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Impact of Government Spending on Agricultural Output in Nigeria: (1990-2022)

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Abstract

This study utilized data spanning from 1990 to 2022 to investigate the impact of government expenditure on agricultural output in Nigeria. Employing the Autoregressive Distributive Lag (ARDL) methods, the study revealed a negative relationship between both government credit to agriculture and government expenditure on agriculture with agricultural output. The paper further recommended that Effective management of allocated resources in the agricultural sector is crucial, as merely increasing the budgetary allocation to the sector does not guarantee improved performance. To enhance the sector's functioning, consistent implementation of government policies and programs is essential also Many farmers are hesitant to seek loans from financial institutions due to concerns about collateral security and high interest rates. Therefore, the government should enact legislation that fosters a favorable lending environment for agricultural investments. Additionally, significant funding should be directed towards banks specializing in agriculture, such as Agricultural Development Banks (ADBs) and similar institutions, to support farming operations.

Keywords: *Government expenditure, Agriculture, Output*

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Background to the Study

According to Wujat (2015), the low productivity of Nigeria's agricultural sector can be attributed to the limited adoption of mechanized agriculture and a lack of knowledge about modern agricultural technology among farmers. Agriculture plays multiple functions in an economy, including supplying food, driving economic growth through increased productivity, and promoting poverty reduction in some cases (Sen, 1999). In the context of Nigeria, the farming industry has traditionally been tasked with multiple objectives, including nourishing an expanding populace, earning foreign currency, generating job opportunities, and supplementing the incomes of agricultural households. State investment in this sector aims to bolster economic progress and catalyze development, with budgetary distributions designated for various domains annually (Ken, 2014).

Nonetheless, in spite of rising fiscal allocations directed towards agriculture in Nigeria over the years, the sector's performance has been underwhelming, marked by a steady downturn in overall yield. The nation's ambitions to rejuvenate the agricultural sector as a driver of economic expansion haven't come to full fruition. When evaluated through the lens of GDP, agricultural output has demonstrated inconsistent outcomes, marked by minor swings. For example, in 2018, agricultural yield stood at 2.12%, which rose to 2.36% the following year but then dipped to 2.17% in 2020 (NBS, 2021).

Nigeria boasts plentiful agricultural assets, featuring extensive cultivable land, beneficial climatic circumstances, and nutrient-rich soil. However, continual reductions in fiscal commitments to agriculture, relative to the complete budget, have led to insufficient funding for the sector and reduced efficacy. This financial shortfall has made the sector both unprofitable and unsustainable (Wujat, 2015). Relative to other developing countries and even within the African setting, Nigeria's proportion of governmental expenditure allocated for agriculture is conspicuously low (Oyinbo, Zakari, and Rekwot, 2013).

The downturn of the agricultural industry in Nigeria has its roots in the 1970s, when petroleum production started to dominate the economic landscape. The sector's share in GDP, which hovered around 60% during the nation's independence in 1960, dwindled to roughly 25% between 1975 and 1979. While there was a modest upswing between 1979 and 1982, this was not adequate to keep pace with the yearly population increase of 3.4% (Wujat, 2015). Despite agriculture's significance within the Nigerian economy, the nation has leaned heavily on imported goods for its agricultural needs, creating a negative trade balance. From 2010 to 2018, Nigeria's import expenditures on agricultural commodities amounted to a staggering total of US$231,550,000 (CBN, 2018). In a nutshell, the agricultural domain in Nigeria has grappled with issues like diminished efficiency, lack of sufficient funds, and a strong dependency on imported goods. Its performance has been influenced by several factors, such as limited utilization of contemporary farming techniques, inadequate capital investment, and the overpowering presence of the oil sector.

Literature Review

Conceptual Review

Public Sector Expenditure

Governmental expenditure sector encompasses the financial resources allocated by a nation's administration across diverse sectors, including public works, safety measures, and social services like residential options, medical care, and academic institutions. In the past, government expenditure was limited due to the belief in laissez-faire ideologies, which advocated for minimal government intervention. However, in the 20th century, economist John Maynard Keynes argued that government spending plays a crucial role in income distribution. Since then, government expenditure has gradually increased. Idenyi, *et al* (2016).

Overview of Nigeria's Budgetary Allocation to Agricultural Output

Nigeria's budgetary allocation to the agricultural sector has seen an increase of 28.42% between 2010 and 2021, with agricultural exports as a proportion of GDP rising by 79.6% (CBN, 2015). Despite these efforts, the implemented agricultural policies have not been able to significantly boost Nigeria's agricultural industry to the extent of becoming the country's economic engine as desired. The Buhari administration's economic diversification policy aimed to revive and strengthen the agricultural sector in response to the economic downturn caused by a decline in global oil prices and the devaluation of the naira. This period witnessed substantial investment in capital expenditure in the agricultural industry.

Over the past five years, the Ministry of Agriculture received a boost of 592.9 billion naira. (CBN, 2006). However, although the government sought alternatives to oil, the budget allocation for the agricultural sector still constituted a small portion of the overall budget during that time. Nigeria faced challenges due to the price war and the impact of the COVID-19 pandemic on global oil prices, which also had repercussions on agricultural output through lockdown measures. Agriculture has played a significant role in Nigeria's economy, contributing over 20% of the GDP for the past two decades and employing more than 40% of the workforce, with the majority of jobs located in rural areas.

The Economic Recovery and Growth Plan (ERGP) launched by President Buhari's administration, targeted comprehensive expansion by diversifying industrial outputs and ensuring sustenance in food and energy between 2017 and 2020. The administration aimed to leverage the agricultural industry to boost job creation, secure food supply, and curtail the amount of foreign currency used for importing foodstuffs. As a result, substantial financial resources were channeled into the agricultural sector, with budgetary allocations of 135.6 billion naira in 2017, escalating to 203 billion and then slightly decreasing to 137.9 billion naira in 2018 and 2019, correspondingly. Nevertheless, in spite of these initiatives, the sector's share in the nation's GDP persisted at a modest level, fluctuating between 20% and 21%. As noted by Romanus and colleagues in 2020. Overall, Nigeria's agricultural sector has received increased budgetary allocations in recent years, but the desired level of growth and transformation has not been fully realized, leading to a relatively low contribution to GDP. Overall, Nigeria's agricultural sector has received increased budgetary allocations in recent years, but the desired level of growth and transformation has not been fully realized, leading to a relatively low contribution to GDP.

Theoretical Review

The Classical Versus the Keynesian Approach to Public Expenditure

Classical economists believed that government interference in the economy was more harmful than beneficial, advocating for a laissez-faire approach where the private sector takes on the majority of state activities. Adam Smith, in his book "The Wealth of Nations" (1776), strongly argued for a laissez-faire economy, where the pursuit of profit would drive economic growth.

However, after the Great Depression of 1929-1930, traditional economists who had previously rejected government involvement recognized the role of market imperfections. They argued that inflexible labor unions obstructed salary adaptability and were a factor in elevated joblessness rates. Conversely, proponents of Keynesian economics endorsed state involvement to correct these market flaws.

In his seminal work, "The General Theory of Employment, Interest, and Money" (1936), John Maynard Keynes took issue with classical economic thinkers for their long-term orientation and their trust in a self-regulating, laissez-faire market. Keynes contended that state intervention was essential for mitigating economic slumps, positing that heightened public sector expenditure could energize economic performance, thereby creating additional employment and amplifying consumer spending. He perceived state expenditure as an external catalyst capable of fostering economic advancement, particularly in the near term.

For this investigation, the Keynesian paradigm concerning public investment serves as the foundational theory. Supporters of Keynesian economics call for augmented state spending as a lever to stimulate and expedite economic progression. Drawing from this viewpoint, the research aspires to evaluate the influence of fiscal allocations by the Nigerian government on augmenting agricultural production, and to scrutinize patterns, frameworks, and state-led strategies that could be instrumental in optimizing agricultural yield.

Policies of Public Expenditure in Nigeria

The Second National Strategy for Development (1970-1974) acknowledged the restrictions of the private sphere due to funding limitations, structural challenges, and the latent hazard of external dominance. Consequently, a notable part was allocated to the government, and the significance of state-run corporations in fostering expansion and self-sufficiency was stressed. The Third National Blueprint (1975-1980) advocated for a redistribution of assets towards countryside regions, which hadn't reaped substantial rewards from the economic surge of the 1970s. During this epoch, governmental outlays were projected to assist small-scale agriculturists and residents of rural communities. Buba et al (2023)

Nonetheless, the succeeding National Strategy (1981-1985) grappled with fiscal limitations, causing an emphasis primarily on monetary regulations aimed at revenue accumulation via enhanced tax initiatives and curtailing public finances. The roll-out of the Structural Adjustment program (SAP) in July 1986 conceded the prospect of diminishing state funding resources for the later segment of the 1980s and onwards. An unpredictable petroleum marketplace and the imperative to slash governmental expenses, specifically those requiring foreign currency, compelled these actions.

In a manner akin to prior measures from international institutions like the IMF and World Bank, endeavors were undertaken to trim down state expenditures. These actions encompassed moderating the growth of governmental salaries, cutting back subsidies for agricultural additives, edibles, fuel, and related products, postponing or constraining fresh capital projects, and streamlining state-owned enterprises via privatization and market-oriented reforms. The objective was to fortify budgetary oversight and amplify managerial efficacy. In the initial National Rotational Plan (1990-1992), the government aimed to tackle rising price levels by optimizing its financial allocations to be more economical, while also bringing them in line with the nation's assets, attainable developmental goals, and comprehensive fiscal equilibrium.

Empirical Review

Mathew and Mordecai (2016), carried out an investigation to assess the effects of public agricultural expenditure on agricultural output in Nigeria, spanning the years from 1981 to 2014. Utilizing yearly sequential data gathered from the Central Bank of Nigeria, they deployed a range of statistical measures like the Augmented Dickey-Fuller evaluation, Johansen Co-integration analysis, Error Correction Approach (ECM), and Granger Cause-and-Effect assessment. The outcomes from the Johansen Co-integration assessment highlighted a durable connection among agricultural output, public agricultural investment, loans from commercial banks to the farming sector, and interest levels. The ECM model's conclusions signaled that public agricultural expenditure wielded a notable yet detrimental influence on agricultural output, while bank loans to the farming sector and interest rates exerted negligible beneficial impacts on Nigeria's agricultural production.

Uremadu and his team (2018), carried out an independent analysis exploring the effects of government agricultural spending on farming output, making use of chronological data from the years 1981 to 2014. They examined the information through co-integration tests and a vector error adjustment model. The findings from the Johansen co-integration trials indicated a durable relationship between farming output and state agricultural finances. Insights from the vector error modification framework showed that agricultural yield quickly adapted to shifts in comprehensive government agricultural investment, real currency exchange rates, loan accessibility from the banking sector for the farming industry, average annual rainfall metrics, and population growth rate.

De and Dkhar (2021), probed the short-term and enduring correlations between farming yields in Meghalaya and state financial allocations to agriculture and correlated sectors. They applied the ARDL methodology for co-integration and used an error adjustment version of the ARDL model with annual time-series datasets running from 1984 to 2014. The investigation confirmed a long-term linkage between the variables under consideration and underscored that government agricultural spending significantly decreased agricultural output in the long run. Sebastian, Florence, and Charity (2018), executed a study to explore how Nigerian state agriculture investments influenced farming yields, considering data from 1990 to 2014. The study included all factors during the unit root evaluation, which was followed by applying a vector error rectification model, co-integration examination, and another unit root evaluation. The Johansen co-integration tests pointed to a sustained linkage

between farming yields and government agricultural expenditure. The vector error correction model outcomes demonstrated that alterations in comprehensive governmental agricultural investments, real currency exchange rates, agricultural sector credit from banks, mean yearly rainfall amounts, and rates of population growth rapidly bore on agricultural production.

Methodology

The investigation made use of ancillary information gathered from multiple platforms, encompassing the National Bureau of Statistics (NBS), the Central Bank of Nigeria (CBN), Statistical Digests, Yearly Financial Summaries, Economic and Financial Analyse. The scrutiny spanned the years ranging from 1990 to 2021.

Theoretical Framework

The conceptual underpinning of this investigation is rooted in Keynesian doctrine, formulated by the UK financial theorist John Maynard Keynes in the 1930s. In accordance with Keynesian viewpoints, government expenditure can exert a beneficial influence on industry expansion, notably within the agricultural arena in Nigeria. Considering Nigeria's substantial dependence on agriculture, the ripple effect of governmental financial contributions on gross domestic product merits attention. Through financial commitments to the agricultural sector, like machinery enhancements, amplified yields, and stable job openings, Nigeria could witness increased efficiency, trade augmentation, and eventually, an elevation in economic development.

Model Specification

The functional model of the study is thus;

The implicit function is

$AO = f(GEA, GCA)$ ---------- (1)

Where:

AO = Agricultural output (in **N** Billions) is the dependent variable

GEA = Government expenditure on Agriculture (in **N** Billion) independent variable

GCA = Government credit to agriculture (in **N** Billion) independent variable

It is expressed explicitly as

$LOG\ AO_t = \alpha + \beta_1 GEA_t + \beta_2 GCA + u_{1t}$ ---------- (2)

Where:

A = intercept

$\beta_{1\&}\beta_2$ = parameter estimates of the regressor

u_1 = stochastic error term.

The ARDL model specification

$$\Delta LOG\ AO_t = \alpha + \sum_{i=1}^{q} \beta_1\ LOG\ AO_t + \sum_{i=1}^{q} \beta_2\ GEA_{t-1} + \sum_{i=1}^{q} \beta_3\ GCA_{t-1} + \beta_4 \Delta LOG\ AO_{t-1} + \beta_5 \Delta GEA_{t-1} + \beta_6 \Delta GCA_{t-1} + \mu t \quad (3)$$

Where:

AO	=	Agricultural Output
GEA	=	Government Expenditure to Agriculture
GCA	=	Government Credit on Agriculture
LFA	=	Labour Force on Agriculture
Δ	=	First differencing operator
μ	=	Error term
α	=	Constant Coefficient
$\beta_1.\beta_6$	=	Parameter Coefficients for the independent variables

Results and Discussion

Unit root

The unit root evaluation was conducted to examine the stability of the variables within the model and to confirm that their data didn't exhibit extreme fluctuations. The findings from the unit root assessments are outlined as follows:

Table 1: Summary of Unit Root test results using the ADF Procedure

VARIABLES	ADF TEST STATISTICS	CRITICAL VALUES	ORDER OF INTEGRATION
Agricultural Output (AO)	-5.131792	-3.568379	I(1)
Government Expenditure on Agriculture (GEA)	-6.433583	-3.568379	I(1)
Government Credit on Agriculture (GCA)	-8.291204	-2.963972	I(1)

Note: The test includes both Trends and Intercepts and all are at 5% level of significance.
Source: Authors Computation, 2022 (Eviews-12)

Agricultural output, Government Expenditure on Agriculture, and Government credit on Agriculture variables were determined to be stationary at order one and at the 5% level of significance using the ADF test.

Cointegration Test Result

After conducting the stationary test, it is important to examine whether there exists a long-run relationship between the time series variables. This is done through a cointegration test, which helps in improving the reconciliation of short-term variations and achieving convergence. Only variables that are found to be cointegrated are considered suitable for inclusion in the error correction model, as it allows for better estimation of the error correction process.

Table 2: Summary of Cointegration Test

F-Bounds Test			**Null Hypothesis: No levels relationship**	
Test Statistic	Value	Signif.	I(0)	I(1)
		Asymptotic: n=1000		
F-statistic	18.23290	10%	4.19	5.06
K	2	5%	4.87	5.85
		2.5%	5.79	6.59
		1%	6.34	7.52

Source: Authors Computation, 2022 (Eviews-12)

Given that the F- statistics value of 18.23290 is higher than the lower I(0) and upper I(1), 4.87 and 5.85 respectively constraints at the 5% level of significance, the boundaries test concludes that there is a long-run relationship between the variables.

Estimation Regression for ARDL-ECM

Table 3 showcases the examination of the short-term linkage between the dependent and independent factors, in addition to the evaluation of long-term balance. The Error Correction Mechanism (ECM) offers perspectives on the duration needed for the association to achieve a stable state over an extended period, signifying its resilience.

Table 3: Summary of Short-Run, Long-Run, and ECM Results of the ARDL Model Dependent Variable of Logged Agricultural Output

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.***
LOG(AO(-1))	0.705781	0.11985	5.888768	0.0000
GCA	-0.000278	0.00011	-2.54459	0.0189
GEA	-0.000265	0.00078	-0.34127	0.7363
GEA(-1)	-0.000363	0.00081	-0.44943	0.6577
GEA(-2)	-0.001023	0.00083	-1.2268	0.2335
GEA(-3)	0.003183	0.00088	3.620072	0.0016
C	2.352736	0.9297	2.53063	0.0194
@TREND	0.024755	0.01177	2.102527	0.0477
CointEq(-1)*	-0.294219	0.09027	-3.2592	0.0038
R-squared	0.993053			
Adjusted R-squared	0.990737			
Durbin-Watson stat	1.54865			
F-statistic	428.8378			
Prob(F-statistic)	0.00000			
LONG-RUN				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
GCA	-0.000946	0.00035	-2.6694	0.0143
GEA	0.005204	0.00724	0.718647	0.4803

Source: Authors Computation, 2022 (Eviews-12)

The cointegration equation's error correction term is both statistically significant (with a probability value less than 0.05) and negative, indicating its importance. It suggests that

deviations from the long-term relationship between variables are corrected at a rate of less than 1. The high R2 value of 0.99 for the independent variables demonstrates their strong predictive power, as they account for 99% of the changes in agricultural output. This indicates a substantial correlation between the independent variables and industrial production, with only a minimal 1% contribution from other factors that were not included in the model. The model's suitability for economic and policy making is supported by the probability value (prob) associated with the F-statistic, which is 0.00000, indicating its significance. Additionally, the Durbin-Watson statistic of 1.54865 suggests the presence of positive autocorrelation in the data.

Analyzing the individual variables, the constant term represents autonomous (AO) factors, which account for 70% of agricultural output without any assistance from government credit or government expenditure (GCA). A $1 billion increase in government credit for agriculture is associated with a decrease in agricultural output of -0.000278 percent. On the other hand, government spending on agriculture (GEA) has a negative relationship with agricultural output, but this relationship is not statistically significant (p-value of 0.7363). Specifically, a $1 increase in government spending on agriculture leads to a decline in agricultural output of 0.000265 percent.

Diagnostic Tests

The computed model's residual was examined for serial correlation and heteroskedasticity to determine its robustness. The Breusch-Godfrey Test for Serial correlation and the Breusch-Pagan-Godfrey Test for Variance Inconsistency were employed for this examination.

Table 4: Residual-Based Diagnostic Tests

Breusch-Godfrey Serial Correlation LM Test	
F-statistic	0.653784
p-values	0.5314
Heteroskedasticity Test: Breusch-Pagan-Godfrey	
F-statistic	18.09092
p-values	0.0000

The Breusch-Godfrey Serial Correlation LM test cannot dismiss the null assumption of "no sequential dependencies," based on the given outcome, which generates a p-value of 0.5314 for the F-measure (0.653784). The F-value (18.09092) turns out to be statistically meaningful for the Breusch-Pagan-Godfrey Test for Variance Inconsistency, having a p-value of 0.0000. Consequently, the residual of the estimated ARDL framework shows heteroscedastic.

Conclusion and Recommendation

This research made use of datasets ranging from 1990 to 2022 to explore the effects of government expenditure on agricultural output within Nigeria. By applying the Autoregressive Distributive Lag (ARDL) approach, the investigation indicated an adverse association between both governmental financial support to the farming sector and state spending on agriculture in relation to agricultural output. Based on the findings of this study,

the following recommendations are proposed:

1. Effective management of allocated resources in the agricultural sector is crucial, as merely increasing the budgetary allocation to the sector does not guarantee improved performance. Consistent implementation of government policies and programs is essential to enhance the sector's functioning.
2. Many farmers are hesitant to seek loans from financial institutions due to concerns about collateral security and high-interest rates. Therefore, the government should enact legislation that fosters a favorable lending environment for agricultural investments. Additionally, significant funding should be directed towards banks specializing in agriculture, such as Agricultural Development Banks (ADBs) and similar institutions, to support farming operations. By implementing these recommendations, it is expected that the agricultural sector in Nigeria can be strengthened and its contribution to the overall economy enhanced.

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