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## Effect of Agricultural Sector Determinants on Economic Growth

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### ABSTRACT

The effect of in the some components sectors of non-oil economic growth of countries continues to be tested in order for the turning around of the nations' economic outlook for the future good. The adoption of export promotion policy which is one of the fundamental strategies for improvement in countries' economic growth has experienced remarkable economic growth for some years even in the case Nigeria. This paper extends the previous empirical studies on the agricultural sector by providing some evidence from time series data ranging from 1981 to 2011. In the study, the simple regression model was used in estimation, where fishery, food/crop production, forestry index and livestock index are the independent variables and gross domestic product (GDP) as the dependent variable. This paper basically reflect on the significant of the promotion of agricultural sector determinants for exportation, by shedding light on agricultural sector contribution or productivity to the economic growth and development of the country. Since the agricultural sector of non-oil component has contributed significantly to the economic growth. This paper highlights the performance and some constraints that are confronting the agricultural sector; in which policy measures are suggested for the promotion of exportation of agriculture sector determinants in Nigeria based on the result.

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## INTRODUCTION

Major challenges facing mankind are provision of an equitable standard of living, adequate food, clean water, shelter and energy, a healthy and secured environment, an educated public, and satisfying job for this and future generations. Of which the first and most basic to human life and survival is food security; which is a situation in which majority of the populace of a country have access to domestically produced food at affordable prices at all times (Akinboyo, 2008). This thereby necessitate the role of agriculture in improving the economic framework of any country, which cannot be over emphasized due to that agriculture is the source of food for man and animal and provides raw materials for the industrial sector.

Agriculture is made up of forestry, livestock, fishing, food and cash crops production such as yams, cassava, maize, cocoa, groundnut and oil palm in Nigeria. The country is largely endowed with natural resources that are necessary for the development of agriculture; such resources include abundant land supply, human and forestry resources. Has a total land area of about 98.3 million hectares out of which 71.2 million hectares (72.4%) are cultivable but only 34.2 million hectares (34.8%) are under use (Olujeny, 2008).

Agriculture is the mainstay of many economies which is fundamental to the socio-economic development of a nation because it is a major element and factor in national development (Ahmed, 1993). Therefore, he defined agriculture as the production of food and livestock and the useful tendering of plants and animals. Likewise, Okolo (2004) described agricultural sector as the most important sector of the Nigeria economy which holds a lot of potentials for the future economic development of the nation as it has been recorded in the past.

Rostow (1960) in his Stages of Economic Growth explained that agriculture is crucial for the "take-off stage" of a nation's economic growth and development. The importance of agriculture in the economy of any nation cannot be over emphasized; because it plays a major role in virtually all social and economic activities of countries for example poverty reduction (Wahab, 2011).

This paper therefore is to analyze the determinants of the agricultural sector to the growth and development of Nigeria economy between year 1981 and 2011 using a simple regression analysis for the promotion of exportation.

### **Literature Review:**

In Nigeria, before the discovery of oil, agriculture was the main sector contributing to the economy. The major source foreign exchange earnings and accounted for over 60% of its Gross Domestic Product (GDP) in the 1960s. It provided food and employment for the population and raw materials for the growing industries; thereby constitute to the bulk of Nigeria's non-oil exports. In which in the total value of non-oil exports, the shares of agricultural products both processed and unprocessed is as high as 70 per cent far back then (CBN, 2011). During the period, Nigerian economy was described as an agricultural economy because the engine of growth of the overall economy for the country was agriculture (Wahab, 2011).

Alkali, (1997) recorded that Nigeria was the world's second largest producer of cocoa, the largest exporter of palm kernel and the largest producer and exporter of palm oil. In which the country was also a leading exporter of other major commodities such as cotton, groundnut, rubber, as well as hides and skins. Also the positive contribution of agriculture to the Nigerian economy before the discovery of oil was affirmed; despite the reliance of Nigerian peasant farmers on traditional tools and indigenous farming methods, these farmers produced 70% of Nigeria's exports and 95% of its food needs (Lawal, 1997).

In the 1970s, agricultural sector however suffered neglect during the period because of the oil boom. It was stated that agricultural sector accounted for less than 50% of Nigeria's GDP in 2004 and since then Nigeria has been facing serious poverty challenges and the insufficiency of basic food needs (Ogen, 2007). The oil boom thereby led to the main constraint confronting agricultural sector, which lies in the neglect of agriculture and the increased dependency on mono-cultural economy.

In an attempt to solve the mono-cultural economy dependency and promote the important roles which the agricultural sector can play in the development of the country, various policies and programmes were put in place by the government. Such policies included Nigerian Agricultural and Cooperative Bank (NACB) in 1973, Operation Feed the Nation (OFN) in 1976, Agricultural Credit Guarantee Scheme (ACGS) Fund Act in 1977, Structural Adjustment Programme (SAP) in 1986 etc. Despite all the policies and programmes put in place, Okolo (2004) catalogued the key issues responsible for the poor outcome of the agricultural sector as to under investment in the sector. Likewise, Evbuomwan et al (2003) identified the constraints confronting the performance of agricultural sector as to the use of crude implements, low level of inputs and limited areas under cultivation.

## **MATERIALS AND METHODS**

### **Research Design:**

This research involves quantitative analysis of the variables, adopting the method of Ordinary Least Square (OLS) econometric statistical technique. The econometric model to be used to examine this study is Gross Domestic Product (GDP) as dependent variable whereas Fishery, Food production, Forestry and Livestock are considered as independent variables. The data for this study would be extracted mainly from secondary sources, such that data will be sourced from publications of the Central Bank of Nigeria (CBN) such as Statistical Bulletin and the Central Bank of Nigeria Annual Report and Statement of Accounts 2012. Also data sourced from internet research and publications of the National Bureau of Statistics will be employed.

### **Estimation Procedure:**

The model estimation will be done through the use of the ordinary least square (OLS) method of estimation. The data analysis will be done with the appropriate tool based on the economic theory that was developed to overcome the problems of spurious correlation often associated with non-stationary time series data.

### **Model Specification:**

$$Y_t = C_0 + C_1F_i + C_2FP_t + C_3Fo_t + C_4L_t + U_t$$

Where:

$Y_t$  = Gross Domestic product for current year

$F_i$  = Fishery

$FP_t$  = Food production

$Fo_t$  = Forestry

$L_t$  = Livestock

$C_0, C_1, C_2, C_3$  and  $C_4$  = constants

$U_i$  = error term

### **Apriori Expectation and Justification of the Variables in the Models:**

Economics postulations suggest that increase in the agricultural component such as food or crop production, fishery and livestock will bring about increase in gross domestic product. Simply the increase in agricultural component will positively affect the gross domestic product which is based on the economic postulation that an

increase in non-oil component in Nigerian economy will be directly transmitted into the economy or increase in the value of economic growth. However, the expected signs of regression coefficients in the equation are:  $C_1, C_2, C_3, C_4 > 0$

## RESULT AND DISCUSSION

The empirical test and analysis of the data sourced for the study used the economic approaches which are: Augmented Dickey-Fuller (ADF), Kwiatkowski-Philips-Schmidt-Shin (KPSS) and Philips- Perron (PP) test for stationary of series, Ordinary least square (OLS) and Breusch-Godfrey serial correlation LM test. In which, an econometric equation is estimated to test the hypotheses.

### **Data Analysis of Empirical Result:**

The annual time series data for the period 1981 to 2011 as presented to test the hypotheses in this study.

#### **Hypothesis One:**

Fishery as determinant of agricultural sector has not contributed significantly to the economic growth of Nigeria; thus  $H_0: C_1 = 0$

#### **Hypothesis Two:**

Food Production as determinant of agricultural sector has not contributed significantly to the economic growth of Nigeria; thus  $H_0: C_2 = 0$

#### **Hypothesis Three:**

Forestry as determinant of agricultural sector has not contributed significantly to the economic growth of Nigeria; thus  $H_0: C_3 = 0$

#### **Hypothesis Four:**

Livestock as determinant of agricultural sector has not contributed significantly to the economic growth of Nigeria; thus  $H_0: C_4 = 0$

### **Results of Unit Root Tests:**

Three standard tests for unit root, namely the Augmented Dickey-Fuller (ADF), Philips-Perron (PP) and Kwiatkowski-Philips-Schmidt-Shim (KPSS) was used to test the order of integration of the variables, knowing that the stationary test of the time series is needed in order to avoid the problem of spurious regression. Table 1 shows the combined results of the ADF, PP and KPSS unit root test, which relieved their level of stationarity taking into consideration two types test constant without trend and constant with trend.

### **Results of OLS:**

The ordinary least square regression yields the following results from Table 2;

$$Y_t = -677570.0 - 42.54854F_t + 0.696613FP_t + 178.8038F_o_t + 26.56915L_t + U_t$$

$R^2$  (R-squared) is a measure of overall goodness of fits in the result which is at the high value of 0.99 or 99 percent; meaning that the proportion explained by the independent or dependent variable is 99 percent while the remaining 1 percent is explained by the error term ( $U_i$ ). Adjusted R-squared on other hand allows for degree of freedom which is also at 99 percent. It was revealed that all the independent variables (fishery, Food production, Forestry and Livestock) are positive and insignificant with the t-statistics of -0.617547, 0.806125, 1.182567 and 1.514216 respectively.

The result from Table 3 of the ordinary least square regression using logarithm of all variables yield:

$$Y_t = 2.240723 + 0.303728F_t + 0.617831FP_t + 0.025798F_o_t + 0.068235L_t + U_t$$

$R^2$  (R-squared) is a measure of overall goodness of fits in the result which is at the high value of 0.99 or 99 percent; Adjusted R-squared allows for degree of freedom which is at 99 percent and which is similar with the result in table 2. It was revealed that all the independent variables (fishery, Food production, Forestry and Livestock) are positive. Fishery and food production are significant with the t-statistics 3.130239 and 5.135304, whereby forestry and livestock are insignificant with the t-statistics of 0.300071 and 0.481085 respectively.

### **Results of Serial Correlation LM Test:**

The Breusch-Godfrey serial correlation LM test show that  $n.R^2 = 1.510840$  and the Prob. Chi-Square(2) which is 0.4698 is insignificant. This means that the estimated model have no autocorrelation problem.

**Table 1:** ADF,PP And Kpss Unit Root Test.

Variable	ADF		PP		KPSS		Result
	Constant	Trend and Constant	Constant	Trend and Constant	Constant	Trend and Constant	
GDP <sub>LEVEL</sub>	3.82521***	3.71600**	11.06116***	9.859554***	0.596399**	0.18868**	I(0)
Fish <sub>LEVEL</sub>	12.76757***	2.890029	12.41358***	5.988815***	0.618030**	0.19234**	I(0)
FP <sub>LEVEL</sub>	6.214522***	2.336524	7.529195***	6.031410***	0.604221**	0.190784**	I(0)
For <sub>LEVEL</sub>	0.832724	6.949535***	9.669709***	5.204362***	0.610221**	0.19148**	I(0)
Liv <sub>LEVEL</sub>	3.253944**	2.670456	13.88289***	4.830263***	0.623244**	0.187798**	I(0)

Notes: \*\*\*, \*\*, \* denotes rejection of the null hypothesis of a unit root at the 1%, 5%, and 10% significance level. No asterisk indicates that the series is non-stationary

**Table 2:** Dependent Variable: GDP Method: Least Squares Date: 01/09/14 Time: 12:20 Sample: 1981 2011 Included observations: 31

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-677570.0	289580.7	-2.339832	0.0272
FISHERY	-42.54854	68.89931	-0.617547	0.5422
FOOD_PRODUCTION	0.696613	0.864150	0.806125	0.4275
FORESTRY	178.8038	151.1996	1.182567	0.2477
LIVESTOCK	26.56915	17.54647	1.514216	0.1420
R-squared	0.991323	Mean dependent var		7334671.
Adjusted R-squared	0.989988	S.D. dependent var		10672643
S.E. of regression	1067911.	Akaike info criterion		30.74700
Sum squared resid	2.97E+13	Schwarz criterion		30.97828
Log likelihood	-471.5784	Hannan-Quinn criter.		30.82239
F-statistic	742.5923	Durbin-Watson stat		1.492076
Prob(F-statistic)	0.000000			

**Table 3:** Dependent Variable: LOG(GDP) Method: Least Squares Date: 01/09/14 Time: 12:16 Sample: 1981 2011 Included observations: 31

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.240723	0.246455	9.091820	0.0000
LOG(FISHERY)	0.303728	0.097030	3.130239	0.0043
LOG(FOOD_PRODUCTION)	0.617831	0.120310	5.135304	0.0000
LOG(FORESTRY)	0.025798	0.085972	0.300071	0.7665
LOG(LIVESTOCK)	0.068235	0.141835	0.481085	0.6345
R-squared	0.997475	Mean dependent var		14.14058
Adjusted R-squared	0.997087	S.D. dependent var		2.278157
S.E. of regression	0.122955	Akaike info criterion		-1.207302
Sum squared resid	0.393068	Schwarz criterion		-0.976014
Log likelihood	23.71318	Hannan-Quinn criter.		-1.131908
F-statistic	2568.246	Durbin-Watson stat		1.519638
Prob(F-statistic)	0.000000			

**Table-4.** Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.614805	Prob. F(2,24)		0.5490
Obs*R-squared	1.510840	Prob. Chi-Square(2)		0.4698
Test Equation:				
Dependent Variable: RESID				
Method: Least Squares				
Date: 01/09/14 Time: 12:27				
Sample: 1981 2011				
Included observations: 31				
Presample missing value lagged residuals set to zero.				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	17929.58	297361.6	0.060296	0.9524
FISHERY	-0.712604	80.43703	-0.008859	0.9930
FOOD_PRODUCTION	0.120318	0.894480	0.134512	0.8941
FORESTRY	-0.117405	165.4140	-0.000710	0.9994
LIVESTOCK	-1.302127	18.68827	-0.069676	0.9450
RESID(-1)	0.229198	0.220541	1.039254	0.3090
RESID(-2)	-0.083472	0.347443	-0.240247	0.8122
R-squared	0.048737	Mean dependent var		-2.01E-09
Adjusted R-squared	-0.189079	S.D. dependent var		994170.8
S.E. of regression	1084093.	Akaike info criterion		30.82606
Sum squared resid	2.82E+13	Schwarz criterion		31.14987
Log likelihood	-470.8040	Hannan-Quinn criter.		30.93162
F-statistic	0.204935	Durbin-Watson stat		1.974235
Prob(F-statistic)	0.971873			

**Conclusion:**

The study shed light on agricultural sector contribution or productivity to the economic growth and

development of the country; by promoting the significant agricultural sector determinants which are fishery, food production, forestry and livestock. The findings of this research highlight the importance of the agricultural sector determinants and discovered that fishery and food production need to be promoted to enhance further economic growth and for exportation; since they have a positive significant effect on the economic growth. However, the effect of forestry and livestock as determinants of agricultural sector revealed is yet to improve economic growth of the country. Therefore policies should be geared towards making more land available, more financial assistance and adequate modern equipment for the country to meet the production challenge of the population and also for exportation; since strengthening and promoting of a non-oil export is needed for Nigeria's economic outlook to improve.

In as much agriculture will continue to play an important role in the economic growth and poverty alleviation in developing countries in the era of economic liberalization and globalization; agriculture sector determinants must therefore be made economically rewarding by the country making partnership with private sectors involved in any of the determinants both small or large scales.

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