Government Agricultural Expenditure, Agricultural Output and Economic Growth in Nigeria: A Structural Vector Autoregressive Approach

Dennis Terpase Nomor and **Emmanuel Terngu Udele**
Department of Economics, Benue State University, Makurdi.

Corespondence: tenoms80@gmail.com

Abstract
The persistent rise in government agricultural spending amidst unsteady growth has become an empirical concern. This study therefore, examined how economic growth respond to government recurrent and capital agricultural expenditure through agricultural output channel in Nigeria from 1981-2022. The analytical technique utilized was Structural Vector Autoregressive (SVAR) model. The contemporaneous result indicated that agricultural output responds positively to government recurrent agricultural expenditure. Similarly, economic growth responded to agricultural output positively. Result further showed that agricultural output has negative contemporaneous response to government capital agricultural expenditure while agricultural output had positive instantaneous effect on economic growth in Nigeria. The study concluded that economic growth responded positively to government recurrent agricultural expenditure through agricultural output contrary to the adverse influence of government capital agricultural expenditure to economic growth through agricultural output in Nigeria. It was recommended among others that government should improve on monitoring the use of funds meant for capital agricultural projects to ensure overall efficiency.

***Key words**:* Economic growth, agricultural output, government agricultural expenditure

1. Introduction

The significance of government expenditure in economies worldwide is a prevalent concern. Over the years, the size of government spending and its impact on economic dynamics has garnered considerable scholarly attention. This trend towards increased government expenditure seems consistent across nations, irrespective of their developmental stage (Ahuja & Pandit, 2020). Government funding plays a crucial role in sustaining various economic activities, without which many would be severely limited or non-existent (Bucci & Cozzi, 2021).

The debate surrounding the contribution of government spending to economic growth, particularly in terms of its magnitude, remains ongoing. The central issue revolves around whether extensive government spending aligns with the objective of fostering rapid economic development (Onuoha & Okoye, 2020). Proponents of substantial government spending argue that it can boost productivity, thereby enhancing growth (Hajamini & Falahi, 2018). This viewpoint resonates with Keynesian economics, suggesting that government intervention in spending stimulates demand, thereby bolstering economic performance. Empirical evidence from studies by Evans and Karras (1994), Mishra and Mohanty (2021), and Buthelezi (2023) supports this notion, highlighting the positive impact of government expenditure on economic growth. Conversely, critics contend that excessive government spending may impede growth due to inefficiencies inherent in government institutions and governance structures (Bassanini et al., 2001; Nurlina, 2015). Gupta (1989) suggests that the relationship between economic growth and government spending hinges on how these funds are utilized. Okoye et al. (2019) further support this argument, asserting that while government spending may hinder economic growth, investment in education can foster it. In the context of Nigeria, statistical data reveals a notable increase in total government agricultural expenditure from ₦53.99 billion in 2018 to ₦81.87 billion in 2022 (CBN, 2022). This sustained investment, encompassing both recurrent and capital expenditure, is anticipated to generate greater output, potentially stimulating economic growth.

The agricultural sector plays a pivotal role in driving a nation's economic growth, serving as the primary source of food and raw materials for agro-industrial processing, while also generating employment opportunities and supporting industrial production (Eleri et al., 2012; Omekwe et al., 2018). Despite its importance, the sector's contribution to national income has been on a downward trajectory over the years. While it once accounted for approximately 60% of national income in the 1960s, by 1981, this figure had plummeted to just 12.24%, remaining below 25% in subsequent years, except for a few exceptions such as 2002, 2003, 2004, and 2009, when contributions reached 36.965%, 33.827%, 27.23%, and 26.749% respectively (CBN, 2022).

The success of Nigeria's agricultural sector is closely tied to government initiatives and expenditure. Over the years, successive governments have introduced various agricultural programs and policies aimed at boosting economic growth through agricultural output. These include initiatives such as the National Accelerated Food Production Program (1973), Operation Feed the Nation (1976), the Agricultural Development Fund (2002), the 7 Points Agenda emphasizing Food Security and the Agricultural Transformation Agenda (2009), the Anchor Borrowers Program (2015), and the Presidential Fertilizer Initiative (2016) (Ahungwa et al., 2014; Toromade, 2018; CBN, 2020). Despite these efforts, Nigeria's Gross Domestic Product (GDP) growth rate has experienced fluctuations, standing at 0.8% in 2017, 1.9% in 2018, 2.2% in 2019, -1.8% in 2020, and 3.10% in 2022 (CBN, 2022). The juxtaposition of rising government agricultural spending amidst the erratic growth of the Nigerian economy has prompted the need for empirical investigation. This study delves into the impact of government recurrent agricultural expenditure and capital agricultural expenditure on economic growth through output. Its findings are of immense relevance to the Nigerian government for policy formulation and implementation aimed at enhancing production in the agricultural sector. Additionally, the research provides valuable insights for policymaking concerning the allocation of substantial public investments in agriculture as a strategy for economic diversification. Furthermore, the study offers essential policy recommendations to government organizations and agencies to efficiently manage financial resources allocated to the agricultural sector, thereby maximizing output. The subsequent sections of this paper are structured as follows: Literature review is in section 2, section 3 is the methodology, results and discussion are in section 4, while section 5 is the conclusion and recommendations.

2 Review of Literature

2.1 Conceptual Clarification

Government agricultural expenditure encompasses the financial resources allocated and spent by governments on various agricultural projects, programs, and initiatives (Ukpong et al., 2022). These expenditures aim to bolster agricultural development, improve rural livelihoods, enhance productivity, and address various challenges encountered by the agricultural sector. Government agricultural expenditure in the view of Buari, Alexander, Saheed, and Alfa (2020), is the amount that local/municipal, regional, and national governments spend on agriculture out of their annual budgetary allotments. They cover expenses related to crop development, seed production and distribution, fertilizer procurement, agricultural mechanization, extension services, pest and disease control, soil conservation, irrigation, and research. According to Pernechele, Fontes, Baborska, Nkuingoua, Pan, and Tuyishime's (2021), government expenditure on agriculture refers to transfers made by the government to economic agents (producers and input suppliers) for general support for agricultural infrastructure, research and development, and extension services, marketing, storage, or inspection facilities, among other things, as well as administrative costs. Government expenditure on agriculture includes all of the costs that the government incurs in this industry, including those for policies and programs, grants and subsidies provided to farmers, pest control services, inspection services, irrigation and drainage system, crops inspection services, and agriculture extension services, among other things (Agbana & Lubo, 2022). This study considered government expenditure on agriculture as the financial resources allocated by a government to support and develop the agricultural sector. This expenditure plays a crucial role in fostering agricultural growth, food security, and rural development. This means that the incurred expenses in the agricultural sector have huge expected returns in terms of output improvement.

Conversely, agricultural output comprises several components, including sales of agricultural products (including trade between agricultural entities), changes in inventory, products for self-consumption, output intended for further processing by agricultural producers, and internal consumption of livestock feed products (Eburajolo & Aisien, 2019). Agricultural output is measured in monetary units, representing the total value of all agricultural production minus the value of intermediate inputs originating within the agricultural sector. This total, inclusive of both cash and non-cash transactions (such as barter, trade, and self-consumption), is termed "final output" and differs from agricultural GDP by not subtracting the value of non-agricultural inputs. Agricultural output is the main measure of individual crop and livestock output.

According to Omekwe, Bosco and Obayori (2018), agricultural output comprises: (a) Crop enterprise output: It is the total value of crops produced by the farm (other than losses in the field and in store). It includes crops used for feed and seed by the farm business and those consumed in the farmhouse and by farm labour. Crop enterprise output is calculated on a "harvest year" as distinct from an "accounting year" basis; that is, it refers only to those crops (with the exception of certain horticultural crops) wholly or partly harvested during the accounting year and excludes any crop carried over from the previous year. Thus valuation changes (between the previous and current crops) are not relevant and the total harvested yield of the crop is valued at market prices (plus any subsidies). However, any difference between the opening valuation of any stocks of previous crops and their ultimate disposal value (sales, used on farm and any end-year stocks) is included in total farm output. (b) By-products, forage and cultivations: This category covers the value of output of the by-products of agricultural activity, sales of fodder, valuation changes for fodder and cultivations. It also covers revenue from the letting of bare land or forage on a short-term lease. (c) Livestock enterprise output: This comprises the total sales of livestock and livestock products including direct livestock subsidies and production grants received, part of the valuation change (see below), produce consumed in the farmhouse and by labour and the value of milk and milk products fed on the farm (excluding direct suckling) adjusted for debtors at the beginning and end of the year (except for direct livestock subsidies) and transfers between enterprises; less purchases of livestock and livestock products from outside the farm business. Stock appreciation for breeding livestock (cattle, sheep and pigs) has been excluded from individual livestock enterprise outputs. However, changes in the numbers of breeding livestock between the opening and closing valuation and the total valuation change of trading livestock are included. Unlike crop enterprise output, livestock enterprise output is calculated on an accounting year basis. (d) Miscellaneous output: Miscellaneous output covers the value of output from those activities which are still within the agricultural cost center but do not fall within either livestock or crop enterprise output. These will include revenue from way-leaves, agricultural hire work, sundry woodland sales, contract farming rent, miscellaneous insurance receipts and compensation payments.

Agricultural output in this study is referred to the quantity and quality of agricultural products and goods produced by a country, region, or farm over a specific period. This output is a key indicator of the performance and productivity of the agricultural sector, which is crucial for food security, economic development, and overall well-being. It is measured as the percentage of contribution of agriculture to a country's overall GDP, which includes the value of agricultural output and related activities.

Furthermore, economic growth refers to the proportional or percentage increase in real income over a specific period, typically a year. It signifies the pace of growth, whether positive or negative, in the gross domestic product (GDP). Essien (2001) and Vintila and Mocanu (2023) assert that, economic growth takes place when there is a real or nominal rise in an economic variable that typically lasts over time. According to Ogunjinmi (2022) economic growth describes the consistent rise in real per capita income resulting from a sustained rise in the country's gross domestic product or output over an extended period of time, frequently a year. It can be defined as a rise over time in the market value of the goods and services an economy generates, with inflation taken into account. Economic growth was concisely and precisely described by Uwakaeme (2015) as the increase in the total amount of goods and services generated in an economy during a specific time period. When the entire output of goods and services in a given year is divided by the population of that country during a certain time period, economic growth may be described in terms of per capita income.

In line with Palmer (2012), economic growth is the rise in a nation's potential to generate more goods and services as a result of that country's rising output levels. Because economic development is often associated with an increase in the nation's overall standard of living, the availability of products and services is frequently used to determine a country's standard of living. In the opinion of Suprapto and Saleh (2022), economic expansion is an economic activity that raises the expenses of goods and services provided to society while also improving people's welfare. Long-term macroeconomic concerns include the issue of economic growth. A country's capacity to generate products and services keeps growing from one time to the next. Mladen (2015) consider economic growth as the steady rise in a nation's output volume or an increase in its gross domestic product as the primary quantitative measures of production over a year. It suggests a yearly rise in material production measured in value, the pace of growth of the GDP, or the level of the national income. Growth is possible since economic development is not achieved by it. However, due to the complexities involved in measuring economic development, the study limited it focus to broad economic growth. GDP is used to measure economic growth. Economic growth is defined as an increase in a country's economic activities measured in gross domestic product (GDP), which is determined by the sectoral contribution.

2.2 Theoretical and Empirical Review

This research is grounded in the Keynesian theory of Government Expenditure, which originated during the 1930s amidst attempts to comprehend the Great Depression. John Maynard Keynes laid the groundwork for Keynesian economics during this period, focusing on "demand-side" concepts that emphasize sudden economic shifts. Prior to the emergence of Keynesian economics, classical economic theory presumed minor, self-adjusting cyclical fluctuations in employment and economic output. However, this assumption was fundamentally challenged during the significant downturn of the 1930s, famously known as the Great Depression, leading to the development of Keynesian economics. Keynes (1936) posited that structural rigidities and specific characteristics inherent in market economies would exacerbate economic distress, leading to a further decline in aggregate demand. He advocated for government intervention during times of economic turmoil, arguing that economies inherently lack stability and that government spending and policies should be increased to achieve this stability.

A study by Christopher et al. (2024) on the impact of government expenditure on agricultural output in Nigeria using the Autoregressive Distributed Lag (ARDL) model uncovered a negative correlation between both government credit to agriculture and government expenditure on agriculture and agricultural output. However, the study did not encompass how economic growth responds to recurrent and capital agricultural expenditure via output. A study by Onalo et al. (2016) explored the relationship among capital, recurrent, aggregate expenditures, and economic growth in Nigeria from 1981 to 2014, employing Johansen cointegration tests and Granger causality techniques. The findings indicated a robust correlation between capital expenditures and economic growth. In a separate study focusing on data from 1983 to 2019 in South Africa, Ngobeni and Muchopa (2022) investigated the effects of government spending on agricultural output. Their research, utilizing the Johansen cointegration test, highlighted a long-term relationship. However, the Granger causality test suggested that government spending on agriculture does not lead to an increase in the value of agricultural output. Additionally, a vector autoregressive (VAR) model analysis demonstrated that an increase in government spending on agriculture, average annual rainfall, and population would ultimately enhance the value of agricultural output.

Salisu and Haladu (2021) utilized annual time series data spanning from 1985 to 2019 to explore the short- and long-term connections among agricultural output, government spending, and economic growth in Nigeria. Employing the Autoregressive Distributive Lag (ARDL) model, their findings unveiled a positive long-term effect of government spending on Nigeria's economic growth, while the short-term effect was negative. Furthermore, the study revealed that both government spending and agricultural output positively influence Nigeria's economic growth. Similarly, in Nigeria, Atayi et al. (2020) investigated how Nigerian government spending impacts agricultural output using Ordinary Least Squares methodology over the period from 1981 to 2018. Their study uncovered a positive impact of government spending (both capital and recurrent) on agricultural output in Nigeria. These empirical studies highlight a scarcity of research focusing on how economic growth responds to government recurrent or capital agricultural expenditure through the agricultural output channel.

3.0 Methodology

3.1 Kind and Sources of Data

This study utilized time series data obtained from the Central Bank of Nigeria (CBN). Specifically, data on Real Gross Domestic Product (RGDP), serving as a proxy for economic growth, government agricultural expenditure, and agricultural sector output, all measured in billion naira, were sourced from the Central Bank of Nigeria (CBN) Annual Statistical Bulletin spanning the years 1981 to 2022. The selection of this time frame was driven by data availability, encompassing periods from the military era through various democratic regimes. The starting period of this study is anchored on the premise that it coincided with the onset of a global economic recession, which precipitated declining foreign exchange earnings, balance of payment disequilibrium, and unemployment within the Nigerian economy. During this period, significant attention was directed towards the agricultural sector as a strategic avenue for sustaining the economy.

3.2 Model Specification

Model 1: The specified model in this study is based on the Keynesian theory of government expenditure. According to the theory, government expenditure is capable of improving economic growth of a country. Also, following Salisu and Haladu (2021) model which was in line with Keynes theory was specified as:

$$RGDP = GVEX \quad -------------- 1$$

Where; *RGDP* = Real Gross Domestic Product a proxy of economic growth, and GVEX = Government expenditure.

Aligned with the study's aim, which delved into the impact of government agricultural expenditure (comprising both capital and recurrent expenditure) on economic growth via the agricultural output channel. However, in the budgetary context, financial resources are typically not universally dispersed throughout the economy, but rather allocated to specific economic sectors, including agriculture, to enhance their output (CBN, 2022). As proposed by Gavrilova (2020), outputs from the agricultural sector possess the potential to catalyze economic growth. This suggests that agricultural recurrent expenditure could influence economic growth through agricultural output. The transmission is thus:

$$GREA \rightarrow AGOP \rightarrow RGDP$$

Where; GREA represents Government agricultural recurrent expenditure, AGOP signifies Agricultural sector output, and RGDP stands for Real Gross Domestic Product. These variables were incorporated into the Structural Vector Autoregressive (SVAR) model in the following format. Thus, utilizing an SVAR (1) with 3 variables, the model is expressed in the form:

$$Z = [\text{GREA}, AGO,\ RGDP]' \quad ------- \ --------1$$

The variables entered the SVAR model in their level form. Thus, utilizing an SVAR (1) with 3 variables, the model is expressed in the form:

$$RGDP_t = f\left(RGDP_{t-1}, AGOP_{t-1,} GREA_{t-1}\right) ---------- 2$$

$$AGOP_t = f\left(RGDP_{t-1,} AGOP_{t-1} GREA_{t-1}\right) ----------3$$

$$GREA_t = f\left(RGDP_{t-1}, AGOP_{t-1,} GREA_{t-1}\right) ----------4$$

Thus, to justify specifications of the order of the variables in the model yield the under listed transposed matrix of the form:

$$RGDP_t = f\left(RGDP_{t-1}, AGOP_{t-1,} GREA_{t-1}\right) ---------------5$$

$$AGOP_t = f\left(RGDP_t, RGDP_{t-1}, AGOP_{t-1,} GREA_{t-1}\right) ----------- 6$$

$$GREA_t = f\left(RGDP_t, RGDP_{t-1},\ AGOP_t, AGOP_{t-1,} GREA_{t-1}\right) ------ 7$$

Thus, the exposition of the normalized SVAR system of equations yields:

$$RGDP_t = \beta_{11}^1 RGDP_{t-1} + \beta_{12}^1 AGOP_{t-1} + \beta_{13}^1 GREA_{t-1} + \beta_{12}^0 AGOP_t + \beta_{13}^0 GREA_t + \varepsilon_{1t} -------8$$

$$AGOP_t = \beta_{11}^1 RGDP_{t-1} + \beta_{12}^1 AGOP_{t-1} + \beta_{13}^1 GREA_{t-1} + \beta_{12}^0 RGDP_t + \beta_{13}^0 GREA_t + \varepsilon_{1t} -------9$$

$$GREA_t = \beta_{11}^1 RGDP_{t-1} + \beta_{12}^1 AGOP_{t-1} + \beta_{13}^1 GREA_{t-1} + \beta_{12}^0 RGDP_t + \beta_{13}^0 AGOP_t + \varepsilon_{1t} -------10$$

Collecting the contemporaneous effects to the left hand side (LHS) yields and presenting in a matrix form, the over-parameterized SVAR model is specified as:

$$\begin{bmatrix} 1 & -\beta_{12}^0 & -\beta_{13}^0 \\ -\beta_{21}^0 & 1 & -\beta_{23}^0 \\ -\beta_{31}^0 & -\beta_{32}^0 & 1 \end{bmatrix} \begin{bmatrix} RGDP_t \\ AGOP_t \\ GREA_t \end{bmatrix} = \begin{bmatrix} \beta_{11}^1 & \beta_{12}^1 & \beta_{13}^1 \\ \beta_{21}^1 & \beta_{22}^1 & \beta_{23}^1 \\ \beta_{31}^1 & \beta_{32}^1 & \beta_{33}^1 \end{bmatrix} \begin{bmatrix} RGDP_{t-1} \\ AGOP_{t-1} \\ GREA_{t-1} \end{bmatrix} \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \end{bmatrix} ---11$$

The SVAR model described above is not estimable due to the imbalance between the number of parameters and equations. In line with economic theory and institutional understanding, constraints will be applied to certain elements of the A_0 matrix to address the identification issue in SVAR. Employing a recursive methodology, the study imposed restrictions, setting the upper elements above the matrix diagonal to zero. In other words, we set $-\beta_{12}^0 = -\beta_{13}^0 = \beta_{23}^0 = 0$.

Therefore, the generic SVAR model can be specified as:

$$A_0 Z_t = A_1 Z_{t-1} + A_2 Z_{t-2} + \ldots + A_P Z_{t-P} + \varepsilon_t --------------12$$

$$A_0 Z_t = A_1 Z_{t-1} + \varepsilon_t --------------------13$$

Where; $A_0 = 3\times 3$ matrix of contemporaneous effects of endogenous parameters, $Z_t = 3\times 1$ column vector matrix of estimable endogenous variables; $A_1 = 3\times 3$ matrix of estimable endogenous variables, $Z_{t-1} = 3\times 1$ column vector matrix of lagged estimable endogenous variables

$\varepsilon_t = 3\times 1$ column vector matrix of error terms in the system. With VAR (ε_{it}) set to unity and A_0 being chosen to capture the contemporaneous interactions among the Z_t, along with the standard deviation of the structural shocks in the model. Since most macroeconomic variables are recursive in nature, restricting A_0 matrix above in the recursive specification yields:

$RGDP_t = lags + \varepsilon_{1t}$ …………………………………………………………………14

$AGOP_t = \beta_{21}^0 RGDP_t + lags + \varepsilon_{2t}$ ……………………………………………………15

$GREA_t = \beta_{31}^0 RGDP_t + \beta_{32}^0 AGOP_t + lags + \varepsilon_{3t}$ …………………………………16

Thus, the parsimonious form of the model is specified in a triangular matrix below:

$$A_o = \begin{bmatrix} 1 & 0 & 0 \\ -\beta_{21}^0 & 1 & 0 \\ -\beta_{31}^0 & -\beta_{32}^0 & 1 \end{bmatrix} \begin{bmatrix} RGDP_t \\ AGOP_t \\ GREA_t \end{bmatrix} = \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \end{bmatrix} -------------17$$

A_0 =From our equation (4. 26), where $A_0 Z_t = A_1 Z_{t-1} + \varepsilon_t$,

In this study, one of the constraints utilized involves imposing a recursive structure on the system. This approach assumes that A_0 is predominantly lower triangular, and that the structural shocks are uncorrelated. This method aids in identifying the parameters of the structural equations. World's proposal effectively reduces the number of unknown parameters to match precisely the number estimated in the aggregate model.

More so, A_0 which is a lower triangular matrix, measures the contemporaneous effects or long run path. This implies that $\text{var}(\varepsilon_{1t}) = \sigma_1^2$, $\text{var}(\varepsilon_{2t}) = \sigma_2^2$, $\text{var}(\varepsilon_{3t}) = \sigma_3^2$, $\text{var}(\varepsilon_{4t}) = \sigma_4^2$ such that $\text{cov}(\varepsilon_{1t}\varepsilon_{2t}\varepsilon_{3t}\varepsilon_{4t}) = 0$. The zeros at the upper diagonal imply that there must be no serial correlation among the structural shocks in the model. The *B* matrix measures the structural shocks in the SVAR system. Note that, the lower triangular matrix of variances of the parameters changes to zeros. Furthermore, it is also set to avoid spillover effects of the shocks on other variables in the model. That is Ω_S and Ω_S is a diagonal matrix.

This implies that our normalized SVAR of the form $A_0 Z_t = A_1 Z_{t-1} + \varepsilon_t$ reduces to $A_0 e_t = B\eta_t$. But we know that $B\eta_t = Bu_t$. Hence, the baseline line for our estimable SVAR model can be specified in the reduced form as:

$A_0 e_t = Bu_t$ ………………………………………………………………… 18

In matrix form, we have:

$$\begin{bmatrix} 1 & 0 & 0 \\ -\beta_{21}^0 & 1 & 0 \\ -\beta_{31}^0 & -\beta_{32}^0 & 1 \end{bmatrix} \begin{bmatrix} RGDP_t \\ AGOP_t \\ GREA \end{bmatrix} = \begin{bmatrix} \sigma_1^2\, RGDP & 0 & 0 & 0 \\ 0 & \sigma_2^2\, AGOP & 0 & 0 \\ 0 & 0 & \sigma_3^2\, GREA & 0 \end{bmatrix} \begin{bmatrix} u_{tRGDP} \\ u_{tAGOP} \\ u_{tGREA} \end{bmatrix}$$

$A_0 e_t \quad = \quad B \quad u_t$

Where: A_0 =matrix of long run contemporaneous effects, e_t =column vector matrix of errors for the respective variables, B = matrix of structural shocks in the model, u_t= column vector matrix of structural shocks in the model. Hence the "S" matrix is specified as:

$$e_t = A_0 B u_t = \begin{bmatrix} e_{tRGDP} \\ e_{tAGOP} \\ e_{tPAREX} \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 \\ -\beta_{21}^0 & 1 & 0 \\ -\beta_{31}^0 & -\beta_{32}^0 & 1 \end{bmatrix} \begin{bmatrix} u_{tRGDP} \\ u_{tAGOP} \\ u_{tGREA} \end{bmatrix}$$

Where

$-\beta_{21}^0$ measures the effect of agricultural output (AGOP) on economic growth (RGDP), $-\beta_{31}^0$ determine the effect of government agricultural recurrent expenditure (GREA) on economic growth (RGDP), $-\beta_{32}^0$ ascertain the effect of government agricultural recurrent expenditure (GREA) on agricultural output (AGOP)

Model 2: To examine the impact of Government Agricultural Capital Expenditure on Economic Growth via Agricultural Output in Nigeria. Consistent with Keynesian theory and following the budgetary approach, financial resources are typically allocated to specific economic sectors, such as agriculture, to enhance their output. Government spending in the agricultural sector often takes the form of capital investment. As noted by Gavrilova (2020), output generated from the agricultural sector possesses the potential to stimulate overall economic growth. Therefore, economic growth can emanate from government agricultural capital expenditure through agricultural output. This pass-through effect is written as:

$$GCAX \rightarrow AGOP \rightarrow RGDP$$

Where; *GCAX* = Government agricultural capital expenditure, *AGOP* = Agricultural output, and *RGDP* = Real Gross Domestic Product. The variables in the model will enter the SVAR model in their level form. Thus, utilizing an SVAR (1) with 3 variables, the model will be expressed in the form:

$$Z = [\text{GCAX}\ AGOP\ RGDP]' -----------------------19$$

The variables entered the SVAR model in their level form. Thus, utilizing an SVAR(1) with 3 variables, the model is expressed in the form:

$$RGDP_t = f\left(RGDP_{t-1}, AGOP_{t-1,} GCAX_{t-1}\right) -------------------20$$

$$AGOP_t = f\left(RGDP_{t-1,} AGOP_{t-1} GCAX_{t-1}\right) -------------------21$$

$$GCAX_t = f\left(RGDP_{t-1}, AGOP_{t-1,} GCAX_{t-1}\right) ------------------22$$

Thus, to justify specifications of the order of the variables in the model will yield the under listed transposed matrix of the form:

$$RGDP_t = f\left(RGDP_{t-1}, AGOP_{t-1,} GCAX_{t-1}\right) ---------------------23$$

$$AGOP_t = f\left(RGDP_t, RGDP_{t-1}, AGOP_{t-1,} GCAX_{t-1}\right) ----------------24$$

$$GCAX_t = f\left(RGDP_t, RGDP_{t-1}, AGOP_t, AGOP_{t-1,} GCAX_{t-1}\right) -----------25$$

Thus, the exposition of the normalized SVAR system of equation yields:

$$RGDP_t = \beta_{11}^1 RGDP_{t-1} + \beta_{12}^1 AGOP_{t-1} + \beta_{13}^1 GCAX_{t-1} + \beta_{12}^0 AGOP_t + \beta_{13}^0 GCAX_t + \varepsilon_{1t} --------26$$

$$AGOP_t = \beta_{11}^1 RGDP_{t-1} + \beta_{12}^1 AGOP_{t-1} + \beta_{13}^1 GCAX_{t-1} + \beta_{12}^0 RGDP_t + \beta_{13}^0 GCAX_t + \varepsilon_{1t} -------27$$

$$GCAX_t = \beta_{11}^1 RGDP_{t-1} + \beta_{12}^1 AGOP_{t-1} + \beta_{13}^1 GCAX_{t-1} + \beta_{12}^0 RGDP_t + \beta_{13}^0 AGOP_t + \varepsilon_{1t} --------28$$

Collecting the contemporaneous effects to the left hand side (LHS) yields and presenting in a matrix form, the over-parameterized SVAR model is specified as:

$$\begin{bmatrix} 1 & -\beta_{12}^0 & -\beta_{13}^0 \\ -\beta_{21}^0 & 1 & -\beta_{23}^0 \\ -\beta_{31}^0 & -\beta_{32}^0 & 1 \end{bmatrix} \begin{bmatrix} RGDP_t \\ AGOP_t \\ GCAX_t \end{bmatrix} = \begin{bmatrix} \beta_{11}^1 & \beta_{12}^1 & \beta_{13}^1 \\ \beta_{21}^1 & \beta_{22}^1 & \beta_{23}^1 \\ \beta_{31}^1 & \beta_{32}^1 & \beta_{33}^1 \end{bmatrix} \begin{bmatrix} RGDP_{t-1} \\ AGOP_{t-1} \\ GCAX_{t-1} \end{bmatrix} \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \end{bmatrix} ---29$$

The SVAR model described cannot be estimated due to an excess of parameters compared to equations. As it is not feasible to estimate an over-parameterized model, in line with economic theory and institutional understanding, specific constraints will be applied to certain parameters of the A_0 matrix. This is done to address the identification issue in SVAR. Following the recursive approach, we can impose restrictions on the upper elements above the matrix diagonal to zero. In other words, we set$-\beta_{12}^0 = -\beta_{13}^0 = -\beta_{14}^0 = \beta_{23}^0 = \beta_{24}^0 = \beta_{34}^0 = \beta_{35}^0 = 0$.
Therefore, the generic SVAR model can be specified as:

$$A_0 Z_t = A_1 Z_{t-1} + A_2 Z_{t-2} + \ldots + A_P Z_{t-P} + \varepsilon_t ------------------30$$

$$\Rightarrow A_0 Z_t = A_1 Z_{t-1} + \varepsilon_t --------------------------31$$

Where:
$A_0 = 3 \times 3$ matrix of contemporaneous effects of endogenous parameters, $Z_t = 3 \times 1$ column vector matrix of estimable endogenous variables, $A_1 = 3 \times 3$ matrix of estimable endogenous variable, $Z_{t-1} = 3 \times 1$ column vector matrix of lagged estimable endogenous variables, $\varepsilon_t = 3 \times 1$ column vector matrix of error terms in the system. With VAR (ε_{it}) set to unity and A_0 being chosen to capture the contemporaneous interactions among the Z_t, along with the standard deviation of the structural shocks in the model.

Since most macroeconomic variables are recursive in nature, restricting A_0 matrix above in the recursive specification yields:

$$RGDP_t = lags + \varepsilon_{1t} ------------------------------32$$

$$AGOP_t = \beta_{21}^0 RGDP_t + lags + \varepsilon_{2t} --------------------------33$$

$$GCAX_t = \beta_{31}^0 RGDP_t + \beta_{32}^0 AGOP_t + lags + \varepsilon_{3t} --------------------34$$

Thus, the parsimonious form of the model is specified in a triangular matrix below:

$$A_o = \begin{bmatrix} 1 & 0 & 0 \\ -\beta_{21}^0 & 1 & 0 \\ -\beta_{31}^0 & -\beta_{32}^0 & 1 \end{bmatrix} \begin{bmatrix} RGDP_t \\ AGOP_t \\ GCAX_t \end{bmatrix} = \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \end{bmatrix} -------------35$$

A_0 =From our equation (35), where $A_0 Z_t = A_1 Z_{t-1} + \varepsilon_t$, In this study, one of the constraints employed involves implementing a recursive system. This presupposes that A_0 is typically lower triangular, with uncorrelated structural shocks. This approach aids in identifying the parameters of structural equations. Wold's suggestion effectively reduces the number of unknown parameters to precisely match the number estimated in the comprehensive model. Furthermore, the lower triangular matrix, denoted as A_0, quantifies the contemporaneous effects or long-term trajectory. This implies that $\text{var}(\varepsilon_{1t}) = \sigma_1^2$, $\text{var}(\varepsilon_{2t}) = \sigma_2^2$, $\text{var}(\varepsilon_{3t}) = \sigma_3^2$, $\text{var}(\varepsilon_{4t}) = \sigma_4^2$ such that $\text{cov}(\varepsilon_{1t}\varepsilon_{2t}\varepsilon_{3t}\varepsilon_{4t}) = 0$. The presence of zeros along the upper diagonal indicates the absence of serial correlation among the structural shocks in the model. The *B* matrix quantifies these structural shocks within the SVAR system. It's important to note that the lower triangular matrix, representing variances of the parameters, transitions to zeros. Furthermore, it is also set to avoid spillover effects of the shocks on other variables in the model. That is Ω_S and Ω_S is a diagonal matrix.

This implies that our normalized SVAR of the form $A_0 Z_t = A_1 Z_{t-1} + \varepsilon_t$ reduces to $A_0 e_t = B\eta_t$. But we know that $B\eta_t = Bu_t$. Hence, the baseline line for our estimable SVAR model can be specified in the reduced form as:

$A_0 e_t = Bu_t$ -- 36

In matrix form, we have:

$$\begin{bmatrix} 1 & 0 & 0 \\ -\beta_{21}^0 & 1 & 0 \\ -\beta_{31}^0 & -\beta_{32}^0 & 1 \end{bmatrix} \begin{bmatrix} RGDP_t \\ AGOP_t \\ GCAX \end{bmatrix} = \begin{bmatrix} \sigma_1^2\, RGDP & 0 & 0 & 0 \\ 0 & \sigma_2^2\, AGOP & 0 & 0 \\ 0 & 0 & \sigma_3^2\, GCAX & 0 \end{bmatrix} \begin{bmatrix} u_{tRGDP} \\ u_{tAGOP} \\ u_{tGCAX} \end{bmatrix}$$

$$A_0\, e_t \quad = \quad B \quad u_t$$

Where: A_0 = matrix of long run contemporaneous effects, e_t = column vector matrix of errors for the respective variables, B = matrix of structural shocks in the model, u_t = column vector matrix of structural shocks in the model. Hence the "S" matrix is specified as:

$$e_t = A_0 Bu_t = \begin{bmatrix} e_{tRGDP} \\ e_{tAGOP} \\ e_{tGCAX} \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 \\ -\beta_{21}^0 & 1 & 0 \\ -\beta_{31}^0 & -\beta_{32}^0 & 1 \end{bmatrix} \begin{bmatrix} u_{tRGDP} \\ u_{tAGOP} \\ u_{tGCAX} \end{bmatrix}$$

Where

$-\beta_{21}^0$ measures the effect of agricultural output (AGOP) on economic growth (RGDP)

$-\beta_{31}^0$ determine the effect of government agricultural capital expenditure (GCAX) on economic growth (RGDP), $-\beta_{32}^0$ ascertain the effect of government agricultural capital expenditure (GCAX) on agricultural output (AGOP).

4.0 Results and Discussion

The Augmented Dicker-fuller (ADF) and Phillips-Perron (PP) unit root tests were used to examine the stationary of the series and the result is in Table 1.

Table 1: Results of the ADF Unit Root Test

Variable	@level	1st Difference	5% Critical Level	Order of Integra-tion	Variable	@level	1st Difference	5% Critical Level	Order of Integration
D(LNRGDP) **P-value**	-0.24003 0.9248	-4.18189 0.0022	-2.93898	I(1)	**D(LNRGDP)** **P-value**	0.384002 0.9798	-3.919096 0.0044	-2.936942	I(1)
D(LNAGOP) **P-value**	-0.38037 0.9031	-6.05952 0.0000	-2.93694	I(1)	**D(LNAGOP)** **P-value**	-0.382624 0.9027	-6.058704 0.0000	-2.936942	I(1)
D(LNGREA) **P-value**	-1.73071 0.4085	-6.48346 0.0000	-2.93898	I(1)	**D(LNGREA)** **P-value**	-1.698800 0.4243	-9.042814 0.0000	-2.936942	I(1)
D(LNGCAX) **P-value**	-0.57046 0.8659	-10.7674 0.0000	-2.93694	I(1)	**D(LNGCAX)** **P-value**	-0.941778 0.7646	-10.06492 0.0000	-2.936942	I(1)
D(INT) **P-value**	-2.60916 0.0995	9.719300 0.0000	-2.93694	I(1)	**D(INT)** **P-value**	-3.561484 0.0111	-9.925349 0.0000	-2.936942	I(1)
D(INF) **P-value**	-3.65712 0.0087	-6.64467 0.0000	-2.93898	I(1)	**D(INF)** **P-value**	-2.904760 0.0635	-10.59008 0.0000	-2.936942	I(1)
D(CR) **P-value**	-1.74674 0.4009	-6.64467 0.0000	-2.93898	I(1)	**D(CR)** **P-value**	-1.796164 0.3772	-6.432686 0.0000	-2.936942	I(1)

Source: Extracts from Eviews 10

The unit root tests, namely ADF and PP, showed that all series are stationary at first difference, significant at the 5% level. This is evident from their respective probability values being lower than the critical values of 0.05. Additionally, the VAR lag selection criteria were utilized to ascertain the optimal lag length, with the results presented in Table 2.

Table 2: Optimal Lag Selection

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-45.69862	NA	0.002605	2.563085	2.692368	2.609083
1	97.19463	255.7037	2.27e-06	-4.483928	-3.966796*	-4.299936
2	104.3491	11.67306	2.53e-06	-4.386794	-3.481812	-4.064809
3	124.8059	30.14682*	1.42e-06*	-4.989782*	-3.696951	-4.529803*
4	131.5123	8.824208	1.68e-06	-4.869066	-3.188386	-4.271093

Lag	LogL	Model 2 LR	FPE	AIC	SC	HQ
0	-16.02411	NA	0.000532	0.975595	1.103562	1.021508
1	120.8248	245.6263	7.58e-07	-5.580760	-5.068895	-5.397107
2	137.6639	27.63328*	5.12e-07*	-5.982762*	-5.086998*	-5.66139*
3	145.7813	12.07209	5.49e-07	-5.937502	-4.657840	-5.478370

Source: Extracts from Eviews 10

The lag analysis identified three (3) as the optimal lag that would provide dependable estimates for model 1. Conversely, for model 2, the optimal lag was determined by all the information criteria. Consequently, both models were estimated using their respective optimal lags. The estimation focused on the impact of government recurrent agricultural expenditure on economic growth through agricultural output. The contemporaneous response of the variables in

Model 1 is detailed in Table 3.

Table 3: Contemporaneous Response Result

	LNRGDP	LNAGOP	LNGREA
LNRGDP	1	0	0
LNAGOP	0.898934 (0.0001)	1	0
LNGREA	5.903397 (0.1488)	0.172815 (0.0427)	1

Source: Extract from E-views 10

The findings presented in Table 3 reveal a positive contemporaneous relationship between agricultural output and government recurrent expenditure on agriculture. Moreover, the analysis demonstrates that agricultural output exerts a positive and statistically significant instantaneous impact on economic growth. This suggests that government recurrent agricultural expenditure enhances agricultural output, and the immediate effect of agricultural output on economic growth is favorable. Consequently, it appears that the time required for the effects of agricultural output to materialize on the level of economic growth in Nigeria may not be prolonged.

Furthermore, the analysis reveals a positive instantaneous response of economic growth to government recurrent expenditure on agriculture. This indicates that the effect of government recurrent agricultural expenditure on economic growth may not take an extended period to materialize. The implication of these findings is that economic growth is bolstered by government recurrent agricultural spending, channeled through agricultural output. This outcome aligns with theoretical expectations and is consistent with the findings of Atayi et al. (2020).

Given the inherent unreliability of the standard errors associated with unstandardized VAR estimates, this study places reliance on impulse response and variance decomposition. Particularly significant is the contemporaneous response of the variables to their respective shocks, as well as the shocks in other variables. The findings pertaining to the contemporaneous effects of the SVAR are depicted here.

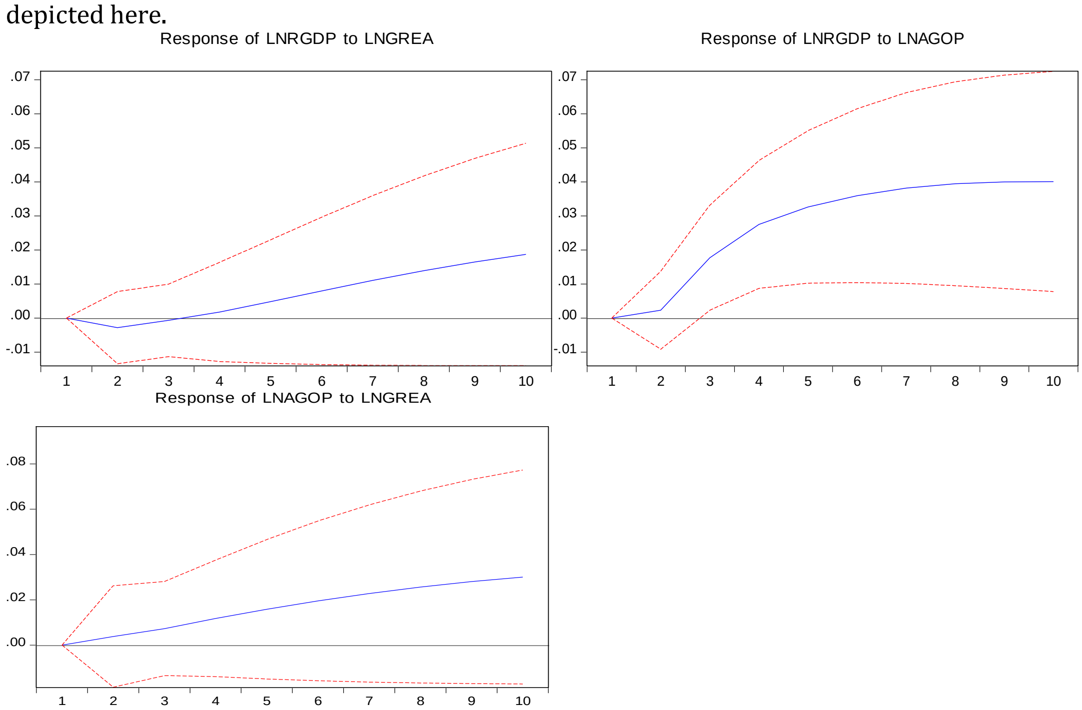

Figure 1, 2 and 3: Response of LNRGDP to LNAGOP, Response of LNRGDP to LNGREA and Response of LNAGOP to LNGREA

Figure 2 illustrates the impulse response of economic growth to shocks in government recurrent agricultural expenditure in Nigeria over a forecast period of ten years. It indicates that initially, economic growth may respond negatively to government recurrent agricultural expenditure in the short term. However, over the medium and long term, economic growth is projected to progressively improve. The sustained and significant positive response of economic growth to government recurrent agricultural expenditure in the long run suggests that such expenditure will foster increased economic growth in Nigeria. The impulse response depicted in Figure 2 shows that economic growth is anticipated to positively respond to agricultural output in the short term, with no convergence towards zero over the medium and long term. This positive response signifies that the level of output in Nigeria's agricultural sector will significantly influence economic growth in the near future based on current trends. Figure 3 further illustrates that agricultural output responds positively to government recurrent expenditure on agriculture throughout the forecasted period. This positive response underscores the crucial role of government recurrent spending in agriculture in enhancing output in the traditional sector. Additionally, Table 4 presents the results of the accumulated forecast error variance of economic growth in response to shocks in industrial output and commercial bank lending.

Table 4: Result of the Accumulated Forecast Error Variance

Period	S.E.	D(LNRGDP)	D(LNAGOP)	D(LNGREA)
1	0.033497	100.0000	0.000000	0.000000
2	0.035448	97.54969	2.174247	0.276066
3	0.038420	92.75289	6.773189	0.473921
4	0.040707	82.80166	8.025791	9.172550
5	0.041107	81.36439	8.450208	10.18540
6	0.041361	80.60076	8.660757	10.73848
7	0.041451	80.34238	8.625040	11.03258
8	0.041530	80.20705	8.595557	11.19740
9	0.041545	80.19092	8.595683	11.21340
10	0.041555	80.16969	8.614710	11.11560
Decision		Decrease	Increase	Increase

Source: Extract from Eview 10

Table 4 displays the accumulated forecast error results of economic growth in response to its own shock, indicating 100% at the initial period, followed by 92.75% in the short-term, 81.36% in the medium-term, and 80.17% in the long-term. This suggests that economic growth strongly predicts itself, with the variation in economic growth in Nigeria due to its own shock gradually decreasing over time. Furthermore, the findings reveal that innovation in agricultural output and government recurrent expenditure on agriculture account for approximately 6.77% and 0.47% of the accumulated forecast error variance of economic growth in Nigeria in the short-term, respectively, compared to zero variations at the initial period. In the medium term, the accumulated forecast error variance of economic growth in response to shocks in agricultural output and government recurrent expenditure on agriculture increases to about 8.45% and 10.19%, respectively. Finally, in the long run, the accumulated forecast error variance of economic growth due to innovation in agricultural output and government recurrent expenditure stands at 8.61% and 11.12%, respectively. This suggests that variations in economic growth due to shocks in the agricultural sector output and government recurrent expenditure in Nigeria would increase over time. Consequently, government agricultural recurrent expenditure and agricultural output serve as reliable predictors of economic growth in Nigeria within the forecasted period.

Model 2 Effect of government capital agricultural expenditure on economic growth through agricultural output. The Contemporaneous response of economic growth to government capital expenditure on agriculture via agricultural output in Nigeria is presented in Table 5.

Table 5: Contemporaneous Response Result

	LNRGDP	LNAGOP	LNGCAX
LNRGDP	1	0	0
LNAGOP	1.368250 (0.0000)	1	0
LNGCAX	6.082181 (0.0013)	-5.290688 (0.0000)	1

Source: Extract from E-views

Table 5 illustrates that agricultural output exhibits a negative and statistically significant contemporaneous response to government capital expenditure on agriculture, as indicated by its p-value being less than the 5% level of significance. This suggests that government capital agricultural expenditure did not lead to improvements in agricultural output in Nigeria during the study period. While this result may seem theoretically implausible, it aligns with the findings of Fan et al. (2007) but contradicts those of Igweze-Ekwunife and Okpala (2022). However, the instantaneous coefficient indicates that agricultural output has a positive and statistically significant immediate effect on economic growth in Nigeria. This implies that economic growth significantly and immediately improved due to the contribution of agricultural output, despite the adverse effect of government capital expenditure on agriculture in Nigeria. Consequently, the increase in output in the agricultural sector cannot be attributed to government capital spending in the agricultural sector. Also, the study reveals that the instantaneous response of economic growth to capital expenditure on agriculture is positive and statistically significant, indicating that government capital expenditure on agriculture will become noticeable on economic growth in Nigeria within the shortest possible time. Given the inherent unreliability of the standard errors associated with unstandardized VAR estimates, the study relied on impulse response and variance decomposition. Of particular importance is the contemporaneous response of the variables to their shocks and shocks in the other variables. The results of the SVAR contemporaneous effects are presented in Figure 5.

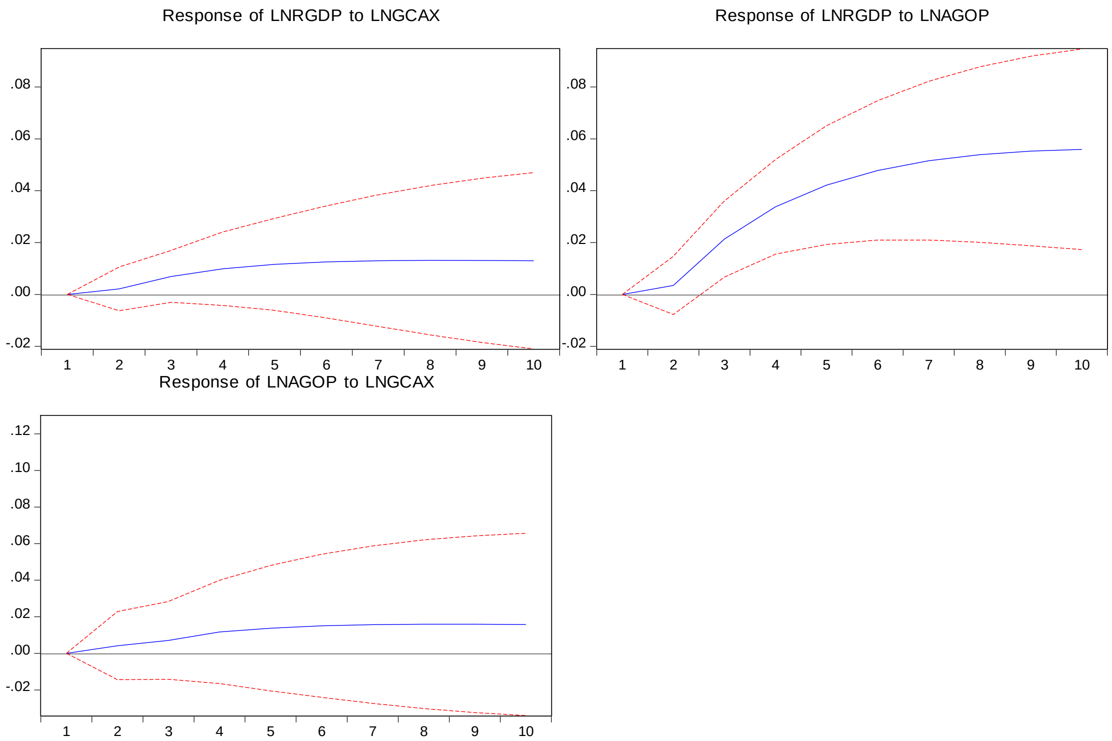

Figure 4, 5 and 6: Response of LNRGDP to LNGCAX, Response of LNRGDP to LNAGOP, and Response of LNGOP to LNGCAX

Figure 5 illustrates that economic growth responds positively but weakly to shocks in government capital expenditure on agriculture in Nigeria over a ten-year forecast period. The findings indicate that economic growth would improve gradually, reaching a plateau beyond a certain point in both the medium and long term. This suggests that government capital expenditure on agriculture is not a robust determinant of economic growth in Nigeria during the forecasted ten-year period. On the other hand, Figure 6 depicts the impulse response of economic growth to shocks in agricultural output in Nigeria over a ten-year forecast period. It reveals that economic growth would respond positively and strongly to agricultural output in the short term, medium term, and long term throughout the forecasted period. This implies that agricultural output will significantly contribute to the growth of the Nigerian economy in the long run. Additionally, Figure 7 illustrates that agricultural output will gradually improve due to shocks in government capital expenditure on agriculture in Nigeria in the short run. Subsequently, economic growth will remain stable for the rest of the period. This suggests that government capital expenditure on agriculture would not lead to adverse effects but would gradually enhance agricultural output in Nigeria over the forecasted periods. Table 9 presents the results of the accumulated forecast error variance of economic growth in response to shocks in service output and commercial bank lending.

Table 5.16: Result of the Accumulated Forecast Error Variance

Period	S.E.	D(LNRGDP)	D(LNAGOP)	D(LNGCAX)
1	0.034511	100.0000	0.000000	0.000000
2	0.035496	98.86449	0.045243	1.090265
3	0.037798	95.23699	3.709626	1.053383
4	0.038751	94.69365	4.302795	1.003558
5	0.038798	94.62279	4.375040	1.002170
6	0.038840	94.53006	4.469898	1.000046
7	0.038863	94.52505	4.475392	0.999560
8	0.038863	94.52445	4.475910	0.999641
9	0.038864	94.52352	4.476837	0.999641
10	0.038865	94.52305	4.477342	0.999611
Decision		Decrease	Increase	Decrease

Source: Extract from Eview 10

The results of the accumulated forecast error of economic growth in response to its own shock indicate that it accounts for 100% at the initial period, followed by 95.24% in the short term, 94.62% in the medium term, and 94.52% in the long term. This suggests that economic growth serves as a robust predictor of itself, with the variation in economic growth in Nigeria due to its own shock gradually diminishing over time. Furthermore, the findings reveal that innovation in agricultural output explains approximately 3.71% in the short term, 4.38% in the medium term, and 4.48% in the long term of the accumulated forecast error variance of economic growth. This indicates that agricultural output moderately predicts economic growth. Again, the accumulated forecast error variance of economic growth in response to shocks in government capital expenditure on agriculture suggests that economic growth would decrease over time. Consequently, government capital expenditure on agriculture is not a reliable predictor of economic growth in Nigeria.

Diagnostic Tests for the Models: The post estimation test was conducted to ascertain the reliability of the estimates for both Model 1 and Model 2. The VAR Residual Heteroskedasticity Tests was conducted and the result is presented in Table 6.

Table 6: VAR Residual Heteroskedasticity Test Result

Model 1			Model 2		
Chi-sq	**df**	**Prob.**	**Chi-sq**	**df**	**Prob.**
124.6928	108	0.1299	70.27823	72	0.5354

Source: Extract from Eview 10

The findings from the VAR residual heteroskedasticity tests, as presented in Table 6, indicated insignificant Chi-square values for the heteroscedasticity tests of the models. Moreover, the probability values exceeded the 5% level of significance, suggesting the absence of heteroscedasticity in the model. This implies a constant covariance of the error term with the explanatory variables. Furthermore, the study conducted the VAR residual serial correlation test to assess the interdependence of the residuals. The results of this test are outlined in Table 7.

Table 7: Result of VAR Residual Serial Correlation LM Tests

Model 1							Model 2						
Lag	LRE*stat	df	Prob.	Rao F-stat	Df	Prob.	Lag	LRE* stat	Df	Prob.	Rao F-stat	df	**Prob.**
2	5.24096	9	0.812	0.572959	(9, 56.1)	0.8135	1	4.795110	9	0.8518	0.523802	(9, 65.9)	**0.8522**
3	8.42165	9	0.492	0.946051	(9, 56.1)	0.4936	2	7.923098	9	0.5419	0.885536	(9, 65.9)	**0.5428**

Source: Extract from Eview 10

The findings from the VAR residual serial correlation LM tests, as depicted in Table 7, indicated no instances of serial correlation among the variables. This conclusion was drawn as all the probability values exceeded 0.05 at the 5% level of significance. Consequently, it suggests that the residuals were uncorrelated with each other, indicating no occurrence of autocorrelation.

Additionally, the study conducted a VAR residual normality test to assess the normality of the residuals. The results of this normality test are presented in Table 8.

Table 8: VAR Residual Normality Test

Model 1				Model 2			
Component	Jarque-Bera	Df	Prob.	Component	Jarque-Bera	Df	**Prob.**
1	0.668754	2	0.7158	1	6.904896	2	**0.0317**
2	1.907121	2	0.3854	2	121.0872	2	**0.0000**
3	88.61341	2	0.0000	3	0.906313	2	**0.6356**
Joint	91.18929	6	0.0000	Joint	128.8984	6	**0.0000**

Source: Extract from Eview 10

The VAR residual normality test results presented in Table 8 indicate that the residuals were normally distributed, as evidenced by the joint probability value of the Jarque-Bera test being less than the 0.05 level. Consequently, based on this outcome, the null hypothesis, which suggests that the residuals are multivariate normal, was not rejected for the model. This normality test affirmed that the data used exhibited a normal distribution. Furthermore, the non-normality of the distribution of the residuals was not expected to compromise the reliability of the estimates. This is because the normality of residuals was not a prerequisite for the asymptotic validity of certain statistical procedures, especially given that the errors were not observed. Regarding the stability test results for the model, the study employed the inverse roots of the AR characteristics polynomial test. These results are presented in Figure 7 and 6.

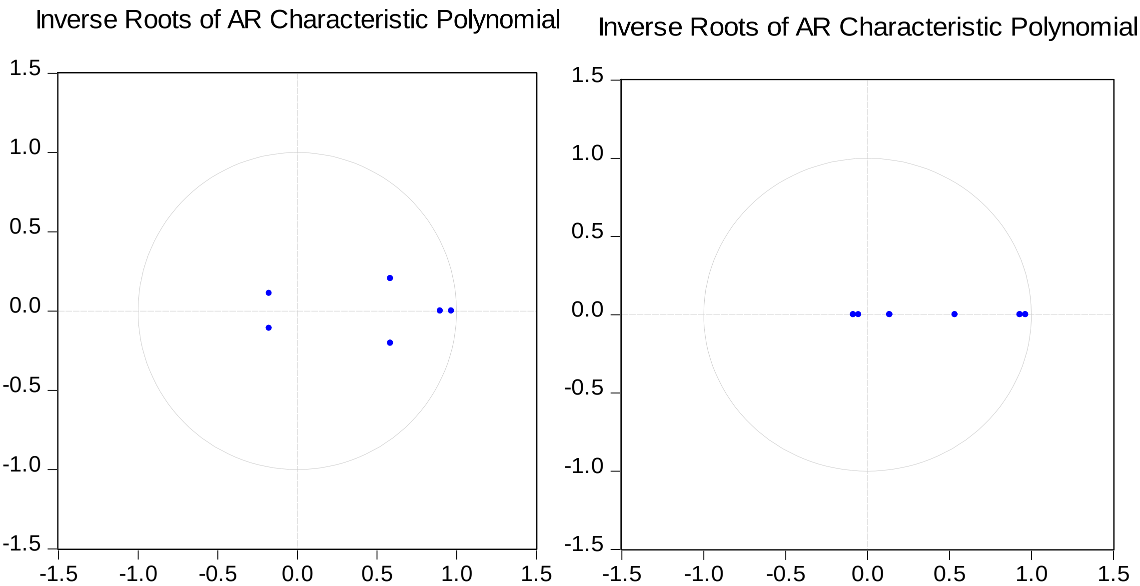

Figure 7 and 8: Stability Test Results

The Inverse Roots of AR Characteristic Polynomial test was used to examine how stable the variables entered the SVAR model. Results satisfy the VAR stability condition since all the roots lied within the unit circle. The series were therefore stable.

5 Conclusion and Recommendation

Based on the obtained findings, the study concluded that economic growth responds positively to government recurrent agricultural expenditure through agricultural output in contrast to the adverse influence of government capital expenditure on agriculture to economic growth through agricultural output in Nigeria. Based on the study results, the following recommendations were made: Government should improve on her agricultural policy enforcement and implementation regarding recurrent agricultural expenditure to strengthen its influence on agricultural output. This could be done by introducing consistent and supportive agricultural policies and programmes such as early provision of fertilizer, herbicides and pesticide which can improve agricultural output. Also, government should monitor the use of funds meant for capital agricultural projects as well as invest in farm machinery and equipment to reduce labour-intensive processes and increase overall efficiency.

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