

IMPACT OF GOVERNMENT EXPENDITURE ON AGRICULTURAL GROWTH IN NIGERIA

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Abstract

Agriculture is an indispensable unit in the economic development process. Agriculture does not only provide the essential, food, but also provides the resources needed for the provision of other basic essentials of shelter and clothing. Industrialization and modernization basically rely on agricultural resources for take-off. This study seeks to investigate the impact of Government expenditure on agricultural growth in Nigeria from 1981 to 2017. Relevant data for the study were sourced from the Statistical Bulletin of the Central Bank of Nigeria and the World Bank Development indicators (WDI). The Engle-Granger two-step procedure to co-integration was deployed to estimate the model of the study. The finding of the study revealed that government expenditure on agriculture in Nigeria has negative impact on agricultural growth in the short run.

Keywords: Agricultural growth, agricultural output, government expenditure, national agricultural policy.

JELCode: C01, E62, H54, O13.

Introduction

Nigeria is endowed with abundant natural resources. With her huge reserves of human and natural resources, Nigeria has the potential to build a prosperous economy and provide for the basic needs of her population. This enormous resource base if well managed could evolve a vibrant agricultural sector capable of supporting the industrial sector by meeting the supply of raw materials of industries as well as providing gainful employment for her teeming population (Ukeje 2002).

The importance of agriculture in the socio-economic development of any nation cannot be over emphasized; hence many countries of the world (developed and developing) had placed lots of emphasis on its development. This is evident in the number of programmes that have been introduced by both international agencies and individual countries to ensure improvement in agriculture in various countries of the world. In Nigeria, successive governments have introduced and implemented agricultural support programmes. These programmes include; Operation Feed the Nation (O.F.N.), Agricultural Research Policy, Agricultural Development Project, Agricultural Credit Government Scheme, The Green Revolution, River Basin Development Authorities (RBDA), National Agriculture Land Development, Nigeria Agricultural and Co-operative Bank (NACB), The Structural Adjustment Programme (SAP), Directorate of Food,

Roads and rural Infrastructure (DFRRI). It is however, disheartening that despite the laudable goals of these programmes and the huge financial resource expended on them, the goals and objectives for establishing them was never achieved.

The retardation of Nigeria agricultural sector had been traced to the discovery of crude oil in commercial quantities in mid 1960's coupled with the oil boom of 1974 as a result of which the agricultural sector was abandoned to its fate for easy earnings of the petro-dollar. The economy became heavily dependent on oil revenues. Even though the initial capital and infrastructural development of the oil sector had come from agricultural earnings at the time, ironically, the huge petro-dollar from the oil and gas sector could no longer support agricultural development in Nigeria. Before the oil boom, agricultural contributions to the economy were instrumental in sustaining economic growth and stability, stable growth in agricultural exports was the backbone of Nigeria's favorable balance of trade. Primary processing of raw materials from the agricultural sector helped through the imposition of taxes and accumulation of marketing surpluses, which were used to finance development in other sectors including the oil sector.

Nigeria agricultural sector had continued to remain at the subsistent level; agricultural output has been on steady decline from 40 percent in 1998 to 0.20 percent in 2014 (CBN, 2014). As a result, over 90 percent of Nigerian farmers are caught in vicious cycle of poverty, caused by disguised employment and low income leading to poor saving and little investment in technology. This therefore, calls for the attention of the government for the development of the agricultural sector. The development of agricultural sector must set the pace for the diversification of the Nigeria economy thereby building a buffer against the oil price volatility shocks on the Nigeria economy.

Agricultural sector in the present democratic dispensation in Nigeria has continued to perform below expectation despite the huge sums of budgetary allocation to the sector. In 2002, about N9.874 billion was mapped out for the sector. In the same 2002, over 72 million dollars donated by Food Agricultural Organization (FAO) was distributed to the 36 states of the federation in addition to the year's budgetary allocation. Unfortunately, these funds are siphoned by government officials and their political cronies.

The main objective of this study is to investigate the impact of government expenditure on agricultural growth in Nigeria.

Literature Review

Government efforts on agricultural development in Nigeria

Beginning from the era of Commodity Board in the 1960s, the country has witnessed a myriad of policies and programmes ostensibly introduced to address perceived problems in the agricultural sector. Such policies and schemes have focused on enhancing agricultural output, improving the expected linkages (backward and forward) with the manufacturing sector, increasing earnings and employment opportunities, and increasing food security. They have basically touched on availability of supplies and equipment, incentives to farmers, transportation, agricultural credit, land reform, food preservation, extension services, and infrastructural facilities. Government involvement in agriculture goes beyond providing supportive services, it also includes direct participation in the production of agricultural products (Rogers, 1999).

One of the first steps by Nigerian government was the launching of the National Accelerated Food Production Programme in 1972, a campaign to grow more food. In

1973, the Federal Government established the Nigerian Agricultural Credit Bank (NACB) with an initial paid up capital of ₦20 million. In further recognition of the need to make credit available for the development of agriculture, the Agricultural Credit Guarantee Scheme Fund was set up under Decree 20 of 1977 with an authorized capital of ₦100 million.

This programme brought financial institutions into the financing of agriculture in the country. Since then, and up till 1996 when sectorial allocation of credit was abolished, it became compulsory for a specified proportion of banks' credit to be made available for agricultural activities. As at 1996, a minimum of 18 per cent of the total loans and advances of a bank should go to agriculture and agro-allied activities.

In 1976, the Operation Feed the Nation (OFN) programme was launched with objectives of increasing food production, attaining self-sufficiency in food supply, encouraging all sections of the Nigerian population to grow food, encouraging balanced nutrition and by extension a healthy nation. During the same period, the government announced guaranteed minimum prices for agricultural outputs and also reformed the marketing board system to generate adequate returns to farmers thereby ensuring that customers are charged reasonable prices. Various other incentive schemes were offered in the areas of tax relief, subsidy of prices of agricultural inputs, machinery and equipment.

A major policy that was designed to improve agricultural production was the promulgation of the Land Use Decree in 1978. The Central focus of government policies in the 1980s was the objective of changing agricultural production to large-scale production. It was identified that the bulk of food production in Nigeria was being undertaken by small holder farmers who rely on physical strength rather than equipment, thereby resulting to low output. Emphasis therefore shifted into provision of credit and skilled manpower, and expansion of agro-allied businesses. From 1986 when the Structural Adjustment Programme (SAP) was introduced, the focus had been on returning Nigeria to self-sufficiency and enhancing the contribution of agriculture to foreign exchange earnings.

Part of the programmes over the years had been the establishment of relevant institutions. Thus there were agricultural research institutes like the National Cereal Research Institute, the National Agricultural Extension and Research Liaison Service, Nigeria Institute for Oceanography and Marine Research, Veterinary Research Institute, the Cocoa Research Institute of Nigeria, Forestry Research Institute of Nigeria, Rubber Research Institute of Nigeria, National Agricultural Extension Research and Liaison Services (AERLS). In the 1980s the Federal Government also established Universities of Agriculture, apart from various schools of Agriculture in Nigeria and the faculties of Agriculture in the conventional Universities and the Polytechnics. More-over, there was also established the National Agricultural Land Development Authority (NALDA), the River Basin Development Authorities and the Agricultural Development programmes (ADP). There are also international institutions complementing these institutes like the International Institute for Tropical Agriculture (IITA). Unfortunately, these efforts have not yielded any success. The reasons for their failures was not because the projects and programmes were not feasible, but the methodology of their implementation seems to have missed some vital links, such as effective youth and local community participation and free from politicians interference. However, there are also problems at the micro

(individual) level that borders on management of farm, sources of finance and supervision.

Review of Federal Government Agricultural Expenditure and Agricultural Output

Food and Agricultural organization (FAO) recommended that 25 percent of government capital budget allocation be assigned to the agricultural development capital budget. In Nigeria, this has not been achieved by the government, thereby affecting government programmes and policies for the sector. In terms of allocation to agriculture, it was average of 4.74 percent from 1970-1980. But, from 1980-2000, it rose to 7.00 percent and 10 percent from 2001-2007 though revealing an increase, but still falls short of FAO recommendation of 25 percent.

The ratio of agricultural budget expenditure to total government expenditure from 1970-1980 was on average of 2.66 percent. It rose to 8.34 percent from 1981-1984; however by 2000, it nosedived to a ridiculous value of approximately 2 percent and was 2.10 percent in 2007. This fell short of the Maputo resolution that government of member states of African Union (AU) to allocate at least 10 percent of national budget for the implementation of a comprehensive Africa Agricultural Development programme (CAADP) which Nigeria is a signatory. Poor government expenditure in the agricultural sector over the years has been attributable to the dismal performance of the agricultural sector. The performance of agricultural output could be measured by its contribution to Gross Domestic Products (GDP), until the Nigerian civil war of 1967-1970, agriculture dominated Nigerian's economy contributing some 53 percent to GDP in 1965. By 1984 its percentage share had almost halved.

The National Agricultural Policy

In an attempt to tackle the problems facing the Agricultural Sector in Nigeria, Government came up with the National Agricultural Policy, which was jointly formulated by the national stakeholders and international development partners and approved by the Federal Government in 2002. The major components of the national Agricultural Policy, is the "National Economic Empowerment and Development Strategy (NEEDS)" document. Specifically, the National Agricultural Policy assigns supportive roles to the government, investments in the sector was left for private sector initiatives. The broad objectives of the National Agricultural Policy include; Promotion of self-sufficiency in food and raw materials for industries; recognition that agriculture is business, hence a private sector concern, while the role of government is to facilitate and support private sector initiatives; promoting reliance on local resources; diversification of the sources of foreign exchange earnings through increased agricultural exports arising from adoption of appropriate technologies in food production and distribution, which specifically responds to the needs of women, bearing in mind that they constitute over 50% of the labour force in agriculture.

National Programmes on Agriculture

1. National Accelerated Food Production Programme (NAFPP), 1972. According to Eze (2010), this was part of the Second National Development Plan (1970-74). The plan itself has no clear statement on rural development, although N1,353 million was voted for it. It targeted self sufficiency in the production of rice, maize, sorghum, millet

and wheat. It was a joint programme of Federal Government and USAID. Its objectives include accelerating and increasing food production through the adoption of improved packages of production technology, speed up the transfer of research results to farmers, pursuing intensive and extensive cultivation of crops and linking research to production agencies through extension services.

2. Agricultural Development Programme (ADP), 1975. It is jointly funded by the World Bank, Federal and States governments in Nigeria aimed at provision of rural roads, farm service centers, agricultural extension services and credit. Extension activities implemented by ADPs included establishing demonstration farms, identifying lead farmers, providing information to lead farmers on improved farming practices, facilitating access to improved technology and inputs and helping lead farmers teach others.

3. Operation Feed the Nation (OFN), 1976. The OFN was part of the Third National Development Plan (1975-1980) which was voted N2, 050.738 million (Okeke, 2001). Like the second development plan, there was no categorical strategy for rural development, except some N500 million for rural regrouping (Olayiwola and Adeleye, 2002).

4. Green Revolution Programme- 1980. Aimed at reducing hunger through credit supply to farmers, encourage and intensify cooperative education, mobilizing the local people to actively participate in agriculture, application of research on food and fibre to enhance abundance in staple food production, processing and distribution in Nigeria.

5. Rural Banking Programme, 1977 to 1991. Banks were encouraged to not only establish rural branches but also to extend at least 50 per cent of the deposit mobilized from the rural areas as loans and advances to rural dwellers. Defaulting banks were to be sanctioned.

6. Community Banking Programme, 1991 to 2007. The programme provided for the establishment of community banks with a focus on rural banking operations. The National Board for Community Banks (NBCB) was the regulator of these banks until 2002 when this function was transferred to the CBN.

7. Root and Tuber Expansion Programme-2000. It was established to commercialize root and tuber crop production and improve living conditions, income, food security and nutritional health of the poorest small holder households.

8. National FADAMA Development Programme aimed at increasing income of beneficiaries by at least 20%. The programme was designed in 1993 to improved irrigation technology under World Bank financing (Eze, 2010). FADAMA is a Hausa word for low lying flood plains.

9. Family Economic Advancement Programme (FEAP), 1997 to 2001. This was established to serve the credit needs of the family in their daily economic activities through input supplies, loan in form of cash, and capacity building.

10. National Poverty Eradication Programme (NAPEP), 1999. The mode of operation was tailored to subsidize and extend credit to farmers. The programme consists of four schemes namely; Youth employment scheme; Rural Infrastructures Development scheme; Social Welfare Services Scheme; and Natural Resources Development and Conservation Scheme.

11. Microfinance Bank, 2005. Microfinance bring financial services such as savings, deposit, payments, transfers, micro insurance and micro leasing to the poor and low

income people, who would otherwise have no access to such services in conventional banks.

12. Preferred sector allocation of credit, 1970 to 1996. Banks were mandated to extend 40 per cent of their loans and advances to agriculture which was designated a preferred sector. Banks that failed to meet this target were sanctioned. The funds not lent were transferred to the then Nigerian Agricultural and Cooperative Bank, NACB.

13. Concessionary interest rates for agricultural loans, 1980 to 1987. Banks were further mandates to extend credit to agriculture at a regulated rate of 9 per cent annum.

Table 1: Budgetary Allocation to Agriculture (₦billion)

Years	Total budget	Allocation to Agric sector	% of agriculture
1990	39.76	1.96	4.95
1991	38.66	0.67	1.74
1992	52.03	0.92	1.78
1993	112.1	2.83	2.53
1994	110.2	3.71	3.37
1995	153.49	6.92	4.51
1996	337.21	5.71	1.69
1997	427.21	8.66	2.07
1998	487.11	9.04	1.86
1999	947.69	12.15	1.28
2000	701.05	13.6	1.94
2001	1,018.02	64.94	6.38
2002	1,018.15	44.8	4.4

Source: CBN Statistical Bulletin and Annual Report

The picture of budgetary allocations and actual expenditures for the period covered showed that though the government put up ambitious policies their financial commitment and consideration has been inadequate. It is therefore not surprising that these policies and programmes have not achieved their set out goals. The Nigeria Agriculture Public Expenditure Review (NAGPER), a collaborative study carried out by a research team from the International Food Policy Research Institute (IFPRI) and the World Bank (2008), showed that public spending on agriculture in Nigeria is less than 2 percent of total federal expenditure during 2001 to 2005. This spending contrasts dramatically with the sector’s importance in the Nigerian economy, which ranged from 20% to 30% of total Gross Domestic Product between 1996 to 2000 and ranged between 41 to 42.30 between 2001 to 2007 (CBN, 2005, 2007); and falls below the 10 per cent goals set by African leaders in the 2003 Maputo agreement. Budget implementation approaches differ significantly from those described in policy documents, such that very poor funds are made available for activities considered vital for promoting agricultural productivity.

Table 2: Contribution of Agriculture to Gross Domestic Product

Years	Total GDP (₦billions)	Agricultural share of GDP	% Share of Agriculture in total GDP
2001	431.78	182.66	42.3
2002	451.71	190.01	42.14
2003	495.07	203.01	41.01
2004	527.58	216.21	40.98
2005	361.83	231.46	41.19
2006	595.82	248.6	41.72
2007	63286	267.06	42.2

Source: CBN (2005, 2007) GDP is at 1990 constant price.

Theoretical Review

The Keynesian Theory

According to the Keynesian school of thought, increase in government spending leads to multiple increase in total output of an economy (Jhingan, 2010). This according to Keynes is the multiplier effect of government expenditure.

$$Y = C + I + G (X-M) \text{-----}1$$

Where; Y = Output, C = Consumption, I = Investment, G = Government Expenditure, X-M = Net Export (export minus Import). The change in output will be equal to the multiplier times the change in government expenditure.

$$\Delta Y = 1 (\Delta G) \text{-----}2$$

1-b

$$\text{Where } 1 = K$$

1-b

$$\Delta Y = K \Delta G$$

Therefore, change in output all over change in government expenditure is equal to the multiplier.

$$\Delta Y / \Delta G = K \text{-----}3$$

Hence, expansionary fiscal policy can be used to influence macroeconomic performance and hence increase output growth. This theory suggests that government spending can contribute positively to sectorial growth (like the agricultural sector) in an economy.

In this theory we assume that the agricultural sector output comprising of the output of the four subsectors of crops, fisheries, forestry, and livestock is a function of consumption of agricultural output, investment in agriculture, government expenditure on agriculture and net export of agricultural output.

$$YA = CA + IA + GA + (XA - MA) \text{-----}4$$

Where; CA = Consumption of Agricultural Output, IA = Investment in Agriculture, GA = Government Expenditure on Agriculture and XA - MA = Net Export of Agricultural Output.

Thus, an increase in government expenditure on agriculture is likely to lead to a multiple increase in agricultural output. The relevance of this theory to the Nigerian agricultural sector is that it prescribes how the government can help bring about growth in the agricultural sector through its expenditure on the sector.

Empirical Studies

Several authors like Jose (2008); Lachaal (2000); Yaqub (2002); Sunday (2014); Enoma (2010) have reported the influence of macroeconomic variables fluctuations on agricultural productivity. Jose [2008] investigating food security and agricultural spending in Bolivia adopted a supply-side approach that analyzes the role of agricultural spending on vulnerability to food insecurity. Econometric analysis indicates that levels of public agricultural spending are positively associated with high or very high vulnerability, especially investments in infrastructure, research and extension. The authors interpret this to indicate that agricultural spending allocation is driven by high or very high vulnerability levels, but has small effects on reducing high vulnerability.

Zepda (2003), examining agricultural investment and productivity in the context of developing countries using econometrics models to measure the changes in output and relative contribution of various outputs. His study reveals that there is a strong relationship between investment in technology and human capital compared to that of physical capital and growth that was found to be weak. Other factors that were found to have positive relationship with growth in agricultural output were good policy environment and political stability.

Using econometric approach to estimate total factor productivity for the United States dairy industry between 1972 and 1992) Lachaal (2000) examines how protectionist policies in the form of direct subsidies to agriculture reduced productivity growth in the United States dairy industry. He found that government subsidies encouraged using materials at the expense of feed and raised the cost of production by 1.8% for each 10% increase in subsidy.

In Nigeria, a study by Yaqub (2002) on the sectoral analysis of the impact of exchange rate on output in Nigeria, using seemingly unrelated regression estimation technique found that exchange rate had a significant contractionary effect on Agricultural output, hence existing structures do not support an expansionary depreciation argument.

In a related study by Adetoun (2002), using the descriptive statistical analysis, his result reveals that change in monetary policy instruments cause changes in agricultural output with a long-run equilibrium relationship between the monetary policy variables and growth in output. The study further recommended that enlightening the farmers on how monetary policy changes affect agricultural output is the first step in making farmers and agro-businesses become active players in the policy making process.

Enoma (2010) examined the impact of agricultural credit on the growth of GDP in Nigeria. In his study, measures aimed at increasing agricultural production were discussed and the relationship between agricultural development and economic growth were highlighted. The author concludes that agricultural credit, interest rate and exchange rates were all important in affecting aggregate output in Nigeria.

In the same measure, Sunday (2014) investigating the short-run and long-run elasticity of agricultural productivity with respect to some key macro-economic variables, using the techniques of co-integration and error correction models. Their result revealed that in the short and long-run periods, the coefficients of real total exports, external reserves, inflation rate and external debt have significant negative relationship with agricultural productivity in the country, whereas industry's capacity utilization rate and nominal exchange rate have positive association with agricultural productivity in both periods.

Ojede (2008) employs a two-stage procedure to investigate the impact of macroeconomic policy reforms on the agricultural productivity growth of 33 African countries from 1981 to 2001. Their results indicate a strong positive correlation between the extent of SAP intensity and agricultural productivity, suggesting that the macroeconomic policy reforms improved agricultural productivity growth in the sample countries.

Omojimito (1988) on an investigation of the impact of macroeconomic variables on agricultural growth using fully modified ordinary least squares approach. The results indicate that the volume of credit to the agricultural sector, deficit financing income and institutional reform were positively and significantly accounted for innovations in agricultural output for the period studied thus confirming a direct relationship between growth in output and macroeconomic variables.

Research Methodology

Data Sources

The data used for this study were sourced from the CBN statistical bulletin 2018 and World Bank Development indicators (WDI) covering from 1981 to 2018. The variables sourced from the CBN statistical bulletin include Agricultural Output component of the Gross Domestic Product, Total government Expenditure on Agriculture and Economic Services, Agriculture Sector Loans proxy for Agriculture Sector credits, Agriculture implicit price deflator rate as a measure of price of agricultural products, Average Precipitation Rainfall while WDI variables include Population Growth Rate and GDP per capita as proxy for household income.

Model Specification

The functional form of the model is specified as follows

$$AGDP = f(GEX, ASLO, APRD, RAIN, PGRR, GPCI) \quad (1)$$

Where

AGDP= Agricultural Output component of the Gross Domestic Product

GEX =Total government Expenditure on Agriculture and Economic Services

ASLO= Agriculture Sector Loans

APRD =Agriculture implicit price deflator rate

RAIN = Average Precipitation Rainfall

PGRR= Population Growth Rate

GPCI= GDP per capita

All variables were transformed into their natural logarithm except PRR and PGRR.

The log econometric model is therefore specified as follows

$$\begin{aligned} \ln AGDP_t = & \beta_0 + \beta_1 \ln GEX_t + \beta_2 \ln ASLO_t + \beta_3 \ln APRD_t + \beta_4 \ln RAIN_t \\ & + \beta_5 \ln PGRR_t + \beta_6 \ln GPCI_t + u_t \end{aligned}$$

(2)

Where β_0 is the intercept term, $\beta_1 - \beta_6$ are the parameters of the model to be estimated and u_t is a white noise error term presumed to be normally distributed.

Unit Root Test

In order to avoid the problem of spurious regression, we explored the time series properties of the variables to ascertain stationarity or otherwise. A time series variable is

said to be a unit root process or nonstationary if its first and second moments depend on time. The most widely used unit root test for empirical studies has been the Augmented Dickey-Fuller (ADF) test for nonstationarity which we adopted for this study (Dickey and Fuller, 1979). The ADF test for a time series Y_t is constructed as follows

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \sum_{i=1}^m \alpha_i \Delta Y_{t-i} + \varepsilon_t \quad (3)$$

Where ε_t is a white noise error term that is uncorrelated with the Y_t , β_1 is the intercept of the model and captures any drift in the series, β_2 is a trend parameter that captures any trend in the data, δY_{t-1} is the first lag of Y_t that is a measure of the first order serial correlation in the data while $\sum_{i=1}^m \alpha_i \Delta Y_{t-i}$ is the sum of the lagged differenced dependent

variable used to augment the model beyond the first order autoregressive scheme. The null hypothesis of a unit root is rejected if the computed ADF statistics is greater than the chosen level of significance. If the series is nonstationary, then the first difference of the series should be stationary and the series is said to be stationary at first difference or an $I(1)$ process.

Co-integration Test

One of the most widely used methods for the estimation of long-run relationship is the Engle-Granger two step modeling (EGM) procedure (Engle and Granger, 1987). The first step requires the estimation of the co-integrating regression by OLS. If the error term from this estimation is stationary, then the variables of interest are said to be co-integrated. Even though such variables tend to deviate from their long-run equilibrium path, economic forces restore them back to equilibrium. The second step involves estimating a short-run model with an error-correction mechanism (ECM) by the OLS. Given the Granger Representation Theorem (GRT), if two or more variables are co-integrated, there exists an ECM term which relates these variables in the short-run while maintaining the consistency of the OLS estimated long-run parameter obtained in the first step. In this instance, ECM indicates the periodic change in the time series variables and how it eventually converges to its long-run equilibrium value. Therefore, the long run model of the co-integration test is utilized in multivariate single equation model as shown in model (2) and replicated in model (4) below .

$$\text{LAGDP}_t = \beta_0 + \beta_1 \text{LGEX}_t + \beta_2 \text{LASLO}_t + \beta_3 \text{LAPRD}_t + \beta_4 \text{LRAIN}_t + \beta_5 \text{PGRR}_t + \beta_6 \text{LGPCI}_t + u_t \quad (4)$$

Based on the GRT, all the variables should be nonstationary and integrated of order one. The necessary condition for co-integration is that the estimated residual from equation (4) be stationary (i.e. $u_t \sim I(0)$). If the above conditions are met, the error correction model is estimated from the following model

$$\Delta \text{LAGDP}_t = \beta_0 + \beta_1 \Delta \text{LGEX}_t + \beta_2 \Delta \text{LASLO}_t + \beta_3 \Delta \text{LAPRD}_t + \beta_4 \Delta \text{LRAIN}_t + \beta_5 \Delta \text{PGRR}_t + \beta_6 \Delta \text{LGPCI}_t + \beta_7 \text{ECM}_{t-1} + \varepsilon_t \quad (5)$$

Where Δ is the first difference operator, ε_t is the error term and β_7 is the coefficient of the estimated residual from equation (4) which is the error correction term. GRT requires that the coefficient β_7 in the short-run equation (5) be negative and statistically significant to show the speed of adjustment to long-run equilibrium. Note that the estimation of the ECM precludes the question of spurious regression since the variables are all stationary.

Result Presentation and Analysis

Unit Root Test

Table 3 ADF Unit root test

Variables	Level	ADF test			Remark
		Pvalue	First Difference	Pvalue	
LAGDP	-0.1683	0.933	-5.7157	0.000	I(1)
LAPRD	-2.8368	0.064	-3.2904	0.022	I(1)
LASLO	-1.3059	0.616	-6.8932	0.000	I(1)
LGPCI	-0.9978	0.744	-3.3362	0.020	I(1)
LGEX	-0.7202	0.829	-6.5401	0.000	I(1)
PGRR	-2.4287	0.141	-3.3201	0.021	I(1)
LRAIN	-2.7564	0.074	-8.8693	0.000	I(1)

Source: Authors computation

Table 3 above, presented the result of the ADF unit root test. The p-values of the ADF statistic indicate that all the variables are nonstationary at level for all conventional level of significance except LAPRD and LRAIN that appeared stationary at 10 percent level of significance but nonstationary at lower levels of significance. However, all the variables became stationary after first differencing which implies that all the selected variables of this study are distributed as $I(1)$ processes or integrated of order one. Hence the static co-integration test can be implemented.

Long-run Model Results

In order to proceed with the estimation of the static co-integration model, the long run model of equation (2) was estimated at level of the variables and the result is presented in Table 4.

Table 4: Long-run Model Result

Dependent Variable: LAGDP				
Variable	Coefficient	Std. Error	t-Statistic	P-value
C	1.655	1.684	0.982	0.333
LAPRD	-0.213	0.102	-2.084	0.045
LASLO	-0.003	0.042	-0.086	0.931
LGEX	-0.093	0.027	-3.429	0.001
LGPCI	0.606	0.088	6.835	0.000
PGRR	0.859	0.340	2.522	0.017
LRAIN	-0.086	0.198	-0.435	0.666

Source: Authors computation

In the long run model, the estimated coefficient of total government expenditure on agriculture (LGEX) is statistically significant at all conventional levels of significance with a p-value of 0.001. The value of this coefficient is -0.093 and indicates a negative relationship with the agricultural sector output. This means that one percent increase in total government expenditure on agriculture will on the average induce a decline in agricultural sector output by about 0.09 percent in the long run. This result suggests that government expenditure on the agricultural sector is not robust for a sustainable agricultural output growth. The estimated coefficient of agriculture implicit price deflator (LAPRD) of -0.213 is negative and statistically significant at 5 percent level of significance as the p-values indicate. Expectedly, agricultural output growth declines as a response to uncompetitive prices which in turn affect agricultural output in the long run. The estimated coefficient of agriculture sector loans (LASLO) is -0.003 and negatively signed but statistically insignificant. This shows that loans to the agricultural sector are not inducing growth in the sector as expected in the long run. However, the estimated coefficient of GDP per capita (LGPCI) is positive and statistically significant at all conventional levels of significance with a p-value of 0.000. The value of this coefficient is 0.606 and indicates that one percent increase in GDP per capita will on the average induce an increase in agricultural sector output by about 0.6 percent in the long run. This implies that household income is a significant determinant of agricultural sector output. The coefficients of population growth rate (PGRR) and average precipitation rainfall (LRAIN) are 0.859 and -0.086 respectively. The coefficient of population growth rate is statistically significant with a p-value of 0.017 indicating a 0.8 percent growth in the agricultural sector output as a result of one percent increase in population. However, the coefficient rainfall is not statistically significant.

Co-integration Test

Given the estimated long run model based on the Granger Representation Theorem, if the linear combination of two or more nonstationary variable is stationary at level, then the variables are said to be co-integrated. To test this, the residual from the estimated long run model is subjected to unit root test. If the residual is stationary at level, we conclude the existence of a long relationship. Table 5 shows the result of the ADF test of the residual from which we named the ECM.

Table 5: ADF test of ECM

		P-value
Augmented Dickey-	-4.605	0.0007

Source: Authors computation

The result from Table 5 indicated that the p-value of the ADF statistic is less than all conventional levels of significance (0.01, 0.05, and 0.1). Therefore, based on the estimated linear combination of the variables used for this study, there is evidence of long-run equilibrium relationship.

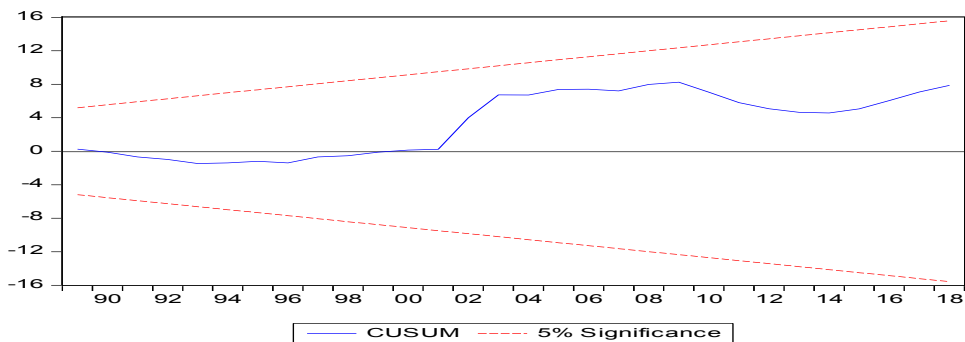
Error Correction Model

Based on the Granger Representation Theorem (GRT), if two or more variables are co-integrated, there exists an ECM term which relates these variables in the short-run while maintaining the consistency of the OLS estimated long-run parameter obtained in the first step. In this instance, ECM indicates the periodic fluctuations in the time series variables and how it eventually returns to its long-run equilibrium value. The ECM term is used to tie the short run and long run equilibrium value of the dependent variable. Model 5 was estimated and the result shown in table 6 below.

Table 6: Error Correction Model
Dependent Variable: DLAGDP

Variable	Coefficient	Std. Error	t-Statistic	P-value
C	0.040	0.020	1.961	0.059
DLAPRD	-0.166	0.123	-1.351	0.187
DLASLO	-0.038	0.046	-0.823	0.416
DLGEX	-0.040	0.023	-1.759	0.089
DLGPCI	0.331	0.150	2.202	0.035
DPGRR	0.806	0.426	1.889	0.068
DLRAIN	-0.108	0.140	-0.771	0.446
ECM(-1)	-0.513	0.183	-2.804	0.008
JarqueBera	0.457847		0.7954	
BG Serial ($x^2, 1$)	1.928824		0.1170	
BG Serial ($x^2, 2$)	12.36254		0.0544	

Source: Authors Computation



GRT requires that the coefficient of the error term in the short-run equation (5) be negative and statistically significant to confirm the existence of short run equilibrium relationship of the variables. From Table 6, it can be confirmed that the error correction term satisfies the GRT and this represents the speed of adjustment to equilibrium when there is a short run deviation from the equilibrium path. The ECM coefficient is -0.513, while the p-value is 0.008 which shows that it is statistically significant at all conventional levels of significance, indicating that about 51 percent deviation from equilibrium emanating from shock to the system is restored annually.

Given that the ECM model is valid, we now proceed with the interpretation of the results which reflects the contemporaneous impact of government expenditure on the agricultural sector output.

The short run model revealed that the estimated coefficient of government expenditure on agriculture (LGEX) is negatively signed and statistically significant at 10 percent level of significance. This result indicated that government expenditure on agriculture impacts negatively on agricultural growth in Nigeria within the period of study. This contradicts Zepda (2003) which revealed that investment in agriculture (technology and human capital) and agricultural output are strongly correlated. The reason for this contradiction is not farfetched; Nigeria's agricultural sector is predominantly subsistence, basic infrastructural support and extension services are totally lacking, and government expenditure on agriculture in the forms of budgetary allocations and interventions over the years are freighted away by corrupt politicians, government officials and conniving civil servants. The estimated coefficient of GDP per capita (LGPCI) is positive and statistically significant at 5 percent level of significance with a p-value of 0.035. Its estimated coefficient 0.331 indicates that 33 percent of household income remains a significant determinant of agricultural sector growth in Nigeria. The coefficient of population growth rate (PGRR) is 0.806 is statistically significant at 10 percent alpha level. This confirms the earlier long run result that population growth favors agricultural growth in Nigeria. However, the estimated short run coefficients of agriculture implicit price deflator (LAPRD), agriculture sector loans (LASLO), and the average precipitation rainfall (LRAIN) are negative and statistically insignificant. The null hypothesis of normal distribution of the JarqueBera test statistic could not be rejected, implying that the series is normally distributed. The Breusch-Godfrey serial correlation test (of 2 lags) revealed that the null hypothesis of no serial correlation could not be rejected; hence there

are neither autocorrelation nor serial correlation in the residual series of the model. The cumulative sum (CUSUM) test indicated that the is stable and meets the criteria for policy formulation.

Conclusion and Recommendations

The study investigated the impact of government expenditure on agricultural growth in Nigeria. The Engle-Granger two step procedure to co-integration was deployed to estimate the relationship between agricultural output, total government expenditure on agriculture, agriculture sector loans, agriculture implicit price deflator, average precipitation rainfall, population growth rate and GDP per capita. The finding of the study revealed that government expenditure on agriculture has negative impact on agricultural growth in Nigeria in the short run. The result also revealed that agricultural sector output and other variables in the model are co-integrated with deviation from long-run equilibrium being corrected up to 51 percent annually. Based on the result, the study recommended that government should block all leakages and corruption in the budget implementation in the agricultural sector as this will help to crowd-in more investment in the sector. There is also need to create a stable macroeconomic environment that will ensure improved household income as this will impact favorable on agricultural sector growth in Nigeria.

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