

EFFECTIVENESS OF FEDERAL GOVERNMENT  
EXPENDITURE POLICY ON AGRICULTURE IN  
NIGERIA

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**Abstract**

The study assessed the effectiveness of federal government agricultural expenditure policies in Nigeria and the implications of these policies from 1960-2007. Secondary data which covered the country were used to achieve the objective. Tin Bergin model was employed to ascertain the effectiveness of federal government agricultural expenditure policy. The study revealed that public expenditure policy on agriculture in Nigeria was generally ineffective, contributing a marginal increase of 0.04 percent to agricultural output from every 10 percent increase in agricultural expenditure. This result agree with the hypothesis of this study, which stated that agricultural expenditure policies relating to Federal Government direct spending have not been effective in achieving increased agricultural productivity in Nigeria.

Keywords: Effectiveness of Agricultural Expenditure Policy, Tin Bergin Model

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### Introduction

World over, informed dialogues have continued to date on the effectiveness of agricultural expenditures policies to economic growth and poverty reduction, most especially in the developing countries, where the majority of the world's poorest live and to which, Nigeria is one. FAO (2012) hinted that extensive body of evidence from around the world shows that agricultural investment is one of the most important and effective strategies for economic growth and poverty reduction in the rural areas. In a related development, World Bank (2007) hinted that GDP growth in agriculture has been shown to be at least twice as effective in reducing poverty as growth originating in other sectors. In his study on Ghana (1960-1987), Fosu (1991) noted that public expenditure policies have generally been ineffective in inducing aggregate output. Contributing, Shenggen, *et al* (1999) posited that government spending on productivity enhancing investments, especially agriculture, rural infrastructures and rural development targeted directly to the rural poor contributed into reductions in rural poverty and growth in agricultural production, but their effects on poverty and productivity differ greatly. FAO (2012) however observed that public expenditures have higher social payoffs when they are concentrated on the provision of public goods such as agricultural research, rural infrastructures and education, rather than on subsidies for fertilizers, water and credit.

On the home front, FGN (2009) observed that Nigeria's agricultural expenditure has been inadequate, untimely, while the inefficient and/or ineffective application of such funds (budgetary or otherwise), constituted bottlenecks to agricultural project implementation. It is therefore against this backdrop that this study is being undertaken to ascertain the effectiveness of federal government expenditure.

Numerous researchers to date have investigated the effectiveness of agricultural expenditure policies in Nigeria. Ukpong and Malgwi (1991) argued that an approach to assessing the effectiveness of policy was to relate actual achievements or results to policy targets and stated objectives. Asogu (1996) revealed that change in government expenditure, representing fiscal policy, was completely effective in the Keynesian or liquidity trap region, where the demand for money was perfectly interest elastic, somewhat effective in the neo-Keynesian region and

completely ineffective in the classical region. Fosu (1991) utilized the effectiveness coefficient of the policy instrument by Tinbergen (1970) in assessing the effectiveness of Ghana's agricultural expenditure policy. From data spanning 27 years, he observed that the estimated policy effectiveness elasticities indicated that public agricultural expenditure policies had been generally ineffective in inducing increase in aggregate agricultural output during the review period. This study utilized this approach in view of its simplicity and empirical usability.

#### **Methodology:**

##### **Area of Study, Scope and Sources of Data**

The study is a macro level empirical study of Nigeria's expenditure policy. Nigeria attained independence on October 01, 1960, and became a Republic in 1963. The country is located in West Africa and is bordered by Cameroon to the south east, Benin to the south west, and Niger to the north. Nigeria has a land area of 924,000km<sup>2</sup> and a population of 140,003,542 million (National Bureau of Statistics, 2012). The average per capital income (estimated by the World Bank in 2006) was US\$300 per annum. Although, the country relies heavily on the petroleum sector which generates over half of government revenue and more than 90 per cent of foreign exchange earnings, agriculture continues to play a focal role in the economy. The study used yearly time series data spanning 1960 - 2007. This is necessary so that the effects of Federal Government expenditure policy on the mixed performance of the agricultural sector can be captured side by side with the effects of the economy during the early 60s, the oil boom era, the civil war of 1967-1970 and SAP reforms up to the close of Chief Olusegun Obasanjo's civilian regime. The effective sample size of 47 years observations utilized is 21 data points more than the minimum required for effective diagnostic test for time series properties. The data used for the accomplishment of the objective of this study and specifically, for the estimation of the parameters of the models were based on secondary time series data.

The sources of these data were from the National Bureau of Statistics (NBS), Central Bank of Nigeria (CBN), Federal Ministry of Agriculture and Rural Development (FMARD), National Programme for Agriculture and Food Security (NPAFS), Federal Ministry of Finance (FMF),

Accountant General of the Federation (AGF), Federal Meteorological Department and the National Centre for Economic Management and Administration (NCEMA).

### Analytical Technique

This study used in-depth descriptive analysis of the relevant macro-economic variables that have direct or indirect bearing on the Federal Government's expenditure on agriculture in Nigeria, coupled with econometric modeling. The Tin Bergen model for effectiveness analysis is as presented below:

### Model: Effectiveness of agricultural expenditure policy

An economic policy instrument is effective in stimulating a target variable if the change in the value of the target variable relative to the change in the value of the policy instrument is greater than zero, that is, if  $dT/dI > 0$ , where  $d$ , denotes a partial derivative and  $T$  and  $I$ , denote the respective levels of the target variable and the policy instrument (Tin Bergen, 1970). This ratio is referred to as the effectiveness coefficient of the policy instrument. For this research, real public agricultural expenditure ( $G_{At}$ ) is the policy instrument, while aggregate agricultural output ( $Q_{At}$ ) is the target - variable. If  $dQ_{At}/dG_{At} > 0$  for the study period, then government agricultural expenditure has been effective in stimulating agricultural output. The parameter  $dQ_{At}/dG_{At}$  can be obtained from an aggregate agricultural output function.

The model is specified as follows:

$$\ln Q_{At} = (a_0 + b_0 \ln G_{tAt}) + (a_1 + b_1 \ln G_{At}) \ln L_t + (a_2 + b_2 \ln G_{At}) \ln L_t + (a_3 + b_3 \ln G_{At}) \ln K_t + b_4 \ln W + U_t$$

Where  $Q_{At}$  = Aggregate agricultural output, approximated by the real agricultural gross domestic product.

$G_{At}$  = Public input into agriculture measured as a weighted average of past real government agricultural expenditures.

$L_t$  = Aggregate labour input into the domestic agricultural sector, approximated by the economically active population in agriculture.

$A_t$  = Area under agricultural activities.

$K_t$  = Capital input into agricultural production, approximated by a measure of overall labour productivity in the economy.

$W_t$  = Weather, approximated by annual average rainfall in Nigeria.

$U_t$  = Stochastic error term that satisfied the normal classical Regression assumption.

## Results and Discussions

### Effectiveness of federal government expenditure policy on agriculture in Nigeria (1960-2007)

The effectiveness of federal government expenditure policy in Nigeria was determined using the Tinbergen policy instrument, that is, real public agricultural expenditure ( $G_A$ ) and the target variable, aggregate agricultural output ( $Q_{At}$ ). If  $dQ_{At}/dG_{At} > 0$  for the study period, then government agricultural expenditure has been effective in stimulating increased agricultural output.

The parameter  $dQ_{At}/dG_{At}$  were derived from an aggregate agricultural output function specified as follows:

$$\ln Q_{At} = a_0 + b_0 \ln G_{At} + (a_1 + b_1 \ln G_{At}) \ln A_t + (a_2 + b_2 \ln G_{At}) \ln L_t + (a_3 + b_3 \ln G_{At}) \ln K_t + b_4 \ln W_t + U_t$$

This was however further expanded for ease of analysis as follows

$$\ln Q_{At} = a_0 + b_0 \ln G_{At} + a_1 \ln A_t + b_1 \ln G_{At} \ln A_t + a_2 \ln L_t + b_2 \ln G_{At} \ln L_t + a_3 \ln K_t + b_3 \ln G_{At} \ln K_t + b_4 \ln W_t + U_t$$

The ordinary least square estimation technique was applied to the regression equation yielding the following estimation of parameters.

$$Q_{At} = -5.72 - 11.58 G_{At} + 0.12A_t + 1.04G_{At}A_t - 0.06L_t - 0.18G_{At}L_t + 0.39K_t$$

(-0.814) (-0.768) (1.562) (0.872) (-0.154) (-0.633) (3.574)

$$+ 0.24GA_t k_t - 0.12W_t$$

(2.941) (-1.279)

$$R^2 = 0.57, F = 4.62.$$

The figures in the parenthesis are t statistics of the corresponding coefficients of the variables in natural logarithms as defined above.

The regression results indicate that the coefficient constituting the elasticity of agricultural output with respect to agricultural capital is significant at 1%. The value of the coefficient of determination ( $R^2$ ) implies that 57.0% of the variation in real aggregate agricultural output is explained by the model. Arising from the regression results, the elasticity of real aggregate agricultural output with respect to public agricultural is given by:

$$e_{QG(t)} = 1.04 \ln A_t - 0.18 \ln L_t + 0.24 \ln K_t$$

The ensuing equation therefore, revealed that the elasticity that approximates the degree of effectiveness of public agricultural expenditure policy varies with the level of use of agricultural land, labour and capital formation. Considering that these levels vary from year to year, the degree of effectiveness of public agricultural expenditure can therefore vary with time.

The higher the elasticity, the more effective is the federal government expenditure policy on agriculture. Elasticity of zero or less is an indication that the policy was ineffective in increasing aggregate agricultural output.

In ascertaining the effectiveness of agricultural expenditures, a total of ten regression equations were computed. These are the policy elasticities for real total federal government agricultural expenditures for the various administrations. The regression results are presented in Table 1.0. Worthy of note however is that only two of the equations have good fit as can be seen from the table.

The computed policy effectiveness elasticities for the various governments covering the period of observation and the combined, military and civilian administrations showed that aside the Shagari era which recorded an elasticity of 0.87 and probably the 1993-1998 military eras which recorded 0.26, public expenditure policies on agriculture have generally been ineffective. The combined policy elasticity for the study period and hence all governments was 0.04. The implication of this result is that a 10% increase in the weighted variable representing agricultural

expenditure corresponds with an average marginal increase of 0.03 per cent in aggregate agricultural output between 1960 and 2007. Further insights into the results revealed that elasticity have not only been positive, but indeed negative for some periods: 1976-79, 1983-85 and 1985-93.

These results agree with the hypothesis of this study, which stated that agricultural expenditure policies relating to Federal Government direct spending have not been effective in achieving increased agricultural productivity.

Table 1: Policy Elasticities of Federal Government Expenditure (1960-2007)

Dependent Variable (Q <sub>A</sub> )	A	B	R <sup>2</sup>	t <sub>a</sub>	t <sub>b</sub>
Agric Output:					
1960-66	3.24 (0.10)	0.04 (0.02)	0.34	31.64	1.44
1966-75	3.57 (0.12)	0.12 (0.05)	0.46	29.70	2.43
1976-79	3.01 (0.22)	-0.36 (0.44)	0.27	13.64	-0.87
1979-83	2.75 (0.06)	0.87 (0.21)	0.85	44.83	4.18
1983-85	3.14 (0.05)	-0.04 (0.13)	0.09	59.57	0.32
1985-93	3.31 (0.07)	-0.02 (0.07)	0.01	45.13	-0.24
1993-98	3.85 (0.17)	0.26 (0.16)	0.40	22.78	1.65
1999-2007	2.45 (0.10)	0.21 (0.15)	0.45	20.12	1.39
1960-2007	3.35 (0.05) (0.10)	0.04 (0.03) (0.02)	0.17	66.52	1.29

Military (Lump sum)	3.37 (0.06)	0.03 (0.04)	0.02	55.20	0.71
Civilian (Lump sum)	3.03 (0.05)	-0.03 (0.02)	0.20	60.49	-1.5

Source: Computed from regression results on the basis of secondary data

NB: Terms in the bracket are the standard error.

### Conclusion and Recommendations

The results from the policy effectiveness elasticity revealed that public expenditure policy have been ineffective, contributing a marginal increase of 0.03 percent to agricultural output from every 10 percent increase in agricultural expenditure. Thus, to enhance the effectiveness of agricultural expenditure in Nigeria, the Federal Government should give priority to: increasing the spending on productivity enhancing investments, especially (agricultural research and extension), rural infrastructures (especially roads and education), small scale irrigation and rural development targeted directly to the rural poor; enhance the volume of expenditure to viable sub-sectors: such as livestock, fisheries and forestry; upscale the proportion of agricultural recurrent expenditures, considering its importance to the sustenance of existing agricultural projects, and sustain democratic governance.



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