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The Impact Of Agricultural Financing On Real Output Growth In Nigeria

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ABSTRACT
The study examined the influence of agricultural financing on economic growth in Nigeria from the period of 1989 to 2021. The study employs the stationary test, the co-integration test, the error correction model and the Granger causality model. All variables were stationary at the first difference, and the co-integration test evidenced a long-run relationship. The study identified, in the long run, that; the agricultural credit guarantee scheme fund shows a positive and significant influence on the gross domestic product in Nigeria. The commercial bank loan and community –micro-finance bank loan shows a positive and significant influence on the gross domestic product in Nigeria within the reference period. In light of the findings, the study concluded that all the variables employed predict Nigeria's gross domestic product. Furthermore, the granger causality results show a demand following a role as against supply leading role, revealing that increase in output level in Nigeria significantly support/promotes agricultural financial instrument. The study recommends that the Federal government should motivate commercial banks to provide adequate credit facilities to the Agricultural sector through moderate bank lending rates for ease of farming business in Nigeria. Proactive campaigns on the availability of credit facilities for farmers to enable them to have access to loans at a single-digit interest rate. This could be achieved through social media, door-to-door vibes, town hall meetings and market squares. Government should create an enabling environment for farmers through the provision of adequate security, pest control measures and seedlings.
Keywords: Agricultural credit scheme fund, Commercial bank loan and advances, Community microfinance credit, Economic Growth.

1.0 INTRODUCTION

Nigeria is rated as the largest nation on the African continent, with a vast geographical landmass of 923,768 km2 (Wikipedia). Nigeria is also one of the few in the continent blessed with good arable farmland for agricultural activities. It is endowed with a variety of vegetation, dynamic topography, and viable agro-climatological conditions. Among the Nigerian industries, service accounts for 32% of the GDP, manufacturing 11% and agriculture 30% (Kamil et al, 2017). Therefore, it is obvious that the agricultural sector plays a significant role in the economic growth and development of the Nigerian economy.

Throughout the pre-colonial period, the Nigeria economy was dominated by Peasant Agriculture, therefore, it was described as traditional. Shifting cultivation and crop rotation characterises the agricultural practices in the pre-colonial period due mainly to land tenure practices and lack of knowledge of mechanised agricultural inputs. Thus, farmers relied on crude implement like hoes, cutlasses and sickles. Before 1973, Agriculture export was the engine of growth providing much of the revenue that the government use in developing infrastructures. Market boards were established and used to extract

surpluses from the agricultural sectors and these surpluses were used to provide basic infrastructure as well as export machines. Nigeria main exports were cocoa, groundnut, cassava and maize. At independent Nigeria was exporter of food to other countries but today we are the net importer of food. Also, at independent, agriculture was the main source of foreign exchange accounting for over 45% of our export and 70% of employment of labour force in the country (CBN, 2010). In spite of this, agriculture suffered a setback when crude oil was discovered as it was neglected and crude oil was the main priority. Agriculture has suffered a number of setbacks due to the ignorance, poverty, lack of motivation, and lack of incentives from various governments over the time in this country.

A significant part of the agricultural sector's role in providing food for survival and providing raw materials for industry to perform economic activities to support a country's economic activities is no longer evident in recent years. Indeed, the contribution of the sector to total GDP has been falling. From the report of CBN (2010), between 1960-64, the contribution of Agriculture to GDP was 61.64%, 1965-69, the contribution fell to 53.27%, 1970-74, its contribution was 39.69% up till the present time that its contribution has fallen to 21.2% in 2018 (CBN, 2010, 2018). Among the problems which have made it difficult for farmers to develop their full potential are inadequate supply and delivery of farm inputs, a lack of working capital, low technological level, diseases and pest infection, poor post-harvest handling and shortage, technology, environment hazards, labour and land use constraints.

More so, Through the implementation of various financing policies, the Nigerian government has attempted to enhance the performance of the agricultural sector by making farm credit available to rural farmers, but these policies have not reached their intended objectives of significantly enhancing the development of the agricultural sector and generating employment opportunities because credit institutions require the farmers to provide acceptable collateral before they can be granted credit, but many farmers live in rural areas without property rights and thus cannot access credit. Again, over the years, the federal government's budgetary allocation to agriculture falls short of the implemented policies when compared to total budget. For instance, during the first, second and third development plan periods (1962-1980), the federal government budgeted ₦3.57 billion but only ₦2.41 was actually released to the agricultural sector (Federal Department of Agriculture, National Development Plan, 1992). It was shown in that record that in the first Plan, 11.6 percent of the budget was allocated to agriculture but only 9.8 percent was released CBN, 2014). Nonetheless, Ranjula (2011) posited that about 5% of Nigerian farmers and 15% in Asia and South America had benefited from former credit and on the average, only 5% benefited from 80% of credit in developing countries. Available statistics from the Central Bank of Nigeria revealed that commercial bank credit equal ₦7 million was allotted to agricultural sector in 1970, rose to ₦37.4 million in 1974, ₦462.2 million in 1980 and ₦1,310.2 million in 1985. Aggregate credit to agricultural sector goes to ₦4,221.4 million, depicting 16% of the total credit in the economy, and ₦25,278.7 million in 1995 which was 17% of the overall credit available in the economy. Starting from the year 2000, the proportion of credit to agricultural sector increased in absolute term but decreased on relative ground. For example, total credit agricultural rose from ₦41,028.9 million representing 2.46% of the total credits in 2005, to ₦128,406.0 million in 2010 representing 1.67% of the total Commercial Bank credit to the economy. As at 2013 and 2014, the share of agricultural credit in total Commercial Bank Credit fell were 3.9% and 3.7% respectively. In 2018, ₦589,673.20 million was allotted to agricultural sector.

The need to correct the existing structural distortions in Nigerian Agricultural sector and put the economy on the path of sustainable growth is, therefore, compelling. This raises the question of what need to be done to develop the agricultural sector in order to realize the potentials of the sector. This study, therefore, investigates the impact of agricultural sector financing on real output growth in Nigeria.

The main objective of this paper is to examine the impact of agricultural financing on real output growth in Nigeria. The study was grouped into five sections. The first section shall commence with background to the study, statement of the problem, objective of the study, scope of the study and organisation of the study. Section two shall give a review of related literature study which includes: conceptual issues,

theoretical review, methodology review and empirical framework. Section three shall present the research methodology of the study which may include theoretical framework, model specification, data and source, estimation techniques and model evaluation procedure. Section four shall present the data analysis as well as interpretation and discussion of analysis made. Section five shall give the summary of findings, conclusion and recommendation.

2.0 LITERATURE REVIEW

2.1. Conceptual Issues

2.1.1. Agriculture

Agriculture can be defined as the domestication of animals, rearing and planting of crops including forestation for human consumption. Agriculture involves the cultivation of land, raising and rearing of animals for the purpose of production of food, feeds for animals and production of raw materials for industries. It is the most important sector in the economy. Throughout the pre-colonial period, the Nigeria economy was dominated by Peasant Agriculture, therefore, it was described as traditional. Shifting cultivation and crop rotation characterises the agricultural practices in the pre-colonial period due mainly to land tenure practices and lack of knowledge of mechanised agricultural inputs. Thus, farmers relied on crude implement like hoes, cutlasses and sickles. Before 1973, Agriculture export was the engine of growth providing much of the revenue that the government use in developing infrastructures. Market boards were established and used to extract surpluses from the agricultural sectors and these surpluses were used to provide basic infrastructure as well as export machines. Nigeria main exports were cocoa, groundnut, cassava and maize. At independent Nigeria was exporter of food to other countries but today we are the net importer of food. Also, at independent, agriculture was the main source of foreign exchange accounting for over 45% of our export and 70% of employment of labour force in the country. But with the discovery of crude oil for export, agriculture experienced a setback because was neglected and crude oil was the main priority. Agriculture has suffered a lot of setbacks as a result of ignorance, poverty, and lack of motivation etc. from various governments over time in this country.

2.1.1.2. Past Government Effort at Revamping Agriculture in Nigeria

Over the years, successive governments in Nigeria at various levels have put in place measures and policies to address directly or indirectly the agricultural productivity in the country. Such policy measures focus essentially on growth, basic needs, and rural development approaches, some of which were initiated after the independence. These policies were put in place in other to revamp the agricultural sector. They may include:

1. **National Accelerated Food Production (NAFPP):** this was established in 1973 to accelerate the production of food crop mainly rice, cassava, sorghum, Wheat, maize, Millet etc. This was done through the provision of improve seedling to farmers.
2. **Operation Feed the Nation (OFN):** It was aimed at increasing food production ad for the country to attain full sufficiency. This was done through improve seedlings to farmers, pesticides, farm stocks and livestock feed. The programme was successful as civil servants turned part of their environment to farm. However, the programme eventually died down because momentum could not be maintained. It started in May 1976 by Obasanjo.
3. **Green Revolution Programme (GRP):** it was launched in 1980 by Shehu Shagari in other to increase food production and distribution in the economy.
4. **River Basin Development Authorities**: it was established for development of surface and ground water resources, irrigation, livestock, rural and urban water supply; controlling erosion and floods including water shed and management; and construction of dams, wells and boreholes.
5. **Agricultural Development Programme Strategy (ADPS):** this has taken institution with the mandate to increase agriculture production and improve the standard of living of the rural population. They provide technical support through extension services to small holders' farmer as a means of promoting then adoption of improved farming techniques.

6. **Structural Adjustment Programme: (SAP)**: It was adopted in 1986, in order to restructure and diversify the production base of the economy from oil as to reduce our dependency on the oil sector; achieve fiscal stabilization and balance of payment; and promote economic growth with single digit inflation.

7. There was another that was established to construct roads and bridges to the rural area to make fertilizer product to reach the farmers and for the harm product to meet with market demand these programmes are Nigerian Agricultural, cooperation and Rural Development Bank (NACRDB), Directorate of Foods, Roads and Rural Infrastructures (DFFRI) and Agricultural Credit Guarantee Scheme Fund (ACGSF).

8. **National Empowerment and Development Strategies** (NEEDS): In 2004 the Federal Government launched another economic reform by name National Empowerment and Development Strategies (NEEDS). The programme was aimed at promoting growth as well as reduces poverty through a participatory process involving civil society and development partners. In agricultural sector, NEEDS was aimed at promoting and improving production, distribution and processing of agricultural products

2.1.2. **Real Output Growth**

Real output is equivalent to economic growth, which, is the rate at which a country's national income grows, usually shown as an increase in real gross domestic product (GDP) or gross national product (GNP) or an increase in per capita income. Routledge Dictionary of Economics (2nd edition), defined economic growth as the growth in the total, or per capita, output of an economy, often measured by an increase in real gross national product, and caused by an increase in the supply of factors of production or their productivity.

Economic growth is the increase in the inflation-adjusted market value of the goods and services produced by an economy over time. It is conventionally measured as the percent rate of increase in real gross domestic product, or real GDP. In economics, "economic growth" or "economic growth theory" typically refers to growth of potential output, i.e., production at "full employment". Growth is usually calculated in *real* terms – i.e., inflation-adjusted terms – to eliminate the distorting effect of inflation on the price of goods produced. Measurement of economic growth uses national income accounting. Since economic growth is measured as the annual percent change of gross domestic product (GDP), it has all the advantages and drawbacks of that measure (Wikipedia, 2015).

2.2. **Theoretical Review**

The relationship between agriculture and real output growth has taken a great deal of analysis both theoretically and empirically. Theoretically, the impact of agriculture on real output can be found in three theoretical approaches such as; Keynesian theory, Wagner theory, Endogenous Growth theory, Diffusion Model and Urban-Industrial Impact Model.

2.2.1. The Keynesian Theory of Government Expenditure

In the Keynesian macroeconomics, increase in government expenditure has an expansionary effect on income and employment through the multiplier effects on aggregate demand. On the other side, government expenditure crowds out private investment as a result of increase in the rate of interest and this slows down economic growth and reduces the rate of capital accumulation in the long run. (Keynes, 1936) regarded government expenditure as an exogenous variable that contributes positively to economic growth that an increase in government expenditure would likely lead to increase in employment, profitability and output through the multiplier effects on aggregate demand. With the introduction of government expenditure (G) by Keynes, the national income determination model is expanded which becomes; AD=C+I+G Where, AD represents aggregate demand which equals the sum of consumption (C), Investment (I), and government expenditure. The government expenditure has direct and positive impact on the GDP. An increase in government expenditure will boost aggregate demand, resulting in higher level of national income. All things being equal, an increase in government spending has an expansionary effect on output and income while a decrease has contractionary effect on output and income.

2.2.2. **Adolph Wagner Theory of Public Expenditure**

Wagner's law is the first model of public expenditure in the history of public finance. It suggests that during the process of economic development the share of public spending in national income tends to expand. The reasons varied; (a) public functions to substitute private activities; (b) when the development result in expansion of spending on culture and welfare, public intervention might be necessary to manage natural monopolies. Adolph Wagner's law of "law of increase expansion of public and state activities" postulates that as real income increase, there is a long-run tendency for the share of public expenditure to increase relative to national income. I.e., if state has improvement in economic growth and development there's every tendency for public spending to increase respectively.

2.2.5. **Endogenous Growth Theory**

It explains that economic growth is a result of endogenous forces and not external/ exogenous forces. Endogenous theory is part of the neo-classical growth models. The role of technological change is emphasized here, it is of the opinion that the long-term growth of an economy is as a result of the activities within the economic system which leads to technological progress. It states that investment in human capital, innovation, and knowledge are the main contributors to economic growth. It focuses more on positive exogenous factors and spill- over effects (positive externalities, that are attributed to costs from other firms) of a knowledge-based economy which will lead to economic development. It believes that the growth rate of an economy in the long- run depends on policy measures. This discussion will be considered the first wave of endogenous approach, it includes the work of other notable o in the theory of growth.

2.2.7. The Diffusion Model

The diffusion approach to agricultural development rests on the empirical observation of substantial differences in land and labour productivity among farmers and regions. The route to agricultural development, in this view is through more effective dissemination of technical knowledge and a narrowing of the productivity differences among farmers and among regions. The diffusion of better husbandry practices was a major source of productivity growth even in pre-modern societies. Before the development of modern agricultural research systems' substantial effort was devoted to crop exploration and introduction. Even in nations with well-developed agricultural research systems a significant effort is still devoted to the testing and refinement of farmers' innovations and to testing and adaptation of exotic crop varieties and animal species. Model was developed emphasizing the relationship between diffusion rates and the personality, characteristics and educational accomplishments of farm operators. Diffusion model provides the major intellectual foundation of much of the research and extension effort in farm management and production economics since the emergence, in the later of the 19th century of agriculture economics as a separate sub discipline linking the agricultural sciences and economics. The developments that led to the establishment of active programs of farm management research and extension occurred at a time when experiment-station research was making only a modest contribution to agricultural productivity growth. A further contribution to the effective diffusion of known technology was provided by the research of rural sociologists on the diffusion process. The limitations of the diffusion model as a foundation for the design of agricultural development policies became increasingly apparent as technical assistance and community development programs, based explicitly or implicitly on the diffusion model, failed to generate either rapid modernization of traditional farms or rapid growth in agricultural output.

2.2.8. **The Urban-Industrial Impact Model**

In the conservation model, location variations in agricultural development were related primarily to differences in environment factors. It stands in sharp contrast to models which interpret geographical differences in the level and the rate of economic development primarily in terms of the level and rate of urban- industrial development. Initially, the urban-industrial impact model was formulated (by Von Thunen) to explain geographical variations in the intensity of farming system and in the productivity of labour in an industrial society. Later this model was expanded to explain the more effective performance of the factor and production markets linking the agricultural and non-agricultural sectors in regions

characterized by rapid urban-industrial development. The model has been tested extensively in the limited states but has received only limited attention in less developed world.

2.3 **Empirical Review**

There are various studies that have investigated the relationship between agricultural sector contribution and economic growth. Studies carried-out by Anifowose (2011), Izuchukwu (2011), Ahungwa *et. al.* (2014), Onunze (2012), and Sertoğlu *et al.* (2017) make known that agricultural sector contribution immensely to the economic growth of Nigeria. Omojimite (2012), Oluwatoyese et al (2016), Brownson et al (2003) etc. make known that unexpected appreciation of the domestic currency increased agricultural output from the supplied side, though it relies on the combined effect of elasticity of demand and supply.

Orji *et al.* (2020) posited that in many developing countries, the agricultural sector has been seen as a major sector that should drive economic development and industrialization because of its importance in the provision of food for the increasing population, the supply of raw material to the growing industrial sector, generation of foreign exchange earnings, creation of employment opportunities, and provision of market for the product of the industrial sector. The study however, investigated the causal linkage between agricultural financing and agricultural output growth in Nigeria. Using data sourced from Central Bank of Nigeria statistical bulletins and World Bank Economic Indicators, the study adopted the Pairwise Granger Causality test. The study found that there was no causal linkage between agricultural financing and agricultural output growth within the period under review. Hence, it is imperative for Nigeria to take more careful look into why agricultural financing has not made significant impact on agricultural output growth. There should exist massive education and enlightenment of farmers to know the different sources of agricultural financing available. When such funds are accessed, it should be properly monitored to ensure efficient utilization in order to increase agricultural output.

Orji, Ogbuabor, Alisigwe, Anthony-Orji (2021) investigated the impact of agricultural financing and agricultural output growth on employment generation in Nigeria from 1981 to 2017. The study adopted the framework of the Auto Regressive Distributed Lag (ARDL) Model for analysis. The empirical results show that while agricultural financing increases employment generation in both the short run and long run, the lag of agricultural output growth increases employment generation mainly in the short run. Other variables found to have significant effect on employment generation were price and agricultural output while labour force population, wages and aggregate expenditure were insignificant. The study concluded that policy makers should endeavour to see that every fund allocated for a specific agricultural schemes and interventions should be fully utilized for its purpose. To increase employment opportunities, there should be careful monitoring of the implementation of each scheme and policy to realize their specific objectives.

Ademola (2019) in his study examined the impact of agricultural finance on the growth of Nigerian economy. This study employed Ordinary Least Square (OLS) of multiple regression estimates. The result of the study suggested that the productivity of investment will be more appropriately financed with resources administered by the commercial and specialized financial institutions. And also, that there are an urgent and sincere needs to expand the credit size to the agricultural sector in order to enhance the productivity growth of the sector. It, therefore, recommended that maintenance of credible macroeconomic policies that is pro-investment in overhauling the Agricultural Sector and debt-equity swap option are necessary for an agricultural-led economic growth.

Anifowose (2011) found that the Nigeria agricultural sector contributes immensely to the economic growth of Nigeria but the over-dependence on the oil sector has over shadowed the potentials of the sector. He concluded that the Nigerian agricultural policy needs to be evolved; there is need for national re-orientation towards agriculture or farming, the activities of agriculture financing, institutions in providing finance and credit for rural farmers, should be supplemented with the provision of road networks, rail system and warehouses, in order to further encourage farmers to increase their production etc. Equally, Izuchukwu (2011) reiterated that agricultural sector is seen as an engine that contributes to the growth of the overall economy of Nigeria and that in order to improve the agricultural sector, he

recommended that government should provide more funding for agricultural universities in Nigeria to carry out researches on all areas of agricultural production which will lead to more exports and improvement in the competitiveness of Nigeria agriculture production in international markets. The Central Bank of Nigeria should also come up with a stable policy for loan disbursement to farmers at a reasonable interest payback. In the same light, Ahungwa *et. al.* (2014) found that agriculture has a positive relationship with GDP and contributes significantly than any other sector. The study recommended that government should create an enabling environment by increasing the budgetary allocation, friendly policies framework for strong and efficient agricultural sector that can accelerate the attainment of Nigeria's dream of achieving the targeted growth rate and the proposed vision of becoming one among the 20 leading world economies by the year 2020.

However, Onunze (2012) asserted the main and potential contribution of agriculture to economic growth has been a subject of much controversy among development economists. As some contend that agricultural development is a pre-condition for industrialization, others strongly object it and argue for a different path but concluded that the productivity in agricultural sector has appreciably impacted positively on the economic growth in Nigeria. More also, Sertoğlu *et al.* (2017) revealed that real gross domestic product, agricultural output and oil rents have a long-run equilibrium relationship. Vector error correction model result shows that, the speed of adjustment of the variables towards their long run equilibrium path was low, though agricultural output had a positive impact on economic growth. It was recommended that, the government and policy makers should embark on diversification and enhance more allocation in terms of budgeting to the agricultural sector.

Nwankpa (2017) examined the agricultural transformation via-a-vis hunger and poverty eradication as a means of sustaining economic growth and development in Nigeria. She found that about 80 percent of Nigerians live in rural areas and agricultural sector remains the main provider of livelihood for most rural dwellers and a major contributor to Nigeria growth rate besides oil and gas sector. However, Odetola & Etummulu (2013) investigated the contribution of the agriculture sector to economic growth in Nigeria using the growth accounting framework. They found that the crop production subsector contributes the most to agriculture sector growth and that growth in the agriculture sector is overly dependent on growth of the crop production subsector. This indicates the importance of this subsector and probably, lack of attention or investment to the other subsectors. Therefore, increased efforts in developing the livestock, fisheries and forestry subsectors will foster the contributions of agriculture sector to the Nigerian economy.

Moreover, Omojimite (2012) found that the volume of credit to agricultural sector, deficit financing and institutional reform positively and significantly affect agricultural output. However, interest rate spread has negative and insignificant effect on agricultural output in Nigeria. Equally, Oluwatoyese et al (2016) showed that commercial bank loan to agriculture, interest rate and food imports are significant factors affecting agricultural output, whereas exchange rate, inflation rate and unemployment rate turned out to be insignificant factors driving Nigeria's agricultural output.

Brownson et al (2003) investigated the effect of macroeconomic variable fluctuation on agricultural productivity in Nigeria over the period of 1970 and 2010 using the techniques of cointegration and error correction model (ECM). In a similar vein, Akpan et al (2015) adopted the techniques of cointegration and error correction model (ECM) to quantify the role of macroeconomic variables on agricultural diversification in Nigeria over the period of 1960 to 2014. Brownson et al (2003) showed that in both long run and short run, real exports, real external reserves, inflation, and external debt have significant negative effects on agricultural productivity, whereas industrial capacity utilization and nominal exchange rate promote agricultural productivity in Nigeria. On the other hand, Akpan et al (2015) reported that longrun positive drivers of agricultural diversification include inflation, viable manufacturing sector, credit to agricultural sector, external reserves, per capita income, unemployment and energy consumption, whereas crude oil prices, lending capacity of commercial banks, FDI in agriculture, and non-oil imports constitute negative long-run drivers in the Nigerian economy.

In addition, Obayelu and Salau (2010) applied the techniques of cointegration and VECM to response of agricultural output to price and exchange rate between 1970 and 2007. Olarinde and Abdullahi (2014) examined the implications for food security of the role of macroeconomic policy in agricultural sector performance in Nigeria over the period of 1978 to 2011 by employing the VECM technique. Obayelu and Salau (2010) reported that in the short run and long run, total agricultural output responds positively to increases in exchange rate (that is, exchange rate depreciation), but negatively to increases in food prices. On the other hand, Olarinde and Abdullahi (2014) found that the long-run determinants of agricultural output include government spending, agricultural credit, inflation rate, interest rate and exchange rate. On their own part, Oyinbo et al (2014) examined the nexus between exchange rate deregulation and Agricultural share of gross domestic product in Nigeria over the period 1986-2011 by employing Granger causality test and VECM. The authors found that there was unidirectional causality from exchange rate to agricultural share of real GDP. They also showed that exchange rate deregulation has negative influence on agricultural share of real GDP.

From the above review, it can be observed that literature abounds on the relationship between agricultural contribution and macroeconomic aggregates, such as, inflation, loans/credit, and fiscal and monetary policy instruments. The present study differs from previous studies by investigating the impact of agricultural financing on real output growth in Nigeria having controlled for some other significant factors already documented in the literature. The study also extends the coverage period till year 2021 so as to capture the recent happenings in the Nigerian economy; an instance is the fall out of the economic recession in the second quarter of 2016.

METHODOLOGY

3.1 Model Specification

The main aim of the study is to examine the impact of agricultural financing on real output growth in Nigeria. The model adopted by the present study is a modification of the model of Odetola and Etumnu (2013) that employed the growth in real GDP, the weighted growth rate of agriculture, the weighted growth rate of industry, the weighted growth rate of building and construction, the weighted growth rate of wholesale and retail trade and the weighted growth rate of services to examine the contribution of agriculture to economic growth in Nigeria. The model also follows Onunze (2012), whom have regressed output of agricultural production, capital formation, inflation, and interest rate against economic growth proxied by GDP. The present study modified both models to include exchange rate and inflation rate in order to capture the control variable that influences the economy. The equation (3) is re-specified to give the economic model of this study which is:

$GDP_t = f(AGC, AGE, AG, AGEMP. INF)$ --------- (1)

Where Gross Domestic Product (GDP) growth rate, agricultural credit (AGC), agricultural expenditure (AGE), agricultural contribution to GDP (AG), agricultural employment (AGEMP), exchange rate (EXR), and inflation rate (INF) respectively.

The relationship expressed in (4) represents the econometrics model which is linearly expressed as:

$GDP_t = \beta_0 + \beta_1 LAGC_{t-1} + \beta_2 LAGE_{t-1} + \beta_3 AG_{t-1} + \beta_4 AGEMP_{t-1} + \beta_5 INF_{t-1} + \mu_i$……..(2)

Where: GDP_t is GDP growth rate at time t,

$LAGC_t$ is Agricultural Credit at time t,

$LAGE_t$ is Log of Agricultural Expenditure at time t,

AG_t is Agricultural Contribution to GDP at time t,

$LAGEMP_t$ is Agricultural Employment at time t,

INF_t is Inflation Rate at time t, and

t-1 is t – 1 is the lag length that is reduced by 1

μ_i is the stochastic disturbance term which has zero mean and is normally distributed. It is often called impulses, or innovations or shocks.

β_0 is the autonomous of the POV independent of the explanatory variable which remains constant, β_1, β_2, β_3, β_4, β_5, β_6, β_7, β_8 *and* β_9 are the parameters to be estimated. All these parameters are the short-run dynamic coefficients of the model's adjustment to long-run equilibrium. The justification behind the logging of agricultural output, exchange rate and Agricultural expenditure is to bring the three variables to same level with other variables and to a linear form.

3.2.1 The Econometric A priori Expectation

The economic a priori test is conducted to enable us examine the magnitude and size of the parameters estimate. This evaluation is guided by economic theory to ascertain if the parameter estimate conforms to expectation. This shows whether each independent variable in the equation is comparable with the postulations of economic theory; that is, if the sign and size of the Parameters of economic relationships follow with the expectation of the economic theory.

Table 3.1: Table of a priori Expectation

Variable	Expected sign
LAGC	Positive (+)
LAGE	Positive (+)
AG	Positive (+)
LAGEMP	Positive (+)
INF	Negative (-)

Any parameter estimates with a positive sign (+) indicates that the independent variable in question has a direct or positive relationship with the dependent variable. This means that if those particular independent variable increases, the dependent variable will increase too. Thus, they move in the same direction. However, a negative sign (-) implies an inverse or negative relationship meaning that if the independent variable increases, the dependent variable will decrease, and vice versa. Thus, they move in opposite directions. Therefore, Agricultural output growth is expected to be positive because increase in the sectorial output growth will brings about economic growth. Same goes with agricultural expenditure, and employment.

(11).

3.2 Method of Analysis

The method of analysis used in the study was multiple regressions modelled after Wooldridge (2005) and Greene (2003). Error Correction Mechanism (ECM) technique was used to analyse the regression estimates. Error Correction Model is a time series model in first differences that contains an error correction term, which works to bring two I (1) series back into long-run equilibrium. An error correction model allows studying the short-run dynamics in the relationship between y and x in reconciling the short-run behaviour of an economic variable with its long-run behaviour (Wooldridge, 2005 & Greene, 2003).

3.2.1 Estimation Procedure

This research work makes use of econometric approach in estimating the relationship between agriculture output (the independent variable) and the economic growth (dependent variable). The empirical analysis is being restricted to the period between 1981 and 2019 due to the large number of years involved. The study utilized the Unit Root Test to examine the stationarity or non-stationarity of the individual variable; trend analysis was used to examine the time trend; more also, the Co-integration test is employed to examine the long run relationship between the respective variables to determine the best estimation technique that will best explain the model. Other test will also be carried out to give a well detailed validity of the study such as multicollinearity test, Auto correlation test, normality of the residual test, heteroskedastic test and stability test.

3.2.2 Trend Analysis

The trend analysis for the course of this study was made out of secondary data collected from existing literature and database specified earlier. The time series data was used which range from 1989 to 2021. The model is assumed to be linear which will make the trend analysis to be in a formal regression analysis. For the cause of the study at hand, the analysis made was used to make further projections and future forecast.

3.2.3 Unit Root test

This is the pre-Co-integration test. It is used to determine the order of integration of a variable that is how many times it has to be differenced or not to become stationary. It is to check for the pre1sence of a unit root in the variable i.e., whether the variable is stationary or not. The null hypothesis is that there is no unit root. This test is carried out using the Philip-Perron (PP) technique of estimation. The rule is that if the PP test statistic is greater than the 5% critical value, we accept the null hypothesis i.e. The variable is stationary but if the PP test statistic is less than the 5% critical value i.e., the variable is non-stationary we reject the null hypothesis and go ahead to difference once. If the variable does not become stationary at first difference we difference twice. However, it is expected that the variable becomes stationary at first difference.

3.3 Source of Data

The data for the study was sourced from relevant government agencies such as the Food and Agricultural Organization statistic (FAOSTAT), Central Bank of Nigeria (CBN), and World Bank (WDI).

RESULTS AND DISCUSSION

4.1. Descriptive Analysis

Table 1: Summary of the Descriptive Statistics

	AG	AGC	AGE	AGEMP	INF	RGDP
Mean	24.21	174592.50	25.70	43.78	19.01	4.24
Median	23.89	59800.00	17.92	44.91	12.88	4.23
Maximum	36.97	610149.70	76.60	50.17	72.84	15.33
Minimum	19.99	58.17	0.15	34.97	5.38	-2.04
Std. Dev.	3.75	209407.20	24.70	5.52	17.08	3.98
Skewness	1.61	1.03	0.63	-0.29	1.89	0.49
Kurtosis	6.06	2.44	2.11	1.49	5.38	3.35
Jarque-Bera	27.07	6.29	3.24	3.60	27.54	1.48
Probability	0.00	0.04	0.20	0.17	0.00	0.48
Observations	33	33	33	33	33	33

Source: Researcher's Computation.

In table 1, the results of the estimated descriptive statistic of the relevant variables are presented as follows; agricultural credit from 1989 to 2021 in Nigeria has ₦61,0149.70 and ₦58.14 million as maximum and minimum values concurrently. The mean value of the data is ₦174,592.50 million alongside of standard deviation of ₦209,407.20 million. The implication of this is that the agricultural credit data does not disperse moderately from its mean because the standard deviation is more than its mean value. Conversely, other variables are moderately dispersed. Therefore, these variables are not dispersed moderately from their mean while exchange, inflation and interest rates are dispersed moderately.

The table also shows that all series have a long-right tail while agricultural employment has a long-left tail. The table shows that agricultural credit, inflation and real GDP are leptokurtic while others are platykurtic.

Jarque-Bera is a test statistic to test for normal distribution of the series. It measures the difference of the skewness and kurtosis of the series. The result of the Jarque-Bera shows that agricultural credit, inflation and agricultural output are not normally distributed while agricultural expenditure, employment and real GDP are variable that is normally distributed.

4.2. Unit Root Tests Report

The Philip-Perron (PP) test was employed to check the presence of unit root in the series. The result of the unit root test based on PP is presented in table 2.

Table 2: **Phillips-Perron Unit Root test for Stationarity**

Variable	**Level (t-Stat)**	**1st Diff (t-Stat)**	**P-Value**	**Order of Integration**	**Remark**
Real output	-3.533		0.013	I(0)	Stationary
Agricultural credit	-0.520	-6.103	0.000	I(1)	Stationary
Agricultural expenditure	-3.184	-16.846	0.000	I(1)	Stationary
Agricultural contribution	-2.449	-6.358	0.004	I(1)	Stationary
Agricultural employment	-2.333	-4.869	0.000	I(1)	Stationary
Inflation	-3.064		0.039	I(0)	Stationary

Source: Researcher's Computation.

The unit root/stationary test is shown on Table 2. Unit root analysis is a test conducted to ascertain if the variables under consideration are stationary. The results of the unit root test show that none of the critical values of the variables are greater than the PP statistical values at first difference. However, agricultural credit, agricultural expenditure, agricultural contribution, and agricultural employment are stationary at first difference [I (1)]. Real output growth and inflation rate are stationary at level [1(0)]. Since most of the variables are integrated at two orders, that is, at zero and first order, the study suspect evidence of co-integration in the model. To investigate if there is a long- run relationship between the variables, the study embarks on cointegration test. By implication, the study wants to find out whether the variables will converge in the long-run, if they diverge in the short-run. Thus, cointegration arises base on the need to integrate short-run dynamics with long-run equilibrium between economic variables. This is necessary because in an attempt to achieve stationarity when differencing will result in the loss of valuable information about the long-run equilibrium relationship between the variables.

4.3. Co-integration Test

The results of unit root tests shows that every variable incorporated in the model are integrated at level or first difference. In the study, the ARDL Bound testing method is used. The H_0 that there is no long-run relationship among the dependent and independent variables is investigated and the H_1 is that there exists a long-run relationship. The results are discussed as under.

Table 3: Co-integration test result

F-Bounds Test Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	3.894334	10%	2.26	3.35
K	5	5%	2.62	3.79
		2.5%	2.96	4.18
		1%	3.41	4.68

Source: Researcher's Computation.

The outcomes of variable addition test in table 4 shows that there exists a long-run relationship among the variables. The ARDL method is applicable to test the H_0 of no co-integration. The F-statistic is 3.89 and the F-table critical value with an intercept and no trend at 0.05 percent probability level is 2.62 to 3.79. It is clear that F-statistic is more than the higher limit of critical value. Hence, H_0 of no long-run relationship among the dependent along with independent variables is rejected, it means there is long-run relationship.

4.4 Causality Test Result

The Pairwise granger causality test was conducted to find out the causal relationship between real output and agricultural finance. The analysis is obtained through the Wald F-Test with the help of E-view version 10 as presented in appendix III.

Table 4: Wald-F Causality Test Result

Wald F-Test	**P-value**	**Test Conclusion**	**Remark**
LAGC: Significant	0.000	Causality from LAGC to RGDP	Bi-directional causality
	0. 087	Causality from RGDP to LAGC	
LAGE: Significant	0.026	Causality from LAGE to RGDP	Bi-directional causality
	0.057	Causality from RGDP to LAGE	
AG: Significant	0.076	Causality from AG to RGDP	Bi-directional causality
	0.031	Causality from RGDP to AG	
AGEMP: Significant	0.091	Causality from AGEMP to RGDP	Uni-directional causality
	0.564	No Causality from RGDP to AGEMP	
INF: Significant	0. 093	Causality from INF to RGDP	Bi-directional causality
	0. 051	Causality from RGDP to INF	

Source: Researcher's Computation.

Note: Rejecting the null hypothesis means that one variable actually granger causes the other, while accepting the null hypothesis confirms that there is no causality between both variables at 5% significance level.

From the Wald Test conducted, it reveals that the p-values of all variable Chi-square are actually less than 5 per cent significant level except from RGDP to AGEMP. Hence, the result of RGDP to AGEMP rejects the null hypothesis of no significant relationship between agricultural employment and output growth in Nigeria. Therefore, agricultural employment causes output growth in Nigeria. This means that the occurrence of agricultural employment makes the occurrence of output growth more probable in the short run in Nigeria. This result is a unidirectional causality.

The hypothesis results also reveal that agricultural credit, agricultural expenditure, agricultural contribution, and inflation have a significant effect on output growth and output growth too has a significant effect on them as well in the short run. From their Wald Test conducted, it revealed that the p-value of their Chi-square is actually significant at 5 percent significant level. Hence, the study rejects the null hypothesis of no significant relationship between these variables and output growth in Nigeria. Therefore, the past values of their estimates are one of the predictors of the future increase in output growth in the short run in Nigeria and vice versa. These variables have bidirectional causality with output growth.

4.5 **Regression Analysis**

4.5.1 **The Short-run Regression Result of the Model**

Table 5: ARDL Error Correction Regression Results

ECM Regression				
Case 3: Unrestricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-20.66597	3.836118	-5.387208	0.0000
D(RGDP(-1))	-0.371453	0.099767	-3.723199	0.0014
D(LAGC)	0.532845	0.233515	2.281842	0.0342
D(LAGE)	-0.683092	0.549490	-1.243138	0.2289
D(LAGE(-1))	-1.376474	0.557619	-2.468486	0.0232
D(AG)	0.529336	0.132702	3.988905	0.0008
CointEq(-1)*	-0.558870	0.102870	-5.432767	0.0000
R-squared	0.776274	Akaike info criterion		4.5721
Adjusted R-squared	0.720342	Schwarz criterion		4.8959
F-statistic	13.87900	Hannan-Quinn criter.		4.6777
Prob(F-statistic)	0.000001	Durbin-Watson stat		1.9827

Source: Researcher's Computation.

The result obtained from the dynamic real output model indicates that the overall coefficient of determination (R^2) shows that about 78 per cent of growth rate of the economy is explained by the variation of the independent variables in the equation while the adjusted R^2 of about 72 per cent shows that having removed the influence of many explanatory variables, the dependent variable is still explained by the equation with about 55 percent. The Durbin Watson (D.W) statistics of 1.98 is not substantially farther away from the traditional benchmark of 2.0 in the model, the study can conclude that there is likely no sign of auto- correlation or serial correlation in the model specification; hence the assumption of non-autocorrelation is not violated. The F Statistics (F=13.879; p=0.000) suggest the joint significance of the independent variables in explaining the variations in real output between 1989 and 2021.

From the estimation table, the signs and magnitude of the coefficients which signify the effect of agricultural credit, agricultural expenditure and agricultural contribution on real output shows that agricultural credit and agricultural contribution is in line with the apriori expected relationship in the literature while agricultural expenditure is not in line with the apriori expected relationship in the literature. In addition to the above, the coefficient of individual variables which are examined to determine the nature of the relationship between explanatory variables on real output between 1989 and 2021. The coefficient of agricultural credit and agricultural contribution were observed to be positive and statistically significant. Meanwhile, the coefficient of agricultural expenditure was found to be negative but statistically insignificant. From the result, a unit rise in the agricultural credit on the average is likely to lead to a 0.53 increase in real output at 95 per cent confidence interval (5 % significance level). Similarly, a unit rise in agricultural contribution to GDP will on the average bring about 0.529 unit increase in real output at about 5 per cent significant level. The long run error correction value shows that about 56% of disequilibrium in real output is corrected each year by changes in agricultural credit and contribution to GDP.

4.5.2 Long-run Model

Table 5: ARDL Long Run Form Results

Levels Equation				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LAGC	-0.201853	0.339167	-0.595144	0.5588
LAGE	2.453647	1.599026	1.534464	0.1414
AG	0.398870	0.305946	1.303726	0.2079
AGEMP	0.695209	0.456429	1.523148	0.1442
INF	-0.098974	0.049371	-2.004708	0.0595

Source: Researcher's Computation.

From the estimation table, the signs and magnitude of the coefficients which signify the effect of Monetary Policy Rate (MPR) on market /commercial banks interest rate in Nigeria shows that the agricultural expenditure, agricultural contribution and agriculture employment are in line with the apriori expected relationship in the literature while agricultural credit and inflation is not in-line with the apriori expected relationship in the literature. In addition to the above, the coefficient of individual variables is examined to determine the nature of the relationship between real output and explanatory variables between 1989 and 2021. The co-efficient of the agricultural proxies were observed to be positive and statistically insignificant. The coefficient of inflation rate (INF) was observed to be negative and statistically significant.

From the result, a 1 unit rise in inflation rate will on the average bring about 0.099 unit decrease in real output in Nigeria at about 6 per cent significant level.

4.6 Post Estimation Analysis

4.6.1 Auto Correlation Test for Real Output Model

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	5.483902	Prob. F(2,17)	0.0145
Obs*R-squared	12.15691	Prob. Chi-Square(2)	0.0023

Source: Researcher's Computation.

The Breusch-Godfrey Serial Correlation LM test is conducted to determine if there is autocorrelation among the explanatory variables in the model. The null hypothesis of no autocorrelation. From the table above, the R-Squared (R^2= 12.157; P. Value=0.002) while the F Statistics ($F_{2, 26}$ =5.4839; P. Value = 0.0145) shows that there is likely autocorrelation among the explanation variables in real output. Therefore, the null hypothesis is rejected.

4.6.2 Breusch – Pagan – Godfrey (BPG) Test Result

The Breusch – Pagan – Godfrey (BPG) was conducted to determine the presence of Heteroscedasticity. The result is presented in table 6.

Table 6: Heteroscedasticity Test Result

Heteroskedasticity Test: Breusch-Pagan-Godfrey

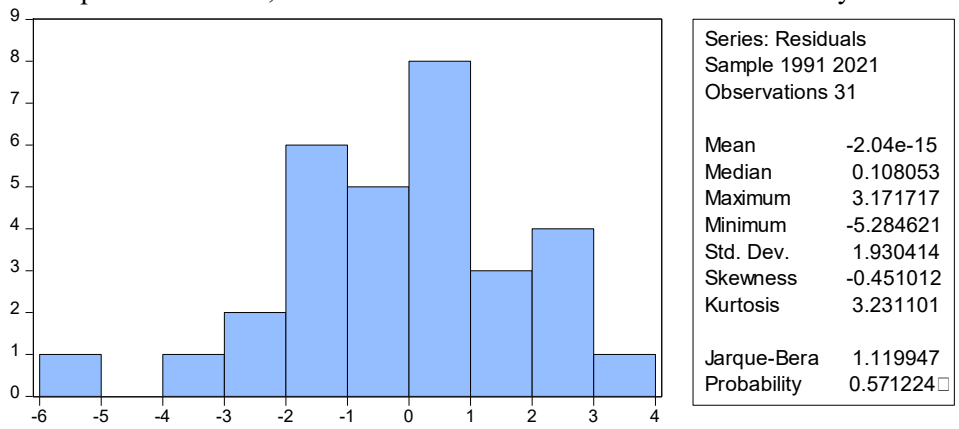
F-statistic	0.539096	Prob. F(11,19)	0.8527
Obs*R-squared	7.373898	Prob. Chi-Square(11)	0.7680
Scaled explained SS	3.090083	Prob. Chi-Square(11)	0.9895

Source: Researcher's Computation.

Using the Breusch – Pagan – Godfrey (BPG) test for the presence of Heteroscedasticity, the result confirmed that the explanatory variables were homoscedastic as shown by F-statistic to be 54 per cent with a probability statistic of 85 per cent. This means that the variables were free of Heteroscedasticity.

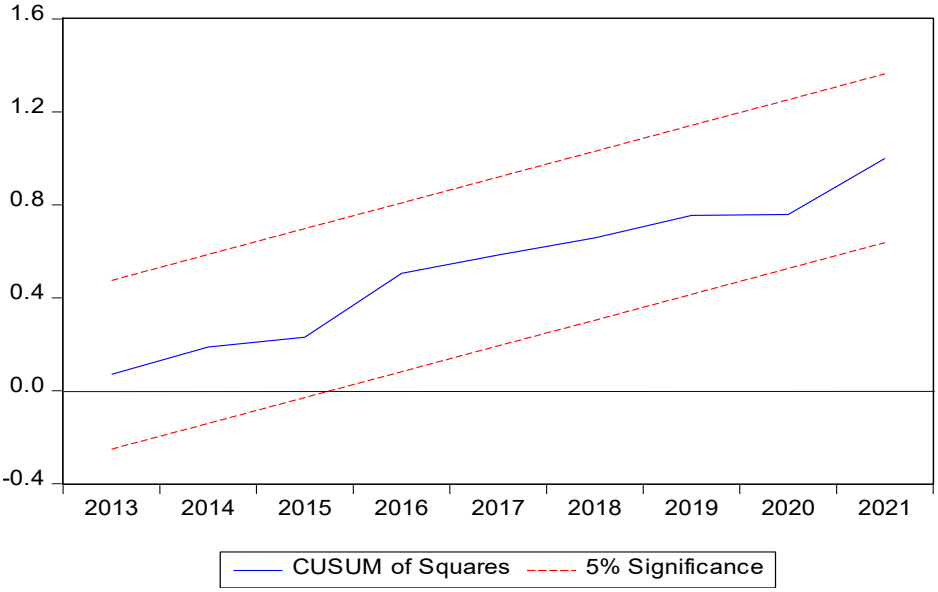
4.6.3 **Normality Test: Jarque-Bera Test**

Jarque-Bera test shows that the error terms of the estimated ARDL model is normally distributed because its p-value of 0.8 is greater than 0.05 significant level. Hence, accepting the null hypothesis of a normal distribution problem. Hence, the time series data of the variables are normally distributed.



Source: Researcher's Computation.

The stability test was performed using cumulative sum (CUSUM) of residuals. The plots of the stability test are given in figure 1. The existence of parameter instability is established if the cumulative sum of the residual goes outside the area between the critical (dotted bounded) lines. It was estimated at 5 per cent critical level.



Source: Researcher's Computation.

5.2. CONCLUSION

The study examined the impact of agricultural finance on real output growth in a bid to understand how government-initiated credit scheme programmes can affect the Nigerian economy between 1989 and 2021. One of the greatest challenges of the Nigerian economy today is the instability in policy and programmes. Hence, the significance of the explanatory variables (agricultural credit, agricultural contribution, expenditure, and inflation) in explaining the changes in real output growth, it suggests the relevance of the variables used in the study. The findings of the study corroborate the works of Orji et al. (2021), Ademola (2019), Anifowose (2011), Ahungwa et. al. (2014), Omojimite (2012) etc. Based on the findings, the recommendations are given to offer revamping the agricultural that have effect on the economy.

5.3 RECOMMENDATIONS

1. The Agricultural Credit Guarantee Scheme (ACGS) Funds should be made more active and should ensure that the collateral problems that most farmers face are taken care of and their credit access improved.
2. There should exist massive education and enlightenment of farmers to know the different sources of agricultural financing available. When such funds are accessed, it should be properly monitored to ensure efficient utilization in order to increase agricultural output. Maintenance of credible macroeconomic policies such as inflation that can aid pro-investment in overhauling the Agricultural Sector is necessary for an agricultural-led economic growth.

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