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Original Research Article

Contribution of Agriculture to the Development of the Nigerian Economy

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Abstract: Inspite of the fact that the agricultural sector has the potential to contribute significantly to the development of the Nigerian economy, the performance of the economy over the years has not been satisfactory. This study therefore examined the contribution of the agricultural sector to economic development in Nigeria. Specifically, the study investigated the impact of crop production, livestock, fishery and forestry outputs on economic development proxied by per capita income which is measured in terms of per capita real gross domestic product in Nigeria. The analytical techniques applied include Augmented Dickey Fuller (ADF) unit root test, Autoregressive Distributed Lag (ARDL) approach, error correction model (ECM) and Granger causality test. Annual time-series data from 1981 to 2020 were used for the study. The findings indicated that crop production and forestry outputs make strong contribution to the development of the Nigerian economy while the outputs of livestock and fishery make insignificant contribution to economic development of Nigeria. The Granger causality test indicated bidirectional causality between crop production output and economic development and a unidirectional causality from livestock output to economic development. To improve the contribution of agriculture to the development of the economy, it is recommended, among other things, that the government should increase its budgetary allocation to the agricultural sector while providing subsidized agricultural inputs to farmers.

Keywords: Agriculture, Economic Development, ARDL.

1. INTRODUCTION

There is a lively debate concerning the contribution of agriculture to the development of an economy. In this regard, there are two opposing viewpoints. These are the agro-optimists and the agro-pessimists. While the former holds the view that agriculture contributes significantly to economic growth and transformation of a nation, the later holds the contrary view that agriculture plays no significant role in the development process. Interestingly, this argument against the role of agriculture in economic development is held strongly in Africa, a continent that is largly agrarian (Jacquet *et al*., 2012).

In spite of the foregoing arguments, agriculture is generally considered as a key driver of national development. The agricultural sector is critically important for ensuring food and nutritional security, income and employment generation, and for stimulating industrial and overall economic development of a country (Wilson, 2002; Ogbalubi & Wokocha, 2013). It has equally been asserted that the 19th century industrial revolution that lifted the agrarian economies of most European countries got its impetus from agriculture (Temin, 1999). Similarly, the contribution of agriculture to economic development has, to a large extent, been established by empirical evidence (Mireri, 2013; Dorosh & Mellor, 2013; Emeh, 2017; Ogbanga, 2018. etc). It is therefore clear that the role of agriculture in the development of any society can hardly be overemphasized.

In Nigeria, before independence and even up to the first post-independence decade, the agricultural sector was the mainstay of the economy. It was the largest contributor to the country's GDP and also the largest employer of labour. However, since the 1970s, the agricultural sector contribution to the economy has declined due to the oil boom of the

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1970s which resulted in the neglect of the once vibrant agricultural sector (Anyanwu *et al*., 1997). Hence, the agricultural sector that was once the mainstay of the economy, is no longer what it used to be.

Today, Nigeria is battling with serious macroeconomic problems including divindling economic growth, high unemployment rates, high and rising inflation rates, etc. It is also true that the agricultural sector in Nigeria has the potential to create jobs and contribute to the growth and development of the economy (Ayinde, 2008; Ekpo & Umeh, 2013; Oyetade & Adeyeye, 2021). It is therefore necessary to explore the impact of the agricultural sector on the development of the Nigerian economy.

2. LITERATURE REVIEW AND CONCEPTUAL CLARIFICATIONS

2.1 Conceptual Clarifications

2.1.1 Agriculture

Agriculture is defined as the art and science of cultivating the soil, growing crops and raising livestock for food and other human needs or economic gains (Anyanwoucha, 2006). For the purpose of this study, agricultural sector contribution to economic development is measured in terms of the total output of the agricultural sector disaggregated into the outputs of crop production, livestock, fishery and forestry.

2.1.2 Economic Development

Economic development is defined as a process of improvement in the various aspects of the economy and the society it supports (Akpakpan, 1999). Todaro and Smith (2011) define economic development as "a process involving major changes in the social structures, popular attitudes, and national institutions, as well as the acceleration of economic growth, the reduction of inequality, and the eradication of poverty".

For the purpose of this study, economic development is measured in terms of income per capita which is in turn, measured by per capita real gross domestic product. Per capita real gross domestic product is therefore defined as the inflation-adjusted final output of goods and services produced within the geographical confines of a country divided by the total population of that country.

2.2 Theoretical Literature Review

2.2.1 Models of Agricultural Development

Models of agricultural development are theoretical models that offers explanations concerning the forces in the society and the economy that bring about agricultural transformation. There are basically four of such models. These are the conservation, urban-industrial, diffusion and high pay off input models. Among these four models, the high pay off inputs model has the highest rating. In addition, the high pay off inputs model encompasses the central themes and concepts of the other three models. Furthermore, the high payoff inputs model was developed to take care of the ineffectiveness of policies based on the other three models. In fact, the high payoff inputs model is highly ranked because of the positive outcomes associated with its application in the agrarian sectors of the economics of Mexico, the Philippines, and other countries in Asia, Africa and Latin America (Stakman *et al*., 1967; Moseman, 1970; Ruttan, 1977, Udemezue & Osegbue, 2018).

The central idea behind the high pay off inputs model is that one way to transform a traditional agranian sector into a viable source of economic growth is to make modern high pay off inputs available to farmers in less developed countries. This was a viewpoint that developed in the 1960s (Ruttan, 1977). This viewpoint believes that farmers in primitive agranian societies are rational and efficient resource allocators. According to this viewpoint, the farmers, however remained poor because, in most less developed countries, there were not enough technical and economic opportunities for them to explore (Moseman, 1970).

As pointed out by Schultz (1964), the high pay off inputs model can be categorized as follows:
(i) The capacity of public and private sector research institutions to produce new technical knowledge;
(ii) The capacity of the industrial sector to develop, produce and market new technical inputs; and
(iii) The capacity of farmers to acquire new knowledge and use new inputs effectively

2.3 Empirical Literature Review

Mireri (2013) from a survey of 1994 urban farmers concludes that urban agriculture creates jobs, contributes to household income and food security in Kisumu municipality of Kenya. Dorosh and Mellor (2013) established from their study that agriculture creates jobs and contributes to poverty reduction in Ethiopia. Uma *et al*., (2013) observed that outputs of crop production and fishery have insignificant negative impact on real GDP in Nigeria while livestock and forestry outputs have insignificant positive and significant positive impact respectively on real GDP in Nigeria. Ayinde (2008) found that agricultural outputs growth strongly reduces unemployment in Nigeria. Salako *et al*., (2015) found that agricultural output makes insignificant contribution to economic growth in Nigeria. Agene *et al*., (2017) established that

agricultural output and agricultural credit guarantee scheme fund of the CBN have significant positive impact on per capita income in Nigeria. Emeh (2017) found that agricultural output has significant positive impact on economic growth in Nigeria. Awoyemi *et al*., (2017) established that agricultural labour productivity and agricultural value-added have significant positive impact on real GDP in Nigeria. Oladotun (2017) observed that agricultural output has insignificant positive impact on economic growth in Nigeria. Oguwuike (2018) established that crop production and livestock outputs have significant positive impact on GDP in Nigeria. The study also found that forestry output has significant negative impact on GDP while fishery output has insignificant positive impact on GDP in Nigeria for the period 1981 to 2016. Lawal *et al*., (2018) found that agricultural output and tourism have significant positive relationship with economic growth in Nigeria. Mohammed *et al*., (2020) found significant positive effect of agricultural output on non-oil export in Nigeria. Oyetade and Adeyeye (2021) established a positive impact of agricultural output on economic growth in Nigeria.

From the empirical literature reviewed, we found out that majority of studies in Nigeria examined the impact of agricultural output on economic growth measured in terms of GDP or real GDP. It is also observed that only Uma *et al*., (2013) and Oguwuike (2018) disaggregated the total agricultural output into the outputs of crop production, livestock, fishery and forestry. However, while Uma *et al*., (2013) measured economic growth using real GDP, Oguwuike (2018) measured economic growth in terms of GDP. Besides, Uma *et al*., (2013) covered the period 1970 to 2009 while Oguwuike covered 1981 to 2016. Our argument here is that between 2016 to 2020, several changes have taken place in the magnitude of the variables used for the study. There is the need therefore to confront the study with recent empirical data.

In addition, it is observed from the empirical literature that only Agene *et al*., (2017) examined the impact of agricultural output on per capita income. However, Agene *et al*., (2017) used total agricultural output instead of disaggregating it into the outputs of crop production, livestock, fishery and forestry.

Therefore, to fill the gaps identified above, this study investigated the contribution of agriculture to the development of the Nigerian economy. Specifically, the study disaggregated total agricultural output into the outputs of crop production, livestock, fishery and forestry while economic development is proxied by per capita income measured in terms of per capita real gross domestic product.

3. METHODOLOGY

3.1 Description of the Variables of the Study

The variables used for this study are explained in this section.

Dependent Variable

The dependent variable for this study is economic development. Economic development is proxied by per capita income which is measured in terms of per capita real GDP. Per capita real GDP is the inflation-adjusted final output of goods and services produced within Nigeria divided by the total population of the country.

Explanatory Variables

The explanatory variables for this study are the outputs of crop production, livestock, fishery and forestry. They are measured in term of the contributions of the four subsectors of the agricultural sector to the total real gross domestic product of the country.

3.2 Model Specification

The contribution of agriculture to economic development is captured by a model specified based on the high pay off inputs model and the analytical model used by Oguwuike (2018) which is expressed as:

$$RGDP = f(CP, LS, FR, FS) \quad (1)$$

Where,

RGDP = Real Gross Domestic Product
CP = Crop Production Output
LS = Livestock Output
FR = Forestry Output
FS = Fishery Output

The above model was however adopted with slight modification to allow us include the variables of the present study. Hence, the mathematical form of the model used for the study is specified as follows:

$$PCRGDP = f(CPOUT, LSOUT, FISOUT, FROUT) \quad (2)$$

Where,
PCRGDP = Per Capital Real Domestic Product (a proxy for economic development)
CPOUT = Crop Production Output
LSOUT = Livestock Output
FISOUT = Fishery Output
FROUT = Forestry Output
f = Functionality Notation

PCRGDP is the dependent variable while CPOUT, LSOUT, FISOUT and FROUT are the explanatory variables.

The ordinary least squares (OLS) multiple regression equation based on the mathematical form of the model is specified as follows:

$$PCRGDP = \beta_0 + \beta_1 CPOUT + \beta_2 LSOUT + \beta_3 FISOUT + \beta_4 FROUT + U \ldots\ldots\ldots\ldots (3)$$

Where β_0 is the regression constant, $\beta_1 - \beta_4$ are the coefficients of the explanatory variables while U is the random variable. All other terms are as earlier defined.

Transforming equation 3 into logarithmic form, we have:

$$PCRGDP = \beta_0 + \beta_1 Log\ CPOUT + \beta_2\ Log\ LSOUT + \beta_3\ LogF\ ISOUT + \beta_4\ Log\ FROUT + U \ldots\ldots\ldots\ldots (4)$$

Where Log refers to the natural logarithm of the variables where applicable. All other variables are as earlier interpreted.

A priori Theoretical Expectations

Based on economic theory, we expect the following signs of the coefficients of the explanatory variables.

$$PCRGDP = \beta_0 + \beta_1\ Log\ CPOUT + \beta_2\ Log\ LSOUT + \beta_3\ Log\ FISOUT + \beta_4\ FROUT + U$$

$(\beta_1 > 0, \beta_2 > 0, \beta_3 > 0, \beta_4 > 0)$

The implication of the signs of the parameter estimates is that we expect a positive relationship (i.e, greater than zero) between each of the explanatory variables and the dependent variable.

3.3. Nature and Sources of Data

Annual time-series data covering the period 1981 to 2020 were used for the study. The data were obtained from secondary sources including the Central Bank of Nigeria annual statistical bulletin for 2020 and the Central Bank of Nigeria annual reports and statements of accounts (various years).

3.4 Techniques of Data Estimation

It is important to note that the ordinary least squares regression technique is based on the assumption that the underlying time-series are stationary. However, in real life, most macroeconomic time-series variables are non-stationary. Thus, the data estimation procedure was preceded by the test for unit root so as to know whether the time-series data are stationary or not and also to determine their order of integration. The Augmented Dickey –Fuller (ADF) unit root test was used in conducting the stationary test. The ADF unit root test tests the null hypothesis of unit root (i.e, series are non-stationary) against the alternative hypothesis of no unit root (i.e, series are stationary). The general form of the ADF test can be specified by the following regression equations.

$$\Delta Y_t = \alpha_o + \alpha_1 Y_{t-1} + \sum_{i=1}^{n} \alpha\, \Delta Y i + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (5)$$

$$\Delta Y_t = \alpha_o + \alpha_1 Y_{t-1} + \sum_{n=1}^{n} \alpha_i\, \Delta Y i + \delta_t + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots (6)$$

Where Y Is a time –series, t is a linear time trend, Δ is the first difference operator, α_o is a constant, p is the optimum number of lags in the dependent variable and ε_t is error term. Equation 5 contains only drift while equation 6 contains both drift and linear trend.

Based on the result of the unit root test, the autoregressive distributed lag (ARDL) model and the error correction model (ECM) were used in estimating the data. The ARDL and ECM models can be specified as follows:

$$\Delta PCRGDP_{t-1} = \alpha_o + \sum_{i=1}^{p} \beta_{1t}\,\Delta \log CPOUT_{t-1} + \sum_{i=1}^{p} \beta_{2t}\,\Delta \log LSOUT_{t-1} + \sum_{i=1}^{p} \beta_{3t}\,\Delta \log FISOUT_{t-1} \sum_{i=1}^{p} \beta_{4t}$$

$$\Delta logFROUT_{t-1} + \lambda ECM_{t-1} + y_1 PCRGDP_{t-1} + y_2 logCPOUT_{t-1} + y_3 logLSOUT_{t-1} + y_4 \log FISOUT_{t-1}$$

$$+ y_5 logFROUT_{t-1} + \varepsilon_t \ldots\ldots (7)$$

Where α_o is the constant term, Δ is the first difference operator, log is the natural logarithm, β_1, β_2, β_3, and β_4 are the short-run coefficients, λ is the coefficient of the ECM (-1) term, y_1, y_2, y_3, y_4 an y_5 are long-run coefficients and ε_t is the white noise error term.

The Granger causality test was used to test the nature and direction of causality between the variables. Generally, if the Granger causality test is to be conducted between two variables, x and y, the test estimates the following pair of regression:

$$X_t = \sum_{i=1}^{n} a_i\, Y_{t-1} + \sum_{i=1}^{n} \beta_j\, X_{t-j} + U_{lt} \ldots\ldots (8)$$

$$Y_t = \sum_{i=1}^{n} \lambda\, Y_{t-1} + \sum_{i=1}^{n} \bar{x}_j\, X_{t-j} + U_{2t} \ldots\ldots (9)$$

Where it is assumed that the error terms U_{it} and U_{2t} are uncorrelated.

4. PRESENTATION OF RESULTS AND DISCUSSION OF FINDINGS

The results of the data analysis are presented and discussed in this section.

4.1 Descriptive Statistics Results

The results of the descriptive statistics is presented in Table 1.

Table 1: Descriptive Statistic Results

Variable	PCRGDP	(CPOUT)	(LSOUT)	(FISOUT)	(FROUT)
Mean	0.268145	8.666803	6.454789	4.224140	4.627298
Median	0.239700	8.296103	6.331001	4.197052	4.481640
Maximum	0.385400	11.95624	7.098425	4.657288	5.233619
Minimum	0.199000	7.389558	5.833084	3.704999	4.209309
Std. Dev	0.068021	1.045192	0.401331	0.187006	0.312175
Skewness	0.537172	1.384701	0.323369	0.003763	0.696258
Kurtosis	1.643822	5.286662	1.684203	4.737394	2.014137
Jarque-Bera	4.739605	20.42248	3.403518	4.779440	4.609125
Probability	0.093499	0.000037	0.182362	0.091655	0.099802
Sum	10.18950	329.3385	245.2820	160.5173	175.8373
Sum Sq. Dev.	0.171193	40.41977	5.959450	1.293940	3.605764
Observation	38	38	38	38	38

Source: Computed from E-view

The descriptive statistics result in table1 shows that the mean values of the variables are 0.268145, 8.666803, 6.454789. 4.224140 and 4.627298 for PCRGDP, (CPOUT), (LSOUT), (FISOUT) and (FROUT) respectively. The standard deviation statistic showed that (CPOUT) with a standard deviation value of 1.045192 is the most fluctuating variable while PCRGDP with a standard deviation value of 0.068021 is the least fluctuating variable. The skewness statistic shows that all the variables are positively skewed. The Kurtosis statistic shows that (CPOUT) and (FISOUT) are leptokurtic (i.e., their values greater than 3). This means that their distributions are more peaked relative to normal distribution. On the other hand, PCRGDP, (LSOUT) and (FROUT) are platykurtic (i.e., their values are less than 3). This suggests that their distributions are flat relative to normal distribution.

4.2 Unit Root Test Result

The result of the Augmented Dickey-Fuller (ADF) unit root test is presented in Table 2.

Table 2: ADF Unit Root Test Result

Variable	At levels			At First Differences			Order of integration
	ADF statistic (At levels)	1% critical value	5% critical value	ADF statistic (At 1st Diff)	1% critical value	5% critical value	
PCRGDP	-0.603513	-3.621023	-2.943427	-3.653249*	-3.621023	-2.943427	I(1)
Log(CPOUT)	-0.342225	-3.769597	-3.004861	-3.857770*	-3.427386	-3.040391	I(1)
Log(LSOUT)	-0.065647	-3.621023	-2.943427	-4.002864*	-3.621023	-2.943427	I(1)
Log(FISOUT)	-3.691723*	-3.653730	-2.957110				I(0)
Log(FROUT)	-0.750264	-3.626784	-2.945842	-6.245762*	-3.621023	-2.943427	I(1)

Source: Computed from E-view

Not: *denotes rejection of the null hypothesis of unit root at the 1% significance level.

The ADF unit root test result in table 2 shows that only Log(FISOUT) is stationary at levels [i.e., I(0)] while PCRGDP, Log(CPOUT), Log(LSOUT) and Log (FROUT) are stationary at first difference [i.e., I(1)].

4.3 ARDL Bounds Test Result

The result of the ARDL bounds test for cointegration is presented in Table 3.

Table 3: ARDL Bounds Test Result

F-Bounds Test	Null Hypothesis: No Long-Run Relationship			
Test statistic	Value	Significance	I(0)	I(0)
F-statistic	8.598755	10%	2.2	3.09
K	4	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37

Source: Computed from E-view

From the bounds test result in Table 3, the computed F-statistic of 8.598755 is greater than the upper bound critical value of 3.49 at the 5% level of significance. Based on the result, we reject the null hypothesis of no long-run relationship and therefore conclude that there exists long-run (equilibrium) relationship in the ARDL model.

4.4 Estimated Long-Run Regression Result

The ARDL estimated long-run regression result is presented in Table 4.

Table 4: ARDL Estimated Long-Run Regression Result

Levels Equation Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-statistic	Prob
Log(CPOUT)	0.197403	0.071136	2.775008	0.0200
Log(LSOUT)	1.026106	0.618920	1.657899	0.1484
Log(FISOUT)	0.479544	0.263762	1.818094	0.1189
Log(FROUT)	1.167004	0.560190	2.083228	0.0824
C	1.392325	0.372688	3.735903	00097
EC = PCRGDP –(0.1974* Log(CPOUT) + 1. 0261* Log(LSOUT) + 0.4795* Log(FISOUT) + 1.670* Log(FROUT) + 1.3923)				

Source: Computed from E-view

The long-run regression result in Table 4 indicated that crop production and forestry outputs have significant positive impact on per capita real GDP while livestock and fishery outputs have insignificant positive impact on per capita real GDP.

4.5 Estimated Short-Run Regression Result

The estimated short-run (ECM) regression result is presented in Table 5.

Table 5: Estimated Short-Run Regression Result

ECM Regression Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-statistic	Prob
D(PCRGDP(-1))	-0.364814	0.111615	-3.268501	0.0171
D(PCRGDP(-2))	-0.016109	0.106221	-0.151657	0.8844
D(PCRGDP(-3))	-0.743294	0.082102	-9.053304	0.0001
DLog(CPOUT)	0.000844	0.000966	0.873760	0.4158
DLog(CPOUT(-1))	0.032493	0.003661	8.874920	0.0001
DLog(CPOUT(-2))	0.019273	0.002246	8.580895	0.0001
DLog(CPOUT(-3))	0.006398	0.001318	4.855272	0.0028
DLog(LSOUT)	0.382257	0.032882	11.62494	0.0000
DLog(LSOUT(-1))	-0.541938	0.070251	-7.714264	0.0002
DLog(LSOUT(-2))	-0.318452	0.062443	-5.099887	0.0022
DLog(LSOUT(-3))	-0.414703	0.089468	-4635208	0.0036
DLog(FISOUT)	0.062866	0.014259	4.408939	0.0045
DLog(FISOUT(-1))	-0.103197	0.019893	-5.187633	0.0020
DLog(FISOUT(-2))	0.100513	0.013360	7.523410	0.0003
DLog(FROUT)	0.353557	0.042647	8.290320	0.0002
DLog(FROUT(-1))	0.677889	0.101618	6.670935	0.0005
DLog(FROUT(-2))	-0.140546	0.057828	-2.430411	0.0511
DLog(FROUT(-3))	0.327572	0.056315	5.816758	0.0011
Coint Eq(-1)	-0.414082	0.042577	-9.725549	0.0001
R-squared	0.875031	Mean dependent var		0.005357
Adjusted R-squared	0.834174	S.D dependent var		0.009101
S.E of regression	0.002335	Akaike infor criterion		-9.018153
Sum squared resid	6.00E-05	Schwarz criterion		-8.130728
Log likelihood	154.2723	Hannan-Quinn criter		-8.734258
Durbin-watson stat	2.816352			

Source: Computed from E-view

From the ECM result in Table 5, the ECM(-1) variable [i.e, the CointEq(-1)] turned up with the correct negative sign. It is also significant at the 0.05 level of significance. This implies that economic development is adjusted to changes in the explanatory variables and lags of the dependent variable within a year in the current period. In terms of size, the coefficient of the error correction term is -0.414082. This implies a speed of adjustment of about 41 percent. It therefore follows that about 41 percent of any disequilibrium in the short-run is reconciled to long-run stable equilibrium within a year.

4.6 Granger Causality Test Result

The result of the Pairwise Granger causality test is presented in Table 6.

Table 6: Pairwise Granger Causality Test Result

Lags: 2			
Null Hypothesis	**Obs**	**F.Statistic**	**Prob.**
LOG(CPOUT) does not Granger cause PCRGDP	34	3.97667	0.0298
PCRGDP does not Granger cause LOG(CPOUT)		4.96270	0.0140
LOG(LSOUT) does no Granger cause PCRGDP	37	3.89561	0.0306
PCRGDP does not Granger cause LOG(SOUT)		0.17510	0.8402
LOG(FISOUT) does not Granger cause PCRGDP	37	0.86199	0.4319
PCRGDP does not Granger cause LOG(FISOUT)		0.72816	0.4906
LOG(FROUT) does not Granger cause PCRGDP	37	2.16168	0.1317
PCRGDP does not Granger cause LOG(FROUT)		2.72293	0.0802

Source: Computed from E-view

The Granger causality test result in table 6 indicated a bi-directional causality between crop production output and economic development and a unidirectional causality from livestock output to economic development. Also, the result indicated no causality between fishery output and economic development and between forestry output and economic development.

4.7 Post-Estimation Tests

Some of the assumptions underlying the classical linear regression model (CLRM) are tested in this section. These assumptions include linearity, homoscedasticity, serial correlation, and normality. The results and decisions for the post-estimation tests are presented in Table 7.

Table 7: Post-Estimation Tests Results

Tests	Value	Prob.	Decision
Linearity (Ramsey Reset) Test t-statistic F-statistic	 0.852263 0.726353	 0.4330 0.4330	Accept (model correctly specified)
Breusch-Godfrey serieal Correlation LM Test F-statistic	 2.842258	 0.1706	Accept (No autocorrelation)
Heteroscedasticity (Breusch-Pagan-Godfrey) Test F-statistic	 0.253938	 0.9925	Accept (Residuals have constant variance)
Normality (Jarque-Bera) Test F-statistic	 1.82449	 0.558541	Accept (Data normally distributed)

4.8 DISCUSSION OF FINDINGS

Long-Run Regression Result

(i) From the estimated long-run result, crop production output turned up with the expected positive sign. Crop production output is also statistically significant at the 0.05 level of significance.

(ii) Livestock output showed a correct positive sign. However, livestock output is not statistically significant at the 0.05 level of significance.

(iii) Fishery output turned up with the correct positive sign. It is however, not statistically significant at the 0.05 level of significance.

(iv) Forestry output also turned up with the correct positive sign. Forestry output is also statistically significant at the 0.05 level of significance.

Short-Run Regression Result

The behavior of the variables in the ECM (Short-Run) model is discussed in this section.

(i) Lagged values of per capita real gross domestic product in periods one and three have significant negative impact on the current value of per capita real gross domestic product. The lagged value of per capita real gross domestic product in period 2 has insignificant negative impact on per capita real gross domestic product in the current period.

(ii) The current value of crop production output has insignificant positive impact on per capita real GDP in Nigeria. On the other hand, lagged values of crop production output in periods 1, 2, and 3 have significant positive impact on per capita real GDP in Nigeria.

(iii) Livestock output in the current period has significant positive impact on per capita real GDP. However, its lagged values in periods 1, 2, and 3 have significant negative impact on per capita real GDP in Nigeria.

(iv) Fishery output in the current period and its lagged value in period 2 have significant positive impact on per capita real GDP while the lagged value of fishery output in period one has significant negative impact on per capita real GDP in Nigeria.

(v) Forestry output in the current period and its lagged values in periods 1 and 3 have significant positive impact on per capita real GDP. However, the output of forestry in period 2 has significant negative impact on per capita real GDP in Nigeria.

(vi) The coefficient of multiple determination (R-squared) is 0.875031. This means that about 87 percent of the total variations in the dependent variable could be attributed to the joint influence of the explanatory variables. The adjusted R-squared is 0.834174. This means that, with the inclusion of additional explanatory variables in the model, the explanatory variables would jointly account for about 83 per cent of the total variation in the dependent variable. The Durbin-Watson statistic is 2.816352. This shows that the model is not affected by the problem of autocorrelation.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS

Based on the findings from the study, the following conclusions were drawn.

(i) Crop production output contributes significantly to the development of the Nigerian economy.

(ii) Livestock output makes weak contribution to economic development in Nigeria

(iii) The output of the fishery sub-sector makes insignificant contribution to the development of the Nigeria economy.
(iv) Forestry output makes strong contribution to the development of the Nigeria economy.

5.2 POLICY RECOMMENDATIONS

Based on the conclusions drawn from the study, the following policy actions are recommended.

(i) The government should undertake a comprehensive review of the various problems militating against the performance of the agricultural sector in the country and profer solutions to them accordingly.
(ii) Farmers in the country should be encouraged through support from the government. To this end, agricultural inputs such as chemicals, fertilizers, improved breeds of crops and livestocks, etc should be adequately subsidized by the government. These and other incentives will encourage the youths to take up farming as a viable source of livelihood while also boosting the performance of the agricultural sector to contribute more to economic development.
(iii) Agricultural extension services should be made available to farmers to educate them on modern farming practices that will boost agricultural productivity. In addition, information concerning climate change adaptation and mitigation measures should be disseminated to farmers to enable them cope with the challenges posed by climate change.
(iv) The government should motivate the financial institutions in the country to grant more credit facilities to both existing and prospective farmers. To this end, the Bank of Agriculture and the Agricultural Credit Guarantee Scheme Fund of the Central Bank of Nigeria should be revitalized and properly funded to enable them provide adequate credit facilities to farmers.
(v) There is also the need to formulate policies and programmes that will boost agricultural productivity in the country. In addition, agricultural projects and demonstration farms should be set up across the country.
(vi) There is the need to improve security in the country, especially in the North Eastern part. Also, the Federal and State Governments should collaborate to find a lasting solution to the incessant clashes between herders and farmers in the country.

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