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ANALYSIS OF THE IMPACT OF GOVERNMENT AGRICULTURAL EXPENDITURE ON AGRICULTURAL PRODUCTION OUTPUT IN NIGERIA: EVIDENCE FROM ARDL MODEL 1981 – 2018

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Abstract

This study analyses the economic impact of government agricultural expenditure on agricultural production output in Nigeria from (1981-2018).Time series data was used and sourced from World Bank and Central Bank of Nigeria (CBN) Statistical Bulletin annual reports. The variables used in the model were agricultural production output as the dependent variable, total government expenditure on agriculture, gross capital formation, domestic savings, credit from commercial bank to agricultural sector, and labour force participation as independent variables. The study adopted various processes of the popular bound testing approach to co-integration (Auto Regressive Distributed Lagged model), and the findings suggest that there is long run relationship among agricultural production output, total government expenditure on agriculture, gross capital formation, domestic savings, credit from commercial bank to agricultural sector, and labour force participation. Also, findings reveals that total government expenditure on agriculture, gross capital formation, domestic savings, credit from commercial bank to agricultural sector, and labour force participation had no significant impact on agricultural production output in the short-run, while in the long-run, all the independent variables except for domestic savings had significant positive impact on agricultural production output. Based on the findings, the study suggests that government agricultural expenditure significantly promotes agricultural production output in Nigeria. Therefore, policy makers and regulatory authorities should create an enabling environment geared towards mobilizing domestic savings from small scale famers, encourage and strengthen credit schemes to famers, encourage labour force participation rate in the sector in order to enhance agricultural output and productivity in Nigeria.

Keyword: Agricultural Expenditure, Agricultural Output, Productivity and ARDL Model.

1.INTRODUCTION

Agricultural sector is one of the most important sectors of the Nigerian economy as it holds a lot of potentials for future economic development of the nation. Prior to the discovery of oil in Nigeria, the agricultural sector was the dominant sector of the economy since its constituted 65 to 70 percent of the country's gross domestic product (GDP) and provide the bulk of the foreign exchange earnings through export and cash crops.(Olawumi and Adesanmi 2018)

In most donor and recipient countries, the agricultural sector remain the largest contributor of providing inputs, food, employment opportunities, raw material for industries, provision of foreign earnings from expectation of surplus and the advantage of value added in the various production process. (Izuchukwu, 2011; Olawumi and Adesanmi, 2018; Iganiga and Unemhilin 2011). Though, the perception that agricultural sector is the engine of growth can be traced back in 1940s, 1950s and early 1970s when the sector contributed significantly to gross domestic product in Nigeria. However, the reverse is the case as the sector is

contributing below expectation compared to what it was known for in the past. The poor state of the agricultural sector has been characterized with the oil boom in the early 1970s which aid successive regime neglected the agricultural sector, since then, the agricultural production was below expectation. In addition, low agricultural productivity in Nigeria has been attributed to the low use of fertilizers, the loss of soil fertility and traditional method of farming, low technology, rain fed farming system and poor agricultural extension services among others.

In recognition of the contribution of the agricultural sector to national economy, and ensure that the sector continuously meet up its obligations of sustaining economic growth, increases agricultural output, creating employment and reducing food importation bills as well as increases foreign exchange earnings; the government over the years have embarked on various agricultural policies and programmes aimed at transforming the sector to continue performing its roles and contribute significantly to Nigeria's Gross Domestic Product. Famous among the these policies are the Operation Feed the Nation (OFN), the Green Revolution programme (GR), land Use Degree, Rural Banking Programme (RBP),National Fadama Development Programme, Family Economic Advancement Programme(FEAP), National Poverty Eradication Programme (NAPEP), National Fertilizer Company of Nigeria (NAFCON), Agricultural Development Project (ADP) and Micro finance Banks among others. All these policies were aimed at improving agricultural productivity, encourage rural farmers through agricultural mechanization and ensure food security. Unfortunately, the costs involved are still more than the benefits realized as majority of these policies have not impacted significantly to the agricultural sector due to poor implementation and mismanagement of funds (Iganiga and Unemhilin, 2011; and Oweyemi et al 2017). Though, several pieces of literature have been identified on the relationship between government agricultural expenditure on agricultural production output in Nigeria. The results of their findings produced inconclusiveness and mixed result. While some scholars posit that government expenditure on agriculture to large extent positively have impact on agricultural production output on the Nigeria's economy, others are of the opinion that impact of government agricultural expenditure on Nigerian economy to large extent is insignificant. For instance, (Iganiga and Unemhilin 2011,Oguwuike, 2018; Shuaibu, 2015) posit that government expenditure to large extent positively impact on Nigeria's economy, while (Adesope and Okoruwa 2013; Sharma, 2012; Onwumere, and Ibe, 2012;Lawal 2011) argue that government expenditure on Nigeria's economy is insignificant. These divergent views called for further empirical research in order to ascertain the impact government agricultural expenditure on agricultural production output in Nigeria from 1981 to 2018

In terms of methodology some of these aforementioned studies used only ordinary least square of multiple regressions which does not take into consideration lag period. Therefore, such methodology can be improved upon by employing autoregressive distributed lag which have advantage over ordinary least square. Thus, the objective of this study is to examine the impact of government agricultural expenditure on agricultural production output in Nigeria from 1981- 2018. Hence, this study proposes null hypotheses that;

i. Government agricultural expenditure has no significant impact on agricultural production output in Nigeria.

The rest of this study is organized as follows; the second section deals with relevant theoretical, conceptual issues and empirical literature, particularly as they relate to the variables understudy. Section three states the methodology of the study, while section four covers the result and discussion of the data analysis. Five sections present conclusion and recommendations.

2. LITERATURE REVIEW

Literature reviewed in this section were summarized under the four heading, the conceptual, theoretical, empirical and gap in literature.

Conceptually, Public expenditure on agriculture includes spending by local/municipal, regional and national governments on agriculture from annual budgetary allocation. It is the expenditure on crop development, seed production and distribution, fertilizer procurement, agricultural mechanization, extension services, control of pests and diseases, soil conservation, irrigation, research (Loto, 2012).The concept production output is important in the area of National Income analysis. The output is the quantity of goods or services produced in a given time period, by a firm, industry, or country,

whether consumed or used for further production processes and Agricultural productivity is measured as the ratio of agricultural outputs to agricultural inputs. Theoretically, there have been contributions from various schools of thought such as the classical, neoclassical, Keynesian and neo-keynesian on whether government should intervene to short-run fluctuations in economic activity. The classicalists believe that market forces bring the economy to long-run equilibrium through adjustment in the labour market. The classical and neoclassical economists deem fiscal policies as ineffective due to the well-known crowding-out effect. While the Keynesians say that government expenditure does not obstruct economic growth instead it accelerates it through full-employment, increased aggregate demand and so forth.

However, this study, anchored on the classic Johnston and Mellor (1961) micro impact of agricultural growth which concludes that economic policy ought to favor agriculture as a vehicle for starting growth in poor economies such as those of sub-Saharan Africa, Nigeria inclusive. The basic idea of the theory was that agricultural productivity growth would, in a closed economy, simultaneously lead to (a) higher rural incomes; (b) lower food prices in urban areas; (c) increased savings in rural areas, allowing for mobilization of capital for domestic industry; (d) expanded domestic markets for non-agricultural goods and consequently economic growth.

Empirically, several pieces of literature have been identified on the relationship between government agricultural expenditure, agricultural output and economic growth for instance;

Idoko and Jatto (2018) examine the relationship between government expenditure on agriculture and economic growth in Nigeria (1985-2015).The research was guided by two research questions and two objectives. The test of the hypotheses was done using multiple regression analysis and Johansen co-integration test. The multiple regression results of the study revealed that there exists a positive and significant relationship between government expenditure on agriculture and economic growth in Nigeria. The Johansen co-integration test result shows that the trace test statistics and max-eigen value test indicates five co-integrating equations respectively at 5% level, on the conclusion there exists a long-run relationship among the variables. The insignificant nature of domestic savings estimates was implicative on fact that the domestic savings in the country did not contribute to economic growth, and there is need for it to be encouraged to prevent difficulties among small scale famers in accessing soft loans, and purchasing adequate and mechanized farming tools while the study focused on the relationship between government expenditure on agriculture and economic growth in Nigeria (1985-2015), the study did not established the impact government expenditure on agriculture have on the food security in Nigeria. It is possible for economic to witness growth in theory at the same time hunger in practical terms especially where the country is not experiencing real growth. More so, did methodology adopted in the study failed to explain the short run term impact of government expenditure on the economic growth. Thus this present study will attempt to fill this gap.

Ojiya, Okoh, Mamman and Chukwuemeka (2017) investigate the effect of Agricultural input on Agricultural productivity in Nigeria between 1990 and 2016 using secondary annual time series data sourced from World Bank database (2016) and Central Bank of Nigeria Statistical Bulletin (2016). The methodology adopted for the study was first and foremost unit root test by Augmented Dickey-Fuller (ADF) approach; a test for long-run relationship (Johansen cointegration), Granger causality test and then the Ordinary Least Squares (OLS) multiple regression method. The finding of the study reveals that variables in the model were both stationary as well as exhibited long-run equilibrium relationship. Empirical OLS regression result revealed an inverse relationship between government expenditure and agricultural output. However, the study scope is limited to effect of Agricultural input on Agricultural productivity in Nigeria between 1990 and 2016.

Ewetan, Fakile, Urhie and Oduntan (2017) examine the long run relationship between agricultural output and economic growth in Nigeria between the period of 1981 and 2014 using time series data. Econometric analysis technique methodology was adopted. The findings of the study reveal that results from Johansen maximum likelihood co-integration approach and Vector error correction model support evidence of long run relationship between agricultural output and economic growth in Nigeria. Granger causality test also confirms the co-integration results indicating the existence of causality between agricultural output and economic

growth in Nigeria. Also, the findings of the study revealed that the long run estimated parameters for agricultural output, inflation rate and exchange rate indicate statistically significant relationship with economic growth over the period covered in this study. However, interest rate does not have a significant relationship with economic growth. While the study focuses on the relationship between agricultural output and economic growth in Nigeria between the periods of 1981 and 2014 little is known on the impact of federal government expenditure on agricultural sector which result to agricultural output through various agricultural policies formulation and implementation.

Aina and Omojola (2017) examine the effect of government expenditure on agricultural sector performance in Nigeria between 1980 and 2013. A relationship was established between government expenditure on agriculture and agricultural production output. The model for the regression analysis has government expenditure on agriculture, interest rate and exchange rate as the independent variables while agricultural production output is the dependent variable. Using secondary data from the Central Bank of Nigeria Statistical bulletin and applying the econometrics method of Ordinary Least Square and Error Correlation Mechanism (ECM) methods, the short run analysis shows that there is a significant and positive relationship between government expenditure on agriculture and agricultural production output. The regression coefficient of interest rate impacted significantly on agricultural sector output and the coefficient of exchange rate is rightly signed. The long run dynamic result shows that the coefficient of government expenditure on agriculture variable is rightly signed as well as the check variables (interest and exchange rates). There exists a long run relationship among the variables because the coefficient of ECM is rightly signed i.e. negative and significant.

Omo and Mohammed (2016) examine the direct/indirect long-run relationships and dynamic interactions between public investment (PI) and output performance in Nigeria using annual data spanning 1970-2010. A macro-econometric model derived from Keynes' income-expenditure framework was employed. The model was disaggregated into demand and supply sides to trace the direct and indirect effects of PI on aggregate output. The direct supply side effect was assessed using the magnitude of PI multiplier coefficient, while the indirect effect of PI on the demand side was evaluated with marginal propensity to consume, accelerator coefficient and import multiplier. The findings of the study reveal that PI have relatively less strong direct effect on aggregate output, while the indirect effects were stronger with the import multiplier being the most pronounced. This is attributed to declining capital expenditure, poor implementation and low quality of PI projects due to widespread corruption. By and large, it is concluded that PI exerted considerable influence on aggregate output. The study did not take into consideration the aggregate government agricultural expenditure on economic growth, and more so, the annual data spanning 1970-2010 needs to be updated.

Adewara and Oloni (2012) explore the relationship between the composition of public expenditure and economic growth in Nigeria from 1960 to 2008 using the vector Autoregressive models (VAR). The findings of the study show that expenditure on education has failed to enhance economic growth due to the high rate of rent seeking in the country as well as the growing rate of unemployment. The study also notes that expenditure on health and agriculture contributes positively to growth. The study however, only focuses on the components of public expenditure and not solely on the impact of government expenditure via agricultural sector on economic growth. Also, the time series data employed in the study need to be revalidated to capture the present economic situation in Nigeria.

Loto (2011) employs the method of cointegration and error correction mechanism to investigate the impact of government expenditures in various sector of the Nigeria's economy such as education, health, national security, transportation and communication, and agriculture, on economic growth in Nigeria within the period 1980-2000. The findings of the study reveal that government expenditure on agriculture and education impacts negatively on economic growth, though the impact of expenditure on education was observed to be insignificant while, the impact of expenditure in the health sector of economic growth was observed to be positive and significant, more so, the impact of expenditure on national security, transportation and communication were observed to be positive and statistically insignificant.

3. METHODOLOGY

This section discusses the source of data collection, model specification and method of data analysis. Secondary time series data was sourced from Central Bank of Nigeria Statistical Bulletin, (2018) on variables which include; agricultural gross domestic product (AGDP) proxy for agricultural production output, total government agricultural expenditure (AGAE), gross capital formation(GCF), Domestic savings(DS), Credit from commercial bank to agricultural sector (CAS)and labour force participation rate (LPR) Nigeria between 1981 and 2018. Data sourced were analyzed with econometric technique of autoregressive distributed lag (ARDL) model, also known as bounds testing approach to co-integration, was originally developed Pesaran, Shin and Smith (2001).

The functional model for the study is specifies as follow:

$$AGDP = F(TGAE, GCF, DS, CAS, LPR) \quad \text{..... 1}$$

The functional model 1 above shows that agricultural production output is a function of total government agricultural expenditure, gross capital formation, domestic savings and commercial bank credit to agricultural sector. However, economic variables do not exhibit exact relationship as depicted by the functional model, but rather an inexact relationship due to stochastic error term as contained in the econometric model 2 below:

$$AGDP = \beta_0 + \beta_1 TGAE + \beta_2 GCF + \beta_3 DS + \beta_4 CAS + \beta_5 LPR + \mu_t \quad \text{.....2}$$

Where:

AGDP	=	Agricultural Production Output
TGAE	=	Total Government Agricultural Expenditure
GCF	=	Gross Capital Formation
DS	=	Domestic Savings
CAS	=	Bank Credit to Agricultural Sector
LPR	=	Labour Force Participation rate
β_0	=	Constant Parameter
β_{1-5}	=	Partial Slopes
μ_t	=	Error Term

To analyze the above econometric model, the Auto Regressive Distributed Lag (ARDL) model specification was adopted to show both short run and long run relationships between agricultural production output, total government agricultural expenditure, gross capital formation, domestic savings, commercial bank credit to agricultural sector and labour force in Nigeria. The ARDL as formulated by Pasaran and Shin (2001), the study adopt and modified the following equations as:

$$\Delta lnAGDP_t = \alpha + \sum_{i=0}^{m} \beta_{1i} \Delta lnAGDP_{t-i} + \sum_{i=0}^{m} \beta_{2i} \Delta lnTGAE_{t-i} + \sum_{i=0}^{m} \beta_{3i} \Delta lnGCF_{t-i} + \sum_{i=0}^{m} \beta_{4i} \Delta lnDS_{t-i} + \sum_{i=0}^{m} \beta_{5i} \Delta lnCAS_{t-i} + \sum_{i=0}^{m} \beta_{6i} \Delta lnLPR_{t-i} + \gamma_1 lnAGDP_{t-1} + \gamma_2 lnTGAE_{t-1} + \gamma_3 lnGCF_{t-1} + \gamma_4 lnDS_{t-1} + \gamma_5 lnCAS_{t-1} + \gamma_3 lnLPR_{t-1} + \epsilon_t \quad \text{..... 3}$$

The short-run dynamics otherwise known as the error correction model also enables the determination of the pace of the re-establishment of equilibrium. Hence, the error correction format of equation above is formulated as:

$$\Delta lnAGDP_t = \alpha + \sum_{i=0}^{m} \beta_{1i} \Delta lnAGDP_{t-i} + \sum_{i=0}^{m} \beta_{2i} \Delta lnTGAE_{t-i} + \sum_{i=0}^{m} \beta_{3i} \Delta lnGCF_{t-i} + \sum_{i=0}^{m} \beta_{4i} \Delta lnDS_{t-i} + \sum_{i=0}^{m} \beta_{5i} \Delta lnCAS_{t-i} + \sum_{i=0}^{m} \beta_{6i} \Delta lnLPR_{t-i} + ect_{t-1} \quad \text{.....4}$$

To investigate the presence of long-run relationships among the variables, bound testing under Pesaran and Shin (2001) procedure is used. The bound testing procedure is based on the F-test. The F-test is actually a test of the hypothesis of no cointegration among the variables against the existence or presence of cointegration among the variables, denoted as:
Ho: β1 = β2 = β3 = β4 = β5=β6=0, i.e., there is no cointegration among the variables.
Ha : β1 ≠ β2 ≠ β3 ≠ β4 ≠ β5 ≠β6 ≠ 0 i.e., there is cointegration among these variables

3.1. Augmented Dickey Fuller Unit Root Test.

Dickey Fuller has been criticized on the basis that the regression was plagued by serial correlation, however, the earlier equation was augmented to handle serial correlation, and hence it fit the following model instead.

$$\Delta y_t = \alpha + \beta y_{t-1} + \delta t + \zeta_1 \Delta y_{t-1} + \zeta_2 \Delta y_{t-2} + .. + \zeta_k \Delta y_{t-k} + \epsilon_t \ldots\ldots\ldots\ldots 5$$

Where k is the number of lags specified in the lags option. The non-constant option removes the constant term α from this regression, and the trend option includes the time trend δt which by default is not included. Testing $\beta = 0$ is equivalent to testing $\rho = 1$ or equivalent that y_t follows a unit root process.
Eviews version 9 econometric package was used to analyze the study data. However, the analysis includes coefficient diagnostics tests, residual diagnostics tests and stability diagnostics tests in order to satisfy certain econometric assumptions. This test as reported in subsequent section.

4. RESULTS AND DISCUSSION

To explore both short and long runs among agricultural production output, total government expenditure on agriculture, gross capital formation, credit to agricultural sector, and labour force participation, several analyses of the ARDL model were adopted. The ARDL do not require pre-testing, but since we are dealing with time series, we begin by testing for stationarity of the data set using Augmented – Dickey Fuller unit root test in order not include variable that is stationary at order 2.

Table 1: Augmented Dickey – Fuller Unit Root Test

Variables	Level	1st difference	Integration Order
LnAGDP		-3.62**	1(1)
LnTGEA		-6.47*	1(1)
LnGCF		-6.94**	1(1)
LnDS	-4.97*		1(0)
LnCRAG		-5.44*	1(1)
LPR	-3.23**		1(0)

Source: Eview 9 Output. Note: *, ** and *** indicate 1%, 5% and 10% respectively.

Table 1 presents the estimated result of stationary test using ADF approach. The ADF estimates of -.497 and -3.23 for domestic savings and labour force participation at level are stationary at 1% and 5% significant level respectively. While the ADF estimates of -3.62, -6.47, -6.94 and -5.44 for agricultural production output, total government expenditure on agriculture, gross capital formation and credit to agricultural sector at first difference are significant at 5%, 1%, 5% and 1% respectively.
From the above result, domestic savings and labour force participation are integrated at order zero, while agricultural production output, total government expenditure on agriculture, gross capital formation and credit to agricultural sector are integrated at order one which provide evidence for the adoption of ARDL model (Pesaran& Shin, 1999).

Table 2: Co – Integration Result among Variables (F-Bound Testing)

Model	F-statistics	Decision
FinAGDP (LnAGDP/LnTGEA, LnGCF, LnDS, LnCRAG, LPR)	4.62**	Cointegrated

Pesara critical value: 2.26-3.35 at 10%; 2.62-3.79 at 5% & 3.41-4.68 at 1%.

Table 2 presents the result of bound test. When considering agricultural production output as the dependent variable, the finding shows evidence of co-integration among the variables under investigation at 5% level of significant. This is because the estimated F statistics of 4.62 is greater than the Pesaran critical value 2:62 – 3:79 at 5%, and indicate that the rejection of null hypothesis which states, "that there is no long run relationship among agricultural production output, total government expenditure on agriculture, gross capital formation, credit to agricultural sector, and labour force participation. By implication, agricultural production output, total government expenditure on agriculture, gross capital formation, domestic savings, credit to agricultural sector, and labour force participation will continuously exerting considerable impact on each other in the long-run.

Table 3: ARDL Results

Short-run	Coefficients	T-statistics	P – value
ΔLnTGEA	0.0465	1.3673	0.1860
ΔLnGCF	-0.1753	-1.4886	0.1515
ΔLnDS	-0.0469	-1.0284	0.3155
ΔLnCRAG	0.0093	0.1539	0.8792
LPR	0.5700	0.4817	0.6550
Ecm	-0.3470	0.4817	0.0014*
Long-run			
LnTGEA	0.6663	9.9402	0.0000*
LnGCF	0.3209	1.0428	0.0089*
LnDS	-0.1352	-1.1292	0.2715
LnCRAG	0.2008	2.0486	0.0532***
LPR	1.6424	0.4528	0.0153**

Source: Eview9 Output. Note: *, **, & *** indicate 1%, 5% and 10% respectively.

Tabl3 presents both short and long runs' coefficients of the ARDL model. In the short-run, the coefficients of 0.0465, 0.0093 and 0.5700 for total government expenditure on agriculture and labour force participation are positively insignificant; while the estimated coefficients of gross capital formation, and domestic savings are negatively insignificant. Interestingly in the long-run, the estimated coefficients of total government expenditure on agriculture, gross capital formation are positively significant at 1% level, while the estimates of credit to agricultural sector and labour force participation are positively significant at 10% and 5% level of significant respectively. The findings are in line with the Keynessians view that government expenditure accelerates growth. However, domestic savings is negatively insignificant. The findings show that investment (government expenditure) in the agricultural sector will yield more output in the long-run. In addition, The speed of adjustment or error correction term to long run equilibrium is negatively significant at 1% level. This finding indicates that the speed of adjustment to long run equilibrium is 34.7% annually, and it will take short periods of time for equilibrium to be reinstalled.

Table 4: Post Estimation Diagnostic Tests

Breusch – Godfrey Serial Correlation LM Test			
F – statistics	0.9455	Prob.F (2, 19)	0.4061
Obs R-Squared	3.1678	Prob. Chi – Square (2)	0.2052
Breusch – Pagan – Godfrey Heteroscedasticity Test			
F – statistics	0.7882	Prob. F (13, 21)	0.6648
Obs R-Squared	11.4770	Prob. Chi – Square (13)	0.5709
Scaled explained SS	4.4607	Prob. Chi – Square (13)	0.9852
Normality Test			
JarqueBera Statistics	0.1504	Probability	0.9275

Source: Eview9 Output.

Table 4 presents different post estimation results. Prominent among the post estimation tests is the Breuch – Godfrey serial correlation LM test to ensure that the residuals of the ARDL estimates are not correlated. The null hypothesis states, "the residuals are not serially correlated", and from the table, null hypothesis of no serial correlation is accepted because the probability value (0.4061) is greater than 5% with corresponding F statistics of 0.9455. Similar finding applies to the observed R – square estimate. Also, the Breusch – Pagan – Godfrey heteroscedasticity test shows that the null hypothesis that states, "the residuals are homoscedasticity" cannot be rejected because the estimated F – statistics of 0.7882 and probability of 0.6648 is greater than 5% level of significant. This shows this model exhibit constant variance over the study periods. Finally, the JarqueBera statistics of 0.1504 with probability value of 0.9275 shows that the residuals of the model are normally distributed. In addition, the speed of adjustment or error correction term to long run equilibrium is negatively significant at 1% level. This finding indicates that the speed of adjustment to long run equilibrium is 34.7% annually, and it will take short periods of time for equilibrium to be reinstalled.

4.1. Summary of Findings

In line with the study method of analysis, the following summary of the findings are presented as follows:

a. Domestic savings and credit to agricultural sector were stationary at level, while total government expenditure on agriculture, gross capital formation and labour force participation were stationary at first difference.

b. There is evidence of long run relationship among agricultural production output, total government expenditure on agriculture, gross capital formation, credit to agricultural sector, and labour force participation.

c. Total government expenditure on agriculture, gross capital formation, domestic savings, credit to agricultural sector, and labour force participation had no significant impact on agricultural production output in short run, while total government expenditure on agriculture, gross capital formation, credit to agricultural sector, and labour force participation had significant positive impact on agricultural production output in long run.

d. The speed of adjustment or error correction term to long run equilibrium is negatively significant at 1% level. This finding indicates that the speed of adjustment to long run equilibrium is 34.7% annually, and it will take short periods of time for equilibrium to be reinstalled.

e. The residuals of the model are not serially correlated, they exhibit constant variance over time, and are normally distributed.

4.2. Discussion of Findings

This study investigates the impact of government agricultural expenditure on agriculture production output in Nigeria over the period of 1981 to 2018. Vital findings from the study show evidence of long run relationship was observed among agricultural production output, total government expenditure on agriculture, gross capital formation, credit to agricultural sector, and labour force participation. This shows that the variables exert considerable influence on each other in the long run. Similarly, findings were reported by (Aina&Omojola, 2017;Ajiya *et al*., 2017; Iganiga *et al*., 2018).

Total government expenditure on agriculture had no significant impact on agricultural production output in short run. This is in line with the findings of Aina&Omojola (2017), Ajiya *et al*. (2017) and Iganiga *et al*. (2018). However, total government expenditure on agriculture significant positive impact on agricultural production output in long run.Thus, in line with the findings of Aina&Omojola (2017), Ajiya *et al*. (2017) and Iganiga *et al*. (2018).

More so, gross capital formation, commercial bank credit and labour force participation rate have significant positive impact on agriculture production output in Nigeria. The speed of adjustment or error correction term to long run equilibrium is negatively significant at 1% level. This finding indicates that the speed of adjustment to long run equilibrium will take short periods of time for equilibrium to be reinstalled in line with the findings of Aina&Omojola (2017).

5. CONCLUSION AND RECOMMENDATIONS

This study investigates the impact of government agricultural expenditure on agricultural production output in Nigeria from 1981 to 2018. The study used sourced annual secondary data from Central Bank of Nigeria (CBN) Statistical Bulletin to compute agricultural production output as the dependent variable, and a host of independent variables (total government expenditure on agriculture, gross capital formation, domestic savings, credit from commercial bank to agricultural sector, and labour force participation). The study adopted various processes of the popular bound testing approach to co-integration (Auto Regressive Distributed Lagged model). The ADF unit root test shows that domestic savings and credit from commercial bank to agricultural sector were stationary at level, while total government expenditure on agriculture, gross capital formation and labour force participation were stationary at first difference. The bound test approach to co-integration reveals evidence of long run relationship among agricultural production output, total government expenditure on agriculture, gross capital formation, domestic savings, credit from commercial bank to agricultural sector, and labour force participation. The ARDL results revealed that total government expenditure on agriculture, gross capital formation, domestic savings, credit from commercial bank to agricultural sector, and labour force participation had no significant impact on agricultural production output in the short-run, while in the long-run, all the independent variables except for domestic savings had significant positive impact on agricultural

production output. More so, the post estimation diagnostic tests revealed that the residuals of the model are not serially correlated, they exhibit constant variance over time, and are normally distributed. Based on the findings, the study concludes that government agricultural expenditure significantly promotes agricultural production output in Nigeria. Therefore, policy makers and regulatory authorities should create an enabling environment geared towards mobilizing domestic savings from small scale famers, encourage and strengthen credit schemes to famers, encourage labour force participation rate in the sector in order to enhance agricultural output and productivity in Nigeria.

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