

Transformation Of Agriculture For Economic Development In Nigeria

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Abstract

With efforts that have been made by the Nigerian government, to make her agricultural sector the pride of the nation in terms of absorbing unemployment and becoming a major source of foreign exchange, it is alarming that the sector still lacks the ability to contribute majorly to the institutional and structural transformation of the Nigerian economy. This research is therefore saddled with the responsibility of determining how transformation of agriculture can promote economic development in Nigeria. The research adopts two equations and uses Phillips-Perrons unit root test to determine the stationarity of the series used and the ARDL cointegration test to determine the short run and long run relationship among agricultural output and agricultural inputs (agricultural machinery and tractors, recurrent expenditure on agriculture, recurrent expenditure on health and agricultural loan) on one side; and RGDP and agricultural output, manufacturing output, industrial output, recurrent expenditure on health and inflation on the other hand. The result shows that agricultural output is a long run determinant of economic development though has negative and significant impact on economic development. On the other hand, all the determinants of agricultural output are insignificant except recurrent expenditure on health while recurrent expenditure; physical capital (AGRMT) and agricultural loans; recurrent expenditure on agriculture are both negative and positive respectively. The research therefore suggests that for the Nigerian agricultural sector to have impactful contribution to economic development government must pay equal if not more attention given to the oil sector to the agricultural sector.

Keywords: Real Gross Domestic Product, Agricultural Output, Agricultural Machinery And Tractor, Industrial Output, Manufacturing Output

INTRODUCTION

Awolowo in his address to the conference of finance commissioners held in Kano State on 23rd February, 1970 as the country Finance Minister read out some measures which he strongly believed will lead Nigeria out of the woods. These measures were seven and out of them he crafted the five cardinal programmes of the defunct Unity Party of Nigeria (UPN) in 1979 while vying for the President of Nigeria. These programmes were: full employment, free education, free health, modernisation of agriculture and rapid industrialisation. The process of agricultural transformation simply means modernisation of agriculture. Olominu (2017) argues that agriculture must be modernised and mechanised in a bold and massive manner. He emphasised the investment in tractors, mechanised ploughs and ridges, fertilisers, pest control, irrigation, research into high yielding grains and seeds, cattle pastures and ranches and fishing trawlers.

Johnston (1962) argues that agricultural transformation is the process through which individual farmer shift from highly diversified, crude-oriented production towards sophisticated markets or other systems of exchange. The process could take the form of greater

reliance on input-output delivery systems and increased integration of the traditional sector with other sectors of the economy both domestic and international. The structural and institutional transformation of any economy must be deeply rooted in the transformation of agricultural sector. This is because it serves as a major supplier of raw materials to other sectors of the economy.

PWC (2016) explains that over the years, agricultural production in Nigeria has been impacted by limited availability of inputs. Local farmers have lacked the required seedlings, fertilisers and water for production activities. Also, the process for securing land is time-consuming and expensive, and this discourages agricultural activities. Low investments in irrigation systems, water pollution, increasing deforestation, have impacted the quality and availability of water for agricultural production. The slow adoption of mechanisation in Nigeria has significantly reduced the quality of agricultural products. The rate of mechanisation has been held back by limited accessibility to modern agriculture equipment and the limited availability of skilled workers.

Limited storage facilities is another inhibiting factor which have resulted in high post-harvest loss, low food quality and undersupply of agricultural products. Also processing of agricultural products is vital for the reduction of post-harvest losses. In this is estimated at between 35%-50% for fruits and vegetables, and 15%-25% for grains, PWC 2016. Inadequate extension services for post-harvest handling, poor quality control and limited use of modern processing practices and technology have limited processing of agricultural output.

However, efforts have been made by the Nigerian government to solve the problems of inputs deficiency. In 2011, government established The Agricultural Transformation Agenda (ATA) which focused on addressing the input challenge. This resulted in policies that facilitated the supply of subsidised seedlings and fertilisers to 18% of farmers in Nigeria (estimated at 12-14 million) between 2011 and 2014. In addition, some state governments have launched different initiatives to ease the process of land acquisition for agriculture purposes. Edo State subsidised land acquisition costs and eased the Certificate of Occupancy (C of O) acquisition process. Similarly Anambra State is promoting community relations to facilitate a conflict free land acquisition on process, while enacting the Land Acquisition Act to smoothen land transfers (PWC 2016).

Not leaving any stone unturned the government has also initiated irrigation projects to improve the supply of water for agriculture purposes. For instance, the Zauro irrigation project entails the development of farmland and 50 million m³ water reservoirs and the middle Ogun irrigation project is expected to develop 12000 hectares of land under irrigation. At completion, the Zaura irrigation is projected to have the capacity to facilitate the production of 42,000 tons of rice, 4,800 tons of maize, 2,200 tons of cowpea and 800 tons of wheat annually. This project however, has been ongoing for several years and is yet to be completed. The use of modern equipment is however not undermined. In 2014, the Africa Exchange (AFEX) and the government introduced the Electronic Warehouse Receipt System (e-WRS) to facilitate the storage of agricultural products. Farmers and distributors are able to store products in certified warehouses which provide quality storage facilities thereby reducing post-harvest loss. Also warehouse receipts are eligible as collateral and can be utilised to access finance from banks. PWC (2016) by 2016 the scheme had engaged 60,000 farmers across eight states, with plans to develop mobile warehouses to reach more farmers.

In 2012, Nigeria Expanded Trade and Transport (NEXTT) project was funded by USAID to advance trade efficiency along the LAgos-KAno-JIbiya

(LAKAJI) corridor. By 2015, the project facilitated a 25% reduction in time for importing goods and 5% decrease in in time for exporting goods through Lagos to Jibiya border. In addition, a 35% decrease in cost-to-import, and 21% reduction in cost-to-export was recorded for goods passing through the corridor (PWC, 2016).

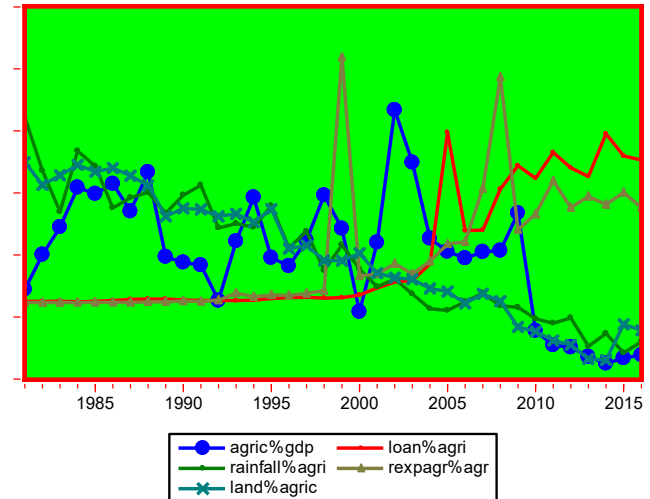


Figure 1: Paths of agricultural output, agricultural loans, rainfall, recurrent expenditure on agriculture and land in Nigeria from 1981-2016

Source: Word Bank Data Indicator (WDI)

Figure 1 shows the relationship between agricultural output and various agricultural inputs. From 1981 to 2016 recurrent expenditure on agriculture and loan to agriculture were relatively stable while they increased inconsistently in the later years. While agricultural output declines drastically between 2010 and 2014 but witnesses a slight increase between 2014 and 2016 alongside rainfall and land.

Given the various structural and institutional transformation that have taken place in the Nigerian agricultural sector, this research is saddled with the responsibility to determine the ability of this sector to contribute to economic development. Herrick and Kindleberger (1983) define economic development to include improvements in material welfare especially for person with lowest incomes, the eradication of poverty accompanied reduction in illiteracy rate, diseases and early death, changes in the composition of input and output that generally include shifts in the underlying structure of production away from subsistence agricultural towards industrial activities.

Previous research (Mathew and Adegboyega, 2009) in analysing the relationship between agricultural output and agricultural inputs using Johansen cointegration test discover that agricultural output is directly related to agricultural export, commercial bank agricultural

credit and fertilizer distribution but inversely related to agricultural expenditure. Also (Dim and Ezenekwe, 2013) in answering the question “does agricultural matter for economic development in Nigeria?” regressed life expectancy against agricultural expenditure and explained that agricultural output has negative but significant impact on life expectancy (economic development) while agricultural expenditure was found to be positive but nonsignificant. Agricultural output was also modelled against socio-economic, natural and human factors, which influence agricultural productivity. This shows that only rainfall and industrial sector matter for agricultural output in the country as both variables have positive impacts on agricultural output. They argue that the development of agricultural sector at the expense of other crucial sectors such as power, health, education among the host of others will not yield expected optimal result in the form of economic development. To further explore these grounds, this research asks the following questions:

1. Do improved agricultural inputs and other sectors improve agricultural sector performance in Nigeria?
2. Does agricultural transformation bring about economic development in Nigeria?

However, the objective of this research paper is to provide answer to the above mentioned questions. These objectives include:

1. To determine if improved agricultural inputs improve agricultural sector performance in Nigeria.
2. To examine the relationship between agricultural sector and other sectors of the economy
3. To examine the process of agricultural transformation for economic development

This research is divided into four sections. The first section talks about what inspires the research paper as well as it outlines. The second section reviews the various literatures that have explored areas related to the topic in-question in order to identify areas where further contribution is necessary. The third section outlines the methodology employed by the research and also interprets the results generated through critical theoretical analysis. Finally, the research paper draws a conclusion and recommends policy capable of enhancing economic development

LITERATURE REVIEW

Abdul, Muhammed and Hussain (2017) argued that theoretically, the role of agriculture in economic development is greatly divided between two schools of thought. Those who believe that agriculture was subsistence oriented and lobbied formational development policies based on industrialisation and

urban bias (Lipton, 1977, Johnson and Mellor 1961 and Krueger et al 1988). The other school of thought argued that agriculture was important in the early stages of development and had multiplier effects in other sectors (Schultz (1964), Haggblade et al.(2007) and Lewis (1955)).

Lewis (1958) distinguishes between capitalist and subsistence sectors in a closed economy. The capitalist sector uses reproducible capital and produces all the industrial output, while the subsistence sector contains, at least initially, non-reproducible capital in the form of agricultural land. Given this classification the major factor to be transferred from agriculture to industry is labour. Lewis argued that there exists a wage differential which enables the capitalist to pay the worker less than his marginal product. Hence, he is able to increase his stock of capital which increases labour productivity and the capitalist hires more labour from the agricultural sector, and so the process continues. Lewis failed to take into consideration the possibilities of industrial sector been dependent on the subsistence sector for its food supply and some of its raw materials beyond labour force. Given his model under this scenario economic development will be difficult to come by because poverty and unemployment will increase.

Nicholls (1963) in evaluating the role of agricultural surpluses in economic development defines his surplus not as a function of production but as the difference between the quantity produced and the quantity consumed within the agricultural sector itself. While, unlike Ranis and Fei, he does permit subsistence wage in terms of agricultural goods to rise as labour migrates from the agricultural sector as productivity increases. He also assumes a zero income elasticity of demand for agricultural goods to be used by the agricultural sector. This situation releases a surplus of agricultural goods that can be used to finance an industrial expansion and not just labour as postulated by Lewis. However, Nichols failed to explain how an increase in productivity may come about in agriculture; he does focus upon an empirically testable proposition: income elasticity of demand. Hence a way of indicating whether or not an increase in agricultural productivity actually does contribute to industrial development is available.

Jorgenson (1967) divides the economy into two sectors- the modern or manufacturing (industrial sector) and the traditional or agricultural sector. He explains that there is asymmetry in the production relations in the two sectors. He explained that the subsistence sector is dependent on land and labour alone; and the modern sector is dependent on capital and labour alone. He argued that a backward agricultural economy can change its system by altering the parameters of its

system. If the economy is in a low level equilibrium trap and β remains constant, it can come out of the trap situation by increasing the rate of technical change (α) so that the sign of the expression $\alpha - \beta\epsilon$ is changed from negative to positive and there is a steady increase in the output of food per head.

EMPIRICAL REVIEW

It is alarming that despite the resources that have gone down the drain in the agricultural sector; the optimal impact is yet to be felt on poverty, life expectancy at birth and common welfare of the people which are the major indices for measuring economic development. Various empirical works have been done to check the effectiveness of the transformed agricultural sector on economic development and also to check reasons why this is not yielding the expected result.

Eboh, Moses and Oliver (2012) in their study of drivers and sustainability of agricultural growth in Nigeria from 1970 to 2009, using growth accounting, non-parametric and econometric approach (ADF and Cointegration tests) argue that non-irrigated and irrigated inclusive production reveal that rainfall, fertilizer use, labour, land and machinery are important factor in agricultural production and development in Nigeria. However, they explained that the introduction of human capital reduces labour and physical capital share of agricultural output, marginally in the short-run. Odetola and Etumnu (2013) in their study of the contribution of agriculture to economic development using OLS and Co-integration test discover that there is no co-integration between agricultural growth and economic growth. Using Granger-causality test they also explained that there exist a unidirectional causal relationship between agricultural growth and GDP growth. They argued that agriculture growth Granger-causes GDP growth but GDP growth does not Granger-cause agriculture growth. They explained the Nigeria agricultural sector grows the economy while there is no corresponding compensation to the sector from the economy. The study also identifies the ability of the agricultural sector to recover quickly during shock using growth accounting method. However, this quick recovery of agriculture can be further checked with the use of ARDL cointegration test. This research only identifies how the growth in agriculture contributes to economic growth but fails to outline how this growth is achieved which may help to reveal the impact of economic growth on agricultural growth.

Daniel and Ihechituru (2011) in their study of the effect of agricultural reforms on the agricultural sector in Nigeria from 1960 to 2009 using descriptive statistics discover that the effect of economic reforms on the agricultural sector can be said to be unsatisfactory in view of minimal contribution to the sector. However

mere descriptive analysis may not be sufficient to assume that the reforms yield minimal contribution, hence, econometric analysis should be employed to measure the impact of the various sectors reformed on agricultural contribution.

Dimand Ezenekwe (2013) modelled life expectancy against agricultural output and agricultural expenditure among other variables from 1970 to 2010 using Augmented Dickey-fuller unit root test, ordinary least squares and the Newey-West method on secondary data. The agricultural output with co-efficient (1.71) is elastic-implying that a percentage rise in agricultural output will increase life expectancy (economic development) in Nigeria by 1.71%. However, the study noted that agricultural productivity is not sufficient to improve rural life except it is accompanied by a corresponding off-farm employment creation, education, health and other social services. This implies that for agricultural transformation to be accompanied by reduction in poverty, unemployment and inequality the government must be up and doing. However, the use of industrial production and carbon emission as factors that determine agricultural output is secondary, the study undermines the major agricultural inputs mentioning only rainfall.

Mathew and Adegboyega (2009) examine the role of agricultural sector in economic development in Nigeria from 1970 to 2008. They use Johansen Co-integration technique to examine whether there is a long run relationship between agricultural output and economic development or not. Their result shows that there is co-integration between the variables. The ECM shows that there is an indirect relationship between agricultural capital expenditure and agricultural output. They explained that holding other variables constant, a unit increase in agricultural capital expenditure will result in decrease in agricultural output by 0.256. All variables were important determinants of agricultural output in Nigeria within the period under review. The result shows that agricultural output is more sensitive to agricultural export slightly sensitive to fertilizer and commercial agricultural credit. They concluded that there is a direct correlation between the level of agricultural development and economic development in Nigeria. The researchers fail to analyse the relationship between economic development and agricultural development. Ekiran, Awe and Ogunjobi (2014) in their study of agricultural export and economic growth from 1982 to 2012 using Multivariate Johansen Co-integration and Error Correction Model discover that agricultural export, net capital flow, agricultural output and world price of Nigeria major agricultural commodities are long-run determinants of economic growth in Nigeria.

METHODOLOGY

The research used empirical time series data from 1981 to 2016 obtained from CBN statistical bulletin and World Bank Development Indicator (WDI). With the aid of ARDL, the research determines first the impact of the key independent variables such as health expenditure (REXPH), recurrent expenditure on agriculture (REXPAGR), agricultural machinery and tractors (AGRMT), on agricultural output (AGRO). On the other hand, the research also analyse the impact of agricultural output on real gross domestic product (RGDP) which proxies economic development using ARDL Bounds test to determine whether there exist a long run relationship between AGRO and RGDP. To further proof the significance of the Multiple Linear Regression, Phillip-Perrons unit root test.

Model Specification

This study is deeply rooted in the Jorgenson neoclassical model of a dual economy. Jorgenson (1967) divides the economy into two sectors- the modern or manufacturing (industrial sector) and the traditional or agricultural sector. According to Jorgenson, depending on the conditions of production and the net reproduction rate, the agricultural sector is characterised either by a low level equilibrium trap in which output of food per head is constant and population and food supply are growing at the same positive rate ($\alpha - \beta\epsilon$), or by a steady growth equilibrium in which output per head is rising and population is growing at its physiological maximum rate. The necessary and sufficient condition for a positive growth of output in the agricultural sector is $\alpha - \beta\epsilon > 0$. He explains that there is asymmetry in the production relations in the two sectors.

Mathew and Adegboyega (2009) employed an econometric model to analyse the relationship between agricultural output and agricultural inputs. This research modifies the modified model of Mathew and Adegboyega (2009).

The modified models are specified below:

Agricultural output and Agricultural input

$$AGRO = F(AGRMT, REXPAGR, REXPH, AGR)$$

Where AGRO is agricultural output

AGRMT is agricultural machinery and tractors
REXPAGR is recurrent expenditure on agriculture

REXPH is recurrent expenditure on health

AGRL is the agricultural loans

To estimate equation 1, we take the natural log of both sides which will result in the equation 2 below

$$\ln agro = \beta_0 + \beta_1 \ln agrmt + \beta_2 \ln rexpagr + \beta_3 \ln rexph + \beta_4 \ln agrl + \epsilon_t \quad \text{-----2}$$

Given that $\beta_1, \beta_2, \beta_3, \beta_4 > 0$

Economic Development and Agricultural Output

$$RGDP = F(AGRO, REXPH, MANO, INDO, INFLATION) \quad \text{-----3}$$

Where RGDP is the real gross domestic product is used to proxy economic development

AGRO is the agricultural output

REXPH is the recurrent expenditure on health

MANO is the manufacturing output

INDO is the industrial output

To evaluate the equation 3 above, we take the natural log of both sides which produces equation 4

$$\ln rgdp = \varphi_0 + \varphi_1 \ln agro + \varphi_2 \ln rexph + \varphi_3 \ln mano + \varphi_4 \ln indo + \varphi_5 \ln inf + \epsilon_t \quad \text{-----4}$$

Given that $\varphi_1, \varphi_2, \varphi_3, \varphi_4, \varphi_5 > 0$

ESTIMATION TECHNIQUES

Ramsey Reset

The Ramsey Regression Equation Specification Error Test (RESET) test by Ramsey, J. B. (1969) is a general specification test for the linear regression model. It helps to determine whether the non-linear combination of fitted values explain variation in the response variable. The test assumes mis-specified model if the non-linear combinations of the explanatory variables have any power which explains the response variable.

The hypothesis for the test is:

H₁: the model is mis-specified and H₀: the model is not mis-specified

At 5% level of significance, the model will be adjudged not mis-specified if the p-value of the F-statistics is greater than 0.05 otherwise it is mis-specified. The model in question for agricultural output and economic development in this research is assumed not mis-specified because its p-value (0.9290) is greater than 5% level of significance as well as the model for agricultural output and inputs at p-value (0.2087).

	F-statistics	Prob.
Economic development and Agricultural output	0.008152	0.9290
Agricultural output and Agricultural inputs	1.715674	0.2087

Breusch-Godfrey Serial Correlation test

The Breusch-Godfrey serial correlation test by Breusch and Godfrey (1978) is a test for autocorrelation in the error in a regression model. It uses the residuals from the model being considered in a regression analysis, and a test statistic is derived from these. Under Breusch-Godfrey serial correlation, hypothesis is set as: H₀ = there is no serial correlation and H₁ = there is serial correlation. Given that the level of significance is 5%, if the p-value of the F-statistics is greater than the level of significance we accept the null hypothesis of

no serial correlation otherwise we reject it. The p-value (0.9758) of economic development and agricultural output is greater than 5%, hence; there is absence of

serial correlation as well as the model for agricultural output and agricultural input which p-value is (0.8683).

	F-statistics	Prob.(2,19)	Prob. Chi-square (2)
Economic Development and Agricultural output	0.024579	0.9758	0.9583
Agricultural output and Agricultural inputs	0.142596	0.8683	0.7419

Phillip-Perrons Unit root test

The unit root test proposed by Phillips and Perrons (1988) is employed to determine the stationarity of the series used in this research. The PP test does not require us to specify form of serial correlation of Δy under the null. A conditional homoscedasticity is

not a condition required for the use of PP. it helps to resolve the problem of mis-specified P of the AR order which often is not over looked under ADF. The table below shows that all the variables are stationary at first difference except recurrent expenditure on agriculture and inflation that are stationary at level at 5% and 10% respectively.

Table 1: Summary of Phillips-Perrons Unit Root test

Series	pp-statistics		Critical values		Prob. Levels		I(d)
	Levels	1st diff.	5%	10%	Level	1st diff.	
RGDP	0.137675	-4.145578	-2.948404	-2.614300	0.9642	0.0027	I(1)
AGRO	-2.117952	-8.339751***	-2.948404	-2.614300	0.2391	0.0000	I(1)
REXPH	-0.202567	-7.558908***	-2.948404	-2.614300	0.9290	0.0000	I(1)
MANO	-1.701326	-6.178391***	-2.948404	-2.614300	0.4218	0.0000	I(1)
INDO	-2.050535	-7.906494***	-2.948404	-2.614300	0.2650	0.0000	I(1)
AGRMATR	-1.155030	-5.512175***	-2.948404	-2.614300	0.6825	0.0001	I(1)
REXPAGR	-3.518540**	-20.72999***	-2.948404	-2.614300	0.0133	0.0001	I(0)
INFLATION	-1.621180	-10.54634	-2.948404	-2.614300	0.0781	0.0000	I(0)
AGRL	-0.619244	-9.460053	-2.948404	-2.614300	0.8536	0.0000	I(1)

Source: Author's analysis by Eviews 9

ARDL Bounds Test Approach

The study applies Autoregressive Distributed Lag (ARDL) Bounds Test approach by Pesaran et al (2001), based on unrestricted error correction model. The bounds test approach is employed because:

1. The long run and short-run parameters of the model are estimated simultaneously
2. It does not involve unit root testing required to determine the order of integration of variables.
3. Whereas all the other methods insist that the variable in atime series regression are integrated of order one, that is first difference,

only that of Pesaran et al. (2001) could be used regardless of whether the underlying variable are at level, first difference or fractionally integrated.

However, the ARDL Bounds test by Pesaran et al. (2001) cannot be used when the order of integration of a variable is greater than 1.

The following ARDL representation of equation (2) will be estimated in order to test the existence of long run relationship between agricultural outputs and agricultural inputs:

$$\ln gdp_t = \omega_0 + \sum_{i=1}^q \delta_i \Delta \ln gdp_{t-i} + \sum_{i=1}^q \delta_2 \Delta \ln mtr_{t-i} + \sum_{i=1}^q \delta_3 \Delta \ln ind_{t-i} + \sum_{i=1}^q \delta_4 \Delta \ln rexp_{t-i} + \sum_{i=1}^q \delta_5 \Delta \ln inf_{t-i} + \sum_{i=1}^q \delta_6 \Delta \ln gdp_{t-i} + \omega_7 \ln gdp_{t-1} + \omega_8 \ln mtr_{t-1} + \omega_9 \ln ind_{t-1} + \omega_{10} \ln rexp_{t-1} + \omega_{11} \ln inf_{t-1} + \omega_{12} \ln gdp_{t-1} + u_t$$

5

$$\ln agrv_t = \omega_0 + \sum_{i=1}^q \delta_1 \Delta \ln agrv_{t-i} + \sum_{i=1}^q \delta_2 \Delta \ln gmat_{t-i} + \sum_{i=1}^q \delta_3 \Delta \ln rexp_{t-i} + \sum_{i=1}^q \delta_4 \Delta \ln rexp_{t-i} + \sum_{i=1}^q \delta_5 \Delta \ln agrt_{t-i} + \omega_6 \ln agrv_{t-1} + \omega_7 \ln gmat_{t-1} + \omega_8 \ln rexp_{t-1} + \omega_9 \ln rexp_{t-1} + \omega_{10} \ln agrt_{t-1} + u_t$$

6

To investigate the presence of long run relationship amongst the variables in equation (5 and 6), with the chosen lag requires the use of the F-test in which the joint significance of the parameters for lagged one variable is tested with F-statistics calculated under the null hypothesis. We then perform a joint significance test with the following hypothesis:

$H_0 : (\omega_7 = \omega_8 = \omega_9 = \omega_{10} = \omega_{11} = \omega_{12} = 0)$, represents no co-integration

$H_1 :$ (at least one of the parameters is not equal to zero), represents presence of co-integration

The calculated F-statistic is then compared with the critical bounds values reported by Pesaran *et al.* (2001). If the calculated F-statistic exceeds the upper bounds value, then H_0 is rejected, but if the F-statistic lies below both the upper and the lower bounds value, it implies that the null hypothesis of no co-integration is not rejected. However, the test becomes inconclusive when the computed F-statistic lies between the lower and upper bounds values.

Table 2: Summary of the ARDL Bounds Test Results

Variable	Critical Variables	ARDL Bounds test	
		F-statistics _{rgdp} (4.862315); F-statistics _{agro} (3.544182)	
F_{rgdp} (agro, mano, rexph, indo, infl)	1%	3.41	4.68
	2.5%	2.96	4.18
	5%	2.62	3.79
	10%	2.26	3.35
F_{agro} (agrmt, rexpagr, rexph, agrl)	1%	3.74	5.06
	2.5%	3.25	4.49
	5%	2.86	4.01
	10%	2.45	3.52

Source: Authors Analysis by Eviews 9

Table 2 shows that the computed F-statistics (4.862315) and (3.544182) are greater than the lower and upper bounds critical values of 3.41 and 4.68 at the 1% level of significant; and 2.45 and 3.52 at 10% level of significant respectively, using Pesaran et al. (2001). Hence, the null hypothesis of no cointegration is rejected, implying that there is long run relationship among rgdp, agro, mano, rexph, indo and inflation on one hand and agro, agrmt, rexpagr, rexph and agrl on the other hand in Nigeria.

Long Run and Error Correction Model

Sequel to the outcome of ARDL Bounds test of short run and long run relationship between the components of real gross domestic product and agricultural output, it is therefore, inevitable to analyse the short run relationship and long run relationships of the variables.

Estimated long-run coefficients the ARDL Approach [ARDL_{agro} (2,0,1,3,4)] and [ARDL_{rgdp} (1, 2, 0, 3, 0, 0)] selected based Akaike Information Criterion

Table 3: Summary of ARDL Long Run Coefficient for Agricultural Output

Dependent Variable: AGRO				
Regressors	Coefficient	Std. Error	t-statistics	Prob.
lnagrmt	0.952078	1.266175	0.751932	0.4630
lnrexpagr	-0.217000	0.177047	-1.225663	0.2381
lnrexph	0.236684	0.104539	2.264081	0.0378
lnagrl	-0.101906	0.098017	-1.039676	0.3139

Source: Author's analysis by Eviews 9

Table 4: Summary of ARDL Long Run Coefficient For Real Gross Domestic Product

Dependent Variable: RGDP				
Regressors	Coefficient	Std. Error	t-statistics	P.value
lnagro	0.967209	0.263896	-3.665117	0.0019
lnmano	-0.061675	0.027682	-2.227944	0.0397
lnindo	0.201753	0.040898	4.933134	0.0001
lnrexph	0.018155	0.020131	0.901839	0.3797
Infl	-0.001626	0.000885	-1.837183	0.0804

Source: Author's analysis by Eviews 9

From the long run tables above, we can deduce the following:

Agricultural machinery and tractors and Agricultural output: The table shows that there is a positive relationship between agricultural machinery and tractors and agricultural outputs in the long run, however, it is insignificant. This could be attributed to inadequate human capital development and poor maintenance of physical capital as outlined by (Eboh et al. 2012, Mathew and Adegboyega 2009)

Recurrent expenditure on agriculture and Agricultural output: Government expenditure on agriculture is negative and insignificant in the long run which confirms Mathew and Adegboyega (2009) assertion that higher agricultural expenditure brings about decline in agricultural output.

Recurrent expenditure on health and agricultural output: It is often said that health is wealth. In the long run the impact of health expenditure on agricultural output is positive and significant. This satisfies the a priori expectation as healthy farmers will produce higher agricultural output.

Agricultural loans and agricultural output: In the long run agricultural loan is negative and insignificant this contradicts the a priori expectation. This could be attributed to poor agricultural loan management as well as the inability of farmers to access loan. This differs from the findings of Mathew and Adegboyega (2009).

Agricultural output and Real Gross Domestic Products: The contribution of agricultural output to real gross domestic product in Nigeria is positive and significant in the long run. This contradicts Mathew and Adegboyega (2009) who argue that there is a positive correlation between agricultural output and economic development but agricultural output remains insignificant in Nigeria. However, this result shows that the gospel of economic development cannot be preached in the absence of agricultural development, hence, for agriculture to play its rightful roles its transformation is inevitable.

Manufacturing output and Real Gross Domestic Product: This result also shows that manufacturing output is significance in the pursuit of economic development but negative in Nigeria which contradicts the a priori expectation. This result represents the through state of things in Nigeria as we are often tagged a consuming rather than a producing economy due to the absence of enabling environment capable of attracting FDI and encouraging local entrepreneurs.

Industrial output and Real Gross Domestic Product: This result shows that industrial output is significance and positive in the long run which satisfies the a priori expectation.

Recurrent expenditure on health and Real Domestic Product: Expenditure on health in economic development is positive but insignificance which shows the poor state of our health sector in Nigeria.

Inflation and Real Gross Domestic Product:inflation is negative and significance in determining economic development in the long run. This satisfies the a priori expectation.

Error Correction Model the ARDL Approach
[ARDL_{agro} (2, 0, 1, 3, 4)] and
[ARDL_{rgdp} (1, 2, 0, 3, 0, 0)] selected based Akaike Information Criterion

Table 5: Summary of ECM Results for Agricultural Output

Dependent Variable: AGRO				
Regressors	Coefficient	Std. error	t-statistics	P-value
Dln(agrmt)	-1.285735	0.320058	-4.017195	0.1088
Dln(rexpagr)	-0.000856	0.009813	-0.087249	0.9316
Dln(rexph)	0.016247	0.007738	2.099647	0.0520
Dln(agrl)	0.004277	0.012071	0.354341	0.7277
Ect(-1)	-0.181631	0.100359	-1.809813	0.0891
R-squared: 0.833087				
Probability: 0.000948				
Durbin Watson: 2.143658				

Source: Author's analysis by Eviews 9

Dependent Variable: RGDP				
Regressors	Coefficient	Std. Error	t-statistics	P.value
Dlnagro	0.080878	0.066814	1.210500	0.2395
Dlnmano	0.613338	0.120947	5.071136	0.0001
Dlnindo	0.153458	0.246381	0.622848	0.5401
Dlnrexph	-0.003683	0.014966	-0.246125	0.8080
Dlninflation	-0.000771	0.000497	-1.549874	0.1361
Ect(-1)	-0.473834	0.125247	-3.783192	0.0011
R-squared: 0.761436				
Probability: 0.000204				
Durbin Watson: 2.062248				

Source: Author's analysis by Eviews 9

ECT(-1): The error correction terms for both agricultural output and real gross domestic product satisfies the rules of negative, less than one and

significance. With ECT (-0.181631) for agriculture, it shows that the speed of adjustment in the case of any shock is slow. This implies that every year 18% of divergent of the short run agricultural output from its long run path is eliminated and that the ECM only explains 83% of the fluctuations in agricultural output. On the other hand real gross domestic product with ECT (-0.473834) also shows that the speed of adjustment of RGDP is slow in the case of shock. This implies that every year 47% of divergent of the short-run from its long run path is eliminated and that ECM explains only 76% of the fluctuation in RGDP.

Agricultural Machinery and Tractors and Agricultural Output: the result shows that in the short run the relationship between agricultural machinery and tractors and agricultural output in Nigeria is insignificance and negative which contradicts the a priori expectation. This only shows that Nigeria is yet to achieve its prime in mechanised and modernised farming.

Recurrent Expenditure an Agriculture and Agricultural Output: The result shows that in the short run expenditure on agriculture is negative and insignificance in transforming agricultural output. This could be attributed to the neglect of the sector in the past as credence was given to oil sector.

Recurrent Expenditure on Health and Agricultural Output: Recurrent expenditure on health in the short run is significance at 10%, not 5% and positive. This satisfies the a priori expectation of sound mind in a sound body which promotes agriculture.

Agricultural Loans and Agricultural Output: In the short run agricultural loan though positive but remains insignificance. This could be attributed to the technicalities involved and inability of farmers to access loan.

Agricultural Output and Real Gross Domestic Product: in the short run agricultural output contributes positively to real gross domestic product in Nigeria though it is insignificance. This is because the processing of agricultural output into finished goods by the industrial and manufacturing sectors still remains a nut to be cracked in Nigeria.

Manufacturing Output and Real Gross Domestic Product: in the short run, manufacturing output is significance and positive in contributing to economic development. This satisfies the a priori expectation.

Industrial Output and Real Gross Domestic Product: this result shows that industrial output contributes positively to real gross domestic product but insignificance.

Recurrent Expenditure on Health and Real Gross Domestic Product: in the short run the result shows that the contribution of recurrent expenditure on health to real gross domestic product is negative and insignificant. This contradicts the a priori expectation which implies poor health funding in Nigeria.

Inflation and Real Gross Domestic Product: in the short run the contribution of inflation to real gross domestic product is negative, though insignificant. This satisfies the a priori expectation.

CONCLUSION AND POLICY IMPLICATION

A nation rich in agriculture and able to keep its population alive through a sound health sector and well-funded education will rank among the developed countries of the world. This study is of the opinion that there is a strong correlation between agricultural sector transformation and economic development. However, for agricultural sector to make a significant impact on the journey to economic development its transformation through provision and funding of the necessary modern agricultural inputs as well as every other sector directly or indirectly linked with agriculture must be taken seriously. The result of the study shows that insignificant attention has been paid to agricultural development which hampers its contribution to economic development in Nigeria. The study therefore encourages government to put in place policies, which will:

1. Ensure that attention given to stakeholders in the oil sector in terms of subsidies and waivers are given to stakeholders in the agricultural sector to facilitate the transformation of the sector which consequently will lead to economic development because farmers will be motivated and have a sense of belonging.
2. Create an atmosphere that will ensure healthy integration of the agricultural sector and other sectors of the economy. In transforming the agricultural sector, government is encourage to ensure vertical and horizontal integration among agricultural sector and other sectors of the economy to ensure rapid economic development.
3. Ensure that welfare of those who have decided to take to farming in the rural areas are given adequate attention in terms of provision of competitive education, health facilities, good roads, good pipe borne water and other infrastructural facilities capable of motivating them to remain in farming.
4. Ensure that agricultural and other commercial banks give loans to farmers with less stringent conditions. This will encourage farmers to borrow and pay back the loan. However, programme that will ensure that these loans are used for what they are meant for not

diverted must be put in place by the government to ensure rapid transformation of the sector to ensure rapid economic growth.

5. Encourage agricultural extension to transform agricultural sector which in the form of human capital development. This will help to educate the farmers in the operation and maintenance of the machinery and tractors to achieve efficiency, the use of seedlings as well as pesticides and insecticides. This will lead to greater output; greater income and rapid economic development.
6. Ensure waivers are given on the importation agricultural machinery and tractors and other farming equipment in order to reduce cost on the part of the farmers and increase agricultural output, hence, real gross domestic product will rise.

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