Impact of Agricultural Sector on Sustainable Financial Sector Growth in Nigeria

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Abstract- Since Nigeria gained independence, agriculture has been neglected, despite the country's 70.8 million hectares of agricultural land, out of which only 34 million hectares have currently been cultivated, leaving vast fertile lands unused, because of this it created food insecurity. Hence, the paper investigated the impact of agricultural sector on sustainable financial sector output in Nigeria between 2000 and 2022. The paper adopted the Dynamic Ordinary Least Squares (DOLS) technique, to regress on gross domestic product of the financial sector, with insurance inclusive as the dependent variable while the independent variables include agricultural productivity measured by the output of the agricultural sector (AGPROD), gross credits granted to the agriculture sector (GCA), gross amount distributed to the agricultural credit guaranty scheme (ACGS) and maximum lending rate (MLR). The result reveals that there is a statistical and positive effect of agriculture on sustainable financial sector output in agricultural productivity measured by the output of the agricultural sector (AGPROD). More so, the coefficient of the gross credit granted to agricultural sector (GCA) is positively related to sustainable financial sector output in Nigeria. By implication, a rise in gross credit granted to the agricultural sector (GCA) exerts a positive impact on the output of the financial sector performance in Nigeria. However, the coefficient of the agricultural credit guaranty scheme (ACGS) is positively related to sustainable financial sector output in Nigeria but statistically insignificant. Noticeably, the coefficient of the maximum lending interest rate is negatively and significantly related to sustainable financial sector output in Nigeria. Therefore, the paper concluded that agriculture positively promoted the sustainability of the output in the financial sector in Nigeria. It recommended that the Federal Ministry of Agriculture and CBN should be given top priority in the sector in terms of funds and other resource allocation to stimulate the financial sector's sustainable output in Nigeria.

Indexed Terms- Agriculture, Agricultural Credits, Financial Sector, Sustainable Output and DOLS

I. INTRODUCTION

Nigeria, by the conditions of its geography, is primarily an agrarian country. Historically, agriculture had played a crucial role in the growth of the Nigerian economy and was the main source of foreign exchange before the discovery of crude oil. In the 1960s and 1970s, Nigeria was the second-largest global producer and exporter of cocoa, the largest exporter of palm kernel, and a major producer and exporter of palm oil (Damilola & Adeleke 2023). Other commodities like cotton, groundnut, rubber, hides, and skins complemented Nigeria's export strength. Despite the use of traditional farming methods, the agricultural sector accounted for over 60 percent of the country's GDP during that period. Peasant farmers played a vital role, producing about 70 percent of total exports and satisfying 95 percent of the country's food needs (Adamgbe, *et al.* 2020).

In the 1980s, Nigeria, once heavily reliant on agriculture, shifted its focus towards crude oil, resulting in the neglect of agriculture despite the country's 70.8 million hectares of arable land of which only 34 million hectares are currently cultivated, leaving an estimated 36.8 million hectares fallow (Damilola & Adeleke 2023). The decline in the agricultural sector is evident in a paradoxical scenario: Malaysian farmers initially learned palm plantation techniques in Nigeria, but now they export palm products back to Nigeria. Malaysia has become a leading exporter of oil palm products and remains the world's largest producer of this commodity

(Damilola & Adeleke 2023). In 2021, Nigeria's agricultural imports continued to rise, reaching approximately ₦2.7 trillion. Notable imports included Durum wheat, crude palm oil, and palm oil from various countries. Agriculture relies on financial support, whether in commercial or subsistence farming. Seedlings, fertilizers, farm tools, and agrochemicals all require funding. Interestingly, just as agriculture depends on the financial sector for survival, the financial sector also relies on financial requests from agriculture and other sectors of the economy. Attesting to the submission of Kalu and Ifeanyi (2013), Ikpoto (2022) cited in (Damilola & Adeleke 2023).

Research trends in the literature have primarily focused on the impact of finance on agricultural growth (Ademola *et al.* 2019; Camilus, 2019; Fowowe, 2020; Ndife 2020; Ikpoto, 2022; Obioma *et al.* 2021; Olanipekun *et al.* 2022 & Awosusi *et al.* 2023). However, there has been limited research on how agriculture affects the financial sector. Ikpoto (2022) and Damilola & Adelike (2023) highlighted that despite an upward trajectory in agricultural imports, substantial amounts have been spent on agricultural loans under the Agricultural Credit Guarantee Scheme (ACGS). Since the advent of ACGS, created by the Central Bank of Nigeria (CBN) in 2000 loans to farmers in the areas of cash crops, livestock and food crops and the amount disbursed an average of N6.0 trillion between 2000 and 2022, to the agricultural sector (CBN, 2022). These loans and credits are not free; they come with interest, which constitutes the primary income for lenders. Additionally, insurance plays a crucial role in mitigating the negative impacts of crop failure and livestock illness. It also enhances farmers' ability to access agricultural-related credit and invest in labour and inputs. In return, insurance collects premiums from farmers. Given that banks and financial institutions granting these loans belong to the financial sector, the lending and insurance activities in agriculture are expected to impact the growth of the financial sector. Consequently, this paper aimed to project agriculture as a tool for achieving a sustainable financial sector in Nigeria. To the best of our knowledge, none of the studies used Dynamic Ordinary Least Squares (DOLS) and the specific objective of this paper is to examine the effect of agricultural sector on sustainable financial sector output in Nigeria.

Following this introduction, section 2 reviews the literature which includes a conceptual review of the finance and financial sector; agriculture and agricultural sector; the connection between agriculture and financial sector, and then a theoretical framework and empirical review. Section 3 of the paper presented the methodology. Then Section 4 contains Data Analysis and Results while Section 5 presented the conclusion and recommendations.

II.   LITERATURE REVIEW

2.1   Conceptual Review
2.1.1   Finance and Financial Sector
Finance refers to the management of money and other assets, including investments, lending, borrowing, budgeting, saving, and planning for the future. It encompasses various activities such as banking, investing, and managing risks. Finance is a critical aspect of both personal and business decision-making, as it involves allocating resources efficiently to achieve financial goals and maximize returns (Olayiwola *et al.* 2014). Conceptually, according to Otto et al., (2012), the financial sector must positively influence savings and investment before it will lead to economic growth. The system must perform five major functions. These include, it must mobilize and pooling savings; it must monitor investments and exert corporate governance after providing finance; facilitating the trading, diversification and management of risk; It must produce ex ante information about possible investments and allocating capital; and it must ease exchange of goods and services (Damilola & Adeleke, 2023).

Damilola and Adeleke (2023) citing Mamman and Hashim (2014) states that financial sector in Nigeria comprises bank and non-bank institutions with designated core mandates that are divergent but, in most cases, convergent when it comes to mobilization of funds and savings from areas of surplus to areas of deficit for efficient use. It further states that a typical capitalist or mixed economy is made up of surplus and deficit units. In performing their primary function of intermediation, banks collect deposits from the surplus units of the economy and lend them out to the deficit

units in the form of loans and advances. In Sanusi (2012), the role of the financial system in mobilizing and channeling of funds to the real sectors of the economy cannot be taken for granted. A sound financial system is recognized as a necessary and sufficient condition for rapid growth and development in every modern economy.

On this note, one of the core activities of the financial sector is providing finance to sectors that lack resources, including the agriculture sector. This service comes at a cost to the recipients in the form of interest and other fees, which is how financial institutions derive their income. His study focused on measuring the effect of agriculture as one of the borrowing customers of the Nigerian financial sector. If banks cannot grant loans to the deficit economic units within their operational environment, the business sector will not grow, deposits will be limited, and this will hinder the ability of banks to generate income and limit their growth.

2.1.2   Agriculture and Agricultural Sector

Owonifari and Larinde (2020) view Agriculture as a compound word that describes various means through which crops and animals sustain world human population through the provision of food products, industrial raw materials and other consumables. More so, Agriculture is known to be the bedrock for the growth and sustenance of so many economies, as well as a means of getting rid of poverty in developing nations. Olajide *et al.* (2012) define agriculture as a paramount importance to the development process. He points out that agriculture provided the basis for the world's great civilization in the past and the increase in agricultural productivity in England laid the basis for and sustained the first industrial revolution (cited in Damilola & Adeleke 2023).

In the flip side, the agricultural sector is known to employ over 75 percent of the labour force in developing countries and provides the purchasing power over industrial goods. According to Tombofa (2004) the agricultural provides the industrial and economic springboard from which a country's development can take off. Akinboyo (2008) defines agriculture as the science of making use of the land to raise plants and animals. It is the simplification of natures food webs and the rechannelling of energy for human planting and animal consumption. The United Nations Organization (2008) estimated that, over 50 percent of the world population is engaged in agriculture or dependent on it for a living. Ikala (2010) describes agriculture as the profession of the majority of humans. It includes farming, fishing, animal husbandry and forestry. Oji-Okoro (2011), stated that the agricultural sector is the largest in the Nigerian economy with its dominant share of the GDP, employment of more than 70 percent of the active labour force and generation of about 88 percent of non-oil foreign exchange earnings.

2.1.3   Finance and Agricultural Financing

The relationship between the financial sector and agriculture is interdependent. The G20 Global Partnership for Financial Inclusion (GPFI, 2015) emphasizes that credit is critical to agricultural finance, whether to purchase inputs like seeds, fertilizer, and tools or to cover ongoing operational costs before harvest time. Yet for the smallholders, credit is relatively rarely drawn from financial institutions. The cost of assessment of the client risks and transaction costs of providing loans by conventional means is too high for most financial institutions. Credit can also be made accessible by e-warehousing, which enables the recording and transfer of information on crop storage that can be used as a warehouse receipt for loan collateral. In addition, the International Institute for Sustainable Development (2015) states that aside from private sources of finance, governments are also important sources of finance for developing countries agriculture. Public financing can focus on particular actors, such as small farmers or enterprises; on particular issues, such as environmental protection and organic agriculture; or particular geographic locations. Other promising government initiatives include the creation of financial institutions in agriculture, whose regulations are usually defined by central banks.

According to the World Bank (2020), agriculture finance has to empower poor farmers to increase their wealth and food production to be able to feed 9 billion people by 2050. The Bank estimates that demand for food will increase by 70 percent by 2050, and at least $80 billion in annual investments will be needed to meet this demand. Therefore, there is an ever-increasing need to invest in agriculture due to a drastic

rise in global population and changing dietary preferences of the growing middle class in emerging markets towards higher value agricultural products. Based on the foregoing, increase in demand for agriculture credits from the financial sector due to expected increase in agricultural investment is imminent. This means that more income would accrue to the financial institutions and will manifest in terms of improved performance and growth in their financial statement. However, financial sector institutions in developing countries lend a disproportionately lower share of their loan portfolios to agriculture compared to their agriculture sector's share of GDP. The development and commercialization of agriculture require financial services for long-term funding that can support larger agriculture investments and agriculture-related infrastructure. This aligns with Ruiz (2014) who argues that farmers' decisions to invest and produce are closely influenced by access to financial instruments. If appropriate risk mitigation mechanisms are lacking, or if available financial instruments do not match farmers' needs, farmers may be discouraged from adopting better technologies, purchasing new/improved agricultural inputs, or making other decisions that can improve the efficiency of their businesses. Improving access to finance can increase farmers' investment choices and provide them with more effective tools to manage risks. According to CBN (2022), the trends of credits received by the agricultural sector from deposit money banks and microfinance banks increased from ₦41.03 million in 2000 to ₦449.31 million in 2015. Between 2016 and 2020 there was an uptick in agricultural credits by 35.0 percent from ₦449.31 million in 2015 to an average of ₦ 697.28 million in 2020. The trajectory in upward credits to the agricultural sector hit ₦1.457 billion, representing about 72.0 percent increase in 2021. In 2022 credits to the agricultural sector hit ₦1.457 billion, representing about a 100.0 percent increase for 2022. These connote that there has been an upward trajectory in the mobilization of credits to the agricultural sector from the financial sector over the years and by implication, many incomes in form of credit would have accrued to the lenders within the financial sector in the form of interest income and other charges, thereby contributing to the growth of the sector. Therefore, there is a need to evaluate the effects of these credits on the financial sector. Consequently, this study measures the effect of the finance received by the agricultural sector on the growth of the financial sector in Nigeria.

2.2 Theoretical Framework

This paper is anchored on the Supply-leading and Demand-following hypotheses which focus on the financial sector development responding to changes in the real sector (agricultural sector). Obioma, *et al.,* (2021) cited Schumpeter (1911), who advocates the supply-leading hypothesis with other scholars, states that financial sector development has a positive effect on output growth. The effect runs from financial development to output growth, and it is caused by an improvement in the efficiency of capital accumulation or an increase in the rate of savings as well as the rate of investment. Furthermore, as entrepreneurs have new access to supply-leading funds, their expectations increase and possible alternatives or new horizons are opened, thereby making the entrepreneur "think big" (Obioma, *et al.* 2021).

Reversely, the Demand-following Hypothesis states that the changes that occur in the real sector affect financial development that is financial sector output growth. Keynesian theory of financial deepening occurs due to an expansion in government expenditure. To reach full employment, the government should inject money into the economy by increasing government expenditure. An increase in government expenditure increases aggregate demand and income, thereby raising the demand for money (Mckinnon, 1973). On this note, agriculture, which is classified as part of the real sector and constituent of the aggregate economy has the potential to influence the financial sector's output growth because the Demand following Hypothesis expostulates that as the real sector develops, there would be a rise in the demand for financial services arising from the expansion in the real sector and this spurs growth in the financial sector. This is the position canvassed by Robinson (1952) which was summarised as "financial development follows economic growth", such that where enterprise leads, finance follows.

Fundamentally, the causal relationship between financial sector development and output growth depends on the stage of economic development. In the early stages of economic development, the supply-

leading view can stimulate real capital formation. The development of new financial services creates new opportunities for savers and investors and causes an increase in economic growth. The supply-leading view becomes less important as financial and economic development proceed, and gradually the demand-leading view starts to dominate. According to Obioma, *et al.,* (2021) citing Patrick (1966) one industry can be encouraged financially based on a supply-leading view, and, when it develops, its financing shifts to demand-leading. Other industries that are still at a low level of development will remain in the supply-leading phase.

2.3 Empirical Review

Damilola and Adeleke (2023) examined the effect of agriculture on the sustainable growth of the Nigerian financial sector between 1999 and 2020. The study employed gross domestic product to the agricultural sector (insurance inclusive) as dependent variables, gross credit granted to the agricultural sector by financial institutions, the amount granted to the agricultural sector under the Agricultural Credit Guarantee Scheme, the value of forex utilised by the agricultural sector and prime lending rate. The paper used the Autoregressive Distributed Lags Model (ARDL) techniques for the analysis. The result showed that credits granted to the agricultural sector by the financial institutions, and the amount granted to the agricultural sector under the Agricultural Credit Guarantee Scheme (ACGS) were positive and insignificant. More so, the productivity of the agricultural sector indicated a positive and statistically significant in influence on the sustainability of the Nigerian financial sector's growth. However, the prime lending interest rate maintained a negative and insignificant effect on the growth of the financial sector in Nigeria. The study concluded that agriculture promotes the sustainability of the Nigerian financial sector and recommended that the agricultural sector should be given top priority in terms of funds and other resource allocation to stimulate the sustainability of the financial sector's growth in Nigeria.

Awosusi *et al.* (2023) used the Ordinary Least Squares (OLS) regression technique examine the effect of bank lending on the performance of the agricultural sector in Nigeria between 2001 and 2021. The dependent variable is agricultural sector output, while the independent variables were inflation, interest rate, and credit to agricultural sector. The result obtained showed that there is no significant relationship between inflation and interest rate, on growth of agricultural sector in Nigeria. Specifically, credit to the agricultural sector did have a significant effect on the agricultural sector output growth in Nigeria. The study concluded that the inflow of credits to the agricultural sector has not translated to meaningful growth in the sector due to not favourable and harsh economic policies of the government. The study, therefore, recommended that the government should ensure that the stringent measures attached to credit acquisition such as high interest rates should be removed to enable the actors in the industries to have access to finance.

For the period 1981 to 2016, Ojo, *et al.* (2022) explored the effect of financial sector development on agricultural productivity in Nigeria. Autoregressive Distributed Lags Model (ARDL) techniques were employed, and the variables used were money supply, credit to private sector, loans to agricultural sector and GDP to agricultural sector. The result obtained revealed that agricultural sector loans have a negative effect on agricultural output. It was concluded that financial sector development influences agricultural sector productivity. The study recommended that government should focus on policies that would encourage commercial banks to reduce their cost of lending on the interest rate on agricultural loan to be reduced to 5 percent so that it stimulates investment in agriculture and promote output growth.

The Vector Error Correction Model (VECM) was used by Okwuchukwu (2022) to analyse the impact of agricultural financing on agricultural sector output in Nigeria between 1981 and 2018. Growth in the agriculture sector's Gross Domestic Product (AGDP) was proxy for the agricultural sector output, while commercial banks' credit to agricultural sector (CBCA), Agricultural Credit Guarantee Scheme Fund (ACGS), annual rainfall measured in millimeters (GEXA) and lending interest rate were the explanatory variables. The results revealed that ACGS has a positive and significant effect on CBCA, AGDP, INTR and GEXA were found to have negative but significant effect on AGDP. The paper concluded that the agricultural output was elastic, and this means that

the sector can improve its output if there are more funds available to the farmers. The paper recommended that policies should be made to diversify the economy of Nigeria and investment in the agricultural sector should be prioritized by the government by ensuring that certain per cent of total loans and advances of commercial banks are directed to the agricultural sector.

More so, Abdulrafiu and Christopher (2022) investigated the impact of agricultural finance on agricultural output in Nigeria between 1983 and 2018. The total output of the agricultural sector, agricultural finance to commercial banks as dependent variable. The Granger Causality test and Vector Autoregressive Model (VAR) were employed. The result showed that government agricultural finance and financing from commercial banks have significant and positive impact on Agricultural output in Nigeria. Therefore, the paper concluded that increased financing of the agricultural sector as well as the direction of lower interest-bearing loans to the agricultural sector is the way to further improve the output of the sector in Nigeria. The paper recommended that government financing of agriculture should be almost free, meaning, the cost and process of obtaining government loans should be made easy and government should closely monitor the performance of the sector to ensure the proper utilization of funds to the sector.

For the period 1990 to 2019, Olanipekun, *et al.* (2022) examined the financial sector development and industrial performance in Nigeria. Fully Modified Ordinary Least Squares and Granger Causality tests were employed as the models. Inflation rate, interest rate, total credit to private sector, broad money supply, exchange rate and industrial performance & manufacturing value were adopted as the variables. The result revealed that there is a unidirectional feedback relationship that flows from industrial performance to interest rate in one hand and one way feedback relationship flows from total credit to private to broad money supply on the other hand. The paper recommended that the Nigerian monetary authorities should ensure that adequate credit is disbursed to the private sector to drive better industrial performance in the countries.

Obioma, *et al.* (2021) explored the effects of agricultural financing on the performance of agricultural sector in Nigeria. Agriculture's contribution to GDP, annual rainfalls, government expenditure on agriculture, agricultural credit guarantee scheme, interest rate, and commercial bank loans to agriculture were employed as the variables. Vector Error Correction Mechanism (VECM) and Vector Autoregressive (VAR) were used as the models. The paper revealed that there is significant effect of Agricultural Credit Guarantee Scheme on the Contributions of agriculture to GDP. Commercial bank loans to agriculture showed positive and significant effect on Contributions of agriculture to GDP. The paper recommended that there should be increase in the amount which the agricultural credit guarantee scheme inject into the sector on annual basis and proper supervisory measures should be constituted to ensure efficient application and use of the money.

Orji, *et al.* (2021) assessed the impact of agricultural financing and agricultural output growth on employment generation in Nigeria between 1981 and 2017. The paper adopted the Autoregressive Distributed Lag (ARDL) model and employment, agricultural output growth, agricultural financing, agricultural output, aggregate expenditure, labour force population, wages, and price level were employed as the variables. The findings showed that 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. It was concluded that policymakers should endeavor to see that every fund allocated for specific agricultural schemes and interventions should be fully utilized for its purpose. The paper recommended that to increase employment opportunities, there should be careful monitoring of the implementation of each scheme and policy to realize its specific policy objectives.

Using the Pairwise Granger Causality Test, Orji, *et al.* (2020) carried out a study on the causal linkage between agricultural financing and agricultural output growth in Nigeria. Agricultural output growth and agricultural financing were employed as the variables. The findings showed that there was no causal linkage between agricultural output growth and agricultural financing. The paper recommended that 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.

Ndife (2020) evaluated the impact of Central Bank of Nigeria's development financing on the growth of the agricultural sector of the Nigerian Economy between 1981 and 2018. The paper used Scatter Plots and Regression analysis as the models. While CBN credit to agricultural sector, fishery, livestock, food crops and cash crops were used as the variables. The findings showed that there is a positive relationship between credits given for food crop farming and the growth of agricultural sector of the Nigerian economy. It was concluded that credit granted to the various aspects of agricultural sector through the ACGSF is not yet yielding the desired effect as it is yet to show significant impact in some areas. The paper recommended that government should strengthen the mechanism and processes through which the credits are delivered and also broaden the scope and availability of such credits for maximum impact.

Fowowe (2020) examined the effects of financial inclusion on agricultural productivity in Nigeria. The paper used the Living Standards Measurement Study–Integrated Surveys on Agriculture (LSMS-ISA). Access, agricultural productivity, household consumption, household net worth, household size, household religion, household location, household head, education of the household head, gender of the household head, occupation of the household head, quantity of fertilizer, quantity of herbicide, and quantity of pesticide were employed as the variables. The findings revealed that financial inclusion has a positive and statistically significant effect the agricultural productivity in Nigeria. The paper concluded that households with highly educated heads have lower agricultural productivity. This reflects the fact that agriculture in Nigeria is predominantly practiced by small-holder farmers with little or no technological innovation, leading to low yields. It was recommended that there is a need to embrace technology in agriculture. To achieve this, policymakers need to encourage educated people to get involved in agriculture.

Ademola (2019) examined the impact of agricultural financing on Nigeria's economy. The paper used the OLS model, and the variables employed were interest rate, credit size, commercial bank credit. GDP and agricultural output. The findings revealed that the productivity of investment will be more appropriately financed with resources administered by the commercial and specialized financial institutions. The paper concluded that agricultural output level in Nigeria has a negative impact on the level of economic development. The paper recommended that efforts should be made towards transforming the agricultural sector to make it a growth engendering and a reliable one for the Nigeria economic system to be able to move towards the standard set out in the Millennium Development Goals (MDGs).

Eleojo and Eyo (2019) investigated the impact of financial sector reforms between 1981 and 2016 in Nigeria. The variables used were total amount of formal credit made available to the crop sector, aggregate output of the fishing sector of the Nigerian agriculture, total amount of formal credit made available to the fishing sector, aggregate output of the livestock sector of Nigerian agriculture, total amount of formal credit made available to the livestock sector, credit in reserve, dummy, and financial reform dummy. Descriptive and inferential statistics were employed as the models in the paper. The findings showed that agricultural output of the crop sector was consistently higher than that of other agricultural subsectors in virtually all the reform periods. The paper concluded that adequate care should be taken in formulating the financial reforms for the transformation of agricultural sector especially in the livestock sector in which the reforms had a negative impact on its output, while reforms on crop and fishery subsector should be sustained.

Akanbi, *et al.* (2019) investigated the effect of agricultural sector expenditure on Nigeria's economic growth between 1981 and 2015. Vector Error Correction Model (VECM) was employed and agricultural output, government agricultural expenditure was used as the variables. The findings revealed that public spending on agriculture was low. The paper concluded that agricultural sector expenditure as a percentage of total federal spending averaged 3.63 was below the 10 percent benchmark of the Maputo Declaration. It was recommended that government should review upward agricultural

expenditure to stimulate growth in Nigerian economy, which could trigger more employment opportunity, increase per capita income, improved agricultural sector infrastructural deficit and reduce poverty.

Using the Engle Granger Co-integration Test, Error Correction Model (ECM) Test and Granger Causality Tests, Camillus (2019) researched on the causal relationship between financial deepening and agricultural sector output in Nigeria. Prime lending rate, deposit rate, ratio of financial savings to GDP, ratio of private sector credit to GDP, and ratio of money supply to GDP were employed as the variables. The paper concluded that the Nigerian government and their policy makers should concentrate more on the development of agricultural sector, this in turn will lead to more efficient and effective prime lending rate, savings attitude, increase the quantity and quality of money supply, enhanced private sector credit, improvement on exchange rate, effective mobile payment transaction and improved financial development that will in turn lead to economic growth. The paper recommended that policy makers should initiate policies that will promote the development of agricultural sector output and eliminate obstacles that hinder growth and deepen the robustness and competiveness of the agricultural sector business in Nigeria.

Between 1981 and 2016, Oguwuike (2018) carried out a study on the effect of agricultural output on economic growth of Nigeria. Ordinary Least Squares, Cointegration, Error Correction Mechanism (ECM) were used as methods. The variables used were GDP, crop production, livestock, fishery and forestry. The findings showed that there is co-integration amongst the variables in the model. The paper concluded that a well harnessed agricultural output or production will lead to optimum growth and development of the economy. The paper recommended that agricultural institutions should be revived, revamped and some privatized with proper supervision for better productivity. It also recommended that various agricultural policies and schemes should be reviewed and strengthened for effective implementations and the Nigerian government should increase budgetary allocation to the agricultural sector and ensure effective utilization of the funds/budgets that

translates into improved and increased output annually.

III. METHODOLOGY

3.1 Method of Data Analysis
The ex post facto research design was adopted for this paper. The design was adopted considering the nature of the study which requires the collection of data on events that had already taken place. Data for the study was collected mainly from the Central Bank of Nigeria (CBN) Statistical Bulletin 2022. The statistical model chosen for the analysis is a Dynamic Ordinary Least Squares (DOLS) analysis of the inbuilt approach, with the aid of E-view 13.0 software.

3.2   Model Specification
This paper adopted Damilola and Adeleke (2023) specification with slight modification of the model for the relationship between the effect of Agriculture on Sustainable Financial Sector Output in Nigeria. More so, the theoretical framework is anchored on the Supply-leading and Demand-following hypotheses which focus on the financial sector development responding to the changes in the real sector (agricultural sector). The model was originally introduced by Saikkonen (1992) and Stock & Watson (1993) and is given as:

$$Y_t = \propto + \beta \times_t + \sum_{j=-q}^{j=r} \delta \Delta \times y_{t-J} + e_t \; - - - - - -$$
$$- - - - - - - - - - - - 3.1$$

This under the assumption that adding q lags and r leads of the differenced regressors soaks up all the long-run correlation between the error terms. The study formulates the above model using one lead and one lag as follows.

$$RGDPFS = f(GCA, AGPROD, ACGS, LINTR \; \& \; FXAGR) - - - - - - - - - - - - - 3.1$$

The slight modification of the model

$$RGDPFS = f(AGPROD, ACGS, GCA \; \& \; MLR) - - - - - - - - - - - - - - - - - - 3.2$$

$$RGDPFS_t = \beta_0 + \beta_1 AGPROD + \beta_2 ACGS + \beta_3 GCA + \beta_4 MLR + e_t \; - - - - - - - - 3.3$$

$$RGDPFS_t = \beta_0 + \beta_1 AGPROD + \beta_2 \Delta AGPROD_t$$
$$+ \beta_3 \Delta AGPROD_{t-1} + \beta_4 ACGS$$
$$+ \beta_5 \Delta ACGS_t + \beta_6 \Delta ACGS_{t-1}$$
$$+ \beta_7 GCA + \beta_8 \Delta GCA_t$$
$$+ \beta_9 \Delta GCA_{t-1} + \beta_{10} MLR$$
$$+ \beta_{11} \Delta MLR_t + \beta_{12} \Delta MLR_{t-1} + e_t$$
$$-------- ------- -$$
$$-------3.4$$

The long- run or cointegrating coefficient that is $\beta_1, \beta_4, \beta_7, \beta_{10}$ is what the study used, while the differenced leads and lags ($\beta_2, \beta_5, \beta_8, \beta_{11}$) are usually not interpreted in the Dynamic Ordinary Lease Squares (DOLS) estimation techniques, because Stock and Watson (1993) considered the differenced leads and lags as nuisance parameters, as their role to address feedback effects and autocorrelation.

Where:

RGDPFS = Gross Domestic Product of the Financial Sector, Insurance Inclusive as the dependent variable of the paper;

AGPROD = Agricultural Productivity measured by the output of the Agricultural sector;

ACGS = The gross amount distributed to the Agricultural Credit Guaranty Scheme;

GCA= Gross Credits Granted to the Agriculture Sector; and

MLR = Maximum Lending Rate.

3.3 Apriori Expectation

The theoretical expectation of the explanatory variables is expected to be in the following manners with regard to dependent variables:

AGPROD >0, ACGS>0, GCA>0 MLR </>0

Table 1: Description of Variables

S/N	Variables	Acronyms	Measurement	Sources
1	Gross Domestic Product of the Financial Sector, Insurance Inclusive	RGDPFS	Measured in Billion Naira	CBN Statistical Bulletin, 2022
2	Agricultural Credit Guaranty Scheme	ACGS	Measured in Billion Naira	CBN Statistical Bulletin, 2022
3	Gross Credits Granted to the Agriculture Sector	GCA	Measured in Billion Naira	CBN Statistical Bulletin, 2022
4	Agricultural Productivity measured by the output of the Agricultural sector	AGProd	Measured in Billion Naira	CBN Statistical Bulletin, 2022
5	Maximum Lending Rate	MLR	Percentage %	CBN Statistical Bulletin, 2022

Source: Author's Computation 2024.

3.4   Data Sources

The paper used annual data between 2000 and 2022 mainly from secondary sources from the statistical bulletin of the Central Bank of Nigeria (CBN) to achieve the objectives of the paper

IV.   DATA ANALYSIS AND RESULTS

Table 2: Descriptive Statistics

	RGDPFS	AGPROD	ACGS	GCA	MLR
Mean	2332.752	16937.30	601596 1.	397.8296	25.42285
Median	1908.805	14037.83	584938 9.	255.2053	25.80285
Maximum	6701.132	47944.06	124562 51	1457.822	31.44447
Minimum	165.2931	1508.409	361449. 0	41.02890	18.08667
Std. Dev.	1838.740	12909.49	351816 6.	428.6042	3.966342

			-		-
Skewness	-0.645687	0.893427	0.067957	-1.394296	0.245796
Kurtosis	2.541712	2.922360	1.935564	4.008149	2.022819
Jarque-Bera	1.799437	3.065589	1.103517	8.426252	1.146689
Probability	0.406684	0.215931	0.575936	0.014800	0.563637
Observations	23	23	23	23	23

Source: Author's Computation, 2024.

Table 2 above shows the result of the descriptive statistics of mean, standard deviation, maximum and minimum values of the variables, measures of dispersion in the variables, and measures of normality for twenty-three (23) observations. It shows that within the study period Gross Domestic Product of the Financial Sector, Insurance Inclusive (RGDPFS) as the dependent variable of the paper on average was 2332.752 while its associating standard deviation was 1838.740 and the minimum and the maximum values were 164.2931 and 6701.132 respectively. With regards to Agricultural Productivity measured by the output of the Agricultural sector (AGPROD), the mean value was observed at 16937.30 with a standard deviation which is 12909.49. Furthermore, the minimum and the maximum values were observed to be 1508.409 and 47944.06. Concerning The gross amount distributed to Agricultural Credit Guaranty Scheme (ACGS), it was observed that the ACGS average mean value of 6015961.0 with its associating standard deviation of 3518166.0. The minimum and the Maximum values were 361449.0 and 12456251.0. The mean value of gross Credits Granted to the Agriculture Sector (GCA) by the financial institution was observed at 397.8296 with a standard deviation of 428.6042. Hence, the minimum and maximum values were 41.02890 and 1457.822. It further revealed that the maximum lending rate (MLR) had a mean value of 25.42285 with a standard deviation of 3.966342.

Skewness which measures the shape of the distribution shows that two of the variables have the value to be negative, which suggests that their distribution tail is left of the Meanwhile three variables have Skewness

to be positive which suggests the distribution tails to the right of their means. Variables with a value of kurtosis less than three are called platykurtic (fat or short-tailed), RGDPFS, AGPROD, ACGS and MLR are variables qualified for this during the study period. The Jarque-Bera probability values are shown in Table 2 above. However, the normality of the data does not affect the regression result.

Table 3: Correlation Analysis

Covariance Correlation	RGDPFS	AGPROD	ACGS	GCA	MLR
RGDPFS	3233966.				
	1.000000				
AGPROD	2238372 4	1.59E+0 8			
	0.985844	1.000000			
ACGS	2.24E+0 9	1.36E+1 0	1.18E+1 3		
	0.361407	0.312603	1.000000		
GCA	711892.8	5148467.8	3.17E+0	175714.5	
	0.944372	0.972786	0.219935	1.000000	
MLR	4071.124	28566.52	-1700193.9	62.92991	15.04787
	-0.583592	0.583261	0.127379	0.592179	1.000000

Source: Author's Computation 2024.

Table 3 revealed a positive correlation between the variables with the output variable as expected. However, the correlation matrix is used to determine the relationship between the dependent and independent variables and to observe the relationship among the independent variables of the study. Agricultural Productivity measured by the output of the Agricultural sector (AGPROD) has a positive insignificant correlation with RGDPFS. This is also reflected in the other variables above.

Stationarity Test of Variables

The stationarity of the series employed was checked first using the PP and ADF developed by Dickey and Fuller (1979). The result is shown in Table 4

UNIT ROOT TEST TABLE (PP)

		d(LRGDPFS)	d(LAGPROD)	d(LGCA)	d(LACGS)	d(MLR)
At First Difference						
With Constant	t-Statistic	-4.3131	-3.7346	-7.4922	-4.3904	-4.4339
	Prob.	*0.0032*	*0.0112*	*0.0000*	*0.0027*	*0.0024*
		***	**	***	***	***
With Constant & Trend	t-Statistic	-4.7047	-4.1596	-8.4765	-4.9534	-4.4587
	Prob.	*0.0062*	*0.0185*	*0.0000*	*0.0037*	*0.0102*
		***	**	***	***	**
Without Constant & Trend	t-Statistic	-2.7011	-2.2119	-4.7966	-4.2345	-4.5304
	Prob.	*0.0095*	*0.0291*	*0.0001*	*0.0002*	*0.0001*
		***	**	***	***	***

UNIT ROOT TEST TABLE (ADF)

		d(LRGDPFS)	d(LAGPROD)	d(LGCA)	d(LACGS)	d(MLR)
At First Difference						
With Constant	t-Statistic	-4.3151	-1.5561	-6.2693	-3.5260	-4.4339
	Prob.	*0.0032*	*0.4821*	*0.0000*	*0.0181*	*0.0024*
		***	n0	***	**	***
With Constant & Trend	t-Statistic	-3.1401	-1.0900	-6.2147	-4.1110	-4.4567
	Prob.	*0.1289*	*0.9006*	*0.0003*	*0.0213*	*0.0102*
		n0	n0	***	**	**
Without Constant & Trend	t-Statistic	-1.7897	-0.5184	-4.7962	-3.3334	-4.5304
	Prob.	*0.0704*	*0.4769*	*0.0001*	*0.0021*	*0.0001*
		*	n0	***	***	***

Notes: (*) Significant at the 10%; (**) Significant at the 5%; (***) Significant at the 1%. and (no) Not Significant

The unit root /stationary test is shown in Table 4. Unit root analysis is a test conducted to ascertain if the variables under consideration are stationary. The Phillip Perron (PP) and Augmented Dickey-Fuller (ADF) test was employed. However, as indicated in Table 4 shows that the variables are in order of integration I (1) according to (PP) test. Since all the variables were found to be stationary at order one I(I), it was safe for the study to employ Dynamic Least Squares (DOLS) to validate or test for the presence of Co-integration.

Dependent Variable: LRGDPFS

Method: Dynamic Least Squares (DOLS)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LAGPROD	0.883760	0.168823	5.234833	0.0008
LGCA	0.379694	0.159135	2.385988	0.0441
LACGS	0.029853	0.108260	0.275756	0.7897
MLR	-0.082808	0.019830	-4.175972	0.0031
C	-1.317059	2.445796	-0.538499	0.6049

R-squared	0.996824	Mean dependent var	7.508075
Adjusted R-squared	0.992061	S.D. dependent var	0.941964
F-statistic (0.0000)	288.8782		

Source: Author's Computation 2024.

4.1   Discussion of Findings and Results
The result of the DOLS indicated in Table 5 revealed that the coefficient of the agricultural productivity measured by the output of the agricultural sector is directly related to the output of the financial sector performance in Nigeria. The contribution of AGPROD is about 88 percent, this reveals that there is a statistical and positive effect of agriculture on sustainable financial sector output in Nigeria. This finding conforms with the studies of Damilola & Adeleke, 2023; Fowowe, 2020; Ndife, 2020) and theoretical intuition. On the flip side, it is contrary to the studies of Ademola (2019) and Oji, *et al.* (2020).

The coefficient of the gross credit granted to agricultural sector (GCA) is positively related to sustainable financial sector output in Nigeria during the study period. By implication, a rise in gross credit granted to the agricultural sector (GCA) exerts a positive impact on the output of the financial sector performance in Nigeria. Accordingly, a 1 percent increase in GCA there would be about a 38 percent significant increase in the financial sector output in Nigeria. Hence, finding conforms with the studies of Damilola & Adeleke 2023; Fowowe 2020; Ndife, 2020) and theoretical intuition. Contrary to the findings of Ademola, (2019) and Oji *et al.* (2020). However, the coefficient of the Agricultural Credit Guaranty Scheme (ACGS) is positively related to sustainable financial sector output in Nigeria but statistically insignificant. This is in line with Orji *et al.* (2020) finding and contrary with the studies of Damilola & Adeleke, 2023; Fowowe, 2020; Ndife, 2020). Noticeably, the coefficient of the Maximum lending interest rate is negatively and statistically significantly related to sustainable financial sector output in Nigeria. Hence, the maximum lending interest rate equally met a priori expectation as it was expected to either be positive or negative. Its negative sign thus connotes that, an increase in maximum lending interest rate discourages borrowing by agricultural investors and this will produce the multiplier negative effect on income accruing to the financial sector from interest charges, thereby scaling down the growth of the sector.

The overall significance of the study was measured by F-statistics implying that there is a positive impact on the output of the financial sector performance in Nigeria. Conclusively, Agricultural Productivity is measured by the output of the Agricultural sector, gross credits granted to agriculture by the financial institutions, and credits granted under agricultural credit guarantee scheme as the drivers of the financial sector's growth hence, a priori expectation was met in respect of these variables. Maximum lending interest rate equally met a priori expectation as it was expected.

Post-Estimation Diagnosis Test Result
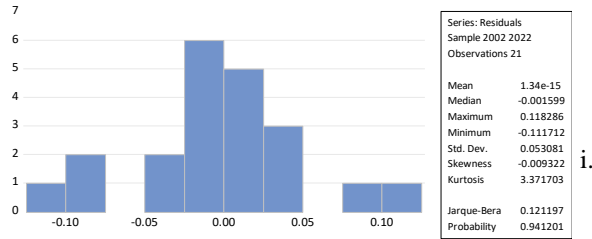
Source: Author's Computation 2024.

The normality test of the paper. The post-estimation of this finding is a result of the inbuilt approach of the Dynamic Ordinary least squares (DOLS).

V. CONCLUSION AND RECOMMENDATION

Since Nigeria gained independence, agriculture has been neglected, despite the country possessing 70.8 million hectares of agricultural land. Unfortunately, only 34 million hectares are currently cultivated, leaving vast fertile lands unused, this created a persistent hunger and starvation among the Nigerian population of over 200 million. Hence, the paper investigates the impact of agricultural sector on sustainable financial sector output in Nigeria between 2000 and 2022. The paper adopted the Dynamic Ordinary Least Squares (DOLS) technique, and the variables include Gross Domestic Product of the Financial Sector, Insurance Inclusive (RGDPFS) as the dependent variable while the independent variables include agricultural productivity measured by the output of the agricultural sector (AGPROD), Gross Credits Granted to the Agriculture Sector (GCA), gross amount distributed to the Agricultural Credit Guaranty Scheme (ACGS) and maximum lending rate (MLR). The result reveals that there is a statistical and positive effect of agricultural sector on sustainable financial sector output in agricultural productivity measured by the output of the agricultural sector (AGPROD). More so, the coefficient of the gross credit granted to agricultural sector (GCA) is positively related to sustainable financial sector output in Nigeria. By implication, a rise in gross credit granted to the agricultural sector exerts a positive impact on the output of the financial sector performance in Nigeria. However, the coefficient of the Agricultural Credit Guaranty Scheme is positively related to sustainable financial sector output in Nigeria but statistically insignificant. Noticeably, the coefficient of the maximum lending interest rate is negatively and statistically significantly related to sustainable financial sector output in Nigeria.

The study recommends as follows:
It revealed that Agricultural Productivity measured by the output of the Agricultural sector (AGPROD) was a significant driver of the financial sector, the Federal Ministry Agriculture and other subsidiaries agent should prioritize investment in the agricultural sector by increasing the amount made available to farmers under Agricultural Credit Guarantee Scheme and making the conditions for its accessibility less stringent.

The banks and other financial institutions in the financial sector should be given special directives by the Central Bank of Nigeria (CBN) to prioritize agricultural lending to further boost the productivity of the sector and by extension, the growth of the financial sector in the long-run.

Maximum lending interest rate on agricultural credits should be critically looked into, and specially reviewed downward, such that it encourages borrowing for agricultural investments and eventually reverses the negative relationship trend in the long-run.

The monetary authority should critically investigate the funds given to Agricultural Credit Guarantee Scheme and set up a special monitoring squad, with a mandate to curb the unproductive incidences of diversions of funds main the agriculture sector in Nigeria.

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