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GOVERNMENT EXPENDITURE ON AGRICULTURE AND POVERTY REDUCTION IN NIGERIA (1986-2023)

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Abstract

The study investigates the relationship between government agricultural expenditure and poverty reduction in Nigeria spanning 1986 to 2023.Expost facto design approach was used as a guide, while annual time series data were sourced from the Central Bank of Nigeria, National Bureau of Statistics (NBS) and World Development Indicators (WDI). Agricultural expenditure was disaggregated in to government expenditure on crop (GEC), government expenditure on fishery and aquatic life (GEF), government expenditure on livestock (GEL) and government expenditure on agriculture (GAE), while poverty reduction was measured using Average Poverty Rate (APR). The Autoregressive Distributive Lag (ARDL) regression was employed in the estimation. The short-run results showed that government expenditure on agriculture, fishery and aquatic life and livestock production had significant positive effect on poverty reduction (p<0.050). The ARDL-ECM coefficient of -0763455 indicates a 76.35 percent annual speed of adjustment back to equilibrium when there is a shock. The long-run results showed that government expenditure on crop production and government total agricultural expenditure had insignificant positive effect on poverty reduction, while government expenditure on fishery and aquatic life production had a significant negative effect on poverty reduction in Nigeria. It was found that government expenditure on livestock production had a significant positive effect on poverty reduction in Nigeria. The Adjusted R square coefficient shows that 73.69 percent of the changes in poverty reduction were largely attributed to changes in the explanatory variables of government expenditure on disaggregated agricultural sub-sectors. The study concluded that government expenditure on agriculture has effect on poverty reduction in Nigeria. The study recommends among others that Government should increase its budgetary allocation to the crop sub-sector to enable farmers have access to farming inputs for higher crop production, government should enact and implement water resources related policies that can help in boosting fishery and aquatic life production, credit facilities for livestock farming under the supervision of the Central Bank of Nigeria so as to increase livestock production and the Food and Agricultural Organization (FAO) agricultural minimum financing benchmark and open up rural communities in order to raise boots productivity and reduce poverty in Nigeria.

Keywords: Government Expenditure, Agriculture, Government Expenditure on Agriculture, Poverty Reduction

1. Introduction

Government expenditure occupies a strategic position in various economies of the world. It is an important instrument in accelerating economic growth and development which is a major macroeconomic objective for most economies in the world. Globally, achieving poverty reduction seems to have direct impact on economic growth and vice versa. In theory,

the Keynesians and Neoclassical economists provided various macroeconomic policy tools of government expenditure which are broadly grouped into monetary and fiscal policies. Monetary policy has to do with the process by which monetary authorities of a country control monetary aggregates such as money supply, interest rate and inflation rate in order to promote growth, and stability in the economy.

Fiscal policy on the other hand is concerned with manipulating government expenditure and taxation to influence the overall level of economic activities, employment and inflation. Nwosa (2014) stated that fiscal policy encompasses all government actions that affect its receipt (revenue), expenditure, consumption, investment, budgeting and debt which are measured by government's net receipts, its surplus or deficit. The main components of government expenditure are the recurrent and capital classification. Expenditure on agriculture is the component of government expenditure which encourages economic growth by favouring the provision of food, employment, and ensures increase in citizenry's income as well as increase in community-based projects.

The agricultural sector in Nigeria encompasses activities in sub-sectors that include crop production, fishery and aquatic life production, livestock production and poultry production. Reducing poverty through the agricultural sector path involves increasing budgetary allocations to this sub-sector of agriculture for higher productivity and income which are key in measuring poverty.

International Monetary Fund (2021) reported that between 2001 and 2021, total government expenditure showed an increasing trend from USD 11 trillion in 2001 to USD 15 trillion in 2005, it further rose to USD 17 trillion in 2009, by the year 2013 it was 17 trillion while 20 trillion in 2017 and all-time high of USD 35 trillion in 2021. Two major events that shifted the trends of agriculture sector expenditure are the 2007-2008 food price crises and the COVID-19 pandemic. In absolute terms, government expenditure in agriculture increased by more than 250 percent from USD 197 billion in 2001 to almost 700 billion in 2021 (IMF, 2021). The reported added that measured in terms of the contribution of agriculture to GDP, the 2001 and 2021 expenditure was roughly equivalent to 18 percent and 19 percent of the agriculture value added respectively. In the light of this report, World Bank (2021) maintained that expenditure on agriculture is one of the most powerful tools to end extreme poverty, boost shared prosperity, and feed a projected 10 billion people by 2050. Hence, Alabi and Abu (2020) stated that "not only that poor spending on agricultural sector has affected the sector's growth in terms of its contribution to the GDP alone; it has increased poverty and food insecurity in Nigeria.

In an attempt to make reality the efforts at reducing poverty, the world poverty line was set at a measurable monetary consumption base of US$1.9 per day (World Bank, 2019). With increases in government expenditure on agriculture world poverty rate began to fall around the 1970s, both in absolute number and as a share of world population (United Nation, 2015). Specifically, the World Bank (2021) maintained that world poverty headcount stood at 42.8 percent in 1981, but continued to reduce to 37.99 percent in 1985 and 36.22 percent in 1990. The results further revealed a poverty rate of 31.29 percent in 1995, 27.72 percent in 2000, 20.93 in 2005, but declined to 13.84 in 2010, 10.10% in 2015 and 9.18 % in 2017 respectively. This implies that the rate of poverty in Nigeria has maintained a fluctuating trend, a scenario depicts for increasing allocation in productive sectors like agriculture. The Food and Agricultural Organization (2020) argued 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 study examines the relationship between government expenditure on agriculture and poverty reduction in Nigeria spanning the period 1986 to 2023.

Poverty reductions strategies ranging from Operation Feed the Nation of 1978, the Green revolution of 1982, the directorate of Foods, Roads and Rural

Infrastructures (DFRI), the National Directorate for Employment (NDE), Poverty Alleviation Programme (PAP), up to the national poverty eradication Programme, (NAPEP) were all attempts made by various governments in the country to curb the menace of poverty. The N-Agro component of N-power programme and the Anchor-Borrowers policy other agricultural funding related poverty reduction porgrammes introduced by the government. Despite these efforts, realities on ground suggest that Nigeria is still amongst countries in the World with highest poverty index, and this may be attributed to the dismal spending on agricultural sector of the economic. It has been observed that Nigeria is still importing foods (fish, grains, fruits, oils and livestock) leading to persistent food price inflation, food insecurity and malnutrition, especially for the core-poor population. Nosike and Ihuga (2019) asserted that the country has over the years failed to reach the 10 per cent agriculture budget standard of the Maputo declaration, which has led to insufficient food production. The report also shows that total expenditure on agriculture, as a percentage of overall expenditure, averaged 4.2 per cent between1970-1985, to an average of 2.6 per cent per annum between 1986-1998, to 3.5 percent between 1999 and 2014; this reflects intensified efforts by the government to reduce its size.

This study was conceptualised to broadly analyse the impact of government expenditure on agriculture on poverty level in Nigeria. In line with this broad objective, the specific objectives of the study include to:

i. Examine the impact of government expenditure on crop production on poverty reduction in Nigeria.
ii. Evaluate the impact of government expenditure on fishery and Aquatic life on poverty rate in Nigeria.
iii. Estimate the impact of government expenditure on livestock production on poverty rate in Nigeria
iv. Investigate the impact of government expenditure on agriculture on poverty rate in Nigeria

2. Literature Review

2.1 Conceptual Issues

Concept of Government Expenditure

The concept of government expenditure as a fiscal tool of public finance arises from the thinking that expenditure undertaken by the government is for public good. Government expenditure could also be called public sector expenditure, public procurement or government purchases. Aruwa, Dang and Gozuk (2015) explained further that government expenditure is an actual payment or the creation of an obligation to make a future payment for some benefits, items or services received. In Nigeria, government expenditure on agriculture which are decomposed in to; crop production, Fishery and aquatic life production and livestock production are among the major areas of government expenditure that are usually captured in yearly budgets. The direction of government expenditure on agriculture has been inconsistent and unsteady over the years. The average capital expenditure on agriculture for the period 2001 to 2010 was N71.14 billion (CBN, 2018). Food and Agricultural Organisation (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 figure from 2011 to 2018 was N72.06 billion (CBN, 2018). The report shows that instead of increasing agricultural expenditure, only N228.4 billion representing about 1.05 percent of the total budget of N21.83 trillion was allocated to agricultural sector in the 2023 budget. These statistics still fall short of the Food and Agricultural Organization (FAO) recommendation that 25 percent of the government capital budget be allocated to the agricultural sector (Ukpong, Uduak, Ekere & Akpan, 2022). Thus, Alabi and Abu (2020) stated that not only that poor spending on agricultural sector has affected the sector's growth in terms of its contribution to the GDP alone; it has increased poverty and food insecurity in Nigeria.

Concept of Poverty Reduction

Poverty reduction is one of the most difficult challenges facing any country in developing world

where on the average majority of the population is considered poor. The high incidence of poverty in the country has made poverty reduction strategies important policy options over the years with varying results. Poverty reduction also means improving the living conditions of the poor people in the society. Poverty reduction refers to deliberate policy interventions that lead to consistent reduction in poverty rates over a length of time (Eneji, 2020). Poverty reduction programmes in Nigeria are means through which the government aims to revamp and reconstruct the economy.

2.2 Keynesians Theory

This study is anchored on the Keynesians theory of public expenditure developed Keynes (1936) during the Great Depression in his book ''*The General Theory of Employment, Interest and Money''*. The 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, 2014). Keynes regarded government expenditure as an exogenous factor which can be utilized as a policy instrument to promote economic growth thereby reducing poverty. Therefore, through multiplier effects on aggregate demand, a rise in government consumption is likely to result in an increase in employment, profitability, and investment. Consequently, government spending increases aggregate demand, which in turn spurs higher output and, depending on expenditure multipliers, lowers poverty.

The theory believes that effective poverty reduction is achievable through government policies and interventions in the economy. However, some scholars, such as Aregbeyeni and Kolawole (2015) argued that Keynesian theory sometimes fails because lower tax rates have been found to boost economic growth. This theory is relevant to the research because an increase in the government expenditure on agriculture may likely lead to an increase in employment, investment and income and its positive multiplier effects on aggregate demand can help in reducing poverty. The theory is also very relevant to the Nigerian economy especially the current poverty situation requires government intervention through increase expenditure in the agricultural sector of the economy in order to cushion the effect of the poverty people are currently experiencing in the economy.

2.3 Empirical Review

Using time series data from 1981 to 2019, Falaye (2023) investigated the relationship between agricultural financing and agricultural sector output in a case study of the Nigerian economy. Data was taken from the World Bank and CBN databases. Crop and livestock production output were the dependent variables, whereas public finance, commercial bank credit to agriculture, inflation rate, and interest rate were the independent variables. The study used Granger causality test, Bounds test, and ARDL test. The results showed that while private and public finance were beneficial in the short term, they were not statistically significant. The study also showed a negative long-term correlation between the periods' agricultural and livestock production outputs and interest rates.

Omele, Saheed and Alexander (2023) investigated the impact of Agricultural Credit Guarantee Scheme Fund (ACGSF) on fisheries production in Nigeria from 1987 – 2021. Secondary data were sourced from the Central Bank of Nigeria (CBN) statistical bulletin. The Autoregressive Distributed Lag (ARDL) model approach to co-integration is employed for data analysis. The ARDL result showed that the coefficient of the ACGSF credit to fisheries subsector is 0.6321 and is statistically significant. Furthermore, a unit increases in ACGSF loan to livestock and food crop subsectors will increases fisheries production by 0.58 percent and 0.15 percent respectively while population will increase fisheries production by 0.09 percent. Inflation is however negative but statistically significant.

In the study, Mdoe, Mlay, Isinika, Boniface and Magomba (2022) examined the effect of livestock on crop commercialization and poverty reduction among smallholder farmers in crop-livestock farming systems in Singida Region, Tanzania. Data set of 600 households selected randomly from random samples of eight and seven villages in Iramba and Mkalama districts respectively. Descriptive statistics were used. The results of descriptive analysis showed differences in ownership of livestock, use of ox-plough and livestock manure, crop productivity, crop commercialization and poverty levels across different categories of farmers while the results of econometric analysis showed that livestock enhanced crop commercialization. The findings showed that farmers have gained higher productivity (yield), signifying the potential of crop commercialization to reduce poverty. The results show decline in poverty as crop commercialization increases from zero to medium level but it showed the existence of socio-economic disparities. Male-headed households (MHH) and households headed by medium-scale farmers (MSF), young farmers and livestock keepers were less poor than their counterpart female-headed households (FHH) and households headed by small-scale farmers (SSFs), older farmers and non-livestock keepers.

Osabohien, Adeleye, and De Alwis (2020) investigated how Nigerian food production was affected by agro-financing from 1981 to 2018. The Canonical Cointegration regression techniques demonstrated that agro-financing is statistically significant in explaining the amount of food production in Nigeria after assessing the time series data for stationarity. There is a one percent correlation between a rise in food production and farmers' access to financing for agriculture. This study is a useful guide in this work since it was on agro-financing and food production which are components of agricultural expenditure and productivity. However, while the scholars delimited their study to food production in Nigeria, this study will focus on agricultural productivity generally. The strength of this study lies on the fact that it focused on food production, but its major weakness is that where Canonical Cointegration was employed, this study will used the ADRL estimation technique.

Fadimu, Akinyemi, Ogundimu, Lawal, Adeyomoye and Akinlabi (2020) investigated the problems and prospects of poultry rearing in Lagelu Local Government Area of Oyo State, Nigeria. The study used a sample of 80 poultry farmers and the data collection was done using interview schedule and structured questionnaires. The result showed that 67.50 percent of the respondents had increase in egg production, 15.00 percent had average increase in egg production and 17.50 percent had no increase in egg production. The respondents had maximum income benefit with 15.00 percent always having high income, 51.20 percent low income and 33.80 percent indicated indifference in their income. It was found that the major problems that poultry farmers encounter in the study area are inadequate capital, pest and disease, lack of credit facilities and high cost of feeding of the respondents. The study recommended that government in all arms and private bodies should provide good credit facilities to the poultry farmers subsidize the cost of feeds and feed ingredients and create access to ready markets, provide veterinary centres and personnel for the poultry industry among others. The study is relevant to the work because it concentrated on poultry farming in Nigeria, but its main weakness is that the scholars focused on the problems and prospects of poultry rearing in Lagelu Local Government Area of Oyo State, while the present research will examine how government expenditure on the sector affect poverty reduction in Nigeria.

3. Methodology

This study adopts *Expost-facto* design. Since the study intends to use time series data that have been documented as secondary data, this design is the most appropriate. This study used secondary annual time series data of government expenditure on agriculture and poverty rate in Nigeria covering the period 1986 to 2023. The choice of 1986 was based on the fact that major reforms in the economy, including fiscal policy measures in Nigeria were introduced during the Structural Adjustment Programme (SAP) of 1986,

while the choice of 2023 was because during the period, government agricultural policies such as the Ancho Borrowers Scheme and macroeconomic economic challenges which include the 2016 economic recession as well as the Covid-19 pandemic that ravaged the economy of developing countries, Nigeria were experienced. The data on the disaggregated government expenditure on agriculture and poverty rate in Nigeria were sourced from the publications of the Central Bank of Nigeria (CBN), National Bureau of Statistics (NBS) and World Development Indicators (WDI).

3.1 Model Specification

The study adopts the Keynesian's theory of public expenditure developed by Keynes and his associates in 1936. Construing from the Keynesians theory, poverty reduction in the economy is a function of the amount of public expenditure made on the agricultural sector of the economy. Therefore, since poverty rate in the context of the research is a function of government expenditure on agriculture which is disaggregated into Government Expenditure on Crop Production (GEC), Government Expenditure on Fishery and Aquatic Life Production (GEA), Government Expenditure on Livestock Production (GEL) and Government Agricultural Expenditure (GAE) respectively. The implicitly form is specified as follows:

$$PVR_t = f(GEC, GEF, GEL, GAE) \quad \text{.....(1)}$$

This study employed the Autoregressive Distributed Lag (ARDL) regression approach in the estimation of the relationship between the variables. The ARDL model was first developed by Pesaran and Shin (1999). ARDL provides consistent estimate of the long run coefficient that are asymptotically normal irrespective of whether the underlying regression are purely 1(0), 1(1) or mutually, integrated. The generic specification of the ARDL model showing both its short-run and long-run relationship is as follows:

$$\Delta Y_t = \beta_0 + \beta_1 Y_{t-1} + \beta_2 X_{t-1} + \beta_3 Z_{t-1} + \sum_{i=1}^{p} \lambda_i \Delta Y_{t-1} + \sum_{i=1}^{p} \psi_j \Delta X_{t-1} + \sum_{i=1}^{p} \phi_j \Delta Z_{t-1} + \varepsilon_t \quad \text{.....(2)}$$

Where:

Thus, Y represents the dependent variable which in this case in poverty rate, while X and Z shows the independent (explanatory) variables, β_0 is the slope parameter showing the relationship between the dependent and independent variables, β_1 β_2 and β_3 are the long-run parameters, while, $\lambda 1^{\Delta}$ and ϕ on the other hand are the short-run parameters of the generic form of the ARDL Model. More so, ε is the linear stochastic or error term that captures the impact of other variables affecting poverty apart from the ones in the model. The model shows that changes in Y are attributed to changes in the lag value of Y and the lag value of X and Y respectively in both long-run and short-run period. The major assumption of the ARDL estimation technique is that the unit root results using the ADF must indicates that the variables show different or mixture of the order of integration, which is 1(0) and 1(1), indicating the lower and upper bounds respectively. Hence, building from model 2, the explicit specification of the model follows the empirical study of Omele, Saheed and Alexander (2023), with modification in terms of variables under investigation is expressed as: Therefore, the modified model based on the variables under investigation is expressed as:

$$\Delta \ln(PVR)_t = \beta_0 + \beta_1 \ln(PVR_{t-1}) + \beta_2 \ln(GEC_{t-1}) + \beta_3 \ln(GEF_{t-1}) + \beta_4 \ln(GEL_{t-1}) + \beta_5 \ln(GAE_{t-1})$$
$$+ \sum_{i=1}^{p} \lambda_i \Delta \ln(PVR_{t-1}) + \sum_{i=1}^{p} \psi_j \Delta \ln(GEC_{t-1}) + \sum_{i=1}^{p} \sigma_j \Delta \ln(GEF_{t-1}) + \sum_{i=1}^{p} \delta_j \Delta \ln(GEL_{t-1})$$
$$+ \sum_{i=1}^{p} \phi_j \Delta \ln(GAE_{t-1}) + \varepsilon_t \quad \text{.....(3)}$$

Where:

PVR = Poverty Rate as a proxy for poverty reduction

GEC= Government Expenditure on Crop Production

GEF = Government Expenditure on Fishery and Aquatic Life Production

GEL= Government Expenditure on Livestock Production
GEP= Government Agricultural Expenditure
β_0= Intercept parameter
β_1-β_5 = Long-run Slope parameter
ε_t= Error term in period t
$\lambda, \psi, \phi, \delta, \theta$ Short-run slope parameters of the explanatory variables

Consequently, to determine the speed of adjustment in an event where the variables are correlated in the long-run, the ARDL-ECM will be used. The dynamic Error Correction form of the model 4 is expressed as follows:

$$\Delta \ln(PVR)_t = \beta_0 + \beta_1 \ln(PVR_{t-1}) + \beta_2 \ln(GEC_{t-1}) + \beta_3 \ln(GEF_{t-1}) + \beta_4 \ln(GEL_{t-1})$$
$$+\beta_5 \ln(GAE_{t-1}) + \sum_{i=1}^{p} \lambda_i \Delta \ln(PVR_{t-1}) + \sum_{i=1}^{p} \psi_j \Delta \ln(GEC_{t-1}) + \sum_{i=1}^{p} \sigma_j \Delta \ln(GEF_{t-1})$$
$$+\sum_{i=1}^{p} \delta_j \Delta \ln(GEL_{t-1}) + \sum_{i=1}^{p} \phi_j \Delta \ln(GAE_{t-1}) + \rho_i ECM_{t-1} + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots (5)$$

The ECM_{t-1} is the Error Correction term lag resulting from the verified long-run equilibrium relationship where ρ is a parameter measuring the speed of adjustment from the long-run back to a short-run equilibrium level after a shock. The sign of the ECM_{t-1} must be negative and significant to ensure convergence of the dynamics to equilibrium.

4. Results and Discussion

Table 1: Results of Descriptive Statistics

Variable	APR	GAE	GEC	GEF	GEL
Mean	53.20079	38.63711	81.79289	2.938421	14.11316
Median	53.55000	17.12500	72.05000	2.610000	14.15000
Maximum	66.90000	228.4000	187.4900	8.490000	29.39000
Minimum	40.10000	0.020000	33.41000	0.250000	4.970000
Std. Dev.	7.532224	58.11394	32.35486	1.823982	6.500514
Skewness	0.021812	0.168143	0.085040	0.427981	0.457191
Kurtosis	2.963509	2.903747	3.063008	3.600037	2.552854
Jarque-Bera	2.704009	3.90082	3.67119	3.926460	3.282827
Probability	0.426559	0.000000	0.000000	0.140404	0.319367
Sum	2021.630	1468.210	3108.130	111.6600	536.3000
Sum Sq. Dev.	2099.173	124957.5	38732.97	123.0957	1563.497
Observations	38	38	38	38	38

Source: Eviews,13

The descriptive statistics results in Table 1 revealed that average poverty reduction (APR) had a coefficient of 52.2 percent, government expenditure on agriculture (GAE) had a mean of 38.64 percent annually, government expenditure on crop (GEC) had a mean of 81.79, government expenditure on fishery and aquatic life (GEF) had a mean of 2.94 percent and government expenditure on livestock (GEL) had a mean of 14.11 respectively. This implies that government expenditure on crop production had the higher mean, indicating that a large amount of government agricultural sector expenditure was channeled to crop production.

Table 2: ADF Unit Root Test

Variable	ADF Coefficient	Critical Values at 5%	Order of Integration
APR	-2.786513	-3.621023*(0.0099)	1(0)
GAE	-8.952970	-2.945842**(0.0000)	1(1)
GEC	-5.227760	-3626784**(0.0001)	1(1)
GEF	-6.498399	-3.626784**(0.0000)	1(1)
GEL	-5.142295	-3.626784**(0.0002)	1(1)

*Note: * Significance at 1%,** significance at 5% ,*** significance at 10%*

The results in Table 2 showed that Government agricultural expenditure (GAE),government expenditure on crop production (GEC), government expenditure on Fishery and aquatic production (GEF) and government expenditure on livestock production (GEL) were found to be integrated at first difference,1(1),while average poverty rate (APR) was found to be integrated at level,1(0).The presence of differ orders of integration as revealed by the estimates suggests that the Autoregressive Distributed Lag (ARDL) regression of the univariate modeling technique is the most appropriate method for estimated the specified model showing the effect of agricultural sector spending on poverty reduction in Nigeria.

Table 3: Results of Bounds Cointegration Test

Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	3.756423	10%	2.2	3.09
K	4	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37

Source: Eviews,13

Table 3 indicated revealed that F-statistic had a value of 3.756423 at k=4, which means is higher than both lower bounds,1(0) and upper bounds ,1(1) at 5% level of significance. The shows there are a long-run relationship between the variables.

Table 4: Results ARDL-ECM Estimation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(APR(-1))	0.399564	0.141915	2.815517	0.0130
D(APR(-2))	-0.440523	0.117101	-3.761909	0.0019
D(GAE)	-0.130850	0.028438	-4.601183	0.0003
D(GAE(-1))	-0.069279	0.043181	-1.604386	0.1295
D(GAE(-2))	-0.179140	0.038359	-4.670123	0.0003
D(GEC)	-0.060041	0.035789	-1.677632	0.1141
D(GEC(-1))	-0.034708	0.039691	-0.874469	0.3956
D(GEC(-2))	-0.154575	0.035428	-4.363099	0.0006
D(GEF)	-1.884338	0.499430	-3.772976	0.0018
D(GEF(-1))	3.036583	0.551668	5.504372	0.0001
D(GEF(-2))	1.014494	0.526625	1.926409	0.0732
D(GEL)	0.938692	0.208631	4.499286	0.0004
D(GEL(-1))	-0.428479	0.152203	-2.815180	0.0131

D(GEL(-2))	-0.223610	0.169225	-1.321378	0.2062
CointEq(-1)*	-0.763455	0.139268	-5.481914	0.0001
R-squared	0.845220	Mean dependent var		0.028571
Adjusted R-squared	0.736875	S.D. dependent var		6.609572
S.E. of regression	3.390428	Akaike info criterion		5.577316
Sum squared resid	229.9000	Schwarz criterion		6.243894
Log likelihood	-82.60304	Hannan-Quinn criter.		5.807419
Durbin-Watson stat	2.398751			

Source: Eviews 13

The results of the short-run estimates of the parameters in table 4 revealed that APR (-1) had a coefficient of 0.399564 and p-value of 0.0342 or $p<0.05$, signifying and insignificant positive effect of one lagged period of average poverty reduction on the current level of poverty reduction in the economy. Also, GEC in the short-run period had a coefficient of -0.060041 and p-value of 0.3575 or $p>0.05$. This implies an insignificant negative relationship between government expenditure on crop production and poverty reduction in the economy, while GEC (-2) had a coefficient of -0.154575 and p-value of 0.0005 ($p<0.05$), indicating that there was a significant negative relationship between the two lagged periods of government expenditure on crop production and poverty reduction in the economy. The finding revealed that GAE in the short-run period had a coefficient of -0.130850 and p-value of 0.0239 or $p<0.05$, which means that in the short-run, government agricultural expenditure (GAE) had significant negative effect on poverty reduction.

Furthermore, it was found that Government expenditure on fishery and aquatic life (GEF) in the short-run had a coefficient of -1.884338 and p-value of .0.0096 which shows that $p<0.05$, and the conclusion drawn is that the short-run effect of GEL on poverty reduction was negative and significant, while GEF (-1) with a coefficient of 3.036583 and p-value of 0.0032 or $p<0.05$ indicates a significant positive effect of GEF on poverty reduction in the short-run. Also, it was found that government expenditure on livestock (GEL) in the short-run had a coefficient of 0.038692 and p-value of 0.0087 which shows that GEL in the short-run had significant negative effect of poverty reduction in Nigeria.

The ARDL-ECM coefficient of -0.763455 with a p-value of 0.0001 suggest that the estimate is less than one, it is negative and significant in line with the rule of thumb. This implies that the speed on adjust from a shock if it occurs back to the short-run equilibrium is about 76.35 percent annually. The Coefficient of correlation (R) revealed a coefficient of 0.845220 which a strong positive relationship between government expenditure on agriculture explanatory variables and poverty reduction, while the Adjusted R Square coefficient of 0.736875 means that 73.68 percent of the changes in poverty reduction within the period was due to changes in GAE, GEC, GEF and GEL in Nigeria. Also, the Durbin Watson (DW) coefficient of 2.398751 which is approximately 2 shows that the model was free from the problem of serial correlation that leads to spurious regression. Therefore, the presence of long-run relationship in the model implies that there is need for the estimation of both the ARDL Error Correction Model (short-run estimates) and the long-run model in order to estimate the speed of adjustment path.

Table 5: Results ARDL Long-Run and Short-Run

Short-Run Estimates				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	31.66743	10.49156	3.018373	0.0086
APR(-1)*	-0.763455	0.183612	-4.157968	0.0008
GAE(-1)	0.031445	0.047243	0.665617	0.5158
GEC(-1)	0.044994	0.059748	0.753065	0.4631
GEF(-1)	-2.874804	1.225566	-2.345695	0.0332
GEL(-1)	1.137501	0.417563	2.724143	0.0157
D(APR(-1))	0.399564	0.171498	2.329854	0.0342
D(APR(-2))	-0.440523	0.204554	-2.153575	0.0479
D(GAE)	-0.130850	0.052072	-2.512884	0.0239
D(GAE(-1))	-0.069279	0.097573	-0.710021	0.4886
D(GAE(-2))	-0.179140	0.059753	-2.998016	0.0090
D(GEC)	-0.060041	0.063246	-0.949328	0.3575
D(GEC(-1))	-0.034708	0.046874	-0.740457	0.4705
D(GEC(-2))	-0.154575	0.044520	-3.472062	0.0034
D(GEF)	-1.884338	0.635524	-2.965015	0.0096
D(GEF(-1))	3.036583	0.865241	3.509521	0.0032
D(GEF(-2))	1.014494	0.754696	1.344242	0.1988
D(GEL)	0.938692	0.311415	3.014283	0.0087
D(GEL(-1))	-0.428479	0.203759	-2.102869	0.0528
D(GEL(-2))	-0.223610	0.226965	-0.985219	0.3401
Long-Run Estimates				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
GAE	0.041188	0.059783	0.688970	0.5014
GEC	0.058935	0.079526	0.741077	0.4701
GEF	-0.765521	1.306903	-2.881255	0.0114
GEL	1.489939	0.461381	3.229301	0.0056
C	41.47913	7.145394	5.805016	0.0000

Source: Eviews 13

The long-run estimates in Table 5 revealed that GAE had a coefficient of 0.041188 and a probability value of 0.5014. This indicates that p>0.05; hence the null hypothesis was accepted and the conclusion is that there was an insignificant positive effect of government agricultural expenditure on poverty reduction in Nigeria. Also, it was found that Government expenditure on crop production (GEC) had an estimated coefficient of 0.058935 and p-value of 0.4701 which means p>0.05 and the null hypothesis was accepted. The conclusion drawn is that there was an insignificant positive effect of government expenditure on crop production on poverty reduction in Nigeria.

Furthermore, the results indicated that Government expenditure on fishery and aquatic life (GEF) revealed a coefficient of -0.76554 and a coefficient of 0.0114, which means p<0.05. Based on this, the null hypothesis was rejected and the conclusion is that government expenditure on crop production had significant negative effect on poverty reduction in Nigeria. The results established that government expenditure on live stocks (GEL) had a coefficient of 1.489939 and p-value of 0.0056, which implies that p<0.05; hence the null hypothesis was rejected and the conclusion drawn is that government expenditure on livestock had significant positive effect on poverty reduction in Nigeria. The results also revealed that the estimated long-run model had p-value of 0.0000 or p<0.05; which implies that the model was found to be

a significant. In order words, the model estimated significantly explained the relationship between government agricultural spending and poverty reduction in Nigeria.

Table 6: Model Diagnostic Test

Test Statistic	Test	Coeff.	p
Breusch-Godfrey Serial Correlation LM Test	No serial correlation	0.918707	0.4235
Breusch-Pagan-Godfrey	Homoskedasticity	1.242670	0.3387
Ramsey RESET Test: t-statistic	Linearity	2.340113	0.3346
F-statistic	Linearity	5.476127	0.3346
Jarque-Bera	Normality	0.200932	0.9044

Source: Eviews 13

The model diagnostic test results in Table 6 revealed that the Breusch-Godfrey Serial Correlation LM Test of serial correlation had a coefficient of 0.918707 and probability value of 0.4235, which means p>0.05. The null hypothesis of no serial correlation was accepted which implies that the estimated model was not spurious of meaningless. Also, the Breusch-Pagan-Godfrey test of heteroscedasticity showed a coefficient of 1.242670 and p-value of 0.3387 or p>0.05; hence the null hypothesis of no heteroscedasticity was accepted and the conclusion is that the model estimated was found to be homoscedastic. The findings showed that the Ramsey RESET Test of linearity revealed that the t-statistic had a coefficient of 2.340113 and p-value of 0.3346, while the F-statistic had a coefficient of 5.476127 and a p-value of 0.3346 respectively. Therefore, since the p-values of the t-statistic and F-statistic were found to be greater than 0.05 level of significance, the null hypothesis of linearity was accepted and the conclusion is that the model was learn or correctly specified. The coefficient of the Jarque-Bera test of 0.200932 and probability value of 0.9044 or p>0.05, implies that the null hypothesis was accepted and the conclusion drawn is that the distribution was found to be normally distributed.

Table 7: Pairwise Granger Causality Tests

Null Hypothesis:	**Obs**	**F-Statistic**	**Prob.**
GAE does not Granger Cause APR	36	4.98027	0.0133
APR does not Granger Cause GAE		1.09353	0.3476
GEC does not Granger Cause APR	36	1.13104	0.0357
APR does not Granger Cause GEC		0.37541	0.6901
GEF does not Granger Cause APR	36	0.70479	0.5020
APR does not Granger Cause GEF		0.48153	0.6224
GEL does not Granger Cause APR	36	0.09341	0.9111
APR does not Granger Cause GEL		0.19270	0.8257
GEC does not Granger Cause GAE	36	0.73990	0.4854
GAE does not Granger Cause GEC		0.91269	0.0120
GEF does not Granger Cause GAE	36	0.33703	0.7165
GAE does not Granger Cause GEF		0.38247	0.6853
GEL does not Granger Cause GAE	36	0.03902	0.9618
GAE does not Granger Cause GEL		0.62941	0.0396

GEF does not Granger Cause GEC	36	1.36776	0.2696
GEC does not Granger Cause GEF		1.01493	0.3742
GEL does not Granger Cause GEC	36	0.11184	0.8945
GEC does not Granger Cause GEL		0.06517	0.9370

Source: Eviews 13

The findings from the pairwise granger causality show a uni-directional causality between GAE and APR and from GEC to APR. This indicates that these variables relate significantly. Moreso, a uni-directional causality was found between GAE and GEL and from GAE running to GEL, which means that a significant uni-directional relationship exists between these variables.

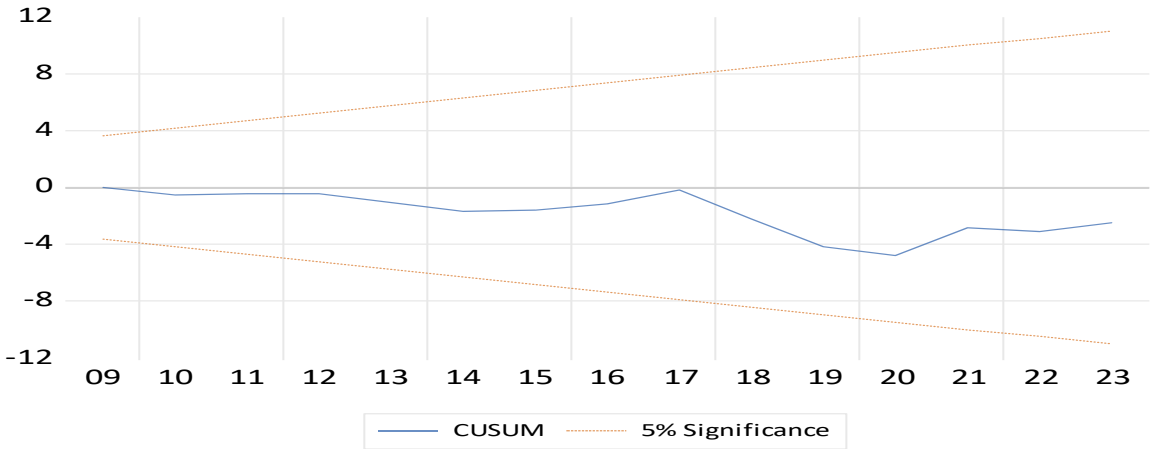

Figure 1: CUSUM Test of Parameter Stability

The results of CUSUM Square Test of Parameter Stability in figure 1 revealed that the blue lines are between the two red lines of stability. Therefore, since the graph is between the 5% boundary graphs, the conclusion is that the parameters were found to be stable at 0.05 level of significance.

4.1 Discussion of Findings

The aim of this study was to assess the effect of government agricultural sector expenditure on poverty reduction in Nigeria. The findings revealed that the average poverty rate had a mean of 53.20 percent and government expenditure on crop production had a mean value of 81.79 million. Udeorah and Vincent (2018) found that government financing through the agricultural credit guarantee scheme fund had a significant negative effect on the aggregate agricultural output and crop production output. Also, the mean value of government expenditure on fishery and aquatic production was found to be N2.94 million. According to the Central Bank of Nigeria (2018), fishery and aquatic life as a sub-sector has recorded the highest average growth rate of 10.3% between 961 to 2011compared to the 6% recorded in crop production in the same period. More so, it was revealed that government expenditure on livestock production had a mean of 4.11 million and government agricultural expenditure had a mean of 38.64 million.

Contrary to the findings of this study, the Federal Ministry of Agriculture and Rural Development (2017) argued that "livestock is the second largest sub-sector of agriculture contributing an average of 9.2% between 1960 and 2011 and that the sector is the largest source of animal protein including dairy and poultry products. The results revealed that government expenditure on crop production had a higher mean value of N81.79 million. This could be ascribed to the fact that in Nigeria, especially rural communities, a significant proportion of those engage in agriculture are into crop production which requires the

procurement of inputs like fertilizer, insecticides and pesticides. WorldFish (2021) reported that "the fisheries and livestock sectors are integral to the country's agricultural economy, contributing 2.09 percent and 9 percent respectively. They play key roles in socioeconomic development, poverty reduction and nutrition security".

The findings from the results of analysis revealed that the bounds cointegration test shows the presence of long-run relationship between the variables, thereby necessitated the estimating of both the short-run and long-run estimates of the parameters. This agreed with Omele *et'al*., (2023) in their study that found that there was a long-run relationship between agricultural credit guarantee scheme fund and fishery production in Nigeria. The results of long-run estimates of the effect of government expenditure on crop production on poverty reduction revealed $p>0.05$; hence the null hypothesis was accepted or retained and the study concluded that government expenditure on crop production had no significant effect on poverty reduction. It shows that a unit increase in government expenditure on crop production leads to about 5.89 percent increase in poverty reduction probably due to the fact that government over the years have not allocated significant amount of its budgetary allocation to this sub-sector. Akaninyene and Sunday (2017) in their study on the relationship between the agricultural credit guarantee scheme fund and the output of the crop sector, livestock and fishery in Nigeria revealed "a positive and significant relationship between ACGSF and the agricultural sector development" and that "the scheme has given more funds and impacted more in the crop sector over the livestock and fishery sector". This could be ascribed to the certainty that due to perceived corruption public investment in farming inputs like fertilizer hardly benefits those who are into farming in rural communities, aside the poor state of road infrastructural development that tend to limit agricultural productivity. Jam, Tsegba and Aondoakaa (2023) in their study found that "in the long-run, volume of funding to crop sector (FCP) has a positive effect on the output of crops and the effect is statistically significant".

The results of the effect of government expenditure fishery and aquatic life on poverty reduction revealed that $p<0.05$ and the null hypothesis was rejected. It was concluded that government expenditure on fishery and aquatic life production had a significant negative effect on poverty reduction in Nigeria. Obasi (2022) found that increasing domestic fish production is crucial for job creation, poverty reduction, and improving the balance of payments, but the lack of institutional credit has contributed to the segmentation of rural financial markets, hindering the growth of the small-scale fisheries sector. The results also indicated that a unit increase in government expenditure on fishery and aquatic life leads to 76.55 percent decrease in poverty reduction. The insignificant relationship between the variables may be attributed to the fact that this sub-sector is dominated by artisan fishermen who carry out small scale fishing, mostly in the riverine communities and in some States in the North. Jam, *et'al.*,(2023) found that the volume of funding to fishery has positive effect on output of fishery within the period under study and this effect is in line with a priori expectation.

The results of analysis on the effect of government expenditure on livestock production on poverty reduction showed that $p<0.05$, signifying that the null hypothesis was rejected and the conclusion drawn is that government expenditure on livestock production had a significant positive effect on poverty reduction in Nigeria. Baidoo, Yusuf and Anwar (2016) found evidence of the positive relationship between livestock production and household income in and recommended that policies to promote smallholder livestock production should be embarked upon to increase income. While, Bahiru (2023) also found that livestock farming is important for the rural economy, providing food, fuel, fertilizer, draught power, and supplementary income for rural farm households.

The study found that government agricultural expenditure had an insignificant positive effect on poverty reduction in Nigeria. This insignificant effect of government agricultural expenditure on poverty reduction in Nigeria could be due to the fact that a significant part of what is allocated to agriculture in

annual budgets is either diverted due to corruption or hardly gets to the farmers or invested in this sub-sector thereby limiting its impact in reducing the rate of poverty in the country. Nugroho (2017) found that agricultural expenditures not only appear statistically significant to boost mostly productivity levels, but also show the highest poverty reduction impact. Egwu (2016) opined that ACGSF is aimed at guaranteeing agricultural outfit that specializes in the following; agricultural outfit engaged in the establishment and management of plantation for cash crop produce like rubber production, oil palm extracting, cocoa plantation etc.; agricultural outfit engaged in the cultivation and production of food crops like fruit of all kinds, tubers of yam, cereals and all other food crops and agricultural activities involved in the large scale production of animal husbandries. Also, it was found that the adjusted R square coefficient measuring the goodness of fit of the model that 73.69 percent of the changes in poverty reduction was due to changes in the disaggregated component of agricultural sector expenditure. This supports the findings of Njidda (2020) studied the impact of government agricultural expenditure on economic growth in Nigeria and found that the overall model was statistically significant at 5% level of significance.

5. Conclusion and Recommendations

The study assessed the relationship between government agricultural expenditure and poverty reduction in Nigeria. The findings from the empirical study government expenditure on crop production had the highest mean value while government expenditure on fishery and aquatic life production. The in short-run, government expenditure on agriculture, fishery and aquatic life and livestock production had significant positive effect on poverty reduction. The long-run estimates showed that government expenditure on crop production and government total agricultural expenditure had insignificant positive effect on poverty reduction, while government expenditure on fishery and aquatic life production had a significant negative effect on poverty reduction in Nigeria. Furthermore, it was found that government expenditure on livestock production had a significant positive effect on poverty reduction in Nigeria. The results of analysis revealed the changes in poverty reduction were largely attributed to changes in the explanatory variables of government disaggregated agricultural sector expenditure in Nigeria. The study concluded that government expenditure on agriculture has effect on poverty reduction in Nigeria.

Based on the findings and conclusion drawn from the study, the following have been recommended:

i. Government should increase its budgetary allocation to the crop sub-sector to enable farmers have access to farming inputs for higher crop production necessary for poverty reduction.
ii. There is need for the enactment and implementation of water resources related policies that can help in boosting fishery and aquatic life production in order to reduce poverty
iii. Government should provide credit facilities for livestock farming under the supervision of the Central Bank of Nigeria so as to increase livestock production for poverty reduction.
iv. Government should meet up with the Agriculture and Food Organization (FAO) agricultural minimum financing benchmark and open up rural communities in order to raise boots productivity and reduce poverty.

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