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Government Fiscal Policy and Agricultural Sector Outputs in Nigeria: Evidence from Fully Modified Ordinary Least Square (FMOLS)

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Abstract

The agricultural sector is an important sector of any economy as it plays a vital role from various points of view like, share in GDP, employment and foreign exchange earnings. Despite Nigeria's rich agricultural and resource endowment, as well as the pre and post oil boom experiences she has witnessed, the Nigerian agricultural sector has failed to blossom as it is expected to; and Less than 50% of the country's cultivable agricultural land is under cultivation. The study thus examines Government fiscal policy and Agricultural sector outputs in Nigeria between 1995 and 2014 using Fully Modified Ordinary Least Square (FMOLS) regression method. Findings from the study showed that over the years, the government has almost been the sole provider of financial and other recurrent resources to support agriculture. Value added tax (VAT) was however found to have influenced the growth of value of agricultural outputs positively and significantly. It shows that the amount of VAT imposed on agricultural outputs has improved the growth of the agricultural produce. However, government capital allocation and expenditure to agriculture is relatively low and that actual expenditure falls short of budgeting expenditure and the rate of under spending is usually higher for agriculture than for other economic sectors. More so, a large proportion of the funds allocated to agriculture do not go directly to farmers. The federal Government thus needs to take a holistic appraisal of agricultural programmes and schemes, with a view to streamlining them to meet the dynamics of times, for the benefits of the Nigerian citizenry. More funding has to be captured in the annual budget so as to boost the performance of the agricultural sector.

Keywords: Capital Expenditure; Recurrent Expenditure; Agricultural Outputs; Value added Tax and Fully Modified Ordinary Least Square,

1. Introduction

The Nigerian economy during the first decade after independence could be described as an agrarian economy because agriculture served as the engine of growth of the overall economy. From the stand point of occupational distribution and contribution to GDP, agriculture was the leading sector. In the early 60's, contribution from this sector accounted for about 70% of the Gross Domestic Product (GDP). This was a period when we were not only virtually self-sufficient in production of food crops to feed ourselves but also provided raw materials for industries and major crops for export (Ekerete, 2012). Indeed, agriculture provided the main stimulus to our national economic growth despite the small farm holdings and primitive productive systems. These contributions of agriculture to the nation overshadowed all other economic sectors in the early 1960's (Abayomi, 1997). During this period, Nigeria was the world second largest producer of cocoa, largest exporter of kernel and largest producer and exporter of palm oil (Ogen, 2003). Nigeria was also a leading exporter of other major commodities such as cotton, groundnut, rubber and hide and skins. Despite the reliance of Nigerian peasant farmers on traditional tools and indigenous farming methods, these farmers produced 70% of Nigerian's exports and 95% of its food needs (Lawal, 2011).

However, the reverse was the case of the agricultural sector in the seventies when its share of the GDP decline to only 34% by 1974 (Ekerete, 2012). Ever since then Nigeria has been witnessing extreme poverty and the insufficiency of basic food items, the agricultural sector as at 1996 accounted for less than 5% of Nigeria's GDP(Olagbaju and Falola, 1996). Over the past two or three decades, the dormant role of agriculture in the economy, especially in terms of ensuring food security, gave way to massive importation of basic food items such as rice, beans and wheat (Egbuna, 2003). This is a clear indication of the failure of the agricultural sector to keep pace with the demand for its products. This blatant neglect of agricultural sector and the attendant dependency of the economy on a mono-cultural product-petroleum have not augured well for the wellbeing of the economy as a whole. In a bid to correct this anomaly, the government, from the year 1975 decided to directly participate in commercial production of food crops. Many large scales agricultural projects specializing in the production of grains, livestock, dairies, animals' feeds and others were established (Fasipe, 1990). The Nigerian Agricultural and Corporative Bank now known as Bank of Agriculture (BOA) was also established in 1973 as part of government's effort to channel oil fund into agriculture through the provision of credit facility to prop agriculture and agro-based ventures (Olagunju, 2010). Various agricultural development programmes were also adopted as part of efforts to revitalize agricultural performance. These were backed up by substantial budgetary allocations, but agricultural output is still very low (Ojo, 2011).

Therefore, the general objective of this study is to establish the impact of government fiscal policy and agricultural sector outputs in Nigeria.

    i) To examine the extent to which total recurrent government expenditure on agriculture (GAR) has significantly impacted on the growth of agricultural outputs in Nigeria.

    ii) To analyze the relationship that exists between Total Government capital expenditure (GAC) on agriculture and the growth of agricultural outputs in Nigeria.

    iii) To examine the effect of VAT on the growth of agricultural outputs in Nigeria.

The following hypotheses have been propounded in line with the objectives:

H_{01}: Total government recurrent expenditure on agriculture (GAR) has not significantly impacted on the growth of agricultural outputs in Nigeria

H_{02}: There is no significant relationship between Total Government capital expenditure on agriculture (GAC) and the growth of agricultural outputs in Nigeria

H_{03}: Value added Tax (VAT) has no significant effect on the growth of agricultural outputs in Nigeria

2. Literature Review

2.1 Conceptual Framework

The word agriculture is a late middle English adaptation of Latin 'agricultra' which was derived from 'ager' meaning 'field' and 'cultura' meaning 'cultivation' or 'growing'. Agriculture is the systematic raising of useful plants and livestock under the management of man (Rimando, 2004). Agriculture includes cultivation of crops and tending of livestock for the purpose of production of food and fiber for humans. In relation to crop farming and livestock farming, the term "agriculture" may be defined as: the art and science of growing plants and other crops and the raising of animals for food, other human needs, or economic gain. This definition describes agriculture as both an art and a science and thus includes specialized disciplines; the words "growing" and "raising" are descriptive of enterprise, activity or practice. It has two main divisions: plant or crop production and animal or livestock production; and its ultimate purpose are for food production, other human needs, or for economic gain.

Agriculture has been defined by Ahmed (2013) as the production of food and livestock and the purposeful tendering of plants and animals. He stated further that agriculture is the mainstay of many economies and it is fundamental to the socio-economic development of a nation because it is a major element and factor in national development.

Agriculture is an enterprise, activity or practice. It is synonymous to farming. The practice of agriculture is based on systematized body of knowledge (science) and requires skill (art). Agriculture often involves the cultivation of the soil to grow plants and the raising of animals for human needs. The words "crops" and "livestock" are also used. However, both words are special or technical terms. "Crops" should clearly mean plants which are useful to man while "livestock" applies to both domesticated animals and poultry.

Mankind began to cultivate food crops about 10,000 years ago. Prior to that time, hunters or gatherers secured their food as they travelled in the nearby environment. When they observed some of the grains left behind at their campsites sprouting and growing to harvest, they began to cultivate these grains. From these humble beginnings agriculture began. Slash and burn, an early type of crop culture, remains today a truly sustainable agriculture, one that is independent of fossil fuel energy.

2.2 Theoretical Framework: The Wagner's Theory

The earliest theory advanced on public expenditure is that of Adolph Wagner in 1876 which came to be known as "Wagner's law". He propounded the "law of increasing expansion of public and particularly states activities' which is referred to as the "law of increasing expansion of fiscal requirements". The law suggests that the share of the public sector in the economy will rise as economic growth proceeds, owing to the intensification of existing activities and extension of new activities. According to Wagner, social progress has led to increasing state activity with resultant increase in public expenditure. He predicted an increase in the ratio of government expenditure to national income as per capital income rises. It is the result of growing administrative and protective actions of government in response to more complex legal and economic relations, increased urbanization, and rising cultural and welfare expenditures. According to Musgrave, however, it is not fruitful to seek an explanation for the total expenditure. Tests carried out by various researchers have shown that the increase in expenditure is far more complex than in evident from the tests carried out on empirical data. Therefore according to him, it may be far more rewarding to adopt a desegregated approach (an approach which divides the study of expenditures of government) through a study of expenditures of government on capital formation, consumption and transfer payments. Irving (1968) used the law and came up with a different view (Akogwu, 2007). He opined that public expenditure (E) is an increasing function of per capital gross national product (GDP).

2.3 Empirical Review

Akogwu Gabriel (2007) carried out a study on Public Expenditure and economic growth in Nigeria from 1979-2003; a causal analysis. He used the Wagner's law of expanding state activity as basic theoretical framework. The methodology employed was basically that of econometric techniques, making use of three different forms of models. His findings also revealed that there is a long-run equilibrium relationship between public expenditure and economic growth in Nigeria, but on the short-run, the income elasticity of public expenditure is fairly inelastic, and not greater than unity. He also opined that change in public expenditure as a result of change in National Output is not automatic. He recommended that there should be greater control of unproductive expenditure such as external debt services and extra budget expenses. The work is relevant to this study since it looks into the behaviour of government spending and output.

An analysis of Agricultural production in Nigeria from 1981-2003 by Lawal (2011) using descriptive statistics as well as regression analysis were undertaken as major tools of analysis in the study.

International Food Policy Research Institute (2008) wrote on public spending on agriculture in Nigeria (2001-2005) using empirical analysis. Findings revealed that public spending on agriculture was exceedingly low. Less than 2 percent of total Federal expenditure was allotted to agriculture during 2001 to 2005, far lower than spending in other key sectors such as education, health, and water. This spending contrasted 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 percent goal set by African leaders in the 2003 Maputo agreement. Nigeria also falls far behind in agricultural expenditure by international standards, even when accounting for the relationship between agricultural expenditures and national income. The spending that is extant is highly concentrated in a few areas. They recommended that there is an urgent need to improve internal systems for tracking, recording, and disseminating information about public spending in the agriculture sector.

Another work was carried out by Kalan and Aziz (2009) titled "Growth of government Expenditure in Bangladesh: an empirical enquiry into the validity of Wagner's Law", the relationship between 'social progress' and 'growth of state activity' in an economy, using Bangladesh data from 1976-2010 in a bi-variates as well as trivariate framework incorporating 'population size' as a third variable. The estimated results provided evidence in favour of Wagner's law for Bangladesh in both the short-run and long-run. There was a long-run co integration relation among real government expenditure, real GDP and the size population where government expenditure is positively tied with the real GDP, per capital GDP and population size. Both the real GDP and GDP per capita Granger cause total government expenditure to change. Their finding also revealed that population size is a significant stimulus, for spending to grow in both the long-run and short-run. Their work is more of a causal analysis which revealed why government expenditure increases. An evaluation study on the desirability of Nigerian's fiscal profile between 1970 and 1990 by Ariyo (1993) suggested that the structures of government expenditure are inherently unsustainable by the country's resources profile. The major cause attributed to this was the phenomenal increase in government expenditure financed through debt raised from both internal and external sources. This had consequently led to persistent and unsustainable annual deficits. The result also suggested that the structural adjustment programme (SAP) implemented in 1986 has so far not been of much assistance in addressing the problem. The study evaluated the Nigerian fiscal profile and concluded that it has not been desirable since most expenses are financed through debt.

Again, another study by Ariyo provided a behavioural explanation for the persistence of huge annual fiscal deficits in Nigeria. The study on deficits financing reveals that the excess expenditure over and above the budgeted estimates was not anchored on any macroeconomic target. It also revealed large revenue and expenditure variances which suggested the absence of any positive effects over the years. The study concluded that the intrusion of the political class which probably nullified the degree of professionalism of the technocrats was the major cause for the variance.

Ajab Amin (2003) examined the effect of fiscal policy on growth in Cameroun focused on the relationship between public spending and growth via private investment. A derivative of the Denison growth accounting model was employed to analyze the relationship between Cameroun's fiscal policy and economic growth. An ordinary least square (OLS) technique was used in estimating the equations that linked private investments with growth. The result from the study showed that expenditures particularly on education and health crowed in private investment. The result further revealed some evidence of causality running from infrastructure to private investment to growth. Jappelli and Meana (1994) also carried out a cross country study on public investment and welfare and it showed that public expenditure on investment and consumption has different impact on economic activity.

That public investment stimulated outputs and so increased government revenue which in turn allowed the government to spend more. The findings showed that specific spending promoted growth. Therefore specific revenue resources should be allocated to specific expenditure which in turn promoted output growth. Okolo (2004), in his work on "Regional Study on Agricultural Support: Nigeria's Case" observed that the growing public spending is the cause of large public deficits. His suggestion was that public expenditure should be curtailed and tax base should be broadened since more tax revenue may not increase public expenditure. But given the needs and demands of the public sector resources, expenditure would always tend to increase. However, his study was aimed at examining causality. He stressed the need to curtail public expenditure in general but did not point out any specific expenditure. Akinboyo (2008), Wrote on the role of statistics in the development of the agriculture sector from 1960-2007. He attempted to gain insight into the extent of the transformations of the sector, particularly, its contribution in ensuring food security. Using empirical approach, he opined that since 1964 the sector which supposed to be the main driver to economic growth had not performed this role adequately in terms of foreign exchange earnings and better linkages with the other sectors of the economy. He went further to suggest that to redress this enigma and to bring back the glory of the sector, there was need for adequate planning in terms of human and material resources, and these cannot be divorced from adequate reliable and consistent statistics.

Olugbenga &Owoeye (2008) in their study of credit policies and agricultural development in Nigeria tested two hypotheses that credit policies influence to a large extent the behaviour of both constitutional lenders and borrowers. That is, credit policies can influence favourably the supply and demand for agricultural credit. Secondly, that a positive relationship existed between agricultural credit and a host of other variables such as output and use of modern inputs.

Empirically they concluded that credit policies play very little role in influencing both lenders and borrowers behaviour. Credit subsidies are also major sources of production disincentive. They further contended that there is need to re-examine the overall objective of agricultural credit policies largely because it will be erroneous to infer that finance plays little role in agricultural development of the economy.

Akpan (2013) used time series data of 33 years, and the OLS method of regression to analyze the contribution of government expenditures to the growth process in Nigeria. He concluded that capital expenditure on agriculture though not statistically significant but influenced positively on investment. Oguamanam (2011) did an empirical work on commercial bank credit to agricultural sector in Nigeria. From the analysis, commercial bank loans and advances have positive relationship with the level of agricultural output, Federal government capital expenditure contributed positively to the growth of agricultural output in Nigeria. Similar work was carried out by Nnanna (2001) on bank lending behaviour and output growth with implication on monetary policy in Nigeria. He revealed a significant relationship between banks lending behaviour and output growth. He further suggested that in the medium-term, the decline in output has negative influence on bank credit to private sector

Also Isijola (2000) revealed a significant relationship between credit supply and agricultural output in Nigeria. Isijola also identified commercial banks' loans and advances, Agricultural Credit Guaranteed Scheme as the determinant of agricultural credit supply in Nigeria. Shanggenet'al in their empirical analysis on government spending, growth and poverty supported the view that government spending enhances the growth in agricultural productivity. His managerial analysis also showed that additional government expenditures on agricultural research and extension have the largest impact on agricultural productivity growth. Ekpebu (2006) reviewed that the performance of the agricultural sector has been unsatisfying over the years due to insufficient funding or credit facilities, inadequate infrastructural facilities, low technology base, high cost of farm input and inadequate extension services. Emeka (2007) supported the view that raising the volume of financial savings will increase the volume of total deposit of the banking sector which will further lead to increase in the supply of credit to other sectors of the economy (agricultural sector inclusive).

3. Methodology

The research design adopted for this work is the non-experimental research design. Secondary source of data was employed and adopted from published documents. This included reports, library materials, official releases, figures and statistics on the subject of the study and allied issues. More so, the other sources of such secondary research are from the publication of Central Bank of Nigeria (CBN) and National Bureau of Statistics (NBS) particularly their information unit.

Time series econometric procedures were used in order to examine the impacts of total government expenditure on agricultural growth in Nigeria. There are three steps involved in estimating the relationships. The first step is to test the stationarity of the series or their order of integration, as the series need to be integrated in the same order. The second step is to examine the presence of a long run relationship among all variables in the equation. However, the long run coefficients are estimated using the associated co-integration model, proposed by the Engel and Granger. The third is the linear estimation technique that aims at achieving unique parameter estimates that would enable us to interpret the regression coefficients and consequently give a slightly better fit.

Taking inference from the empirical findings and theories, which has been derived from the theoretical exposition of the cobb-Douglas production theory and Wagner's law of government expenditure, and then making agriculture central to the equation, a model was drawn up to determine agricultural sector growth in Nigeria context. The study adopted Iganiga & Unemhilin (2011) model as specified below:

$$VOA = f(GAR, GAC, VAT) -------------------1$$

Thus, linearizing equation (1), we obtain:

$$VOA = \beta_0 + \beta_1 GAR + \beta_2 GAC + \beta_3 VAT + \mu_t --------------2$$

Where;

$\beta_0 =$ The intercept or autonomous parameter estimate

β_1 to β_2 are the slope of the coefficients of the independent variables to be determined

VOA= Value of Agric. Output (#m)

GAR = Govt. Total recurrent Exp. On Agric. (#m)

GAC= Total Government capital expenditure on agriculture (#m).

VAT = Total Value Added Tax on Agriculture (#m).

$\mu =$ Error term (or stochastic term).

We then differentiate partially with respect to of each variable to obtain *apriori* sign expectation of equation (2);

$$\frac{\partial VOA}{\partial GAR} = \beta_1 > 0 -------------3$$

$$\frac{\partial VOA}{\partial GAC} = \beta_2 > 0 -------------4$$

$$\frac{\partial VOA}{\partial VAT} = \beta_3 < 0 -------------5$$

On the *apriori* expectations, positive β_1 and β_2 depicts a direct relationship between VOA, GAR and GAC. It shows that on *apriori* basis, the VOA increases due to an increase in GAR and GAC. However, VAT is expected to have an indirect relationship with VOA

4. Results and Discussion

4.1 Unit Root Test

The study used or adopted Augmented Dickey-Fuller (ADF) Techniques to test and verify the unit root property of the series and stationarity of the model.

Therefore, to examine the existence of stochastic non-stationarity in the series, the research establishes the order of integration of individual time series through the unit root tests. The tests of the stationarity of the variables adopted were Augmented Dickey Fuller (ADF) test. The variables tested are: VOA, GAR, GAC and VAT are presented in table 2 below;

Table 2: Summary of Unit Root Test Results			
Variable	**Order of Integration**	**ADF Test Statistics**	**Critical ADF Test Statistics**
GAR	I(1)	-5.126269	(-3.552934)***
VOA	I(1)	-4.315183	(-3.690814)**
GAC	I(1)	-6.344767	(-4.440739)***
VAT	I(1)	-3.497030	(-3.286909)***

Source: Authors Computation, 2017 (Eview-9.0): Note: MacKinnon critical values for the rejection of hypothesis of unit root are in parenthesis in Columns 1 and 2 and the tests include intercept with trend; ** significant at 1%; ** significant at 5%;*** significant at 10; Mackinnon critical*

From table 2, only one variable, VOA was found stationary at 5% level of significance, and is of an integrated order one {that is I(1)}. At this order of integration, its ADF test statistics (-4.315183) is greater that the critical test statistics (-3.690814)** at 5% significant level. However, the other two variables; VAT, GAR, and GAC were also found stationary at first difference, but at 10percent level of significance. At this order of integration, its ADF test statistics are greater than their critical test statistics at 10%. Since they were all found stationary at first difference, it was safe for the study to proceed with single equation Engel and Granger cointegration test.

4.2 Cointegration Test Result and Interpretation

If two or more time series are not stationary, it is important to test whether there is a linear combination among them. Variables are cointegrated if they have a long term or equilibrium relationship between them.

Table 3 shows the results of the cointegration test using the Engel and Granger methodology. It showed that linear combination exists among the variables of interest; thus indicating a long run associationship among the variables.

4.3 Model Estimation and Interpretation

In order to obtain the long run numerical estimates of the coefficients of the model, FMOLS regression method was adopted.

In the earlier stated simple linear regression model, we have:

$$VOA = 2.21 + 0.26GAR - 0.25GAC + 1.77VAT -------6$$

SEE =   (2.09) (0.11)   (0.21)   (0.0037)

t*   =   1.01 2.38   -1.15   4.78

$$R^2 = 0.9179; \overline{R^2} = 0.9026$$

The coefficient of determination (R-square), used to measure the goodness of fit of the estimated model, indicates that the model is reasonably fit in prediction, that is, 91.79percent change in VOA was due to GAR, GAC and VAT collectively, while 8.21percent unaccounted variations was captured by the white noise error term. It showed that GAR, GAC and VAT had strong significant impact on Nigeria's agricultural output (VOA).

4.4 Statistical Test of Hypothesis

The three hypotheses formulated in this study were tested using student t-statistics. The level of significance for the study is 5%, for a two tailed test. The decision rule is that we shall accept the null hypothesis if the critical/t-value (±1.96) is greater than the calculated value, otherwise reject the null hypothesis.

Hypothesis one

H_{01}: Total government recurrent expenditure on agriculture (GAR) has not significantly impacted on the growth of agricultural sector in Nigeria

From the regression result in table 4, the calculated t-value for GAR is 2.38 and the tabulated value is +1.96, it therefore falls in the rejection region and hence, we may not accept the first null hypothesis. The conclusion is that total government recurrent expenditure on agriculture (GAR) has significantly impacted on the growth of agricultural sector in Nigeria.

Hypothesis two

H0$_2$: There is no significant relationship between Total Government capital expenditure on agriculture (GAC) and the growth of agricultural sector in Nigeria.

The regression result in table 4 showed that the calculated t-value for GAC is -1.15 and it's less than the tabulated value of -1.96; and thus falls in the acceptance region. Hence, we may now reject the second null hypothesis. The conclusion is that there is no significant relationship between Total Government capital expenditure on agricultural (GAC) and the growth of agricultural sector in Nigeria.

Hypothesis three

H0$_3$: VAT has no significant effect on the growth of agricultural sector in Nigeria.

The regression result in table 4 showed that the calculated t-value for VAT is 4.78 and it's greater than the tabulated value of 1.96; and thus falls in the rejection region. Hence, we may reject the third null hypothesis. The conclusion is that VAT has a significant effect on the growth of agricultural sector in Nigeria

4.5 Discussion of Findings

From equation 6, it was observed that GAR has positive and significant relationship with VOA. It showed that the higher the GAR, the higher the growth of VOA. Over the years, government has almost been the sole provider of financial and other recurrent resources to support agriculture. Government has attempted to increase her expenditure on agriculture through budgetary allocation and through the provision of cheap and readily available credit facilities (Nwosu 2004). Odusola (2008) found that over the years, the government budgeting allocation has become an important determinant of agricultural output in Nigeria. The function thus shows that, a 1 percentage change in GAR, on the average, increases the growth of agricultural output by 0.26 percent between 1995 and 2014.

However, it was observed that GAC has negative and insignificant relationship with VOA. It shows that the higher the GAC, the lower the VOA. This is in-line with the findings of Aigbokha (2003) who in their study stressed that government capital allocation and expenditure to agriculture is relatively low and that actual expenditure falls short of budgeting expenditure and the rate of under spending is usually higher for agriculture than for other economic sectors. Emeka (2007) reported that a large proportion of the funds allocated to agriculture do not go directly to farmers. The function thus shows that, a 1 percentage change in GAC, on the average, reduced the growth of agricultural output by 0.25percent between 1995 and 2014.

However, the parameter estimate of VAT was found to have influenced the growth of VOA positively and significantly. It shows that the amount of VAT imposed on agricultural outputs has improved the growth of the agricultural produce. The function thus shows that a 1% change in VAT, on the average, had enhanced the growth of agricultural sector by 1.77 million between 1995 and 2014.

5. Conclusion and Recommendations

The findings from this study showed that the focus of the Nigerian government was mainly on current capital expenditure on agriculture with less attention being paid to other cooperating factors like importation of foods, irrigation, rural-urban drifts and mechanization. These factors are crucial to the growth of agricultural output.

It is recommended in the light of this study that, for any nation, to grow, especially in Nigeria, the focus of government expenditure on the agricultural sector should not be overlooked, thus, the government should direct its spending efforts in productive means, through increase, improve and encourage the output of the agricultural sector as previously shown. This will create better avenues for job creation, growth and higher GDP levels.

Above all, the Federal Government needs to take a holistic appraisal of agricultural programmes and schemes, with a view of streamlining them to meet the dynamics of times, for the benefits of the Nigerian citizenry. Government should increase her budgetary allocation to this sector in a consistent manner because of its importance to the national economy, hoping that with proper monitoring of fund, it would contribute more significantly to the economy of the country. An effective utilization of such funds is also advocated and all areas of wastage blocked. All organs of the Government should exhibit good corporate governance and transparency.

In the same vein, the positive influence 0f VAT towards agricultural productivity was critical from this study. It is therefore recommended that people should pay their taxes promptly to the government with a view to positive impact on agricultural outputs and growth while at the same time increasing amount of VAT spent on agriculture.

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Appendix

Table 1: Volume of agricultural outputs (VOA), Govt. Total recurrent Exp. On Agric.(GAR) (#m), Total Government capital expenditure on agricultural (GAC)(#m) and VAT, at constant basic prices in Nigeria, 1995-2014				
Year	VOA	GAR	GAC	VAT
1990	122.23	258	3,485.70	na
1991	144.7	208.7	3,145.00	na
1992	217.42	455.97	2,336.70	na
1993	350.05	1,803.81	18,344.70	na
1994	528.95	1,183.29	27,102.80	7,261
1995	940.3	1,510.40	43,149.20	20,761
1996	1,275.75	1,592.56	117,829.10	31,000

1997	1,445.15	2058.88	169,613.10	34,000
1998	1,600.58	2891.7	200,861.90	36,000
1999	1,704.82	59316.2	323,580.80	47,100
2000	1,801.48	6335.78	111,508.60	58,500
2001	2,410.05	7,064.55	259,757.80	91,800
2002	2,847.11	9993.55	215,333.40	108,600
2003	3,231.44	11193.6	97,982.10	136,400
2004	3,903.76	10133.5	167,721.80	159,500
2005	4,752.98	20993.6	265,034.70	178,100
2006	5,940.24	29913.6	262,207.30	221,600
2007	6,757.87	60133.5	358,375.60	289,600
2008	7,981.40	65399	504,286.90	404,500
2009	9,186.31	22435.2	506,010.00	468,400
2010	10,310.66	28218	412,245.20	562,900
2011	11,593.43	41169.9	386,500.00	649,500
2012	13,413.84	33301	321,000.00	710,105
2013	14,709.10	44511.9	343440	821110
2014	14563.32	30849.8	321182.33	884524
Source: CBN statistical bulletin (2014)				

Table 3: Results of Engel Granger Cointegration Test					
Date: 01/21/17 Time: 11:52					
Series: VOA GAC GAR VAT					
Sample (adjusted): 1995 2014					
Included observations: 21 after adjustments					
Null hypothesis: Series are not cointegrated					
Cointegrating equation deterministics: C					
Automatic lags specification based on Schwarz criterion (maxlag=4)					
Dependent	tau-statistic	Prob.*	z-statistic	Prob.*	
VOA	-2.744183	0.5857	-12.79385	0.4591	
GAC	-4.210820	0.1083	-37.78828	0.0000	
GAR	-5.322678	0.0190	-63.56727	0.0000	
VAT	-2.503869	0.6918	-12.00813	0.5223	
*MacKinnon (1996) p-values.					
Warning: p-values may not be accurate for fewer than 25 observations.					
Intermediate Results:					
		VOA	GAC	GAR	VAT

Rho - 1	-0.639692	-0.898515	-1.530789	-0.600407
Rho S.E.	0.233108	0.213382	0.287597	0.239792
Residual variance	192138.7	3.46E+09	1.43E+08	7.46E+08
Long-run residual variance	192138.7	1.69E+10	6.84E+08	7.46E+08
Number of lags	0	1	1	0
Number of observations	20	19	19	20
Number of stochastic trends**	4	4	4	4
**Number of stochastic trends in asymptotic distribution				

Table 4: Estimated Regression Model Result				
Dependent Variable: LOG(VOA)				
Method: Fully Modified Least Squares (FMOLS)				
Date: 01/21/17 Time: 11:50				
Sample (adjusted): 1995 2014				
Included observations: 20 after adjustments				
Cointegrating equation deterministics: C				
Long-run covariance estimate (Bartlett kernel, Newey-West fixed bandwidth				
= 3.0000)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(GAC)	0.252765	0.218252	1.158137	0.2638
LOG(GAR)	0.268265	0.112606	2.382333	0.0300
VAT	1.77E-06	0.003000	4.781784	0.0002
C	2.122260	2.090106	1.015384	0.3250
R-squared	0.917999	Mean dependent var		8.352574
Adjusted R-squared	0.902624	S.D. dependent var		0.902607
S.E. of regression	0.281660	Sum squared resid		1.269320
Long-run variance	0.120312			