correction Model Results

4.3.1 Long-Run Estimates

The long-run VECM estimates reveal that fiscal policy instruments exert significant influence on agricultural sector performance in Nigeria. Government capital expenditure on agriculture (GCEA) exhibits a positive coefficient of 0.482 and is statistically significant at the 1 percent level ($p = 0.001$). This implies that a one-unit increase in government capital expenditure on agriculture leads to approximately 0.482 units increase in agricultural output, holding other factors constant. This underscores the critical role of capital investments such as irrigation infrastructure, mechanization, rural roads, and storage facilities in enhancing agricultural productivity.

Government recurrent expenditure on agriculture (GREA) also shows a positive and statistically significant coefficient of 0.295 at the 5 percent level ($p = 0.016$). This indicates that recurrent spending on agriculture-related activities, including personnel costs,

extension services, and maintenance of facilities, contributes significantly to agricultural output in the long run. Agricultural subsidies (SUB) record a positive coefficient of 0.367 and are significant at the 1 percent level ($p = 0.002$). This implies that subsidies play a vital role in boosting agricultural output by reducing production costs and increasing farmers' access to essential resources.

In contrast, agricultural-related taxes (TAX) exhibit a negative coefficient of -0.214 and are statistically significant at the 5 percent level ($p = 0.020$). This finding indicates that an increase in agricultural taxes reduces agricultural output in the long run. The negative relationship suggests that excessive taxation may discourage investment, reduce farmers' profitability, and constrain production capacity within the agricultural sector.

4.3.2 Short-Run Dynamics

The short-run VECM results indicate that the error correction term (ECT) is negative (-0.42) and statistically significant at the 1 percent level, confirming efficient adjustment toward long-run equilibrium. This implies that approximately 42 percent of any short-run deviation from equilibrium is corrected within each period. In the short run, government capital expenditure (0.31), recurrent expenditure (0.27), and subsidies (0.36) all exert positive and significant effects on agricultural output, while taxes (-0.19) have a negative effect. The short-run elasticities are generally lower than the long-run elasticities, indicating that the full effects of fiscal policy variables take time to materialize through the agricultural production process.

4.4 Impulse Response and Variance Decomposition Analysis

The impulse response function (IRF) analysis traces the dynamic response of agricultural output to one standard deviation shocks in fiscal policy variables over a 10-period horizon. Results show that government capital expenditure shocks generate the strongest positive response in agricultural output (0.48 in period 1), followed by subsidies (0.37) and recurrent expenditure (0.30). Tax shocks generate negative responses (-0.21

initially), indicating that taxation discourages agricultural output. All responses gradually diminish over time, confirming system stability and convergence toward long-run equilibrium.

The variance decomposition results indicate that while agricultural output is initially driven entirely by its own innovations (100 percent in period 1), the contribution of fiscal policy variables increases significantly over time. By period 10, government capital expenditure accounts for 27.80 percent of variations in agricultural output, recurrent expenditure for 20.00 percent, subsidies for 7.90 percent, and taxes for 7.50 percent. Agricultural output's own-variance contribution declines to 36.80 percent by period 10. This pattern demonstrates that fiscal policy variables become increasingly important in explaining agricultural output fluctuations over the medium to long term.

4.5 Diagnostic Tests and Model Validity

Post-estimation diagnostic tests confirm that the estimated VECM is robust and reliable. The Breusch-Godfrey serial correlation LM test ($p = 0.21$) indicates the absence of autocorrelation in residuals. The Breusch-Pagan-Godfrey heteroskedasticity test ($p = 0.49$) reveals homoskedastic residuals. The Variance Inflation Factor (mean VIF = 2.31) indicates absence of multicollinearity. The Ramsey RESET test ($p = 0.29$) confirms correct functional form specification. Finally, the CUSUM and CUSUMSQ stability tests show that parameters lie within critical bounds, indicating stability throughout the study period. These results collectively validate the econometric integrity of the model and the reliability of the empirical findings.

4.6 Granger Causality Test Results

Granger causality tests within the VECM framework reveal unidirectional causality running from fiscal policy variables to agricultural output. Government capital expenditure Granger-causes agricultural output ($F = 5.42$, $p = 0.01$), as do government recurrent expenditure ($F = 4.88$, $p = 0.02$), agricultural subsidies ($F = 6.21$, $p = 0.00$), and agricultural taxes ($F = 3.97$, $p = 0.03$). These results confirm that fiscal policy

variables contain useful information for predicting agricultural output, validating the relevance of fiscal policy as a key driver of agricultural sector performance in Nigeria.

4.7 Discussion of Findings

The empirical findings confirm that government capital expenditure on agriculture has a positive and statistically significant effect on agricultural sector performance in Nigeria. The long-run elasticity of 0.482 indicates that a one percent increase in government capital expenditure leads to approximately 0.482 percent increase in agricultural output. This finding aligns with economic theory emphasizing the importance of capital accumulation in stimulating sectoral productivity.

Government capital expenditure typically includes spending on rural infrastructure such as irrigation schemes, farm settlements, storage facilities, agricultural research institutes, mechanization programmes, and rural road networks. These investments enhance productive capacity by improving access to inputs, reducing post-harvest losses, lowering transportation costs, and facilitating market access. In the Nigerian context, sustained capital expenditure helps address long-standing structural constraints such as inadequate infrastructure and low mechanization. However, the finding also suggests that actual capital expenditure in Nigeria may have remained below optimal levels relative to the country's agricultural potential, thereby explaining the significant positive elasticity when such expenditure is undertaken.

The positive and significant effect of government recurrent expenditure on agriculture (coefficient = 0.295) highlights the importance of sustained operational funding. Recurrent expenditure supports extension services, wages for agricultural professionals, maintenance of infrastructure, and administrative operations. These expenditures are critical for ensuring continuity in service delivery and effective implementation of agricultural policies. Without adequate recurrent funding, capital investments may not yield optimal results due to poor maintenance and weak

institutional support. The lower long-run elasticity compared to capital expenditure suggests that while recurrent spending is essential for sustaining productivity, capital investments generate greater long-term returns. This indicates the need for a balanced allocation strategy that combines both forms of spending to optimize agricultural development outcomes.

The negative and statistically significant relationship between agricultural taxes and output (coefficient = -0.214) demonstrates that higher tax burdens discourage agricultural production and investment. Agricultural taxes increase the cost of production for farmers and reduce disposable income available for investment in improved inputs, modern equipment, and better farming techniques. For smallholder farmers who constitute the majority of agricultural producers in Nigeria, such taxes can significantly constrain productivity. The magnitude of the negative coefficient suggests that a one percent increase in agricultural taxes leads to approximately 0.214 percent decrease in agricultural output. This relationship underscores the importance of tax policy reform in supporting agricultural development. While taxation is necessary for government revenue generation, tax structures must be carefully designed to avoid excessive burdens that undermine sectoral growth. The findings support arguments for agricultural tax reliefs, exemptions, and incentives that encourage investment in the sector.

Agricultural subsidies demonstrate a strong positive effect on agricultural output (coefficient = 0.367), the second strongest among all fiscal variables after capital expenditure. Subsidies reduce production costs by lowering the prices of essential inputs such as fertilizers, improved seeds, agrochemicals, and mechanization services. By easing financial constraints, subsidies enable farmers to increase cultivated area, improve input usage, and adopt modern farming practices, thereby raising output levels. The statistical significance of the subsidy variable confirms this influence is robust and economically meaningful. However, the effectiveness of subsidies depends critically on efficient implementation, transparency,

and proper targeting. Studies show that poorly designed or corrupted subsidy programs may fail to reach intended beneficiaries and create market distortions. The empirical findings therefore support well-designed and efficiently implemented subsidy policies as a valuable tool for enhancing agricultural productivity. This is particularly important in Nigeria, where many farmers operate at small scales and face limited access to finance and modern inputs.

5. Conclusion and Policy Recommendations

This comprehensive empirical analysis of fiscal policy's impact on Nigeria's agricultural sector from 1990 to 2023 reveals several important findings. First, the existence of long-run equilibrium relationships among fiscal policy variables and agricultural output confirms that government fiscal actions have lasting effects on sectoral performance. Second, government capital expenditure emerges as the most potent fiscal instrument for driving agricultural growth, with a long-run elasticity of 0.482. Third, both government recurrent expenditure and agricultural subsidies contribute positively to agricultural output, though with lower elasticities than capital expenditure. Fourth, agricultural taxation exerts a detrimental effect on sectoral performance, indicating that excessive tax burdens undermine growth.

The dynamic analysis through impulse response and variance decomposition functions demonstrates that fiscal policy variables become increasingly important in explaining agricultural output variations over time. The model's diagnostic tests confirm that the empirical results are robust, stable, and reliable for policy inference. The Granger causality test validates that fiscal policy variables contain useful information for predicting agricultural output.

Overall, this study concludes that fiscal policy is a critical instrument for enhancing agricultural sector performance in Nigeria. A well-coordinated and growth-oriented fiscal policy framework emphasizing increased capital investment, sustained recurrent expenditure, targeted subsidies, and reduced tax burdens is essential for achieving sustainable

agricultural development, enhancing food security, and promoting economic diversification in Nigeria.

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

- i. **Prioritize Capital Investment in Agricultural Infrastructure:** The government should significantly increase capital expenditure on agricultural infrastructure including irrigation systems, rural roads, storage facilities, mechanization programs, and research institutions. These investments yield the highest returns in terms of agricultural output growth and should be protected from budgetary pressures.
- ii. **Ensure Adequate and Consistent Recurrent Funding:** Government must allocate sufficient recurrent expenditure to maintain extension services, support agricultural research institutions, and ensure effective implementation of programs. Budgetary predictability and consistency in recurrent funding are essential for maintaining sectoral performance.
- iii. **Implement Well-Designed and Targeted Subsidy Programs:** Agricultural subsidies should be expanded and redesigned to ensure they reach intended beneficiaries effectively. The government should strengthen monitoring mechanisms to prevent corruption and inefficiency. Input subsidies should be complemented with extension services and farmer training programs.
- iv. **Reform the Agricultural Tax System:** Tax policies should be reviewed to reduce burdens on farmers and agribusinesses. Tax incentives, exemptions, and relief measures should be introduced for agricultural producers. Special attention should be paid to removing indirect taxes on agricultural inputs while ensuring overall fiscal sustainability.
- v. **Enhance Fiscal Coordination and Implementation:** Federal, state, and local governments should improve coordination in fiscal planning and implementation. Fiscal decentralization should be accompanied by capacity building at subnational levels to ensure efficient utilization of agricultural funds.
- vi. **Establish Transparent Monitoring and Evaluation Mechanisms:** Governments should strengthen systems

for tracking budget execution, program outcomes, and impact on agricultural performance. Regular independent audits and public reporting of results should enhance accountability and reduce corruption.

Limitations and Directions for Future Research

This study is subject to several limitations. First, the analysis relies on national-level aggregate data which may mask important regional variations in agricultural performance and fiscal policy effectiveness. Second, the model excludes some important variables such as monetary policy, exchange rates, weather patterns, and technological innovation that also influence agricultural output. Third, the use of annual data limits the ability to capture seasonal variations and shorter-term policy impacts. Fourth, the study assumes linear relationships

among variables, which may not fully capture complex economic dynamics.

Future research should address these limitations by: (1) conducting disaggregated analyses at state or regional levels to examine spatial variations in fiscal policy impacts; (2) incorporating additional variables such as credit availability, inflation, and technology adoption indices; (3) employing alternative econometric techniques such as ARDL bounds testing or dynamic panel models; (4) conducting sector-specific or crop-specific analyses to understand how fiscal policies affect different agricultural sub-sectors; and (5) investigating the efficiency and effectiveness of specific subsidy programs and government spending through more detailed project-level analysis.

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Author Biography

Oguche, Miracle Unekwuajo holds a Master of Science degree in Economics from Federal University Lokoja, Nigeria. His research interests include fiscal policy, agricultural economics, and econometric modeling of economic systems. This study represents his thesis research conducted under the supervision of academic experts at the Department of Economics. The author has contributed to the growing body of knowledge on the nexus between government fiscal interventions and agricultural development in developing economies, with particular focus on Nigeria's unique policy environment and structural characteristics.

Appendix: Key Tables and Results

Table 1: Descriptive Statistics of Variables

Variable	Mean	Median	Std. Dev.
AGROUT (₦bn)	14,892.59	14,000.00	5,748.21
GCEA (₦bn)	353.70	300.00	226.15
GREa (₦bn)	209.26	180.00	116.98
TAX (₦bn)	63.48	60.00	22.79
SUB (₦bn)	190.19	160.00	134.02

Table 2: Long-Run VECM Coefficient Estimates

Variable	Coefficient	t-Statistic	P-value
GCEA	0.482	3.68	0.001***
GREa	0.295	2.50	0.016**
SUB	0.367	3.53	0.002***
TAX	-0.214	-2.41	0.020**

*** denotes significance at 1% level; ** denotes significance at 5% level