

*Full Length Research Paper*

## **An assessment of Nigeria expenditure on the agricultural sector: Its relationship with agricultural output (1980 - 2011)**

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A strong and an efficient agricultural sector would enable a country to feed its growing population, generate employment, earn foreign exchange and provide raw materials for industries. This study makes a modest contribution to the debates by empirically analyzing the relationship between Nigeria government expenditure on the agricultural sector and its contribution to economic growth, using time series data from 1980 to 2011, obtained from the Central Bank of Nigeria Annual Report and Statement of Account, Journal of Food Research and Federal Office of Statistics. It employs the Engle-Granger two step modeling (EGM) procedure to co-integration based on unrestricted Error Correction Model and Pair wise Granger Causality tests. From the analysis, our findings indicate that agricultural contribution to GDP (Gross domestic product) and total government expenditure on agriculture are cointegrated in this study. The speed of adjustment to equilibrium is 88% within a year when the variables wander away from their equilibrium values. Based on the result of granger causality, the paper concludes that a very weak causality exist between the two variables used in this study. Therefore, the policy implication of these findings is that any reduction in government expenditure on agriculture would have a negative repercussion on economic growth in Nigeria.

**Key words:** Agriculture, causality, gross domestic product, total expenditure.

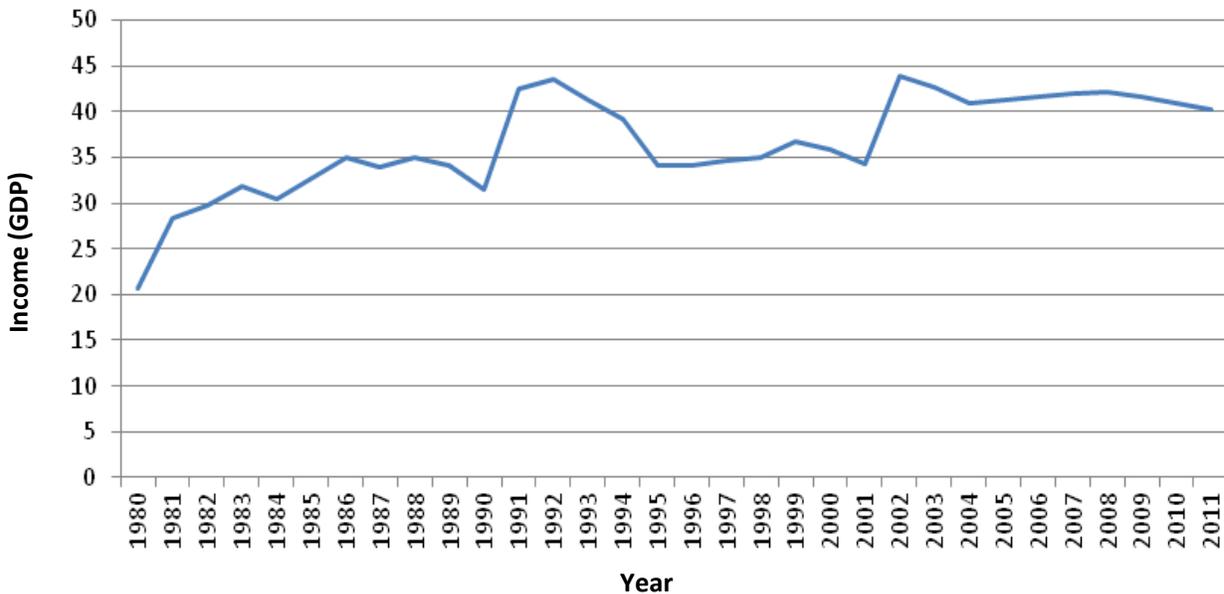
### **INTRODUCTION**

The study of economic history provides us with ample evidence that an agricultural revolution is a fundamental pre-condition for economic development (Eicher and Witt, 1964; Oluwasanmi, 1966; Jones and Woolf, 1969). According to Anyanwu et al. (1997) as reported by Ebomuche and Ihugba (2010) agriculture involves the cultivation of land, raising and rearing of animals for the purpose of production of food for man, feed for animals and raw materials for industries. It involves cropping, livestock, and forestry, fishing, processing and marketing of these agricultural products. Essentially it is composed

of crop production, livestock, forestry and fishing.

The agricultural sector has the potential to be the industrial and economic springboard from which a country's development can take off. Nigeria, which spans an area of 924,000 km<sup>2</sup>, is bordered by the Gulf of Guinea, Cameroon, Benin, Niger, and Chad. The topography ranges from mangrove swampland along the coast to tropical rain forest and savannah to the north (NPC, 2004). Nigeria is generously endowed with abundant natural resources. With its reserves of human and natural resources, Nigeria has the potential to build a prosperous

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**Figure 1.** Percent of agricultural contribution to GDP.

Source: Central Bank of Nigeria (2010) and OCSEA (2011, December, Volume 1 issue 3)

economy and provide for the basic needs of the population. This enormous resource base if well managed could support a vibrant agricultural sector capable of ensuring the supply of raw materials for the industrial sector as well as providing gainful employment for the teeming population (Ukeje, 2002).

Before the discovery of oil in the country in the late 1950s and early 1960s, agriculture was the dominant sector of Nigeria economy. It consisted over 65% of the country's Gross Domestic Product (GDP) and provided the bulk of the foreign exchange earnings through the export of cash crops. The sector is one of the most important sectors of Nigeria's economy. It holds a lot of potentials for future economic development of the nation, having played dominant role in the remote past. With the emergence of oil as a major source of government revenue and foreign exchange earner the sector was neglected and hence led to the decline (Ijaiya, 2000; Iwayemi, 1994; Ukpong and Malgwi, 1991). In the last decade, its impact may not have been so prominent because of the dominating effect of the oil sector which annually contributed not less than 96% of the nation's total export earnings (CBN, Annual Report and Statement of Accounts, various Issues). The population involved in farming is between 60 and 70% (Nwajiuba, 2012). The sector contributed an average of 36.6% to the GDP during the years of study 1980-2011, it was highest in 1992, 43.6% and 2002, 43.9% and lowest in 1980, 20.6% (Figure 1). The total federal expenditure that was allotted to agriculture during 1980 to 2011 was less than 4% (CBN, 2010; JFR, 2012).

Public spending (e.g. Budget) is one of the most direct effective instruments used by governments to promote

agricultural growth and poverty reduction. Public spending at the federal level and sub-national level follows a basic structure-recurrent spending and capital spending. This spending structure is characterized by different expenditure categories depending on the ministry, department or agency. The nature of support given to agriculture by various governments in the country varied over the years. Before independence, the assistance to the sector was generally aimed at developing the export crops required by the overseas industries. After independence when the national development plans were prepared, agricultural support took a much more formal form, and thus presented a more serious impression of what government intended doing for the sector. However what most of the efforts later turned out to be as can be inferred from the allocations made in the various national development plans and annual budgets, leave much to be desired. When compared to other sectors like mining, manufacturing, education, and health, agriculture virtually received the least annual allocations that are often inadequate to put the sector on sustainable grounds. This accounts to a large extent for the poor performance of many institutional reforms and strengthening which were over the years undertaken in the sector.

There have been a number of valuable studies on the relationship between agriculture and economic growth. Oji-Okoro (2011) is of the opinion that agriculture resource has been an important sector in the Nigerian economy in the past decades, and is still a major sector despite the oil boom. The pervasive influence of agriculture on Nigeria's economic and social development has also been articulated by Oluwasami (1966).

Ogen (2007) believes that the agricultural sector has a multiplier effect on any nation's socio-economic and industrial fabric because of the multifunctional nature of agriculture. Ogwuma (1981), studied on public expenditure in agricultural sector using econometric analysis. Based on his report, agricultural financing in Nigeria shows positive relationship between interest rate and loanable funds on the level of agricultural output. Using time series data, Lawal (2011) attempted to verify the amount of federal government expenditure on agriculture in the thirty-year period 1979 to 2007. Significant statistical evidence obtained from the analysis showed that government spending does not follow a regular pattern and that the contribution of the agricultural sector to the GDP is in direct relationship with government funding to the sector. Adofu et al. (2012) in their work; effects of government budgetary allocation to agricultural output in Nigeria (1995-2009) show that the percentage, degree or amount of budgetary allocation to agricultural sector has a positive relationship with the total agricultural production in the country. This implies that the more the public spending on agricultural sector, the more the improvements in the performance of the agricultural sector. Also, a large degree of change in agricultural output is accounted for by change in budgetary allocation to agricultural sector. Thus, budgetary allocation to agriculture has a large impact on agricultural output.

However, none of these studies employed Granger Causality to analyze the relationship between government expenditure and agric output that is if government expenditure granger causes agric output or agric output granger cause government expenditure.

This study is an improvement on other studies on the relationship between government expenditure on agriculture and its contribution to economic growth. The paper is organized as follows: first, introduction, then literature review and theoretical framework. Third, methodology and model estimation are discussed. Fourth, discussion of results, and finally, recommendations and conclusion.

### **Objective of the study**

The main objective of this study is to examine the impact of Nigeria's federal government expenditure on agricultural on the contribution of agriculture to the GDP (output). The scope is limited to a period between 1980 and 2011. The choice of this study period is based on the availability of data.

## **LITERATURE REVIEW AND THEORETICAL FRAMEWORK**

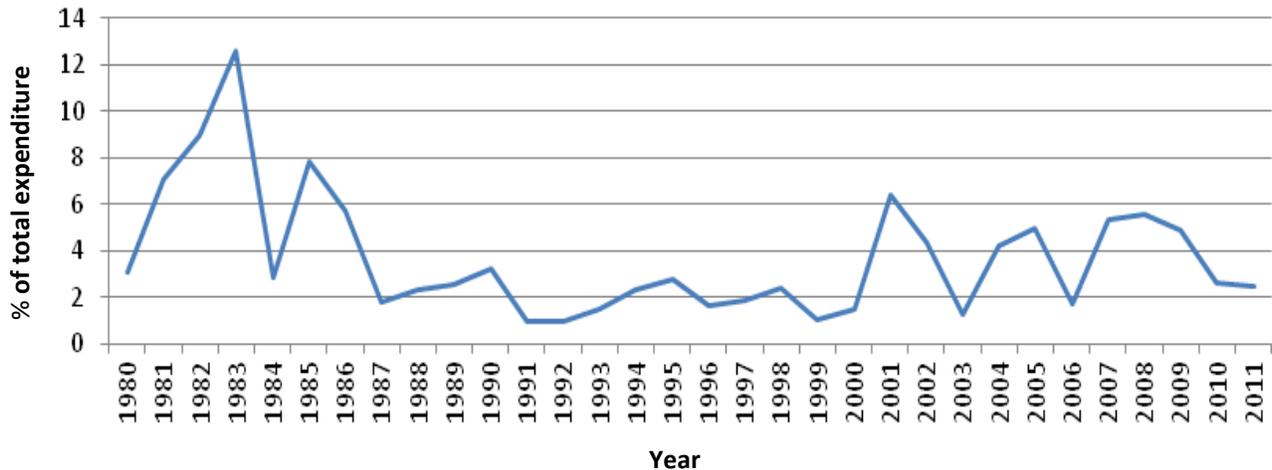
### **Agriculture financing in Nigeria**

According to Akande et al. (2009) 'National budgets play

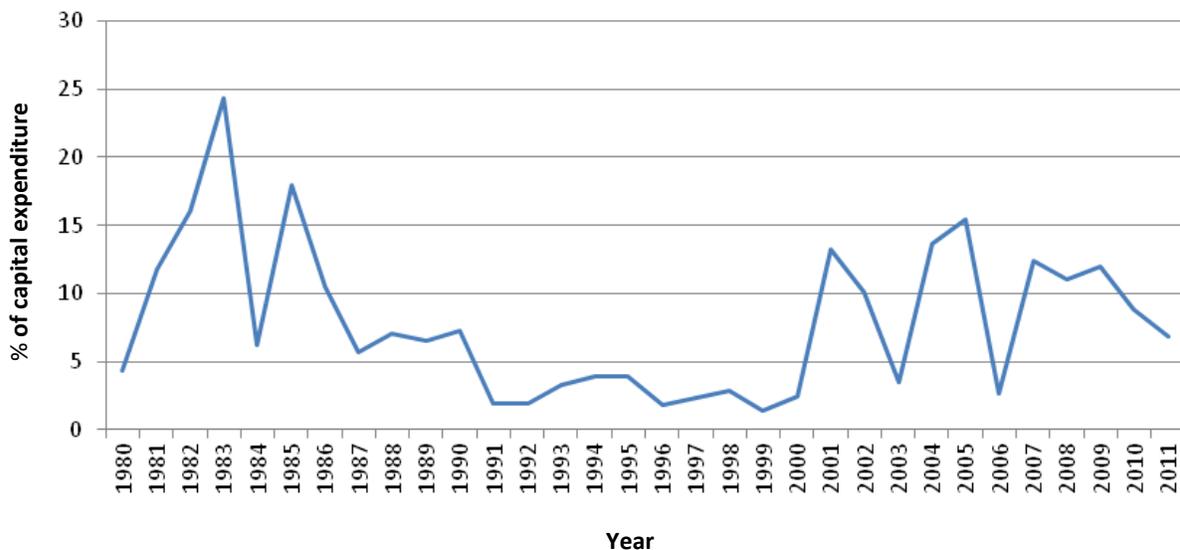
a prominent role in modern economic management. They are used for allocating resources and planning as well as forecasting revenue inflow and expenditure. Increasingly, national budgets are becoming a pivot instrument of economic management.' The importance of National budgets is not only in its presentation to the populace but rather in the structure, patterns, inter-sectoral links as well as the allocation to sectors in accordance to national priority of the government. Basically, Agricultural allocation has a way of bringing desired effect in other sectors such as industry through inter-sectoral linkage.

The underdeveloped state of many markets in developing countries like Nigeria makes government involvement in agricultural investment necessary. Spending on agriculture in Nigeria is exceedingly low. Less than 4% of total federal expenditure was allotted to agriculture during 1980 to 2011, far lower than spending in other key sectors such as education, health, and water. According to Mogues et al. (2008) in 2000, Nigeria's agricultural public spending expressed as a share of total public spending was lower than that of all other African countries for which data were available, and it was also substantially lower than the regional averages for Asia and Latin America. In prior decades, Nigeria's ranking was only somewhat better. This spending contrasts dramatically with the sector's importance in the Nigerian economy and the policy emphasis on diversifying away from oil, and falls well below the 10% goal set by African leaders in the 2003 Maputo agreement. Nigeria also falls far behind in agricultural expenditure by international standards (FAO Percent Recommendation is 25%) even when accounting for the relationship between agricultural expenditures and national income. The expenditure on agriculture was highest in 1983 (12.6%) and lowest in 1992 (1%) (Figure 2).

Having realized the declining role of agriculture to economic development, the government over the years has put in place certain policy measures and programmes with a view of increasing the contribution of agriculture to economic development. However, a peep into the federal government capital expenditure on agriculture as a ratio of the total federal government capital expenditure, it portrays a gloomy future for the sector's development in the country. As indicated in Figure 3, from 1980 to 2011, the federal government capital expenditure on agriculture were below 10% except in the following years; 1981, 1982, 1983 (the highest), 1985, 1986, 2001, 2002, 2004, 2005, 2007, 2008 and 2009 because these were the years that coincides or the year after with different government agricultural development policies and programmes such as the Green Revolution in 1980, the structural adjustment programme (1986), The Directorate of Foods, Roads and Rural Infrastructure (1987) although it was 5.7% but increased to 7.1% the following year, food for all programme in 1987, the better life for rural women programme also in 1987, the Rural Agro-Industrial Development Scheme



**Figure 2.** Percent of agriculture expenditure to total expenditure (1980-2011).  
Source: Central Bank of Nigeria (2010) and OCSEA (2011, December, Volume 1 issue 3).



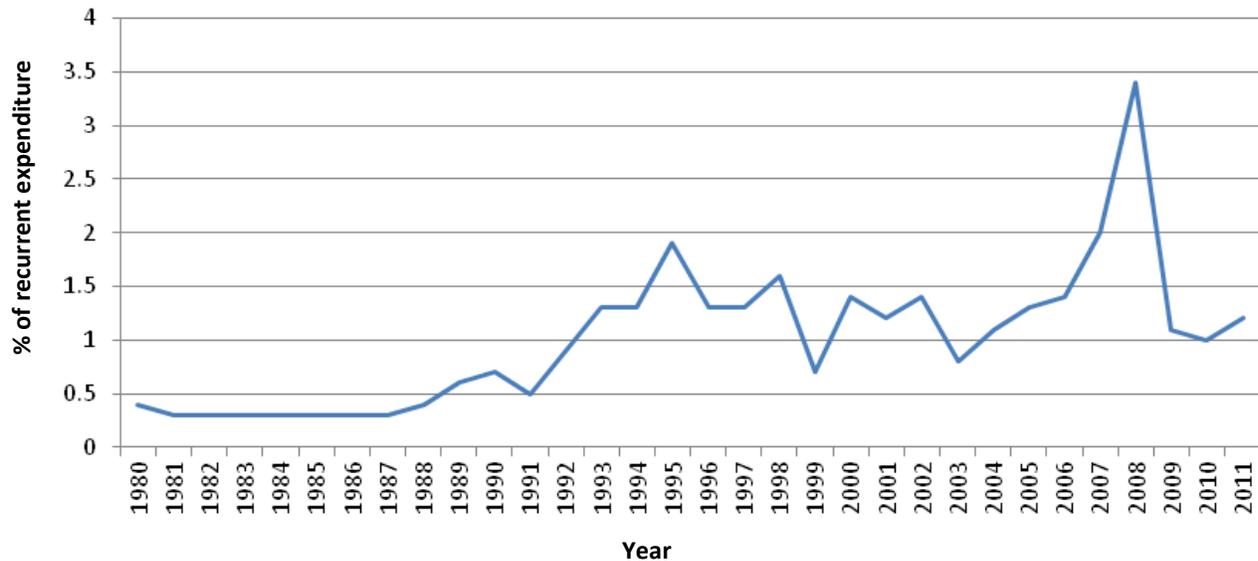
**Figure 3.** Percent of agriculture capital expenditure to total capital expenditure.  
Source: Central Bank of Nigeria (2010) and OCSEA (2011, December, Volume 1 issue 3).

(RAIDS) in 2001 and Economic Empowerment Development Strategy (NEEDS, SEEDS and LEEDS) of 2003 which was implemented in 2004. The federal government recurrent expenditure on agriculture as a ratio of the total federal government recurrent expenditure was highest in 2008 (3.4) the year after the introduction of late president Yardua’s seven point agenda which has agriculture as one of the seven priority sectors and lowest from 1981-1987 (0.3%) (Figure 4). Despite these huge sums of money allocated to the sector during these years, there was little or no improvement in agricultural production because

successive governments only used policies/programmes to embezzle public funds to the total neglect of food production (Ijaiya and Ijaiya, 2004).

**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



**Figure 4.** Percent of agriculture recurrent expenditure to total recurrent expenditure.  
Source: Central Bank of Nigeria (2010) and OCSEA (2011, December, Volume 1 issue 3).

schemes have focused on enhancing agricultural output, improving the expected linkages (backward and forward) with the manufacturing sector, increasing earnings and employment opportunities, increasing food security, etc. They have therefore basically touched on availability of supplies and equipment production, incentives to farmers, transportation, agricultural credit, land reform, food preservation, extension services, infrastructural facilities, etc. Government involvement in agriculture not only goes beyond providing supportive services, it also includes direct participation in the production of agricultural products (Rogers, 1999).

One of the first steps by government was the launching, in 1972, of the National Accelerated Food Production Programme, 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 N20 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 N100 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 bank's 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. The scheme encouraged mass participation. 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, and machinery and equipment.

A major policy that was designed to improve agricultural production was the promulgation of the Land Use Decree in 1978. The focus of the Decree was to reform the land tenure system, which was believed to constitute a formidable obstacle to the development of agriculture in Nigeria.

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 muscles rather than equipment, thereby resulting in low output. Emphasis therefore shifted into provision of credit and skilled manpower, and expansion of agro-allied businesses to mention a few. From 1986 when the Structural Adjustment Programme 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) Ahmadu Bello University, Zaria: with 5 Zonal Offices, one in each of the 5 agro-ecological zones of the country – Umudike (South-east), Ibadan (South-west), Maiduguri (North-east), Badeggi (North-central), Zaria (North-west) etc (Table 1).

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. Moreover, there was also established the National Agricultural Land Development Authority (NALDA), the River Basin Development Authorities and the Agricultural Development programmes (ADP) (Table 2). There are also international institutions complementing these institutes like the International Institute for Tropical Agriculture (IITA). But it is disheartening to note that these efforts have not yielded appreciable successes. The reasons for the low successes were not because the projects and programmes were mere paper and pencil solutions, 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, supervision, etc. In Nigeria, farmers are the most impoverished and backward amongst all types of businesses and professions. This is not the case in developed countries of the world, where farmers are among the richest and most successful entrepreneurs.

### Scope of study

This study was designed to cover a period of 31 years (1980 - 2011). A time series data was used for this study. Data used in this study were obtained from the Central Bank of Nigeria Statistical Bulletin, CBN Annual Report and Statement of Account, Journal of Food Research and Federal Office of Statistics.

### METHODOLOGY

Engle-Granger two step modeling (EGM) procedure (Engle and Granger, 1987) has been widely used to test for long-run relationship. If  $X_t$  and  $Y_t$  are individually  $I(1)$  processes and there exist a linear combination of this variables that is  $I(0)$  process, then  $X_t$  and  $Y_t$  are cointegrated. In other words, a long run equilibrium relationship exists among these variables. Based on the Granger Representation Theorem (GRT), if two variables are cointegrated, there exists an Error Correction Model (ECM) which relates these variables in the short-run while maintaining the consistency of the OLS estimated long-run parameter obtained in the cointegrating

regression. In this instance, ECM indicates the periodic change in the time series variables and how it eventually returns to its long run equilibrium value. Since the ECM equation contains only stationary variables which preclude spurious regression, granger causality test can be applied. This is because cointegration analysis shows that there is causality amongst variables but it does not reveal the direction of such causality.

The long-run cointegrating regression is given as follows:

$$AGDP_t = \phi TGA_t + u_t \quad (1)$$

Where  $AGDP_t$  represents the natural log of agriculture contribution to real gross domestic product and  $TGA_t$  represents the natural log of total government expenditure on agriculture.  $AGDP_t$  and  $TGA_t$  are both nonstationary variables and integrated of order one (that is  $AGDP_t \sim I(1)$  and  $TGA_t \sim I(1)$ ). The necessary condition for cointegration is that the estimated residual from equation (1) be stationary (that is  $U_t \sim I(0)$ ). If the above conditions are met, ECM is estimated from this model.

$$\Delta AGDP_t = \delta_1 \Delta TGA_t + \delta_2 \theta_{t-1} + \varepsilon_t \quad (2)$$

Where  $\Delta$  is the first difference operator,  $\varepsilon_t$  is the error term and  $\theta$  is the estimated residual from equation (1) (that is  $AGDP_t - \phi TGA_t$ ). GRT requires that the coefficient  $\delta_2$  in the short-run equation (2) be negative and statistically significant to confirm the cointegration of the variables. Note that the estimation of the ECM precludes the question of spurious regression since the variables are stationary and equally incorporates both the static long-run and dynamic short-run components.

Granger causality analysis is used to test the hypothesis of prediction of future values of a particular variable(s) while incorporating the past lags of other variables in the model. In other words, a time series variable  $X_t$  is said to granger cause another time series variables  $Y_t$  if the former contains useful information to predict future values of the later. In this framework, if the F-test of the included lagged variables is statistically significantly different from zero, it implies that there is causality which can either be unidirectional or bidirectional in a bivariate case.

The granger causality test is estimated from the following equations

$$\Delta AGDP_t = \sum_{i=1}^n \alpha_i \Delta TGA_{t-i} + \sum_{j=1}^n \beta_j \Delta AGDP_{t-j} + u_{1t} \quad (3)$$

$$\Delta TGA_t = \sum_{i=1}^n \lambda_i \Delta TGA_{t-i} + \sum_{j=1}^n \gamma_j \Delta AGDP_{t-j} + u_{2t} \quad (4)$$

Where  $\alpha, \beta, \lambda$  and  $\gamma$  are the respective coefficient of the variables,  $t$  represents time while  $i$  and  $j$  are their lags,  $u_{1t}$  and  $u_{2t}$  are uncorrelated white noise error term. The null hypothesis is  $\alpha = 0$  for all  $i_s$  and  $\gamma = 0$  for all  $j_s$  while the alternative hypothesis is given as  $\alpha_i \neq 0$  and  $\gamma_j \neq 0$ .

### RESULTS

We begin by exploring the time series properties of the

**Table 1.** Nigerian Agricultural Institutes.

Research institute	Year established	Formal mandate
Forestry Research Institute of Nigeria Jericho Hills, Ibadan, Oyo State, Nigeria	1900	The main aim of institute is to identify and economic management of tree species for plantation in various agro-ecological zones of the country; utilization timber species including wood wastes; agroforestry practices; training of technical and sub-technical personnel.
Institute for Agricultural Research (IAR), P.M.B 1044 Ahmadu Bello University, Samaru Zaria	1924	Genetic improvement and development of production and utilization technologies for sorghum, maize, cowpea, groundnut, Cotton, sunflower, and the improvement of the productivity of the entire crop-based farming system in the North West Zone of Nigeria
National Veterinary Research Institute (NVRI), P.M.B 01 Vom	1924	Research into all aspects of animal diseases, their treatment and control, as well as development and production of animal vaccines and sera
Nigerian Institute for Oil Palm Research (NIFOR) P.M.B 1030 Benin City	1939	Research into genetic improvement , production and processing of oil, coconut, date, raphia and ornamental palms
Nigerian Institute for Trypanosomiasis Research (NITR) No1 Surame Road Ungwan Rimi G.R.A., P.M.B 2077 Kaduna Nigeria	1947	Research into Trypanosomiasis and onchoerciasis generally, especially the pathology, immunology and methods of treatment of the diseases.
Institute of Agricultural Research and Training (IAR&T) P.M.B 5029, Ibadan, Nigeria	1956	Soil and water management research, genetic improvement of kenaf and jute, and improvement of the productivity of the entire farming system of the South West Zone
Lake Chad Research Institute (LCRI), P.M.B 1293, Gamboru Road Maiduguri, Borno State	1960	Genetic improvement and development of production technologies for wheat, millet, and barley; the improvement of the productivity of the entire farming system in the North Eastern Zone
Rubber Research Institute of Nigeria (RRIN), P.M.B 1049 Iyanomo, Benin City	1961	Research into genetic improvement, production and processing of rubber and other lather producing plants
Cocoa Research institute of Nigeria (CRIN), P.M.B 5244 Idi-Ayunre, Ibadan	1964	Genetic improvement, production and local utilization research on cocoa, cashew, kola, coffee and tea
National Institute for Freshwater Fisheries Research (NIFFR). Research, P.M.B 6006 New Bussa	1968	Research into all freshwater fisheries, and long term effects of man-made lakes on ecology and environment throughout the country
National Agricultural Extension Research and Liaison Services (AERLS) Ahmadu Bello University, Zaria:	1975	Crop and Forestry, Livestock and Fisheries, Agricultural Engineering and Irrigation, Agricultural Extension and Economics, Food Technology and Rural Home Economics, and Agricultural Media.
National Cereals Research Institute (NCRI), P.M.B 8 Badeggi, Bida Niger State	1975	Genetic improvement and production of rice, soybean, benniseed, sugarcane and improvement of productivity of entire farming system of the Central Zone
National Horticulture Research Institute (NIHORT) P.M.B 5432 Idi-Ishin, Ibadan	1975	Research into genetic improvement, production, processing and utilization of fruits and vegetables, as well as ornamental plants
Nigerian Institute for Oceanography and Marine Research. P.M.B 12729 Victoria Island Lagos	1975	Research into the resources and physical characteristics of Nigerian territorial waters and the high seas beyond; genetic improvement, production and processing of brackish water and marine fisheries
National Root Crops Research Institute (NRCRI), P.M.B 7006, Umudike, Umuahia, Abia State	1976	Genetic improvement of cassava, yam, cocoyam, Irish potato, sweet potato, and ginger and overall research in improvement of farming system of the South East Zone
Nigeria Stored Products Research Institute (NSPRI), P.M.B 1489km 3 Asa Dam Road, Ilorin Kwara State	1977	Research into improvement of major food and industrial crops and studies on stored product pest and diseases, pesticides formulation and residue analysis
National Animal Production Research Institute (NAPRI), P.M.B 1096 Shika, Zaria	1977	Research on food animal species and forages
International Institute for Tropical Agriculture (IITA), Ibadan, Oyo State	1967	Finding solutions to hunger, malnutrition, and poverty.

Sources: RIU Nigeria, June 2010 and <http://www.pointblanknews.com/Articles/artopn2759.html>.

**Table 2.** Agricultural Development Programmes in Nigeria.

Name	Date started	Status
Farm Settlement Centre	1960s	Defunct
Tractor and Equipment Hiring Scheme	1960s	Defunct
Co-operative Plantation Programme	1960s	Defunct
National Accelerated Food Production Programme (NAFPP)	1973	Defunct
National Grain Production Company (NGPC) and National Root Crops Production Company (NRPC)	1974	Defunct
The Agricultural Development Programmes (ADPs)	1974	Functional
The River Basin Development Authority (RBDA)	1976	Functional
Operation Feed the Nation (OFN)	1976	Defunct
The Nigerian Agricultural and Co-operative Bank (NACB)	1977	Functional
The Green Revolution	1980	Defunct
Agricultural Mechanics and Machinery Operations Training Centre (AMMOTRAC)	1980s (late)	Functional
Rural Agro-Industrial Development Scheme (RAIDS)	1981	Defunct
Structural Adjustment Programme	1985/86	Defunct
The Directorate of Foods, Roads and Rural Infrastructure (DFRRI)	1987	Defunct
Food for all programme in 1987	1987	Defunct
The National Agricultural Land Development Authority (NALDA)	1992	Defunct
National Acceleration Crops Production Programme (NAICPP)	1996	-
Agricultural and Rural Transformation Programme (ARTP)	2000	Functional
Economic Empowerment Development Strategy (NEEDS, SEEDS and LEEDS)	2003/04	Functional
National Food Security Programme (NFSP)	2008	Functional

Source: Computed by the Authors.

**Table 3.** ADF and KPSS unit root test for AGDP and TGA.

Variable	ADF test		KPSS	
	Level	First difference	Level	First difference
AGDP	-1.61293	-10.8007	0.723	0.283
TGA	-3.44835	-7.87293	0.613	0.113
5% Critical value	-2.96397	-2.96397	0.463	0.463

Note the ADF 5% critical value for constant and trend is -3.568379.

variables. Augmented Dickey-Fuller (1979) test and Kwiatkowski et al. (1992) test for unit root is deployed to test the stationarity of the variables. The ADF test the null hypothesis of nonstationarity while the confirmatory KPSS test for stationarity of the null hypothesis. Table 3 reports the result of the ADF and KPSS test for both the levels and first-difference of the variable.

Table 1 reveals that both variables are nonstationary at level but are stationary at their first-difference. In short, both variables are integrated of order one (that is they are  $I(1)$  processes) which sets the stage for cointegration test. Below is the estimated result of the cointegrating (Equation 1).

$$AGDP_t = 9.14 + 0.27TGA_t \\ (0.35)(0.04)$$

Note that the standard error is given in parenthesis below

the estimated coefficient. The coefficient of TGA is statistically significant different from zero. From this estimation, we retrieved the residual and performed ADF test and confirm that it is integrated of order zero (that is  $U_t \sim I(0)$ ) (Result is not reported to save space) and used it to estimate the ECM of equation (2). The result is given below:

$$\Delta AGDP_t = 0.08 + 0.15 \Delta TGA_t - 0.88 \theta_{t-1} \\ \begin{matrix} (0.04) & (0.06) & (0.09) \end{matrix} \\ R^2 = 0.75 \quad d = 1.7$$

The estimated coefficient of the ECM term which is also the speed of adjustment to equilibrium is negative and statistically significant as required by the granger representation theorem. This is enough evidence that AGDP and TGA are cointegrated in this study. The speed of adjustment to equilibrium is 88% within a year when the

**Table 4.** Pairwise Granger causality test.

Direction of causality	F-stat	p-value	Decision	Lag length
TGA → AGDP	2.91	0.07*	Do not reject	2
TGA ← AGDP	1.01	0.38	Reject	2
TGA → AGDP	0.64	0.59	Reject	3
TGA ← AGDP	2.50	0.08*	Do not reject	3
TGA → AGDP	1.16	0.36	Reject	4
TGA ← AGDP	1.68	0.19	Reject	4

The arrow shows the direction of causality.

variables wander away from their equilibrium values.

Since causality test is affected by number of lags included, we tested using 2, 3 and 4 lag lengths. The results in Table 4 shows that up to four lag lengths at 5% level of significance, there was no causality between the variables which is difficult to interpret since they were found to be cointegrated. However, at 10% level of significance and 2 lag lengths TGA is found to granger cause AGDP with no reverse causality from AGDP to TGA (no feedback). Similarly, at 10% level of significance and 3 lag lengths, a unidirectional causality running from AGDP to TGA with no reverse causality from TGA to AGDP was found. The hypothesis that the lag values of TGA and AGDP are statistically significantly different from zero is not rejected for the fourth lag length as the p-values of the F-test indicate. Based on the result of granger causality, we conclude that a very weak causality exist between the two variables used in this study.

## Conclusion

In this study, we set out to empirically investigate the empirical relationship between government expenditure on agriculture (capital and recurrent), and agricultural contribution to GDP (output), using annual time series data from 1981 to 2011. Some econometric tools are employed to explore the relationship between these variables. The study examines stochastic characteristics of each time series by testing their stationarity using Augmented Dickey Fuller (ADF) test. Then, the relationship between government expenditure on agriculture and agricultural contribution to GDP (output) is examined using Engle-Granger two step modeling (EGM) procedure and Pairwise Granger causality tests. The results from the Test indicate that there exists long-run relationship between government expenditure on agriculture (capital and recurrent), and agricultural contribution to GDP (output). In addition, the causality results reveal that up to four lag lengths at 5% level of significance, there was no causality between the

variables. However, at 10% level of significance and 2 lag lengths TGA is found to granger cause AGDP with no reverse causality from AGDP to TGA (no feedback). Similarly, at 10% level of significance and 3 lag lengths, a unidirectional causality running from AGDP to TGA with no reverse causality from TGA to AGDP was found. According to empirical findings of this study, one may tentatively suggest that the growth of government expenditure on agriculture in Nigeria is not directly dependent on and determined by economic growth as Wagner's Law indicates. However, causality results reveal that reduction in total government expenditure on agriculture (TGA) would have a negative repercussion on agricultural contribution to GDP (output) in Nigeria. The study recommends that government should pay more attention to the agric sector by compelling non-governmental financial institutions; most especially banks to supplement government efforts at financing agriculture through the disbursement of loans at low interest rate and appropriate time in order to avoid the diversion of such loans.

## REFERENCES

- Akande SO, Falokun GO, Taiwo SO, Ogunwale AO, Adeoye BW (2009) Budget Process in Selected Countries, Lessons for Nigeria, NISER Monograph Series No 1, 2009.
- Central Bank of Nigeria (2010). Statistical Bulletin Central Bank of Nigeria. 2(1), December.
- Dickey D, Fuller W (1979). "Distribution of the Estimators for Autoregressive Time Series with a Unit Root", J. Am. Stat. Assoc. 74:427-431.
- Ebomuche NC, Ihugba AO (2010). Structure of the Nigerian Economy. Peacewise Systems; 124 Tetlow Road, Owerri, Imo State Nigeria.
- Eicher C, Witt L (1964). Agriculture in Economic Development. New York: <http://www.pointblanknews.com/Articles/artopn2759.html>.
- Engle RF, Granger CWJ (1987). Cointegration and Error Correction: Representation, Estimation and Testing. *Econometrica* 55:251-76.
- Ijaiya GT (2000). Economic Growth in Nigeria: An asymmetry of the Balanced Growth Doctrine in Usman A and Ijaiya GT (eds), selected essays on the contradictions of economic development theories. Ilorin: Haytee Publishing Co.
- Ijaiya MA, Ijaiya GT (2003). The impact of agricultural finance on agricultural output in Nigeria. *Poverty, Globalization and Human*

- Development. Edited by Jugale VB. [www.unilorin.edu.ng/index.php/jjaiyama](http://www.unilorin.edu.ng/index.php/jjaiyama)
- Iwayemi A (1994). *Perspectives and Problems of Economic Development in Nigeria: 1960-1990*. Ibadan: CEAR.
- Jones EI, Woolf SS (1969). *Agrarian Change and Economic Development: The Historical Problems* London: Methuen.
- Kwiatkowski D, Phillips PCB, Schmidt P, Shin Y (1992). Testing the null hypothesis of stationarity against the alternative of a unit root. *J. Econ.* 54:159-178.
- Lawal WA (2011). An Analysis Of Government Spending On Agricultural Sector And Its Contribution To GDP In Nigeria. *Int. J. Bus. Soc. Sci.* 2(20).
- Mogues T, Morris L, Freinkman M, Adubi A, Ehui S (2008). *Agricultural Public Spending in Nigeria*. IFPRI Discussion Paper 00789 September.
- National planning Commission (2004). *Meeting Everyone's Needs- National Economic Empowerment and Development Strategy Nigerian National Planning Commission, Abuja*.
- Nwajiuba C (2012). [http://www.boell.org/downloads/4\\_Green\\_Deal\\_Nigeria\\_AGRICULTURE.pdf](http://www.boell.org/downloads/4_Green_Deal_Nigeria_AGRICULTURE.pdf), Page 3.
- Ogen O (2007). "The Agricultural Sector and Nigeria's Development: Comparative Perspective from the Brazilian Agro-Industrial Sector Economy (1960-1995)". *Nebula March 2007@Noble World Archives*.
- Ogwuma PA (1981). *The growth of the banking Industry in Nigeria, Presented at the Annual Seminar of the Chartered Institute of Bankers of Nigeria, Bankers House, Lagos State*.
- Oji-Okoro I (2011). "Analysis of the contribution of agricultural sector on the Nigerian economic development." *World Rev. Bus. Res.* 1(1):191-200.
- Oluwasanmi HA (1966). *Agriculture and Nigeria's Economic Development* Ibadan: Ibadan University Press.
- Rogers BA (1999). Policy recommendations on agriculture. *Nigeria World Friday, October 22*.
- Ukeje EU (2002). "Towards Accelerated industrial crop production: problems and prospects" *CBN Bullion, July/ Sept 2002, 26(3):1-2*.
- Ukpong G, Malgwi U (1991). *Federal Government Policies in respect of agricultural finances. CBN Bulletin, Lagos pp. 47-59*.