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## The Impact of Federal Government's Expenditure on the Agricultural Sector in Nigeria

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### Abstract

Agriculture is seen as a strategic sector that contributes to the growth of the Nigerian economy, despite the abysmal under-funding by government. This paper examines the impact of Federal Government's expenditure on agricultural sector. The data used is sourced from the Central Bank of Nigeria Statistical bulletin. Simple regression is used with a view to analyse the data which indicates impact of agricultural expenditure on its output from 1991 to 2010. The  $R^2$  is 1% indicating a weak relationship between the variables are as a result of inadequate funding. It is recommended that government should reinforce its budgetary allocations to the agricultural sector, ensure proper release of funds, monitor agricultural inputs distribution to farmers and create commodity markets.

### Introduction

Nigeria is basically an agro-based economy with abundant land and water resources to enhance agricultural development. Agriculture contributes immensely to the Nigerian economy in the provision of food for the increasing population, supply of raw materials to industries, major source of employment and generation of foreign exchange earnings (Okumadewa, 1997; World Bank, 1998 and FAO, 2006).

Economic history reveals that agricultural revolution is a fundamental precondition for economic growth, especially in developing countries (Eicler and Witt, 1964; Woolf and Jones, 1969). Agricultural sector in 1960s contributed up to 64% of the total GDP of Nigeria, but gradually declined to 48% in 1970s during the oil boom (Ukeje, 2003). Nigeria, has diverse agro-ecological conditions that can support a variety of farming models, which can create its own agricultural models. However, successive administrations over the years neglected agriculture and failed to diversify the economy away from overdependence on capital-intensive oil sector.

Nigeria, which was the largest net exporter of agricultural produce in west Africa like, groundnuts accounting for 42%, palm oil 27%, Soya beans 28% and cocoa 18% in 1960s, now spends over ₦1.2 trillion importing palm oil, canned beans and other food items (Akintola, 2011). The country has however, the potentials to return to its previous position if adequate attention is given to agricultural growth policy through finance and the provision of rural infrastructure.

Although, the major focus of the policy is aimed at establishing a system of sustainable agricultural financing schemes and programmes that could provide macro and micro

credit facilities, but only a paltry evidence is witnessed in terms of agricultural output. It is sad that most of the small-holder farmers in Nigeria lack access to inputs to increase productivity, income and reduce poverty. Rural farmers that constitute about 80% of the farming population in the country lack access to credit facilities and inability to procure improved seeds, fertilizers, herbicides and cannot buy or rent mechanised farming machineries like tractors (Alpuerto et al, 2009). Despite numerous laudable agricultural programmes like Agricultural Credit Support Scheme of 2006; FADAMA Development Programmes; Agricultural Credit Guarantee Scheme Fund among others, productivity has not improved (Oriola, 2009).

Public expenditure, which serves as the bed rock of financing for the sector has consistently fallen short of the public expectation. For instance, a collaborative study carried out by the International Food Policy and Research Institute (IFPRI) and the World Bank in 2008, revealed that Nigeria's public expenditure on agriculture is less than 2% of total federal annual budget expenditure. This is significantly below compared to other developing countries like Kenya (6%), Brazil (18%) and 10% goal set by African Leaders Forum, under the Comprehensive Africa Agricultural Development Programme (CAADP).

In spite of poor investment, agriculture has on the average contributed 32% of the country's GDP from 1996 to 2000 and 42% between 2001 and 2009 (CBN 2010). According to CBN Governor, in 2011 agriculture accounted for 40% of the nation's GDP, yet it received only one per cent of the total commercial bank loans (Peoples Daily, 2011).

The main objective of this paper is to analyse the impact of Federal Government financing on agricultural sector, and to what extent agricultural schemes, programmes and research institutes have contributed to boost agricultural output. Its hypothesis is to determine whether Federal Government's expenditure on agricultural sector has impact on agricultural output in Nigeria or not. The study covers the period from 1991 to 2010.

### **Methodology**

The study adopts an ordinary least squares (OLS) of simple regression model in order to test the impact of agricultural expenditure on agricultural output in Nigeria between 1991 and 2010. Federal Government expenditure represents an independent variable (X), while agricultural output represents dependent variable (Y). The data is analysed using E-View software package.

Test of statistical significance are conducted using the F-statistic test, t-test, unit root test and co-integration test. These tests are essential in testing the reliability of the parameter estimates.

### **Model specification**

The model specifies that agricultural output in Nigeria (Y) depends on Federal Government expenditure or financing in the agricultural sector (X), which is thus:

$$Y=f(x) \dots\dots\dots 1$$

$$Y=\beta_0 + \beta_1 X+U_1 \dots\dots\dots 2$$

$$\frac{\partial y}{\partial x} >0$$

Where:

- Y= Agricultural output in Nigeria
- X= Agricultural expenditure by Federal Government
- $\beta_0$  = The intercept of regression equation
- $\beta_1$  =The slope of the regression equation
- $U_1$  = Error term or stochastic variables

The presence of error term ( $U_1$ ) takes care of other variables that have influence on agricultural output but not specified in the model like drought, mismanagement of farm inputs, diversion of funds or corruption, among others.

Other tests specified in the study are F-test, Unit Root test and Co-integration test.

**F-test:** This measures the variation of dependent variable as explained by the independent variables(s). In other words, it measures the statistical significance of explanatory variables(s) in the model, which is calculated thus:

$$\frac{\frac{R^2}{k-1}}{\frac{1-R^2}{n-k}}$$

- Where:  $R^2$  = Coefficient of determination
- k= Number of Parameters ( $\beta_0$  and  $\beta_1$ )
- n= Sample size.

The degree of freedom is calculated as:  $Df = \frac{k-1}{n-k}$

Where k-1 is the numerator from the table and n-k is the denominator,

**Unit Root test** – This is the test of stationarity or nonstationarity under time series variables. In this case, the results suggest significant relationship between the variables. The study employs Augmented Dickey – Fuller (ADF) tests to examine the variables in the test. It is formulated thus:

$$\Delta Y_t = \rho Y_t - 1 + U_t$$

The Hypothesis test for the Unit root:

$H_0 : P=0$  (unit root)

$H_1 = P \neq 0$  (no unit test).

Decision Rule: If  $t^* < ADF$  Critical value, reject the null hypothesis, that is, unit root does not exist.

**Cointegration Test:** Test is carried out to determine the long-run relationship, between the dependent and independent variables, when one or more of the variables is/are non-stationary at a level, which means they have stochastic trend (Johansen, 1991). This test is used to check if the independent variable(s) can predict both at present (short-run) or future (long-run). Cointegration of two or more time series suggests that there is a long-run, or equilibrium relationship between them (Gujarati and Porter, 2009). This study adopts Johansen cointegration test.

**Apriori expectation.** This states that agricultural output in Nigeria is positively and directly influenced by agricultural financing by Federal Government. As more funds are released to the sector, total output of agricultural sector is increased. Hence  $\frac{\partial y}{\partial x} > 0$

### Results and Discussion

The table below presents data on agricultural sector expenditure (X) and output (Y) given in millions (naira). The table represents a sample of the Federal Government financing of the agricultural sector over the years, 1991- 2010.

Table 1. Agricultural Output and Expenditure In Nigeria  
1991-2010 In Millions (Naira)

YEAR	OUTPUT (MILLION ₦) Y	EXPENDITURE (MILLION ₦) X
1991	97464	208.7
1992	145225.67	455.97
1993	23182.67	1803.81
1994	439244.86	1183.81
1995	619806.83	1510.40
1996	84157.07	1592.56
1997	953549.37	2058.88
1998	105784.04	2891.70
1999	1127693.12	59316.17
2000	119210.00	6335.78
2001	1594895.53	7064.55
2002	3357062.94	9993.55
2003	3624579.49	7537.35
2004	3903758.69	11256.35
2005	4773198.38	16325.15
2006	5940236.97	17900.00
2007	6757867.73	32500.00
2008	7981397.32	65400.00
2009	9186306.05	224400.00
2010	10273651.99	29560.00

Source: Central Bank of Nigeria Statistical Bulletin

TABLE 2: Regression Results

Variable	Coefficient	Std Error	t-statistic	Prob.
C	71738.34	137997.8	0.519851	0.6108
D(FINANCES(-1),2)	1.444299	3.650295	0.395666	06979
R-Squared	0.010329	Mean dependent var		68067.50
Adjusted R-squared	-0.055649	S.D dependent var		552526.5
S.E of regression	567692.1	Akaike info criterion		2944668
Sum squared resid	4.83E+12	Schwarz criterion		29.54470
Log Likelihood	-248.2968	F-statistic		0.156552
Durbin-Watson Stat	2.728668	Prob(F-Statistic)		0.697922

Functional model:  $Y = \beta_0 + \beta_1 X_1 + U_i$

Substituted coefficients:

Agricultural output =  $71738.34 + 1.444.3x + U$

S.E                      137997.8                      3.650295  
 t\*                              0.519851                      0.395666

The  $\beta_0$  coefficient 71738.34 shows agricultural output level in Nigeria, if there is zero expenditure by the Federal government. The coefficient of  $\beta_1$  which is 1.4443, shows that a unit increase in agricultural expenditure will increase agricultural output by 1.4443.

The coefficient of determination ( $R^2$ ) is 0.010, which shows 1% change in the dependent variable (agricultural output). The goodness of fit however explains that there exists a weak relationship between these variables that is one per cent of distortion in agricultural output is caused by inadequate financing due to non-availability of credit facilities to farmers, drought or untimely of farm inputs. The contributions of these factors are captured by the error term ( $U_1$ ), which has 99% greater influence as shown in the analysis.

**F - test**

From the regression analysis, the value of F-calculated is 0.16. In other to get the F-tabulated for decision making, the degree of freedom is calculated thus:

$$D.f = \frac{k - 1}{n - k} = \frac{2 - 1}{20 - 2} = F_{t0.05} = 4.41$$

That is,  $0.16 < 4.41$ , F- calculated is less than F-tabulated, and thus reject the null hypothesis ( $H_0$ ). This implies that the explanatory variable (agricultural expenditure) is not statistically significant in explaining the variability in the dependent variable (agricultural output).

### Unit Root Test

Most economic variables that exhibit time series are not stationary and using non-stationary variable in the model might lead to spurious or fake regression which cannot be relied upon for precise prediction (Gujarati and Porter, 2009). It becomes necessary to determine whether the variables are stationary that is, whether they have characteristics of unit root. This is done by employing Augmented Dickey – Fuller (ADF) test.

If the ADF test statistic is less than Mackinnon critical values, then we conclude that there is no unit root and thus reject the null hypothesis (Ho) and vice versa (Opp cit). The result of the stationarity test with trend and intercept is presented in Table 3

Table 3 Unit Root Test

Variable	ADF Test	Mackinnon critical Values			Stationarity Level
		1%	5%	10%	
Agric output	-5.04078	-4.6712	-3.73447	-3.3086	2 <sup>nd</sup> Difference
Agric Expenditure	-5.4844	-4.6712	-3.7347	-3.3086	2 <sup>nd</sup> Difference

From Table 3, it can be observed that agricultural output data in Nigeria is non-stationary at its original level, that is 1<sup>st</sup> difference, but becomes stationary at its 2<sup>nd</sup> difference. The ADF test for output,  $2(-5.04018) < \text{Mackinnon critical values at 1\%, 5\% and 10\% that is, } -4,6712; -37347 \text{ and } -3.3086$  respectively.

On agricultural expenditure the data shows non-stationarity as shown in the table. The ADF test for Agric Expenditure,  $2(-5.4844) < \text{Mackinnon Critical Values at 1\%,5\% and 10\% } (-4,6712, -37347, -3.3086)$ , implying that agricultural financing in Nigeria has significant impact on output.

### Co-Integration Test

Co-integration test is carried out in order to determine the long-run relationship between the dependent and independent variables when one or all of the variables is/are non-stationary at a level, which means they have stochastic trend. It is usually used to check if independent variable(s) can predict the dependent variable both at a short or long-run. The study uses Johansen (1991) co-integration econometric framework to examine long run (future) relationship among dependent and independent variables

Table 4: Johansen Co-Integration Test

Eigen Value	Likelihood Ratio	5 percent Critical value	1 Percent Critical value	Hypothesized No. of CE(s)
0.956545	58.73422	25.32	30.45	None**
0.541399	11.69362	12.25	16.26	At most 1

\*(\*\*) denotes rejection of the hypothesis at 5% or 1% significance level. L.R. test indicates 1 co integrating equation(s) at 5% significance level.

The result from table 4 reveals that there is co-integration among two variables since the likelihood ratio value of 58.73422 > critical value of 25.32 at 5% and 30.45 at 1% level of significance. It becomes necessary to reject the null hypothesis of none \*\* and conclude that there is the existence of long-run relationship among the variables (Agricultural output and agricultural expenditure in Nigeria). Though the variables may wander away from themselves, but in the long-run, they will co-integrate.

### Conclusion

The economic history of Nigeria is agro-based. Agricultural production provides employment opportunities and a source of income to about 80% of the country's population. It is also a source of food security, raw materials to local industries and generates foreign exchange earnings for the country.

The findings of this paper revealed that there exists positive relationship between agricultural expenditure (financing) and its output, although a weak one, as shown in the regression analysis Table 2.

As a sector that provides basic foundation to the Nigerian economy, increased improvement in agricultural production would not only enable Nigeria to feed its citizens but return to its former position as an exporter of agricultural products.

### Recommendations

Base on the findings of the study it is recommended that:

- ❖ There is inconsistency in the Federal Government's annual budgetary allocations to the agricultural sector, creating the demand-supply gap leading to mass importation of food items to fill the gap. For instance, a collaborative study

carried out by the International Food Policy and Research Institute (IFPRI) and the World Bank in 2008, revealed that public expenditure on agriculture is less than 2% of the total annual budget expenditure. This is significantly below compared to countries like Kenya (6%), Brazil (18%) and 10% goal of the African Leaders Forum on agriculture.

- ❖ Because of the shortfall in agricultural output as a result of poor financing by government as revealed in the study, government should be more proactive in insisting on the private sector, especially, the financial sector to set aside funds annually for agricultural financing to compliment government efforts.
- ❖ The study also revealed that even where funds are available, most of the farmers may lack the knowledge of the existence of such funds. This makes it difficult for such funds to be accessible to farmers to enhance agricultural production. Government should make efforts through its agencies to enlighten farmers of the availability of such finance facilities.
- ❖ The study further reveals that in spite of poor investment in the agricultural sector, yet it has contributed 42% of GDP between 1996 and 2000. This is presumed to be the contributions of small holder-farmers who constitute about 80% of the farming population in Nigeria. Government is therefore called upon to reinforce its link with rural farmers in the provision of farm inputs and credit facilities that could be affordable to the farmers, through its agricultural extension workers.
- ❖ 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

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