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TABLE OF CONTENTS

GOVERNMENT AGRICULTURAL EXPENDITURE ON CROP PRODUCTION AND POVERTY RATE IN NIGERIA

By

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ABSTRACT

The rate of increase in poverty in Nigeria is alarming despite increase in government agricultural expenditure on crop production. This study determined the impact of government agricultural expenditure on crop production on poverty rate in Nigeria from 1986-2025. Poverty rate was used as the dependent variable while government agricultural expenditure on crop production was utilized as an independent variable. The control variables employed were inflation rate and exchange rate. Data were collated from the Central Bank of Nigeria (CBN), National Bureau of Statistics (NBS), and World Development Indicators (WDI). The study used ex post facto quantitative research design. Augmented Dickey-Fuller (ADF) unit root test was conducted and the result showed mixed-order of integration and hence Autoregressive Distributed Lag (ARDL) model was used in the estimation of the data. The estimated ARDL model results showed that government agricultural expenditure on crop production (GEC) had a negative (-0.159714) and statistically significant impact on poverty rate in the short-run but a positive (0.135784) and statistically insignificant impact on poverty rate in the long-run. Inflation rate (INFL) impacted negatively (-0.138679) on poverty rate in the short-run although statistically insignificant and likewise in the long-run it had a negative (-0.187354) and statistically insignificant impact on unemployment. The results showed that exchange rate (EXCR) had a positive (0.176755) and statistically significant impact on poverty rate in the short-run but a negative (-0.012573) and statistically insignificant impact on poverty rate in the long-run. The study recommended that the Federal Ministry of Agriculture and the National assembly should revise the agricultural investment framework to increase budget allocation and funding of crop production in order to enhance poverty reduction in Nigeria.

Keywords: Government Agricultural Expenditure, Crop Production, Poverty Rate, Nigeria

1.0 INTRODUCTION

Developed nations of the world such as Germany, United States of America, Netherlands, South Korea, and United Kingdom, among others, have achieved poverty reduction with government agricultural expenditure. Developing countries, especially African countries (Egypt, South Africa, Angola, Democratic Republic of Congo, Ghana and Nigeria inclusive, among many others, have not witnessed any significant reduction in poverty through government agricultural expenditure (World Bank, 2023). Government agricultural expenditure is one of the most powerful tools to end extreme poverty, boost shared prosperity, and feed a projected 10 billion people by 2050. Growth in the agricultural sector is two to four times more effective in raising incomes among the poorest compared to other sectors. Agricultural expenditure is also crucial to economic growth; accounting for 4 percent

of the global Gross Domestic Product (GDP) and in some least developing countries, it accounts for more than 25 percent of the GDP (World Bank, 2021).

Over the years, both the developed and developing countries of the world experienced steady increase in government agricultural expenditure. International Monetary Fund ([IMF, 2022) reported that between 2001 and 2021, total government agricultural expenditure showed an increasing trend from $11 trillion in 2001 to $15 trillion in 2005; it further rose to $17 trillion in 2009. By the year 2013, it was $17 trillion while $20 trillion in 2017 and all-time high of $35 trillion in 2021. Two major events that led to increase in government agricultural expenditure were the 2007-2008 food price crises and the COVID-19 pandemic. In absolute terms, government agricultural expenditure increased by more than 250 percent from $197 billion in 2001 to $492.5 billion in 2021 (IMF, 2022).

The essence of increased agricultural expenditure in the world has been directed at impacting poverty. In an attempt to reduce poverty globally, poverty line was set at a measurable monetary consumption base of $1.9 per day (World Bank, 2019). With increase in government agricultural expenditure, world poverty rate began to fall in the 1970s. World poverty headcount stood at 42.8 percent in 1981, but it reduced to 37.99 percent (1985), 36.22 percent (1990), 31.29 percent (1995), 27.72 percent (2000), 20.93 percent (2005), 13.84 percent (2010), 10.10 percent (2015), and 9.18 percent (2017). In 2005, about 1.695 billion people which was 26 percent of the world population lived on more than $10 per day, but this increased to 2.595 billion people, that is 35 percent of the world population by 2015. The global poverty rate in 2018 was 8.6% (656 million people) that lived on less than $1.90 a day and in 2020 it increased to 9.7% (712 million people) due to Covid-19 pandemic and in 2023 it was rated 9% (710 million) living in poverty (World Bank, 2023).

Increasing world productivity and government agricultural expenditure have reduced the number of people living in poverty since more than a third (1/3) of the world population as of 2015 lived on more than $10 per day compare to a quarter (1/4) of world population in 2007. In absolute number, this meant the number of people who lived on more than $10 per day increased by 900 million between 2007 and 2015. In Africa, government agricultural expenditure kept fluctuating over the years. For instance, it was 2.69 percent in 2011, but increased to 2.72 in the year 2021 (Roser & Ortiz-Ospina, 2017). Using the 2011 Purchasing Power Parity (PPP) and $1.9/day poverty line as yardsticks of measuring poverty, the Middle East and Northern African (MENA) region recorded some fluctuations in poverty levels. For instance, between 1990 and 1995, poverty headcount increased from 6.59 percent to 6.80 percent and then fell to 3.74 percent in 2000, 3.16 percent in 2005 and 2.06 percent in 2010. This however, changed when poverty headcount in the same MENA region increased to 3.76 percent in 2015, 5.10 percent in 2016, 6.29 percent in 2017 and 7.22 percent in 2018 (World Bank, 2021). Evidence from Sub-Saharan Africa (SSA) showed that increases in government agricultural expenditure aligned with a consistent poverty rate between 1995 and 2018. The statistics further indicated that the poverty headcount in SSA stood at 60.93 percent in 1995, but slowly and consistently reduced to 58.94 percent in 2000, 51.97 percent in 2005, 47.47 percent in 2010, 41.83% in 2015, 41.74 percent in 2016, 41.03 percent in 2017 and 40.19 percent in 2018 and in 2023 it was 40.16 percent (World Bank, 2023).

Notably in West Africa particularly, the trends of government's agricultural expenditure and poverty rate in the region have been fluctuating. The average agricultural capital expenditure in Nigeria for the period 2001 to 2010 was ₦71.14 billion (CBN, 2018). Food and Agricultural Organization (FAO, 2016) reported that in terms of capital allocation to agriculture in Nigeria, it averaged 4.74 percent from 1985-1999, but between 2000-2005 it rose to 7.00 percent, and 10 percent between 2010-2015. The average capital expenditure from 2011 to 2018 was ₦72.06 billion and ₦228.4 billion representing about 1.05 percent of the total budget of ₦21.83 trillion was allocated to agricultural sector. The average government agricultural capital expenditure between 2019 and 2023 was ₦23.58 billion (CBN, 2023). These statistics still fall short of the FAO recommendation that 25 percent of the government capital budget be allocated to the agricultural sector (Ukpong, Uduak, Ekere & Akpan, 2022). Alabi and Abu (2020) stated that poor spending on the agricultural sector has not only affected the sector's growth in terms of its contribution to the GDP alone, but has increased poverty and food insecurity in Nigeria. Consequently, FAO (2020) suggested that investing in agriculture by the government via increasing her expenditure is one of the most effective ways of promoting agricultural productivity thereby raising incomes, reducing poverty and food insecurity. This shows that to reduce poverty rate significantly in Nigeria, government at all levels need to commit a significant percentage of their financial resources to the agricultural sector of the economy, owing to its role in job creation and income generation which are key indicators of poverty reduction in developing economies.

It is obvious that government agricultural expenditure on crop production has been increasing over the years in Nigeria. Despite these increases, poverty rate for the period under review continued to record increasing trend from 30 percent, 43 percent, 71 percent, 78 percent and 85 percent in 1981, 1991, 2001, 2011 and 2021 respectively. Also, government agricultural expenditure in the years 2020 and 2023 were 87% and 89% respectively (CBN, 2023). The rise is mainly due to huge revenue generated from excess proceeds of crude oil in the international market. Attahiru (2016) stated that Nigeria's government agricultural expenditure on crop production has an active role to play in reducing poverty, developing social overheads, creating infrastructure for economic growth in the form of transportation and communication facilities, education and training, growth of capital goods, industries, research and development. Government agricultural expenditure on crop production rose from ₦122.2 million in 1990 to ₦5 billion in 2000 but declined to ₦4.5 billion in 2010 and in 2015 the sum of ₦8.2 billion was spent (United Nations, 2020). Despite various policy interventions and credit schemes such as the Commercial Agriculture Credit Scheme (CACS), the Nigeria Incentive-Based Risk Sharing System for Agricultural Lending (NIRSAL), and the Micro, Small, and Medium Enterprises Development Fund (MSMEDF), poverty levels have not significantly declined (Akpan, Udoh, Essien, & Ukoha, 2021; Salisu & Alamu, 2023).

The Nigerian government in an attempt to boost government's agricultural expenditure on crop production to reduce poverty and unemployment introduced agricultural programmes such as National Fadama Projects, Agricultural Transformation Agenda (ATA), Growth Enhancement Support Scheme (GESS), Youth Empowerment in Agriculture Programme (YEAP), National Urban Agricultural Programme (NAUP), Agri-business Development and Empowerment Programme (ADEP) and others, and poverty reduction schemes and programmes such as National Poverty Eradication Programme (NAPEP), National Social Investment Programme (NSIP), Government Enterprise and Empowerment Programme (GEEP), among others. Therefore, given the trends and patterns of high poverty rate and increase in government's agricultural expenditure on crop

production over the years in Nigeria despite the implementation of policies, initiatives and programmes, poverty rate has not significantly reduced. It is against this background that this study investigated the impact of government's agricultural expenditure on crop production and poverty rate in Nigeria. The paper has been structured into six sections with the introduction as section one, section two is the literature review and section three is the methodology of the study. Section four is the results and discussion; section five is the discussion of findings and section six is the conclusion and policy recommendations.

2.0 LITERATURE REVIEW

2.1 Conceptual Review

Government agricultural expenditure on crop production in Nigeria is a critical aspect of the country's agricultural development. The Federal Government allocated significant funds to the Ministry of Agriculture and Food Security, with a proposed budget of ₦175.84 billion for 2023, focusing on infrastructure development, research, and support for farmers. There are concerns over the low budget allocation to agriculture, which stood at 1.2% of the national budget, far below the 10% benchmark committed to under the Maputo and Malabo Declarations (CBN, 2023). The key areas of focus are:

- Special Agro-Industrial Processing Zones (SAPZ): ₦126.02 billion allocated for infrastructure development and support value chain;
- Development Project (VCDP): ₦37.5 billion for improving agricultural productivity and value addition;
- Rural Access and Agricultural Marketing Project (RAAMP): ₦4.61 billion for rural infrastructure development; and,
- Grain Supply and Storage: ₦3.15 billion for addressing food security concerns (CBN, 2023).

Poverty rate refers to the percentage of a population living below a certain income threshold ($2.15 per day) as the minimum amount of income needed to meet the basic needs. Poverty rate is a complex issue that affects millions of people. Approximately, 40 percent of Nigerians live below the national poverty line, with 87 million people experiencing poverty (World Bank, 2021). The National Bureau of Statistics (2022) reported that 63 percent of Nigerians, or 133 million Nigerians were poor, faced with deprivations in areas such as education and health. The largest number of extreme poor, that is, those that live below the international poverty line of US$1.90 are found majorly in Sub-Saharan Africa, the world's poorest region (World Bank, 2020).

Understanding poverty trends in the country is crucial to inform policy at the country, regional, and global levels. Measuring poverty trends is a complex exercise that requires data on household welfare that can be compared over time. Limited availability of household-level data and changes, or improvements, to the methodology used to measure household consumption can affect the comparability of survey-based poverty estimates. These issues arise frequently in poverty measurement exercises and can severely limit the availability of evidence needed to guide policies for reducing poverty (Schoch, 2022). Poverty rate in Nigeria is measured using two main approaches: monetary poverty which is an approach that measures poverty based on income levels, with 40 percent of Nigerians living below the national poverty in 2018/19, while the multidimensional poverty is an approach that considers multiple deprivations, including education, health, and living standard with 63 percent of Nigerians identified as poor in 2022.

The World Bank (2023) estimated that 46 percent lived below poverty line in 2023, representing 104 million people. Poverty is more prevalent in rural areas with 72 percent of people in rural areas experiencing multidimensional poverty compared to 42 percent in urban areas. The 2018/19 estimates show that 39.1 percent of Nigerians lived below the international poverty line of US$1.90 per person per day, corresponding to 78.5 million people (NBS, 2020). While the 2018/19 estimates provide a crucial "snapshot" of the state of poverty just before the COVID-19 crisis, they do not provide information on poverty trends in Nigeria. In the case of Nigeria, drawing a trend between the 2009/10 HNLSS and 2018/19 NLSS would impact not only the policy discussion on poverty reduction at the national level, but also any analysis of poverty trends in West Africa, Sub-Saharan Africa as a whole, and as poverty becomes more concentrated in Sub-Saharan Africa and in conflict-affected situations, and potentially the entire world (World Bank, 2020). The poverty rate statistics in Nigeria is so alarming that it tends to contradict the resources the country is endowed with. According to Schoch (2022), Nigeria is Africa's most populous country, with over 200 million people, and Africa's largest economy, with a nominal gross domestic product (GDP) of US$450 billion.

2.2 Theoretical Review

2.2.1 *Cyclical Interdependence Theory*

The cyclical interdependence also known as social cycle theory is another theory that is useful to this study. The theory was propounded by Pitirim, Oswald, Arnolf and Hans (1957). They developed a theory of interlocking circular interdependence within a process of cumulative causation that explains economic development and underdevelopment. The theory argues that personal and community welfare are closely linked in a cascade of negative consequences. Based on the principles of the theory, lack of employment opportunities can lead to emigration, closure of retails stores, decline in local tax revenues, deterioration of schools, poorly trained workers, inability of firms to adopt cutting edge technology and lack of incentives to attract new firms which lead to more unemployment and a vicious cycle of poverty. For an individual, unemployment leads to low consumption, low spending, low savings and investments, loss of self-confidence, weak motivation and depression. The theory states further that because of this, one problem leads to multiple problems and this in turn influences poverty rates.

The strength of this theory to the study is predicated on the fact that in Nigeria, there is high rate of unemployment, which is a major causal factor of poverty and its steady increase, which spells calamity in the citizens. With an unemployment rate of 10.4 percent in 2015, a total of 22.45 million individuals in the Nigerian labour force are either unemployed or underemployed National Bureau of Statistics ([World Bank, 2023). Therefore, since the theory argues that economic challenges like unemployment are associated with negative multiplier effect, in Nigeria, due to high rate of unemployment, there is a high dependency ratio which puts a lot of strains and pressure on the privileged few who may indulge in corrupt practices to meet up with family and societal expectations. This, in turn, leads to inefficiency in productivity; lack of accountability, poor service delivery and low performance and eventually this leads to systemic failures and aggravates poverty in the country. There is therefore, an intertwining of factors where one problem leads to another and eventually engulfs the entire country affecting everyone directly or indirectly as revealed by the alarming poverty rates in the country.

Although, this theory has shown empirical evidence in various countries and civilization; it has provided a framework for understanding the growth and decay of societies and civilization as well as remaining relevant even today as societies continue to face challenges and undergo changes. Nonetheless, some studies have found limited or no support for the theory. The theory has been criticized for its narrow focus on economic and cultural factors, ignoring other discipline. Overemphasis on long-term trends, as well as complexity and variability of society making it challenging to identify universal pattern and cycles. Cyclical interdependence theory is relevant and applicable to this study because it emphasized on the need and how poverty can be reduced.

2.2.2 *Keynesian Theory of Public Expenditure*

The Keynesian theory of public expenditure was used as important theoretical framework for this study. The Keynesian theory which is the foundation of economics was first presented by Keynes (1936) during the Great Depression. Keynesian theory presupposes that government intervention can stabilize an economy especially, during a recession when there is little money to spend. The theory argues that with government technological intervention, there is increased expenditure and employment (Jahan, Mahmud & Papageorgiou, 2020). Keynes regarded government expenditure as an exogenous factor which can be utilized as a policy instrument to promote economic growth thereby reducing poverty. The Keynesians also postulated that government expenditure can contribute in addressing the challenges of poverty. Hence, an increase in the government consumption is likely to lead to an increase in employment, profitability and investment through multiplier effects on aggregate demand. As a result, government expenditure augments the aggregate demand, which leads to an increased output thereby reducing poverty depending on expenditure multipliers. The theory believes that addressing the macroeconomic problem of alarming poverty rate is achievable through government policies and interventions in the economy, rather than allowing market forces to regulate the economic activities.

Poverty can only be addressed through the same socio-economic factors in the economy. In the light of this view, Aregbeyeni and Kolawole (2022) and Bak and Larsen (2020) argued that Keynesian mind set is alive among politicians and journalists, who often advocate the need to raise expenditure to enhance growth. In Nigeria, government seems to be the major employer of labour, therefore, if government expenditure is channeled into profitable ventures such as provision of quality education, healthcare services, infrastructural facilities and agricultural supports, the private sector will find the environment conducive for investment thereby improving the level of employment opportunities. The employment opportunities will lead to the redistribution of resources which will in turn reduce the rate of poverty by bridging the income gap between the rich and the poor in the society.

The Keynesian theory has both its strengths and weaknesses. The strength of the Keynesian theory lies on its assumption that the role of government expenditure as a fiscal policy is key in stabilizing the economy because it helps in creating employment by financing businesses, stimulating economic growth, stabilizing the banking system, reducing tariffs, as well as balancing and regulating the economic output. However, some of the weaknesses of the theory include excessive government spending leading to inflation, increases in demand for debt, stagflation and crowding out effect arising from increase interest rate and discouraging private investment which is key in addressing macroeconomic problems including poverty. The Keynesian theory of expenditure is adapted for this study due to its relevance in terms of the variables of interest (government expenditure and poverty

rate). The Keynesian theory of public expenditure is adopted due to its relevance in terms of the variables of the study.

2.3 Empirical Review

Chandio, Jiang, Wei and Guangshun (2018) examined the effect of government expenditure on wheat production on poverty reduction in Sandh, Pakistan. The study utilized cross-sectional data collected from 180 wheat farmers and the specified Cobb Douglass production function was estimated using two-stage least square regression. The results revealed that government expenditure on wheat production had a positive and significant effect on poverty in the short-term in Pakistan. Also, in the long-run, government expenditure on wheat production impacted negatively on poverty rate in Pakistan. Asghar and Salman (2018) examined the impact of government expenditure on crop production and food security on poverty in Pakistan. Survey technique was used and the data were obtained through the use structured questionnaire. The data were analyzed using the independent t-test. Results showed that government expenditure on crop production had a negative and statistically significant impact on poverty while food security impacted positively on poverty in Pakistan. Nugroho (2019) empirically analyzed the direct and indirect effects of various governmental development expenditures to enhance crop productivity and combat poverty by means of increasing wage levels, stabilizing prices, and boosting non-agricultural employment in Indonesia. The study covered the period 2005 to 2014. A simultaneous equation approach was specified to rank different types of expenditure in terms of their effects on crop productivity and poverty and also to calculate the number of poor three-stage least squares (3SLS) method was employed. The result indicated that increase in government expenditure on crop productivity reduced poverty in Indonesia.

Dahmardeh and Tabar (2019) investigated the relationship between government expenditure on crop production and poverty rate in Sistan and Baluchestan Province of Iran between the period 1978 and 2008. The study employed Autoregressive Distributed Lag (ARDL) technique and found out that government expenditure on crop production had positive effect on poverty rate in Sistan and Baluchestan Province of Iran. Okpe, Abu, Odoemenem and Asogwa (2018) examined the effect of government expenditure on rice production and poverty reduction in Nigeria which covered the period 1986-2015. The data were gathered from the Central Bank of Nigeria (CBN), Food and Agriculture Organisation (FAO) and National Bureau of Statistics (NBS). The study employed Autoregressive Distributed Lag (ARDL) technique. ARDL results showed government expenditure on rice production both in the short-run and long-run related negatively to poverty rate in Nigeria. This implied that rice yield was responsive to poverty reduction in Nigeria during the period under review both the long-run and in the short-run.

Zakaree (2020) examined the impact of government expenditure on crop production and poverty reduction in Nigeria from 1998-2011. Time series data from 1998-2011 were obtained from the Central Bank (CBN) Annual Statistical Bulletin. Ordinary Least Square (OLS) technique of data analysis was used to estimate the model specified. The results of the estimated model revealed a negative relationship between government expenditure on crop production and poverty rate in Nigeria. In other words, government expenditure on crop production had a negative but statistically significant impact on poverty rate in Nigeria. A distinguishing feature of Zakaree's study is that it paid attention to poverty in Nigeria, but while the scholar used time series data covering 1998 to 2011 which suggested that changes in the relationship between the variables in the current period was not captured. Osabohien, Adeleye and De Alwis (2020) examined the impact of government agro-

financing on food production and poverty reduction in Nigeria from the period 1981 to 2018. The time series data were collated from the Central Bank of Nigeria (CBN) and National Bureau of Statistics (NBS). After testing the time series data for stationarity, the Canonical Cointegration regression approached was utilized. The results showed that government agro-financing had a negative and statistically significant on food production and likewise on poverty rate in Nigeria.

Oyinbo, Zakari and Rekwot (2021) examined the relationship between government expenditure on crop production and poverty reduction in Nigeria. Time series data from 1986-2014 were obtained from the Central Bank (CBN) Annual Statistical Bulletin. The study employed Autoregressive Distributed Lag (ARDL) technique of model estimation. The result of the ARDL indicated that government expenditure on crop production was significant in influencing poverty rate negatively in Nigeria. The study observed that despite the growth of the Nigerian economy, poverty is still on the increase, hence the need for increase in government's agricultural expenditure. Apata (2021) examined the effect of government expenditure on crop production and poverty rate agro-ecological regions in Nigeria covering the period 1981to 2018 using time series data that were sourced from the National Bureau of Statistics (NBS) and World Development Indicators (WDI). The data were analyzed using descriptive statistics and three-stage simultaneous equations. Descriptive statistics analysis results indicated that government expenditure on crop production reduced poverty rate in agro-ecological regions in Nigeria by 4.88 percent. The elasticity results computed from the 3-stage simultaneous equation showed government expenditure on crop production impacted negatively and statistically significant on poverty rate in the agro-ecological regions in Nigeria.

Ngobeni, Chiedza and Muchopa (2022) determined the impact of government expenditure on crop production and population growth rate on poverty rate in Nigeria using time series data that spanned from 1983 to 2019. The study utilized Johansen cointegration test and Pairwise Granger causality test. The results of the Johansen cointegration test revealed that long-run relationship existed among the variables of study. The Granger causality test results that unidirectional causality ran from government expenditure on crop production to population growth, and from government expenditure on crop production to poverty rate. Bidirectional causality existed between government expenditure on crop production and poverty rate in Nigeria. In other words, there was feedback between government expenditure on crop production and poverty rate. Falaye (2023) investigated government agricultural financing on crop production nexus in Nigeria using time series data from 1981 to 2019. The data was were obtained from the Central Bank of Nigeria (CBN) and World Bank data base. The in-=dependent variables were government expenditure on crop production, inflation rate and interest rate while poverty rate was the dependent variable. The study used ARDL bounds test and Granger causality test. The results of the ARD bound test showed that long-run relationship existed among the study variables. The Granger causality test results showed that a bidirectional causality existed between government expenditure on crop production and poverty rate, and between government expenditure on crop production and inflation rate in Nigeria. Also, causality ran from inflation to interest rate within the study period.

3.0 METHODOLOGY

The study adopted expost-facto research design using econometric model to determine the impact of government expenditure on crop production on poverty rate in Nigeria spanning from 1986-2025. The choice of expost-facto research design is based on the availability and reliability of the time series data on government agricultural expenditure on crop production and poverty rate in Nigeria.

The expost-facto research design relies on historical facts that already exist (Akpan & Obayori, 2022). Data were sourced from the Central Bank of Nigeria (CBN) Statistical Bulletins, National Bureau of Statistics (NBS) publications and World Development Indicators (WDI) publications**.** Dickey-Fuller (1981) unit root test was used to check whether the time series variables have unit root or not. The Autoregressive Distributed Lag (ARDL) Model was used to estimate the model. The variables of interest are presented in Table 1.

Table 1: Types and Sources of Data

SN	Variables Acronym	Meaning as used in this Study	Types of variable	Unit of Measurement	Expected Sign	Data Source
1	POV	Poverty Rate	Dependent	Percent	(-)	NBS
2	GEC	Gov. Expenditure	Independent	Percent	(-)	NBS
3	INFL	Inflation Rate	Independent	Percent	(+)	CBN
4	EXCR	Inflation Rate	Independent	Percent	(+)	CBN

Source: Author's Compilation (2022)

3.1 Model Specification

The study adopted the Keynesian theory of public expenditure propounded Keynes (1936). The theory explains the theoretical framework that supported the relationship between government expenditure (on agriculture) and unemployment (which is related to poverty). The studies of Zakaree (2020) and Falaye (2023) were adapted in terms of the variables employed. The model is specified as:

$$POV = f(GEC) \quad (1)$$

$$POV = f(GEC, INFL, EXCR) \quad (2)$$

$$POV = GEC - INFL - EXCR \quad (3)$$

$$POV = \beta_0 + \beta_1 \lg GEC - \beta_2 INFL - \beta_3 EXCR + \mu t \quad (4)$$

Since some of the variables were not in the same unit, they were logged to obtain a common base.

Where:

POV - Poverty Rate
GEC - Government agricultural expenditure on crop production
INFL - Inflation Rate
EXCR - Exchange Rate
μt - Error term

The mathematical expression is given as; POV = GEC - INFL - EXCR. The *a priori* expectation based on theoretical postulation was that increase in GEC will lead to decrease in poverty rate (POV) in Nigeria while increase in INFL, and EXCR will lead to increase in POV. The a *priori* expectations are; β_0 and $\beta_1 > 0$ while β_2 and $\beta_3 < 0$.

3.2 Model Estimation

The Autoregressive Distributed Lag (ARDL) model is expressed mathematically as:

$$\Delta \text{In}POV_t = \alpha_0 + \alpha_1 \text{In}GEC_{-1} + \alpha_2 \text{In}GEC_t + \alpha_3 INFL_t + \alpha_4 INLL_{t-1} + \alpha_5 EXCR_t + \alpha_6 EXCR_{t-1} + \sum\phi\Delta POV_{t-1} + \sum\beta\Delta \text{In}GEC_{t-1} + \sum\varrho\Delta INFL_{t-1} + \sum\Upsilon\Delta EXCR_{t-1} + \mu_t \quad (5)$$

The *a priori* expectations based on economic theory postulation of the slopes of the coefficients of long-run parameter estimates of the explanatory variables; α_1 and $\alpha_2 < 0$ while α_3, α_4, α_5, and $\alpha_6 > 0$. Poverty rate (POV) is the dependent variable while the independent variables are; Government agricultural expenditure (GEC), inflation rate (INFL) and exchange rate (EXCR) are the control variables. Positive relationship is expected between government agricultural expenditure on crop production and poverty rate in Nigeria. α_0 is the intercept, t is a temporal time trend, t_{-1} is the time lag, and μt is a random error term. Note that ϕ, β, ϱ and Υ are the coefficients of the short-run parameter estimates of the ARDL model.

4.0 RESULTS AND DISCUSION

4.1 Pre-Estimation Test

4.1.1 *Unit Root Results*

The stationarity properties of the variables included in the model were tested using Augmented Dickey-Fuller (ADF) and Philips-Perron unit root tests as presented in Table 2.

Table 2: Augmented Dickey-Fuller (ADF) unit Root Test Results

Variable	ADF Coefficient	Critical Values at 5%	Integration
PVR	-2.786513	-3.621023* (0.0099)	1(0)
GEC	-5.227760	-3626784** (0.0001)	1(1)
INFL	-7.934455	-2.94584** (0.0000)	1(1)
EXCR	-5.864900	-3.540328** (0.0001)	1(1)

*Note: * Significance at 5% and **Significance at 5%*

Source: Authors' Computation (2026), E-views12

Table 2 presented Augmented Dickey-Fuller (ADF) unit root test results of the variables used in this study. The null hypothesis for ADF time series data is that it has no unit root or it is not stationary. The test was conducted at level, order I(0) and at first difference, order I(1) and the asterisk symbol (**) indicated level of significance at 5%. The results showed that government agricultural expenditure on crop production (GEC), inflation rate (INFL), and exchange rate (EXCR) were found to be integrated at first difference,1(1), while poverty rate (PVR) was found to be integrated at level,1(0).Therefore, the mixture of 1(0) and 1(1) order of integration as revealed by the estimates in Table 3 suggests that the Autoregressive Distributed Lag (ARDL) regression of the univariate modelling technique is the most appropriate method for estimating the specified model showing the effect of government's agricultural expenditure on poverty rate in Nigeria.

4.1.2 *Lag Length Result*

Table 3: Lag Length Selection Test Result of the Model

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-458.5972	NA	3550789	26.43413	26.61188	26.49549
1	-414.7506	75.16559	728873.4	24.84289	25.73166	25.14970
2	-406.0033	12.99603	1147450	22.25733	22.85712	22.80958
3	-393.8855	11.23379	962218*	20.47917*	20.78997*	20.27686*

*Indicates lag order selected by the criterion

Source: Author's Computation (2025), E-views12

The lag length was selected based on the Schwarrtz Information Criterion (SIC). The result of the lag length showed that the maximum lag for the model is 1 that is (i_{max} = 3). The result is presented in Table 3.

4.1.3 *ARDL Bound Test Result*

Table 4: Bounds Cointegration Test Result

Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	5.744361	10%	2.08	3.00
K	5	5%	2.39	3.38
		2.5%	2.70	3.73
		1%	3.06	4.15

Source: Author's Computation (2025), E-views12

Based on minimizing the Schwarrtz Information Criterion (SIC), the estimated ARDL bound test result revealed that the bound F-test for cointegration showed evidence of a long-run relationship between poverty rate and government agricultural expenditure on crop production in Nigeria. The computed F-statistic (F_{cal} = 5.744361 is greater than both the lower and upper bounds at 5% critical value (that is F_{cal} > 2.39, and 3.38) respectively. Therefore, the null hypothesis of no long-run relationship between the examined variables was rejected and the alternative hypothesis was accepted. This ruled out the possibility of spurious estimated relationship. Since there existed a long-run relationship between the variables, it became necessary to conduct ARDL test to achieve objective of the study.

4.1.4 *ARDL-Error Correction Model (ECM) Results*

ARDL-Error Correction Model (ECM) Results are presented in Table 5.

Table 5: Dependent Variable (PVR)

ARDL-Error Correction Model (ECM) Results -Short-Run

Variable	Coeff.	Std. Error	t-Statistic	Prob.
D(GEC)	-0.012851	0.029867	-0.430260	0.6753
D(GEC(-1))	-0.039018	0.027383	-1.424911	0.1819
D(GEC(-2))	-0.077482	0.022907	-3.382455	0.0061*

D(GEC(-3))	-0.159714	0.024810	-6.437482	0.0000*
D(EXCR)	-0.049605	0.022857	-2.170238	0.0528
D(EXCR(-1))	0.176755	0.021072	8.388078	0.0000*
D(EXCR(-2))	-0.087132	0.026952	-3.232863	0.0080*
D(EXCR(-3))	-0.087197	0.022907	-3.806552	0.0029*
CointEq(-1)*ECM	-0.740151	0.093891	-7.883118	0.0000

R-squared	0.941668	Mean dependent var	0.044118
Adjusted R-squared	0.886768	S.D. dependent var	6.708320
S.E. of regression	2.257347	Akaike info criterion	4.773110
Sum squared resid	86.62545	Schwarz criterion	5.536290
Log likelihood	-64.14287	Hannan-Quinn criter.	5.033377
Durbin-Watson stat	1.774929		

Source: Author's Computation (2025), E-views12

The short-run ARDL-ECM results presented in Table 5 revealed that government agricultural expenditure on crop production (GEC) in the current period had a coefficient of 0.012851 and p-value of 0.6750 or $p > 0.05$, which showed an insignificant negative relationship between government agricultural expenditure on crop production and poverty rate in Nigeria. The results revealed that GEC (-1) had a coefficient of -0.03901 and probability value of 0.1819 or $p > 0.05$; hence the conclusion that the previous year value of government expenditure on crop production had insignificant negative impact on poverty rate.

However, GEC (-2) had a coefficient of -0.077482 and a probability value of 0.0061, indicating that there was a significant negative relationship between the two lagged periods of government expenditure on crop production and poverty rate in the economy. These findings suggest that the past two years government expenditure on crop production had significant negative impact on poverty rate in Nigeria. Also, GEC (-3) had a coefficient of -0.159714 and a p-value of 0.0000 which means that $p < 0.05$; hence the conclusion that there was a significant negative impact of past three years values of expenditure on crop production and poverty rate in Nigeria.

The short-run analysis further showed that EXCR had a coefficient of -0.049605 and a probability value of 0.0528 or $p < 0.05$, signifying that exchange rate was found to have insignificant negative relationship with poverty rate in the economy within the period. EXCR (-1) revealed a coefficient of 0.176755 with p-value of 0.0000 or $p < 0.05$, indicated that one-year lagged value of exchange rate had significant positive effect on poverty rate in Nigeria. Also, EXCR (-2) revealed a coefficient of -0.087132 with p-value of 0.0080 or $p > 0.05$, indicated that two years lagged value of exchange rate had a significant negative effect on poverty rate in Nigeria. More so, EXCR (-3) revealed a coefficient of -0.087197 with p-value of 0.0029 or $p < 0.05$, indicated that three years lagged value of exchange rate had significant negative effect on poverty rate in Nigeria.

The results of the ARDL-Error Correlation Mechanism (ECM) in Table 5 revealed that COINTEQ* had a coefficient of -0.740151and a probability value of 0.0000. These coefficients satisfied the three basic conditions for ECM Test, namely; it is negative, less than one and the probability value (p-value) is less than 0.05. The results indicated a speed of adjustment from short-run disequilibrium due

to a shock to long-run equilibrium was found to be 74.02 percent, indicating a high speed of adjustment annually. This further suggested that if there was a shock in the model in the short-run, the adjustment speed to long-run equilibrium was 74.02 %. That is, about 74.02 percent of the disequilibrium will be corrected annually to achieve long-run equilibrium.

More so, the findings showed R-squared coefficient of 0.941668 which implied that 94.17 % of the changes or variations in poverty rate was due to changes or variations in the explanatory variables. The adjusted R-square of 0.886768, which implied that 88.68 % of the changes or variations in poverty rate was attributed to changes in the explanatory variables. The coefficient of the Durbin-Watson test found to be 1.774929 which is approximately 2, indicated that the estimated model was free from the problem of serial correlation that leads to a spurious regression.

4.1.5 *Autoregressive Distributed Lag (ARDL) Results*

The Autoregressive Distributed Lag (ARDL) results are presented in Table 6.

Table 6: Dependent Variable (Poverty Rate)
ARDL Short-Run and Long-Run Results

Short-Run Result				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	29.26028	13.09174	2.235019	0.0471
PVR(-1)*	0.740151	0.197108	3.755060	0.0032
GEC(-1)	0.100500	0.081891	1.227239	0.2453
INFL**	-0.138670	0.176226	-0.786887	0.4480
EXCR(-1)	-0.009306	0.019398	-0.479725	0.6408
D(GEC)	-0.012851	0.060652	-0.211878	0.8361
D(GEC(-1))	-0.039018	0.042568	-0.916604	0.3790
D(GEC(-2))	-0.077482	0.034908	-2.219616	0.0484
D(GEC(-3))	-0.159714	0.035359	-4.516930	0.0009
D(GEF)	-0.861564	0.515430	-1.671545	0.1228
D(EXCR)	-0.049605	0.039267	-1.263268	0.2326
D(EXCR(-1))	0.176755	0.051642	3.422689	0.0057
D(EXCR(-2))	-0.087132	0.066097	-1.318246	0.2142
D(EXCR(-3))	-0.087197	0.041175	-2.117718	0.0578
Long-Run Result				
Variable	Coefficient	Std Error	t-Statistic	Prob.
GEC	0.135784	0.114454	1.186362	0.2605
GEF	-2.177291	1.801239	-1.208774	0.2521
GEL	1.208156	0.645355	1.872081	0.0880
INFL	-0.187354	0.198909	-0.941905	0.3665
EXCR	-0.012573	0.024743	-0.508126	0.6214
C	39.53287	10.52027	3.757782	0.0032

Source: Author's Computation (2025), E-views12

Table 6 presented both ARDL short-run and long-run results. The findings from the ARDL short-run results revealed that the coefficient of the constant was positive (29.26028) and the probability value (0.0471) was greater than 5% level of significance. This implied that if all other explanatory variables were held constant, poverty rate in Nigeria in the short-run will be approximately 40 percent. The ARDL short-run showed that poverty rate (PVR) in the past year had a positive (0.740151) and statistically significant impact on poverty rate in Nigeria in the past year. This is because the p-value of 0.0032 was less than 5% level of significance. This implied that 1 percent increase in poverty in the current (PVR) reduced poverty rate in Nigeria in the past year by 74 percent during the period of study.

The results revealed that government expenditure on crop production (GEC)(-3) had a negative coefficient (-0.159714) and statistically significant impact on poverty rate in Nigeria because the p-value of 0.0009 was less than 5% level of significance. This implied that 1 percent increase in government expenditure on crop production reduced poverty rate in Nigeria by 16 percent in the past three years during the period under review. The results also revealed that inflation rate (INFL) had a negative (-0.138670) coefficient and statistically insignificant impact on poverty rate in Nigeria because the p-value of 0.4480 was greater than 5% level of significance. This implied that 1 percent increase in inflation rate (INFL) reduced poverty rate in Nigeria by 14 percent during the period of study. This failed to meet the *a priori* expectation of a positive sign. The results also revealed that exchange rate (EXCR (-) had a positive coefficient (0.176755) and statistically significant impact on poverty rate in Nigeria because the p-value of 0.0057 was less than 5% level of significance. This implied that 1 percent increase in exchange rate (EXCR) increased poverty rate in Nigeria by 18 percent in the past one-year during the period of study.

The ARDL long-run results presented in Table 6 revealed that the coefficient of the constant was positive (39.53287) and the probability value (0.0032) was less than 5% level of significance ($P < 0.0032$). This implied that if all other explanatory variables were held constant, poverty rate in Nigeria in the long-run will be approximately 40 percent. That implied that the model estimated significantly explained the relationship between government's agricultural spending and poverty rate in Nigeria. The findings from the ARDL long-run estimates revealed that government agricultural expenditure on crop production (GEC) had an estimated positive coefficient (0.135784) and p-value of 0.2605 which means $p > 0.05$, indicating that there was an insignificant positive impact of government expenditure on crop production on poverty rate in Nigeria. This implied that 1 percent increase in government expenditure on crop production (GEC) reduced poverty rate in Nigeria by 14 percent during the period of study. This suggested that an increase in government expenditure was associated with an insignificant increase in poverty rate. This finding contradicted the *a priori* expectation of a negative relationship between government expenditure on crop production and poverty rate in Nigeria.

The long-run results indicated that inflation rate (INFL) had a negative (-0.187354) coefficient and p-value of 0.3665, which implied that $p > 0.05$; hence the conclusion drawn was that inflation rate had negative and statistically insignificant impact on poverty rate in Nigeria. More so, the long-run results established that exchange rate (EXCR) had a negative (-0.012573) coefficient and p-value of 0.6214, which implied that $p < 0.05$; hence the conclusion drawn was that exchange rate had negative and statistically insignificant impact on poverty rate in Nigeria. This implied that 1 percent increase in

exchange rate led to decrease in poverty rate and this negated the *a priori* expectation of a positive relationship between exchange rate and poverty rate in Nigeria.

5.0 DISCUSSION OF FINDINGS

The finding of the study revealed that government agricultural expenditure on crop production (GEC) in the short-run had a negative and statistically significant impact on poverty rate in Nigeria. This finding was not unconnected with the fact that in the short-run, all needed to reduce poverty required food availability through increase in crop production. This finding collaborated with the studies of Zakaree (2020) and Osabohien, Adeleye and De Alwis (2020) but it contradicted the findings of the studies of Agwu (2017) and Chandio, Jiang, Wei and Guangshun (2018). It was revealed by the study's findings that while inflation rate had a negative and statistically insignificant impact on poverty rate in Nigeria, exchange rate impacted positively and statistically significant on poverty rate in Nigeria. The finding revealed that government agricultural expenditure on crop production (GEC) in the long-run had a negative and statistically insignificant impact on poverty rate in Nigeria. This suggested that an increase in government agricultural expenditure on crop production was associated with an insignificant decrease in poverty rate. This finding signified lack of sustainability of government agricultural expenditure on crop production in the long-run and hence food insecurity associated with insignificant reduction in poverty in Nigeria. This finding agreed with the studies of Asghar and Salman (2018) but it contradicted the findings of the studies of Agwu (2017) and Chandio, Jiang, Wei and Guangshun (2018). The finding of the study revealed that inflation rate and exchange rate separately had negative and statistically insignificant impact on poverty rate in Nigeria.

5.1 Diagnostic Test Results

The results of the diagnostic tests are presented in Table 7.

Table 7: Model Diagnostic Test

Test Statistic	Test	Coeff.	Prob.
Breusch-Godfrey Serial Correlation LM	Serial correlation	0.019733	0.9805
Breusch-Pagan-Godfrey	Homoskedasticity	2.180143	0.1569
Ramsey RESET Test: t-statistic	Linearity	0.938167	0.3594

Source: E-Views 13

The p-value (0.9805) of the serial correlation test was greater than the typical significance level of 0.05, we accept the null hypothesis that there was no serial correlation in the residuals. The p-value (0.1569) of heteroskedasticity test was greater than 0.05, we accept the null hypothesis that the variance of the residuals was constant. The Ramsey Reset test was used to detect non-linear relationships between the dependent variable and the independent variables. The p-value (0.3594) was found to be greater than the significance level of 0.05, and therefore, the null hypothesis of misspecification is accepted. This showed that the model was not mis specified and the relationships between the variables were adequately captured by the linear specification

5.2 Stability Test Result

The result of the stability test is presented in Figure 1.

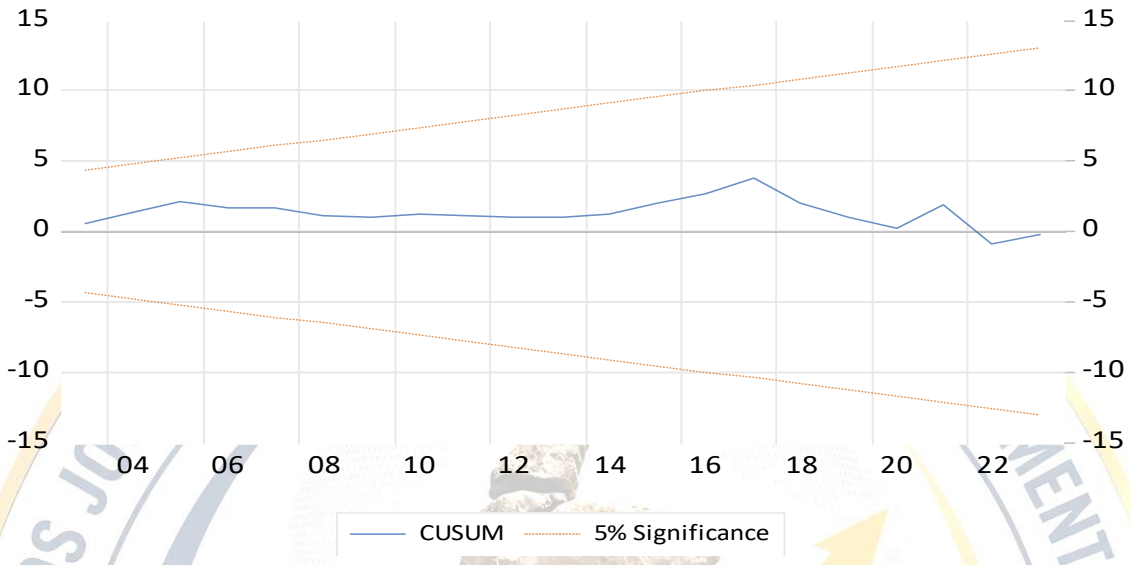

Figure 1: CUSUM Stability Test

Figure 1 presented the CUSUM stability of the impact of non-oil exports on economic in Nigeria. The CUSUM was within the required region of 5% and this showed that the impact of government agricultural expenditure on crop production on poverty rate in Nigeria was stable under the period of review.

6.0 CONCLUSION AND POLICY RECOMMENDATIONS

The study was conducted in order to determine the impact of disaggregated government's agricultural expenditure on crop production on poverty rate in Nigeria. This was aimed at proffering policy recommendations to enhance the benefits of government's agricultural expenditure on poverty rate in Nigeria. It is important to note that effective utilization of government's agricultural expenditure is imperative base on high poverty rate in Nigeria. Government agricultural expenditure on crop production had a statistically significant negative impact on poverty rate in Nigeria. It implied that government expenditure on crop production (GEC) reduced poverty in Nigeria. Based on this, the study concluded that government's agricultural expenditure reduced poverty in Nigeria. The study recommended that the Federal Ministry of Agriculture, the Budget Office and the National assembly should revise the agricultural investment framework to increase funding of crop production in order to enhance poverty reduction in Nigeria.

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APPENDIX

ARDL-Error Correct Results

ARDL Error Correction Regression
Dependent Variable: D(PVR)
Selected Model: ARDL(1, 4, 4, 4, 0, 4)
Case 2: Restricted Constant and No Trend
Date: 06/18/26 Time: 09:15
Sample: 1986 2025
Included observations: 35

ECM Regression
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GEC)	-0.012851	0.029867	-0.430260	0.6753
D(GEC(-1))	-0.039018	0.027383	-1.424911	0.1819
D(GEC(-2))	-0.077482	0.022907	-3.382455	0.0061
D(GEC(-3))	-0.159714	0.024810	-6.437482	0.0000
D(EXCR)	-0.049605	0.022857	-2.170238	0.0528
D(EXCR(-1))	0.176755	0.021072	8.388078	0.0000
D(EXCR(-2))	-0.087132	0.026952	-3.232863	0.0080
D(EXCR(-3))	-0.087197	0.022907	-3.806552	0.0029
CointEq(-1)*	-0.740151	0.093891	-7.883118	0.0000

R-squared	0.941668	Mean dependent var	0.044118
Adjusted R-squared	0.886768	S.D. dependent var	6.708320
S.E. of regression	2.257347	Akaike info criterion	4.773110
Sum squared resid	86.62545	Schwarz criterion	5.536290
Log likelihood	-64.14287	Hannan-Quinn criter.	5.033377
Durbin-Watson stat	1.774929		

* p-value incompatible with t-Bounds distribution.

Autoregressive Distributed Lag (ARDL) Results

ARDL Long Run Form and Bounds Test
Dependent Variable: D(PVR)
Selected Model: ARDL(1, 4, 4, 4, 0, 4)
Case 2: Restricted Constant and No Trend
Date: 06/18/25 Time: 09:25
Sample: 1986 2025
Included observations: 35

Conditional Error Correction Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	29.26028	13.09174	2.235019	0.0471
PVR(-1)*	0.740151	0.197108	3.755060	0.0032
GEC(-1)	0.100500	0.081891	1.227239	0.2453
INFL**	-0.138670	0.176226	-0.786887	0.4480
EXCR(-1)	-0.009306	0.019398	-0.479725	0.6408
D(GEC)	-0.012851	0.060652	-0.211878	0.8361
D(GEC(-1))	-0.039018	0.042568	-0.916604	0.3790
D(GEC(-2))	-0.077482	0.034908	-2.219616	0.0484
D(GEC(-3))	-0.159714	0.035359	-4.516930	0.0009
D(EXCR)	-0.049605	0.039267	-1.263268	0.2326
D(EXCR(-1))	0.176755	0.051642	3.422689	0.0057
D(EXCR(-2))	-0.087132	0.066097	-1.318246	0.2142
D(EXCR(-3))	-0.087197	0.041175	-2.117718	0.0578

* p-value incompatible with t-Bounds distribution.
** Variable interpreted as Z = Z(-1) + D(Z).

Levels Equation
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GEC	0.135784	0.114454	1.186362	0.2605
GEF	-2.177291	1.801239	-1.208774	0.2521
GEL	1.208156	0.645355	1.872081	0.0880
INFL	-0.187354	0.198909	-0.941905	0.3665
EXCR	-0.012573	0.024743	-0.508126	0.6214
C	39.53287	10.52027	3.757782	0.0032

EC = PVR - (0.1358*GEC -0.1874*INFL-0.0126*EXCR + 39.5329)