**AGRICULTURAL FINANCING AND THE NIGERIAN ECONOMIC GROWTH**

**OYATAYO, Taiwo Taoridi PG/18/021286/BMS**

# IGBINEDION UNIVERSITY, OKADA

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**AGRICULTURAL FINANCING AND THE NIGERIAN ECONOMIC GROWTH**

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**BEING A THESIS SUBMITTED TO THE DEPARTMENT OF BANKING AND FINANCE, SANUSI LAMIDO SANUSI COLLEGE OF BUSINESS AND MANAGEMENT STUDIES IGBINEDION UNIVERSITY, OKADA IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF DOCTOR OF PHILOSOPHY (Ph.D.) IN BANKING AND FINANCE OF IGBINEDION UNIVERSITY, OKADA EDO STATE , NIGERIA**

# SUPERVISOR: PROFESSOR SUNDAY AGUWAMBA

**CO-SUPERVISOR: PROFESSOR RAPHAEL IGBINOSA ADEGHE**

**SEPTEMBER, 2021**

# DECLARATION

It is hereby declared that this study “Agricultural Financing and the Nigerian Economic Growth” was undertaken by OYATAYO, Taiwo Taoridi in the Department of Banking and Finance, College of Business and Management Studies, Igbinedion University, Okada under the supervision of Professor Sunday Aguwamba and Co-Supervisor Professor Raphael Igbinosa Adeghe. The idea of this research thesis are the product of my personal research, and the view of other researchers which have been dully acknowledged.

## OYATAYO, Taiwo Taoridi

PG/18/021286/BMS

Date:

# DEDICATION

This thesis is dedicated to God Almighty, my lovely wife Bosede Oyatayo and children (Victory, Glory and Godspower Oyatayo) for their contributions toward my achieving this great height in life.

# CERTIFICATION

We, the undersigned, certified that this Thesis titled “Agricultural Financing and the Nigerian Economic Growth” is an original research work carried out by **OYATAYO, Taiwo Taoridi** of the Department of Banking and Finance, College of Business and Management Studies, Igbinedion University Okada, and has not been submitted for the award of any other degree anywhere.

## Professor Sunday Aguwamba Date

*Chief Supervisor*

## Professor Raphael Igbinosa Adeghe Date

*Co-Supervisor*

## Professor Sunday Aguwamba Date

*H.O.D Banking and Finance*

## Professor Raphael Igbinosa Adeghe Date

*Dean, College of Business And Management Studies*

Date

*External Examiner*

Date

*Dean, School of Postgraduate Studies and Research*

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# ABSTRACT

This study employed regression to examine the impact of agricultural financing on economic growth in Nigeria from 1981 to 2019. The study made use of four explanatory variables and one control variable which included Agricultural output (AO), Agricultural Loans (AL), Agricultural Expenditure on Trainings (AET), Interest rate (INTR), and Inflation rate (INFR) as control variable. All these to establish the impact, the explanatory variables have on the dependent variable (Real Gross Domestic Product) proxy for economic growth. The results of unit root test revealed that; all the variables are stationary at 5% since their absolute value of ADF statistics are greater than their critical value at 5%. The regression result revealed; AO, AL and INTR have positive and significant impact on the RGDP proxy economic growth. They are significant at 5% based on t-statistics computed. These findings were in agreement with the a priori expectations. While AET have positive but insignificant impact on RGDP. In the result, R2 is 99.8% meaning that about 99.8% of RGDP in Nigeria is explained by the independent variables. Therefore, the stated Null hypothesis on AO, AL and INTR were all Rejected on the condition that their P-value were less than the probability bench mark value of 5% and hence, there Alternative Hypotheses Accepted. But for AET, its Null Hypothesis was Accepted on the condition that its P-value was greater than its Probability bench mark of 5%. The study recommends the following; There is an urgent need to improve on Agricultural output (AO) by the Government in providing and ensuring internal security so as to enable our farmers operate without hindrance to improve on their agricultural productivity by the menace of kidnapping banditry; In order for agricultural loans (AL) to further have more impact on economic growth policy makers should intensify efforts towards making policies that will enforce and encourage financial institutions to timely and adequately disburse and monitor Agricultural Loans to the targeted users and it judicious and effective utilization to avoid corruption in disbursement and mismanagement of such funds; The Government of Nigeria should encourage the training (AET) of more Agricultural Extension workers that will train rural farmers on the use of improve technologies to enhance increase productivity; The government through the Central bank of Nigeria should formulate and implement institutional strengthening policies in the areas of effective agriculture financing by providing lower interest rate (INTR) to the real sector of the economy that have direct effects on the citizenry to encourage more domestic agricultural investments; In solving high INFR problems policies should be put in place to control prices of Agric inputs and outputs. In the following ways this study has contributed to knowledge; that it has added to empirical literature by contributing to the body of knowledge and has made few significant recommendations as strategies to promote agricultural productivity in extension economic growth in Nigeria.

**Key Words: Agricultural Financing, Agricultural Output, Agricultural Expenditure on Training, Interest Rate, Inflation Rate, Economic Growth**

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# CHAPTER ONE INTRODUCTION

## Background to the Study

Sustainable public sector interventions in agriculture is critical to the growth and transformation of this sector. The agricultural sector in Nigeria is endowed with fertile soil, complimented by streams, lakes, forests, lush grassland, as well as huge demand driven by a large active population, estimated at 182 million as at 2016 (representing 2.35 percent of global population). The abundant resources, if properly harnessed can support self- sufficiency in food, supply of raw materials to the industrial sector and provide gainful employment to the teeming population, of which about 50 per cent of them are employed in this sector (World Bank, 2017).

In Nigeria, until the exploration and exploitation of oil in commercial quantity in the early 1950’s up to the early 1970’s (before the discovery of crude oil) agriculture was the mainstay of the economy, employing 70 per cent of the total population. In an effort to diversify her oil base economy, Nigeria is placing much emphasis on financing other sectors most especially agricultural sector, since agriculture has the potential to stimulate economic growth through provision of raw materials, food, jobs and increased financial stability (World Bank, 2017).

In the early 1980’s, it became more apparent that the agricultural sector could no longer perform its traditional role of meeting domestic food requirement, raw materials for industry and started to decline as a major foreign exchange earner through exports; due to economic, social and political problems despite the fact that; Nigeria's soils and climate allow cultivation of a wide variety of food crops, including cassava (of which Nigeria is the largest world producer), millet, sorghum and maize. Agriculture is Nigeria's biggest employer of labour, accounting for about 60 per cent of the workforce, working mainly in small-holdings using basic tools. Together with livestock rising, it provides a third of gross domestic product (Arokoyo, 2012). It follows that agriculture financing is one of the most important

instruments of economic policy for Nigeria, in her effort to stimulate development in all directions. Finance is required by agricultural sector to purchase land, construct buildings, acquire machinery and equipment, hire labour, irrigation etc. In certain cases such loans may also be needed to purchase new and appropriate technologies. Not only can finance remove financial constraints, but it may also accelerate the adoption of new technologies (Arokoyo, 2012). The primary goal of agricultural financing policies in Nigeria is to establish an effective system of sustainable agricultural financing schemes, programs and institutions which could provide micro and macro credit facilities for the small, medium and large-scale producers, processors as well as marketers. However, agriculture contributes immensely to the Nigerian economy in various ways, namely, in the provision of food for the increasing population; supply of adequate raw materials (and labour input) to a growing industrial sector; a major source of employment; generation of foreign exchange earnings; and provision of a market for the products of the industrial sector Agriculture financing is mainly a long-term financing that aims at inducing agriculture-led growth and development in an economy. Long-term foreign capital flows take several forms. The broad groups include foreign direct investment, portfolio equity investment, official development assistance and foreign loans. The last of these groups can be further sub-divided into development loan stocks, loans from bilateral, multilateral and capital market, bond finance, and other private loans. However, the growth of output of any economy depends on capital accumulation, and capital accumulation requires investment and an equivalent amount of domestic and external finance to match it (Arokoyo, 2012).

Far back early 1960's, Nigerian economy prospered on the agricultural sector as it was seen as the main pillar for growth and development. Due to unstable nature and performance of agriculture in the country, government at different levels have over the decades instituted and carried out many policies and projects aimed at restoring agriculture to its veritable position

in the economy. But evidence from empirical literatures reveals that there is no breakthrough yet as a result of many problems facing the performance of the sector (Yusuf, 2014).

It is said that a strong and efficient agriculture should ensure, in a nation, adequate food security for the growing population, generate employment, enough raw materials for the industries and sustenance of balance of payment equilibrium. A sustaining growth in agriculture is a major factor in the eradication of poverty and hunger as it aids reasonable stability in the prices and availability of food, apart from being the foundation of export earnings which sustains the balance of payment equilibrium; it also ensures industrial growth of a nation with high capacity utilization not only through the production and smooth flow of raw materials but also release of labor and consequently, full employment. Agricultural growth and development is the foundation of a diversified economy and which in turn sustains the strength of a nation for real economic growth and development. With its apparent failure to meet up the above highlighted responsibilities, it is evident that the sector has relegated its prime position as the main anchor of the Nigerian economy to the petroleum sector that is not even effective in ensuring the citizens welfare and national security. One of the obvious effect is the security insurgences that cut across the country – with Boko Haram in the North, Massob and the Mend boys, etc in the East and South-South and the Armed robbers in the West. The above score card shows the precarious situation of agriculture and which perhaps, informed the decision of the Central Bank of Nigeria - CBN, in the year, 2011, to launch NISRAL (Nigeria Incentive-Based Risk Management System for Agricultural Lending). NIRSAL is said to be a dynamic, holistic approach that tackles both the agricultural value chain and the agricultural financing value chain. It is regarded as the monetary authority’s innovative approach of combating the challenges of low productivity, poor technology and cultural practices, low research and development, and under-financing of the agricultural value chain. With the current financing level of agriculture standing at about 2% of total banks lending, NIRSAL is planned to invest USD 500million (about N75

billion) via fixing of the agricultural value chain and encouraging banks to lend to the agricultural value chain through strong incentives and technical assistance (CBN, 2011).

The previous schemes of the Federal Government included, amongst others, the Agricultural Credit Guarantee Scheme Fund (ACGSF -1977); Nigerian Agricultural, Cooperative and Rural Development Bank – NACRDB (now: Bank Of Agriculture-BOA) Ltd (1973), and the latest CACS –Commercial Agricultural Credit Scheme (2009), all of which, in about 40years, have sunk billions of naira into agricultural sub-sector. This is apart from the World Bank assisted States Agricultural Development Programmes (ADPs) and the States’ Agricultural Credit Programmes. Not much seems to have been achieved through these schemes (CBN,2011).

## Statement of the Problem

Spending to the agricultural sector within the last five years point to the credibility of the

country’s diversification policy. Apart from little or no tangible result, the spendings fell

short of various agreements on agricultural policies and commitment made by the Nigerian

Government to diversify away from oil. In its Medium Term Plan for 2017 – 2020; President

Muhammadu Buhari led government’s Economic Recovery and Growth Plan (ERGP)

preached inclusive growth through diversification of production, achieving maximum welfare

for the citizens by ensuring food and energy security. The Government had planned to use

agriculture as a lever to achieve food security, create jobs, and save foreign exchange for

food imports. To achieve this, the Federal Government increased budgetary allocation to the

sector by three-digit billions for the first time in 2017. In that year, President Buhari

government allocated **₦**135.6 billion to the sector. In 2018 and 2019, the figures increased to **₦**203 billion and **₦**137.9 billion respectively. Despite this, the contribution of the sector to GDP remained sluggish between 20 percent to 21 percent. The same contributory range in

about 9 years. The reason remains that recurrent expenditure still has a huge percentage of the allocation (Aderemi, 2020).

Nigerian Governments have not been able to adequately address these specific constraints in an attempt to increase agricultural production in Nigeria (Lawal & Abdullahi 2011). For example, the Nigerian government was reported to have said and quoted in Ruma (2008) that “nevertheless, the agricultural sector’s contributions to the economic growth and development are yet to be fully exploited since Nigerians are still very vulnerable to hunger and poverty”. The poor people live in the rural and urban centers usually constitute a large percentage of the population in the country and they are the dominant producers of food and other essential materials; yet the formal financial institutions have not adequately provided financial services to them as a result of the institutions stringent conditions for making funds available to farmers as well as the lack of access to available funds by farmers (Olajide, Akinlabi & Tijani (2012). This is because most of the financial institutions are located in the urban areas far from the reach of the local farmers who live in the rural areas. These peasant farmers rely essentially on the informal financial institutions in their areas. Konare (2001) endorsed that the issue of inadequate access to credit by rural farmers, among others, has remained the central concern for farmers, and a key constraint to the modernization and diversification of their activities.

In as much as getting startup capital is difficult; the financial institutions in Nigeria are always reluctant to finance Agribusiness projects despite the fact that there is always a ready market for Agricultural produce. The excuse is that Agricultural production is too risky for them to invest in rather they prefer to invest in the processing aspect of Agribusiness because it falls under manufacturing. They have forgotten that the raw materials for the manufacturing firms are basically and primarily Agric produce directly or indirectly

Mehrteab (2005) opines that the main hurdle confronting the farmers when trying to acquire loans from formal financial institutions is the demand for collateral by those institutions.

Additionally, the process of acquiring a loan entails a lot of paperwork and many bureaucratic procedures that lead to extra transaction costs. These institutions show a preference for large-scale transaction over small-scale transaction and non-agricultural over agricultural loans. The universities and the schools of agriculture have for a number of years produced graduates as well as technical officers whose primary duties have involved helping the farmers to improve their Farming practices. Therefore, one might then ask: what are the reasons and implications for their ineffectiveness with the farmers?

In as much as the objectives of this study are well intentioned bellow, it might be too presumptuous at this stage to make any valid judgment regarding the outcomes of these objectives until sufficient evidence from this study has been amassed to warrant such an assessment. But it should be made clear that the situation in Nigeria demands a radical shift toward improve Agricultural financing that will promote its economy.

Buhari (2021) said in his last broadcast to the Nation on democracy day (12th June, 2021) that; the economic sustainable plan which is primarily focused on the non-oil sector which include Agriculture, has recorded phenomenal growth by contributing over 90% to the GDP growth in the first quarter of 2021. But surprisingly, previous evidence from empirical literatures reveals that there is no breakthrough yet as a result of many problems facing the performance of the Agricultural sector (Yusuf, 2014); Which include corruption, misappropriation of Agricultural development funds, lack of access to such funds by rural farmers, high interest rates on loans, poor or no extension services rendered to farmers on the use of modern technology and all these have resulted in food insecurity over time and poor economic growth. Relative to the amount of money lent to the other sectors of the economy, the total amount lent to agriculture is structurally deficient, insignificant and inadequate, relative to the following challenges: low budgetary allocation, corruption, and policy inconsistency and somersaults.

Therefore, the objective of agricultural financing policies in Nigeria is to establish an effective system of sustainable agricultural financing schemes, programmes and institutions that could provide micro and macro credit facilities for the micro, small, medium and large scale producers, processors and marketers. Therefore, this study when fully carried out will proffer solutions to the outlined problems that will improve on the Agriculture financing policies and strategies that will further encourage the productivity of rural farmers in their occupation of farming that will enhance economic growth in Nigeria.

## Objectives of the Study

The broad objective of this study is to examine the impact of agricultural financing on the Nigerian economic growth; specifically, to:

* + 1. Determine the impact of Agricultural output on the Nigerian economic growth.
    2. Assess the effect of agricultural loans on the Agricultural output in Nigerian.
    3. Evaluate the effect of Agricultural Training Expenditure on the Nigerian economic growth
    4. Examine whether interest rate on Agric. Loans influences the economic growth in Nigeria.

## Research Questions

The variable questions arising from this research study were presented as follow;

* + 1. To what level has Agricultural output influenced the Nigerian economic growth?
    2. To what extent have agricultural loans influenced Agricultural output in Nigeria?
    3. To what degree have Agricultural Expenditure on Training influenced the economic growth of Nigeria?
    4. To what extent does interest rate on Agric. Loans influence the Nigerian economic growth?

## Hypotheses of the Study

The Hypotheses of the study were formulated in Null form:

**H01**: Agricultural output has no significant effect on the Nigerian economic growth **H02:** There is no significant effect of Agricultural loans on the Agricultural output in Nigerian.

**H03:** Agricultural Expenditure on Training have no significant effect on the Nigerian economic growth.

**H04:** There is no significant influence of Agricultural Loan interest rate on the Nigerian economic growth

## Significance of the Study

The significance of Agricultural financing on the Nigerian Economy is timely and has the following relevance:

The study provides an econometric basis upon which the impact of Agricultural financing is examined on the Nigerian economy. The research will give an insight that will clear the perception as to whether Interest rates have effect on Agricultural financing in Nigeria. The research will also enable policy makers and relevant stakeholders in nation building such as Federal Ministry of Agriculture and Rural development and Central Bank of Nigeria (CBN) in making policies that will guide against adverse effect on the economic growth of the country resulting from Agriculture financing. The research will add value to both academics and the professionals; in making contributions to the Government based on empirical findings related to Agricultural financing and economic growth. The research will establish facts on why government should financially support farmers in acquiring agricultural education and

occasional training on how to improve on their productivity and hence, promote economic growth. The literature review will serve as a useful source of secondary database for the academic world and Nigeria at large

## Scope of the Study

This study focuses on Agriculture financing and the Nigerian economic growth for a period of thirty nine years (1981 to 2019). The period is suitable for this research because, statistically; sample size of 39 years is adjudged to be a large sample.

## Limitations of the Study

In the course of this study, the researcher encountered some limitations. The scope of the study is limited to Agriculture financing and the Nigerian economic growth between the periods of 1981-2019. This was so, because of the researcher’s inability to obtain a complete study data from other sub-sectors of the real sector of the Nigerian economy outside the Agricultural sub-sector. The collection of data was limited to the following variables; Agricultural loans, Agricultural output, Interest rate charged on Agricultural loans, Agricultural expenditure on training, Inflation rate and Gross Domestic Product. The researcher encountered difficulties in data sourcing before the final assembling of the time series data on Agricultural Education/Training (Human capital development). Also was unable to study more proxy to economic growth aside the Gross Domestic Product (GDP). The inability of the researcher to study more variables were occasioned by the incomplete or non-availability of study data. In spite of these limitations, the objective of this study will still be realized.

## Definition of Operational Terms

The following are the definitions of the operational terms in this study;

## Agriculture

Is the science of making use of the land to raise plants and animals. It is the simplification of nature’s food webs and the rechanneling of energy for human planting and animal industries.

## Agricultural Sector

Okopi (2008) sees the agricultural sector in the Nigerian contexts to embrace all sub- sectors of the primary industries. They include farming (which includes livestock rearing and growing crops) fishing and forestry.

## Agriculture finance

Agriculture finance refers to (public or private) resources (in form of equity, gift or loan) for improving social welfare through development of agricultural sector (Shreiner & Yaron, 2001).

## Agricultural Loan

This is that which is made available by banks, micro finance institutions and also government agencies to help develop the Agriculture sector; which is availed by a farmer to fund seasonal agricultural operations or related activities like Livestock farming, crop farming, purchase of land, Agricultural tools/ implements, machineries or other farm inputs like chemicals, seeds etc. ([www.paisabazaar.com>pe](http://www.paisabazaar.com/)rsonal loan).

## Agricultural output

Is defined as the main measure of individual crop and livestock output.

## Interest Rate

Ibimodo (2005) defined interest rate, as the rental payment for the use of credit by borrowers and return for parting with liquidity by lenders. Wikipedia (2005) defined interest rates as the rate at which interest is paid by a borrower for the use of money that they borrow from a lender. It can also be defined as the rate which is charged or paid for the use of money and is usually expressed as an annual undertaking.

## Agricultural Education and Training

A popular interpretation of agricultural education is that it is fundamentally synonymous with agricultural extension. This can include either programs for training of farmers. Agricultural education encompasses the study of applied sciences (e.g., biology, chemistry, physics) in relation to Agriculture and business management principles to which Agricultural education provides opportunities to learn basic agricultural skills and knowledge, occupational training and retraining, and professional growth and development.

## Inflation rate

This measures the proportion of sustained general rise in prices of goods and services over time, expressed in percentage.

## Economic growth

Is an increase in the per-capital income of an individual in the economy and it is usually measured in terms of an increase in Real Gross National Product (RGNP) or Gross Domestic Product (GDP) over time. GDP measures increase in total output to a change in population.

# CHAPTER TWO LITERATURE REVIEW

## Introduction

From the review of previous literatures it is very obvious that so many empirical studies have established that a relationship exist between agricultural sector and the economy of Nigeria. The reviews of the studies carried by different researchers have shown a positive relationship between agricultural output among others and economy of Nigeria. It was revealed that agricultural sector is viable and a propeller to economic growth. It plays a significant role in job creation, food sufficiency and foreign exchange earnings of the country. Changes in technology, changes in perception and changes in governance in both agricultural sector and in Nigeria as a whole. This section will critically focus on the conceptual issues, empirical and theoretical related literatures on the subject matter.

## Conceptual Issues

The following are the conceptual issues that are related to this study;

## Concept of Agriculture

Akinboyo (2008) defines agriculture as the science of making use of the land to raise plants and animals. It is the simplification of nature’s food webs and the rechanneling of energy for human planting and animal industries. Ogen (2007) states that from the standpoint of occupational distribution and contribution to the GDP, agriculture was the leading sector in the 1960s. Also, the Nigerian economy, like that of Brazil, could reasonably be described as an agricultural economy during the first decade after independence. This is because agriculture served as the engine of growth of the overall economy of the two countries. Agriculture is the economic mainstay of the majority of households in Nigeria and is a vital

sector for the economy. The important benefits of the agricultural sector to Nigeria’s economy include: the provision of food, contribution to the gross domestic product, provision of employment, provision of raw materials for agro-allied industries and foreign exchange earnings during the period of 1960s, Nigeria was the world’s second-largest producer of cocoa, the largest exporter of palm kernel and the largest producer and exporter of palm oil. It was also a leading exporter of other major commodities such as cotton, groundnut, rubber, as well as hides and skins. Despite the reliance of Nigerian peasant farmers on traditional tools and indigenous farming methods, these farmers produced 70% of Nigeria’s exports and 95% of its food needs. The agricultural sector however suffered neglected during the hey-days of the oil boom in the 1970s.

## Concept of Agriculture Financing

Agriculture financing is mainly a long-term financing that aims at inducing agriculture-led growth and development in an economy. Long-term foreign capital flows take several different forms. The broad groups include foreign direct investment, portfolio equity investment, official development assistance and foreign loans.

Public funds are subsidized funds and private funds regardless of their price, are not subsidized, unless a contribution is tax free or the market price is affected by an explicit or implicit state guarantee of the liabilities of a development finance institution (Shreniner & Yaron, 2001). The following are the sources of Agriculture finance according to Dosaraf Multibiz Concept (2016); Commercial Banks; Microfinance Banks; Cooperatives; Bank of Agriculture; Bank of Industry; Self-Financing.

## Commercial Banks

Commercial Banks have been known to be very discrete and beaurucratic in the approval and disbursement of loan most especially Agribusiness loans. They see Agribusiness as a very

risky business as a result they don’t believe in its viability except if it has been in existence for some years. However, some commercial banks now have special package for SME’s as they now see the need to improve and boost the nation’s economy through them. Agriculture and Agribusiness are categorized under the SME package. The customers of SME package enjoy great benefits one of which includes loans. Some of the banks are: Fidelity Bank; United Bank of Africa; First Bank of Nigeria; Access Bank Plc; First Bank of Nigeria; Stanbic IBTC; Ecobank e.t.c. According to Amechi (2004); Commercial banks can also finance agricultural projects. She further said; “In Nigeria, the federal government directs Commercial banks to allocate a part of their lending to agriculture at reduced interest rates. Such banks usually set up departments of agriculture and employ agriculturists to manage them. Such loans can be on; **Short-term;** where the loans are used to finance Annual and biennial crops and quick maturing Livestock Projects such as pigs and poultry. **Medium- term**; Where the loan matures in two or three years, such loans are normally invested on biennial and some perennial crop which mature in about three years such as Cassava, Citrus, Oil palm etc. **Long-term;** where the loan matures in three or more years, they are used to finance long-spanning perennial crops such as Cocoa, Kola, rubber, etc.

## Microfinance Banks

The microfinance banks have different loan plans, repayment structure and interest rate. The following are the Microfinance Banks that provides finance for Agribusiness (Dosaraf Multibiz Concept, 2016); BOWEN Microfinance Bank; ACCION Microfinance Bank etc.

## Cooperatives

Cooperatives are a wonderful source of funds for any business either small or big. This is because they operate a pool of funds from members’ contribution which may be daily, weekly or monthly. It is safe, reliable; it comes with low interest rate, flexible repayment plan

and tenure. Locate any multipurpose cooperative society today and begin to enjoy access to funds (Dosaraf Multibiz Concept, 2016).

## Bank of Agriculture (BOA)

Federal Government of Nigeria owned BOA and their activity is managed by the Central Bank of Nigeria (Dosaraf Multibiz Concept, 2016). The bank offers different types of loan to practicing farmer. The bank from its name is basically for people engaging in Agribusiness. They offer Micro Credit and Macro credit funds to people, with no collateral from N250, 000 to N1,000, 000. Interest rate is as low as 12%. 1year Repayment tenure is with 3 months moratorium. You are qualify to apply for loan after 1 month of account operation and you will be interviewed before final disbursement of loan comes after your site will be inspected.

## Bank of Industry (BOI)

The Bank of Industry was established by the Federal Government of Nigeria to support industrialization that cuts across different sectors to provide special funding for startups and established firms. This bank offers variety of loan funding packages for Nigerian entrepreneurs which depends on the sector their business falls into. These are the following loan funding windows from Bank of industry (Dosaraf Multibiz Concept, 2016); Graduate- Entrepreneurship-Fund; Agro-Processing Group; BOI – Dangote Fund; Bottom Of The Pyramid; Cap Fund; Cassava Bread Fund; Cottage Fund; FGN Special Intervention Fund; State Matching Fund e.t.c

## Self-financing

According to Aryeetey (1996), this is where a farmer decides to reinvest his savings in another agricultural project or expanding an already existing one. This, however, is a slow

process of saving money depends on a lot of factors: economic and fiscal factors. It leads to small-scale farming and is only suitable for subsistence farming.

## Concept of Agricultural Loan

This is a loan facility offered to people employed in the Agricultural sector to carry out agricultural activities. This provides the capacity to purchase a new farm or expand current operations. Farm loans are available through traditional lenders as well as dedicated government agencies. Fortunately, government usually comes in with low interest loans and other subsidies that usually help the farmers to make profit at the end. These loans are mostly used for the following (business.com, 2021);

1. Purchase farm land
2. Cover operating expenses
3. Help with the marketing of their farm product

## Concept of Agricultural Output

**Enterprise** is an identifiable sector of the farm or horticultural business, for which output includes valuations of unsold stocks produced by the enterprise.

**Agricultural output** is the main measure of individual crop and livestock output (Farm Survey, 2016). It comprises:

1. ***Crop enterprise output*;** which is the total value of crops produced by the farm (other than losses in the field and in store). It includes crops used for feed and seed by the farm business and those consumed in the farmhouse and by farm labour. Crop enterprise output is calculated on a "harvest year" as distinct from an "accounting year" basis; that is, it refers only to those crops (with the exception of certain horticultural crops) wholly or partly harvested during the accounting year and excludes any crop carried over from the previous year. Thus valuation changes (between the previous and current crops) are not relevant and

the total harvested yield of the crop is valued at market prices (plus any subsidies). However, any difference between the opening valuation of any stocks of previous crops and their ultimate disposal value (sales, used on farm and any end-year stocks) is included in total farm output (Farm Survey, 2016).

1. ***By-products forage and cultivations***; which cover the value of output of the by-products of agricultural activity, sales of fodder, valuation changes for fodder and cultivations. It also covers revenue from the letting of bare land or forage on a short-term lease (Farm Survey, 2016).
2. ***Livestock enterprise output;*** comprises the total sales of livestock and livestock products including *direct livestock subsidies* and production grants received*,* part of the valuation change, produce consumed in the farmhouse and by labour and the value of milk and milk products fed on the farm (excluding direct suckling) adjusted for debtors at the beginning and end of the year (except for direct livestock subsidies) and transfers between enterprises; However, changes in the numbers of breeding livestock between the opening and closing valuation and the total valuation change of trading livestock are included. Unlike crop enterprise output, livestock enterprise output is calculated on an accounting year basis (Farm Survey, 2016).
3. ***Miscellaneous output*** covers the value of output from those activities which are still within the agricultural cost centre but do not fall within either livestock or crop enterprise output. These will include revenue from wayleaves, agricultural hirework, sundry woodland sales, contract farming rent, miscellaneous insurance receipts and compensation payments.

**Total Farm Output** is total crop enterprise output plus adjustment for output from previous year’s crops plus total livestock enterprise output plus output from home grown fodder crops plus output from tillages and forage plus output from non-agricultural diversified activities plus miscellaneous revenue plus single payment (Farm Survey, 2016).

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## Concept of Interest Rate

According to Sanusi (2002), interest rates are the costs a borrower has to pay when obtaining a loan in any economy. This definition implies that, interest rates are the determinants of the cost of credits in an economy. The impact of high cost of interest rates in the society is not unconnected to the fact that borrowers may hesitate to borrow when they should. This may be because the cost of credit and the credit itself may aggregate to an amount that may be unaffordable to the borrower to pay back within the stipulated due date of the loan. The implication of this on the economy is that GDP of the economy would be low since equity financing alone cannot adequately sponsor the production activities in an economy.

To Sekuma (2011), money is borrowed at a cost and the cost associated with the borrowing of funds is referred to as interest rate. It is not just production of goods that are negatively affected by increased interest rates but also affected are those involved in real estate business. The increase in interest rates affects demand for mortgages posing a challenge on the prices of residential real estates. On the contrary, proponents of high interest rates are of the opinion that high interest rates encourage the supply of idle funds in the market making an improvement in the cycler flow of funds and making accessibility of funds quite easy for businesses to flourish.

## Concept of Agricultural Extension Education and Training

Education and teaching are pre-requisite for learning and effective performance in extension. Asiabaka (2002) states that learning means change in behaviour of the learner which can

manifest in the cognitive, affective and psychomotor domains. Accordingly, he distinguishes education from training and emphasizes that education connotes knowledge of both theory and practice while training has to do more with practice. Extension training and education take two major dimensions: pre-service and post service. While preservice education and training are obtained in a formal school, college or university set-up, post service education and training are planned to fill a skill-gap, improve upon the pre-service training and usually received on the job.

Agricultural education is a type of vocational training involving the equipping of the learners with the knowledge and skills involved in productive agriculture. It involves the training of both the head and the hands of the learners. Agricultural education entails the use of scientific knowledge in the teaching and learning of food production through the acquisition of knowledge of crop production, livestock management, soil and water conservation and other associated benefits for industrial and human development. It is a type of vocation that emphasizes preparation and participation in an occupation for social value (Odogwu, 2005).

## Concept of Inflation Rate

Inflation, this affects the farm economy most directly through the cost of inputs. Compared with any other major sector in the economy, because it is highly competitive and most of the output is perishable, agriculture is the least able to pass input cost increases through into higher output prices. Consequently, farmers suffer loss of income/profits during inflation. Thus, in Nigeria, the government’s agricultural pricing policy objective is to ensure attractive producer prices for agricultural commodities in order to encourage farmers to produce more. To attain this objective, the Federal Government has always left the domestic food prices to be determined by free market forces with little or no intervention (Obasi, 2007).

The credibility of macroeconomic policy may be perceived through at least three main indicators: inflation rate and its variability; real exchange rate variability; and sustainability

of fiscal balance. These three indicators interact with an economy’s degree of openness trade and the ease of cross-border financial transfers, as moderated by foreign exchange control regulations. High inflation, for instance, make domestic asset holders react to the erosion of the real value of their assets by moving their assets abroad. Also, since inflation is often regarded as an indicator of the government overall ability to manage the economy, a rising inflation rate tends to undermine that ability (Obasi, 2007).

## Concept of Economic Growth

The concept of economic growth is seen as an increase in the per-capital income of an individual in the economy. The economy of a nation is considered to have grown when the nation’s capital dividend by the total population of such a country increases sustainability (Akintoye & Olowulajo, 2008). Haller (2012) stressed that; Though no unanimously accepted definition has been forgotten by now, most of the theoreticians think of the economic development as a process that generates economic and social, quantitative and particularly, qualitative changes, which causes the national economy to cumulatively and durably increase its real national product. We could therefore estimate that *economic growth* is the process of increasing the sizes of national economies, the macro-economic indications, especially the GDP per capita, in an ascendant but not necessarily linear direction, with positive effects on the economic-social sector, while development shows us how growth impacts on the society by increasing the standard of life. in one sense and in the other, economic growth can be: positive, zero, negative. *Positive economic growth* is recorded when the annual average rhythms of the macro-indicators are higher than the average rhythms of growth of the population. When the annual average rhythms of growth of the macro-economic indicators, particularly GDP, are equal to those of the population growth, we can speak of *zero economic growth. Negative economic growth* appears when the rhythms of population growth are higher than those of the macro-economic indicators. Economic growth is a complex, long-run

phenomenon, subjected to constraints like: excessive rise of population, limited resources, inadequate infrastructure, inefficient utilization of resources, excessive governmental intervention, institutional and cultural models that make the increase difficult, etc. Economic growth is obtained by an efficient use of the available resources and by increasing the capacity of production of a country (Todaro & Smith, 2011).

## Current State of Nigerian Agriculture

Nigeria’s key agricultural statistics according to Oyaniran (2020) are as follow;

The share of agricultural contribution to GDP as at Q1 2020 is at approximately 22%; The agricultural sector remains the largest employer in Nigeria (36% of labourforce); More than 80% of Nigeria’s farmers are smallholder farmers (SHFs). These numbers accounts for 90% of Nigeria’s agricultural produce; Only about N40 billion was earmarked by the government for agricultural research and development (R&D) in 2019; Agriculture budget represents 1.8% (or N183 billion) of the total 2020 budget size. This significantly falls short of the 10% specified in the Maputo Declaration; Nigeria’s tractor density is put at 0.27 hp/ hectare which is far below the FAO’s recommended tractor density of 1.5 hp/hectare; Nigeria’s agricultural trade deficit widened by N689.7 billion in 2019 compared to N549.3 billion in 2018; In four years (2016–2019), Nigeria’s cumulative agricultural imports stood at N3.35 trillion, four times higher than the agricultural export of N803 billion within the same period; Nigerians spent about N22.8 trillion on food items in 2019, representing more than half (56.7%) of the total household expenditure of N40.2 trillion

## Agriculture's contribution to GDP (%)

Agriculture is broadly divided into four sub-sectors in Nigeria; crop production, fishing, livestock and forestry. Crop production remains the largest segment and it accounts for about 87.6% of the sector’s total output. This is followed by livestock, fishing and forestry at 8.1%,

3.2% and 1.1% respectively. Agriculture remains the largest sector in Nigeria contributing an average of 24% to the nation’s GDP over the past seven years (2013 –2019). In addition, the sector employs more than 36% of the country’s labourforce, a feat which ranks the sector as the largest employer of labourin the country (Oyaniran, 2020).

## Challenges of the Nigerian Agricultural Sector

According to Oyaniran (2020), the following are the challenges of the Nigerian Agricultural Sector;

**Violent conflict,** due to the desertification and water depletion in the northern part of Nigeria, nomadic herdsmen are now shifting towards the south of the country in search of grazing fields and water for their animals. This has resulted in violent conflict with crop farmers in the south. Increased violence in the food producing states is causing decline in Nigeria’s food production output; **Resource shortages,** over the past years, Nigeria has dealt with very low yields per hectare due to shortages in the supply of inputs such as seedlings and fertilizers as well as inadequate irrigation and harvesting systems, which hinders productivity and yield rates; **Lack of access to finance,** although the Nigerian government has provided several facilities through the Central Bank of Nigeria (CBN) such as the Anchor Borrower’s Programme to help provide small-scale farmers with adequate financing, the farming industry still lacks adequate access to finance; **Insufficient supply to meet population growth and food demand,** with a population of roughly 200 million people, Nigeria’s agricultural productivity is insufficient to meet the food demanded of its growing population thus increasing the demand and supply gap in Nigeria; **Absence of value addition and supply- chain linkages,** Nigeria focuses mostly on food production, thus neglecting the processing and manufacturing segment of the value chain (Oyaniran 2020).

## Government initiatives in Agricultural infrastructure

Government initiatives in Agricultural infrastructure according to Oyaniran (2020) are as follow;

**Establishment of Special Agro-Industrial Processing Zones,** the Federal government is establishing Special Agro-Industrial Processing Zones to concentrate agro processing activities and also SAPZs are aimed at boosting productivity, integrating production and enhancing the processing and exporting of select commodities**; Development of Railway Infrastructure,** as part of its plans to aid the free flow of goods, the Government is in construction of rail lines across the country and once complete, these would serve as an alternative to road transport and enhance the distribution of goods and commodities within the country**; Development of Road Infrastructure,** in addition to its development of Railway infrastructure, the Federal government is also investing in the rehabilitation and construction of roads linking numerous parts of the country and a key example is the ongoing rehabilitation of the Lagos Badagry expressway which serves as a key component of the West African Trade Routes**; Enhancement of Ports Infrastructure,** in addition to the six existing seaports, the government has commenced the development of additional ports in AkwaIbom and Lagos to enhance its maritime capabilities and the Nigerian Ports Authority has also signed a MOU with the Royal Port of Antwerp Oyaniran (2020).

## Nigerian agriculture as the base of the economy

The metrics related to Nigeria’s recovery from the 2016 recession indicate that agriculture has the potential to stimulate growth and support national efforts aimed at boosting the economy. In the first year of implementation of the Economic Recovery and Growth Plan (ERGP), the agricultural sector was the only one with positive growth contribution (about 24%) to the national Gross Domestic Product (GDP). It also grew by over 4% during the same period. But more importantly, agriculture employs over two thirds of the country’s

labour force. Nigeria’s Agriculture Promotion Policy (2016-2020) has identified two key gaps in agriculture: an inability to meet domestic food requirements; and an inability to export at quality levels required for competitive performance and market success (FAO, 2018). As a result of the economic recession and subsequent scarcity of foreign exchange, manufacturers, industries and consumers were forced to source produce from within the country thereby, creating opportunities for farmers, agricultural dealers, processors and other actors involved in the agricultural value chains who inevitably had to respond to this demand. The growth currently being experienced in the agricultural sector is manifesting itself through increase in the cultivation of land for food production and dedication of more resources to livestock rearing (FAO, 2018). It stands out clearly that in spite of the oil, agriculture remains the base of the Nigerian economy, providing the main source of livelihood for most Nigerians. Agriculture is thus one of the main drivers of the economy and of employment in the country. According to the FAO (2018) the Nigerian agricultural sector accounts for 84% of those employed in Nigeria, working mostly in family farms and private small businesses that are however not optimally integrated into the value chains. While the Nigerian agricultural sector has strong potential to employ the labour surplus that the youth provide, it is faced with a myriad of problems affecting its performance. To further improve its attractiveness, the agricultural sector has to be able to compete with other (FAO, 2018).

## Growth trends and major challenges to Nigerian agriculture

Over the past 20 years, value-added per capita in agriculture has risen by less than 1 percent annually. It is estimated that Nigeria has lost USD 10 billion in annual export opportunity from groundnut, palm oil, cocoa and cotton alone due to continuous decline in the production of these commodities which are generally considered as cash crops. As concerns food crops, increases in production have not kept pace with population growth, resulting in rising food imports and declining levels of national food self-sufficiency (Abuka & Ebiemere, 2013). For

example, Nigeria is one of the largest producers of rice in Africa and concurrently the continent’s leading consumer of rice, but she is also one of the largest rice importers in the world. Rice is not only an important food security crop but is an essential income-generating crop for the majority of small-scale producers who commonly sell up to 80% of total production and consume only 20%. Rice generates more income for Nigerian farmers than any other cash crop in the country. With regards to tuber crops, the country is the largest producer of cassava in the world, with about 50 million metric tons produced annually from a cultivated area of about 3.7 million ha. Nigeria accounts for about 20% of the world cassava production, and about 34% of Africa’s production of the crop. Close to 65% of total production is in the southern part of the country where it is predominantly grown by smallholders on small plots for family consumption and sales at the local level. Large-scale commercial plantations of cassava are rare. Livestock and fisheries development is an important component of Nigerian agriculture with abundant social and economic potentials. In spite of this high potential, domestic fish production still falls far below the total demand, which was estimated at 2.2 million metric tons per year in 2008 (FAOSTAT, 2018). As a result, the country imports about 60% of the fish consumed. To reduce the level of fish imports, aquaculture has been given particular attention as one of the priority value chains to be developed. As far as livestock production is concerned, about 60% of the ruminant livestock population is found in the country’s semi-arid zone and mostly managed by pastoralists. Domestic production of livestock products is far below the national demand, resulting in large imports of livestock and livestock products. Except for eggs, the domestic production of animal products is less than half the demand for beef mutton and goat meat, while for milk and pork products it is less than a quarter of the demand; NV20:2020, 2009 (Abuka & Ebiemere, 2013).

## Government policies and strategies for agricultural development

Prior to the mid-1980s economic development in Nigeria was largely rooted in development planning such that agricultural policies, programs and projects were given priority attention in the various plans. However, during the period from the mid-80s to the late-90s development planning was abandoned in favour of the structural adjustment plan. This opened the way for a diversity of policies and programs that have been conceived and implemented over specific eras. In the period from 2001 – 2007 the National Economic Empowerment and Development Strategy (NEEDS I and II) was drawn up and implemented with the Presidential initiatives aimed at developing selected agricultural commodities. This was followed by the Seven-Point Agenda (2007 - 2010) culminating in the preparation of the Food Security Strategy Document in 2009 which ushered in the need to lay emphasis on a value chain approach to agricultural development. During this period of strategic planning, the Nigerian Government also formulated sub-sector specific policies including (FAO, 2017):

1. The Land Resources Policy to guide the sustainable use of agricultural lands;
2. The National Cooperative Development Policy;
3. The National Agricultural Mechanization Policy and;
4. The National Seed Policy

In order to reduce rural exodus and empower the rural population to create jobs, wealth and contribute to poverty reduction, the National Policy on Integrated Development was formulated. This policy sought to integrate the Nigerian rural economy into the mainstream of the national development process through effective coordination and management. From 2001 – 2009 some innovative programs and projects covering such areas of agricultural development as production, marketing, storage and financing were implemented. The most prominent of these programs and projects were the Special Program for Food Security (SPFS), the FADAMA II Program, the Presidential Initiatives on Cassava, Rice, Vegetable oil, Tree Crops and Livestock, the Fertilizer Revolving Fund (FRF) and the restructuring of

the Nigerian Agricultural, Cooperative and Rural Development Bank (NACRDB). In 2004, three key agricultural development and marketing companies were established. These included the Tree Crops Development and Marketing Company, the Livestock Development and Marketing Company and the Arable Crops Development and Marketing Company. Targets were among others, to strengthen agricultural production, provide useful marketing information and marketing outlets as well as storage and processing facilities (FAO, 2017).

To innovate and facilitate credit delivery, the Central Bank of Nigeria (CBN) developed new strategies based on the Trust Fund model with the aim of reducing risks faced by banks in agricultural lending for production, processing and marketing operations. As a result of the implementation of these policies, strategies and specific initiatives, programs and projects, the agricultural sector recorded significant advances both globally and at the level of specific commodities. Notable, were the tremendous increases in the outputs of staples like maize, millet, sorghum, cassava, rice, vegetable oil and yam. Annual production of cassava for example increased from 33 million metric tonnes in 1999 to 46 million metric tonnes in 2006 while that of rice increased from 3.3 million metric tonnes to 4 million metric tonnes over the same period (FAO, 2017). In most developing countries (low and middle-income countries), the agricultural sector remains, the largest contributor providing inputs, food, employment opportunities, raw materials for other industries, provision of foreign earnings from exportation of the surpluses, and more importantly the enormous advantage of the value added in the various production process (Izuchukwu, 2011).

## Overview of Institutional Support and Financing of the Agricultural Sector in Nigeria

The World Bank-assisted Agricultural Development Projects (ADPs) and the River Basin Development Authorities (RBDAs) were among the institutional support agencies established to promote the sustainable development of Nigeria’s agricultural sector. The ADPs, which

started operation with three pilot projects in 1975, had increased to ten by 1985, and further increased to thirty-one by 1993. Their activities were all-embracing, covering four integrated components of agriculture, including adaptive research, agriculture extension, input supply and rural infrastructure development. In contrast, the number of RBDAs was reduced from eighteen to eleven during the period and their functions restricted to water resource management and development. In accordance with the new focus, all the RBDAs were expected to dispose of all their non-water assets and withdraw from all activities involving direct production. Also, during the period, a unified extension in services system was adopted to ensure the orderly development of a sustainable agricultural sector, with particular emphasis on the smooth transfer of research findings from research institutes to Nigerian farmers. The ADPs and the Agricultural Project Monitoring and Evaluation Units (APMEU) were restructured to form the unified extension services to Nigerian farmers. The rapid expansion of the ADPs to all states of the federation was designed to ensure effective extension services to the farmers in rural areas, and enhance the distribution of agricultural inputs and infrastructure development (Bashir, 2013). Unfortunately, the expanded mandates of the ADPs overstretched their resources as the level of required funding could not be sustained to support their activities. The federal and state governments failed to meet their financial obligations to the ADPs, precipitating the non-release of the World Bank’s counterpart funding. As might be expected in the circumstances, the lag between research findings and their adoption by Nigerian farmers has increased rather than decreased.

Government intervention in the agricultural sector was informed by the need for national food security to ensure sustainable access to, and availability and affordability of good quality food for all Nigerians. Other objectives of government included the production of agricultural raw materials for the industrial sector and the export market, promotion of the value-chain approach in the agricultural sector, enhancement of farm income and reduction of poverty (Bashir, 2013). The government continued to provide support to farmers under the

Fertilizer Market Stabilization Program. The Federal Government provides the sum of ₦22. 30 billion as its 25 per cent subsidy contribution to the procurement and distribution of 900,000 tonnes of fertilizer to the states and the Federal Capital Territory (FCT), valued at

₦89. 31 billion. Also, the budgetary allocation from the federal government to the sector increased from ₦35.8 billion in 1990 to ₦51. 47 billion in 2001. The percentage of this allocation in the total capital expenditure was, however, a far cry from the 25 percent stipulated by the Food and Agricultural Organization (FAO). In the same vain, however, the total credit made available in the banking sub-sector to the agricultural sector increased from

₦89. 9 million in the period 1970-1979 to around ₦262, 075 million in the year 2005.

The period 1999-2007 witnessed an increase in credit to the agricultural sector. This was attributed to the various mechanisms put in place by government to provide credit to the farmers. Such mechanisms include the Presidential Initiatives and the Agricultural Credit Support Scheme (ACSS). Access to affordable credit continued to receive attention as the CBN monitored and encouraged the disbursement of funds under the ₦200 billion Commercial Agricultural Credit Scheme (CACS). As of December 2010, the Bank had released ₦96.81 billion to eleven participating banks for disbursement to 86 projects/promoters which included eighteen state governments. In order to further improve the lending environment in the agricultural sector the CBN, in collaboration with other stakeholders, initiated the Nigerian incentive-based Risk Sharing System for Agricultural Lending (NIRSAL). The Rural Finance Institution Building Program (RUFIN) commenced operations during the year. The program has the potential of impacting positively on the capacity of rural financial institutions to meet the credit requirements of rural farm communities. The program was being implemented in twelve selected states through a loan of US$27. 2 million from IFAD, a grant of US$0. 5 million from the Ford Foundation and counterpart funding from the Federal Government and the participating states (Bashir, 2013). As part of efforts to help Nigeria diversify its economy, China has recently increased its

volume of agricultural imports from Nigeria. By end-2010, Nigeria had exported about 80 000 tonnes of cassava to China, with orders to supply another 102 000 tonnes. China is also importing sesame seed from Nigeria and has indicated willingness to buy more Nigerian agricultural produce. In addition, there are currently over 400 Chinese agricultural experts in Nigeria involved in the construction of small earth dams (Bashir, 2013).

**₦592.9 Billion Budget on Agriculture in the Last Five Years (2019-2015)**

Aderemi (2020) disclosed that; the Ministry of Agriculture despite the sum of **₦**592.9 billion

budget allocation it received in the last five years, there is less to show for it. **₦**592.9 billion

is just a fraction of the total budget for the period despite efforts by the Federal Government

to find alternatives to oil. As price war and coronavirus disrupt global oil prices and sent

economies to the north, Nigeria looked elsewhere to reduce corresponding effects on the

economy. Can the agric sector by the bailout? Can it save the nation’s economy from ultimate

collapse and quickly help revive the economy from the looming recession?

In the last 20 years, the agricultural sector has served as one of the key drivers of the Nigerian

economy, contributing more than 20 percent to the country’s GDP. The sector also employs

more than 40 percent of the population – almost 90 percent of such in the rural areas, most

especially women. Despite its contribution to the economy, over the years, the Federal

Government only allocated a small portion of the total budget to the sector. Most allocations

ended up in the recurrent expenditure, leaving a fraction for capital expenditure.

This is not peculiar to the agric sector alone. Other [key sectors](https://www.dataphyte.com/economy/does-nigeria-care-more-about-its-debt-profile-than-its-citizens/) of the economy, such as

health, education, and housing, also received huge recurrent figures. Compared to other

sectors, public spendings on agriculture in Nigeria is low, with less than 2 percent of total federal expenditure allotted to it from 2001 to 2005. This allocation is far lower than spending in other key sectors, according to a research [paper](https://www.ifpri.org/) by the International Food Policy Institute (Aderemi, 2020)

**Diversification, mere paperwork?**

Spendings to the agricultural sector within the last five years point to the credibility of the

country’s diversification policy. Apart from little or no tangible result, the spendings fell

short of various agreements on agricultural policies and commitment made by the Nigerian

Government to diversify away from oil. In its Medium Term Plan for 2017 – 2020, the

President Muhammadu Buhari-led government’s Economic Recovery and Growth Plan

(ERGP) preached inclusive growth through diversification of production, achieving

maximum welfare for the citizens by ensuring food and energy security. The Government had

planned to use agriculture as a lever to achieve food security, create jobs, and save foreign

exchange for food imports.

To achieve this, the Federal Government increased budgetary allocation to the sector by

three-digit billions for the first time in 2017. In that year, President Buhari government

allocated **₦**135.6 billion to the sector. In 2018 and 2019, the figures increased to **₦**203

billion and **₦**137.9 billion respectively. Despite this, the contribution of the sector to GDP

remained sluggish between 20 percent to 21 percent. The same contributory range in about 9

years. The reason remains that recurrent expenditure still has a huge percentage of the

allocation (Aderemi, 2020).

**Achieving agricultural policies still nightmares in Nigeria**

One such beautiful policy is the Maputo Declaration 2003, where Nigeria and other Africa

Union member-nations committed to allocate at least 10 percent of national budgetary

resources for the agricultural sector to increase productivity. Seventeen years on, Nigeria still allocates 2 percent or less on public expenditure to the agric sector. It was only in 2008 that the sector received a boost above the Maputo recommendation – about 12 percent (**₦**134.9 billion) out of the total federal budget. Even at that, about 48 percent (**₦**65 billion) of the total

allocation went into recurrent expenditure. In 2014, AU Heads of State and Government met to review the Maputo Declaration in Equatorial Guinea – paving the way for Malabo Declaration. At the end of the Malabo meeting, they [upheld](https://www.shareweb.ch/site/Agriculture-and-Food-Security/news/Documents/2018_05_28_overview_caadp_malabo_declaration.pdf) the 10 percent public spending

target and extended commitment to half the continent’s poverty by 2025, (five years from

now) through inclusive Agricultural Growth and Transformation Sustain Annual sector

growth in Agricultural GDP at least 6 percent. They believed the initiative will create job

opportunities for at least 30 percent of the youth in agricultural value chains and empower

million rural dwellers. But till date, nothing has really changed; only a fraction of [African](http://www.e-alliance.ch/fileadmin/user_upload/docs/Publications/Food/CAADP_How_are_countries_measuring_up_to_the_Maputo_declaration.pdf)

[nations](http://www.e-alliance.ch/fileadmin/user_upload/docs/Publications/Food/CAADP_How_are_countries_measuring_up_to_the_Maputo_declaration.pdf) have achieved the details of the treaty (Aderemi, 2020).

**Charting way forward**

To attain sufficient growth in the agric sector, the Federal Government must implement

policies and conforms with international treaties. An example is the commitment of 10

percent of its annual budgetary allocation to the sector. The National Assembly should find a

way to domesticate policy actions from the Malabo Declaration. Policymakers must also

ensure capital expenditure received enough share.

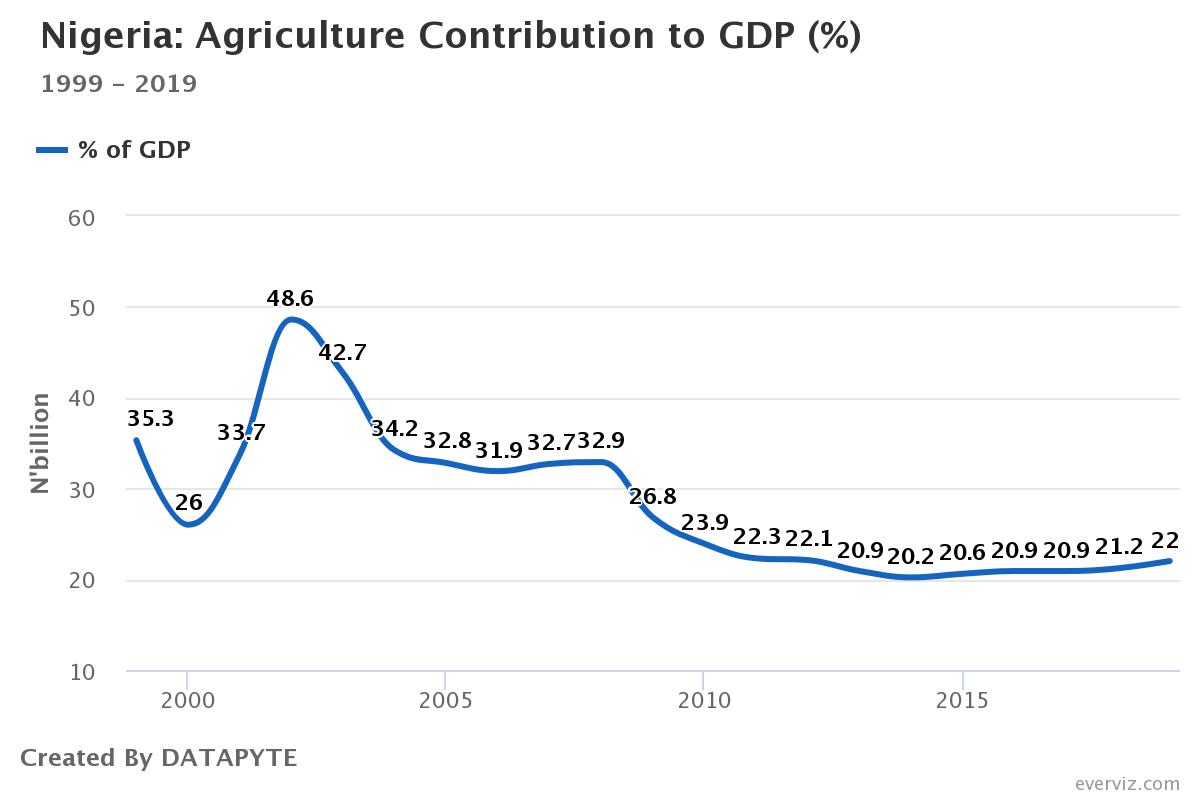
For all these to work out well, the Government must also match allocation with proper

planning and execution strategies. When agric is developed, it is bound to ease the other

sectors of the economy. Just as it was stated in the ERGP, agric has huge potential in

attracting foreign direct investment, boosting foreign reserves. It will thereabout lift millions

out of poverty and create job opportunities for Nigeria’s rising population (Aderemi, 2020).



Source: Aderemi (2020)

## Constraints on Increased Lending to Nigerian Small-Scale Farmers

As Nigerian agriculture undergoes extensive transformation, ramifying the various sub- sectors (crop, livestock, fishery and forestry), the need for debt financing is even more critical than ever before. Farmers are being encouraged to adopt and expand the use of modern inputs and to increase the size of operation in line with the commercial orientation of the ongoing agricultural transformation agenda. With rising poverty and increasing costs of modern inputs, small-scale farmers cannot mobilize enough savings to finance their farming operations and transit from subsistence to commercial agriculture. The government is intervening to provide credit incentives; but medium and large-scale farmers and service providers such as agro-input dealers are favored by the banking sector in the disbursement of loans. The commercial banks consider lending to agriculture to be unprofitable and thus tend to discriminate against the small-scale farmers who dominate operations in the agricultural

sector. The farmers on their part continue to bemoan their restricted access to loans under the various government financial innovations. It is important to stress that for effective delivery of financial services to the agricultural sector, policy makers must understand the constraints faced by lenders and borrowers. Chief among the constraints are policy failures and institutional weaknesses, stringent terms and conditions of financial products and agricultural sector specific risks. In what follows we examine each of these constraints (Aderibigbe & Kwbena 2014)

## Policy Failures and Institutional Weaknesses

The agricultural sector has been poorly served by the financial system, partly on account of the unfavorable policy environment. For years, Nigeria has lacked an enabling environment for efficient operation of the financial system. Until recently, the economy was characterized by weak regulatory regimes, poor physical and financial infrastructure, and policies that repressed financial market development, especially during the 1980s and 1990s, which witnessed negative real interest rates. It is expensive to provide financial services in rural areas, which are typically less dense in economic activity than are urban areas, have poorer infrastructure, and are more subject to risks from weather and agricultural price changes. Furthermore, financial institutions often have a weak institutional capacity to provide financial services in rural areas, and operators within the financial sector often display limited understanding of the agricultural sector and the nature of debt financing required. For example, they often lack understanding of the specificity of farm operations based on time and climatic factors, the gestation period of agricultural production, and the need for weather- related insurance services. This limited knowledge often taints their perception of the risks involved in financing the sector (Aderibigbe & Kwbena 2014).

## Stringent Terms and Conditions of Financial Products

The credit market serving agriculture is encumbered by the operational and administrative inadequacies and exploitative tendencies of financial institutions. These include (1) the stringent loan terms and conditions set by financial institutions, (2) the negative attitude of financial institutions, (3) high interest rates, (4) inadequate capacity to offer services, and (5) inappropriate financial products and services. Other constraints of a general nature include a poor agricultural statistics and information system and an underdeveloped property rights regime, especially as regards the difficulty in using land as collateral for loans. Evidence of market failure in the financial sector includes private banks’ failure to provide appropriate credit and financial services to small and family farms and rural areas. The agricultural credit market is beset by many imperfections, including market segmentation, covariate risk, scarcity of collateral, information deficiencies, and mass illiteracy of clients. The widespread information asymmetry often leads to problems of adverse selection and moral hazard, which underpin the reluctance of commercial banks to lend to small-scale farmers. Adverse selection arises when the lenders do not know the particular characteristics of borrowers, especially in terms of their preferences for undertaking risky projects. In the case of moral hazard, the main problem is that borrowers’ actions are not discernible by lenders. This heightens the risk of default in the sense that individual borrowers may be lax in working to make the project successful, or they may change the type of project that they undertake (Olomola, 2011).

## Agricultural Sector–Specific Risks

The sector-specific risks manifest in seven distinct categories: (1) production and yield risks,

(2) market and price risks, (3) financial risk, (4) legal and environmental risks, (5) risk of loan collateral limitations, (6) human resource risk, and (7) risk of policy instability. These

risks characterize agriculture in many developed and developing countries, including Nigeria and details of each category have been provided elsewhere (Olomola, 2011).

* + - 1. **Digital Smallholder Farmers Financial Services: Developments in Serving** According to Synthesis Report (2015); a number of private-sector actors and other stakeholders are experimenting with digital financial services (“DFS”), particularly those enabled by mobile phones, to overcome the specific challenges of serving smallholder farmers and their families. Buoyed by the relative success of DFS in the non-agricultural context, a range of DFS deployments have been launched in recent years aimed at extending financial services to smallholders. The efforts are still nascent and the challenges plentiful. Nonetheless, there is widespread interest in exploring the potential of DFS to overcome a number of traditional economic and cultural barriers that currently limit smallholder use of formal financial services. Given the embryonic and rapidly developing state of DFS for smallholders, it is too early to draw clear conclusions from the examples to date. While initial evidence suggests that DFS through mobile channels offers great promise for improving the lives of smallholders and their families, significant challenges remain. This paper identifies some key examples in the use of digital financial services to reach smallholder families and highlights some related policy considerations.
    1. **Opportunities and Incentives for Credit Participation by Small-Scale Farmers** The agricultural financing reforms implemented since the early 2000s present opportunities for increased involvement by the banking sector in channeling funds to the agricultural sector. Opportunities exist in financial innovations introduced by the CBN from time to time to keep the credit market operating in tandem with the ongoing deregulation of the economy at large. The establishment of the Agricultural Credit Guarantee Scheme Fund (ACGSF) by Decree No. 20 of 1977 and its commencement of operations in April 1978 constituted the

most important incentive to induce commercial banks to lend to agriculture in Nigeria. The fund’s original share capital and paid-up capital were ₦100 million and ₦85.6 million, respectively. The federal government holds 60 percent and the CBN 40 percent of the shares. The fund guarantees credit facilities extended to farmers by banks, up to 75 percent of the amount in default net of any security realized. The fund is managed by the CBN, which handles the day-to-day operations of the scheme. The capital base of the scheme was increased significantly, to ₦3.0 billion, in March 2001 (Synthesis Report, 2015).

## Nature of Government Intervention in Agriculture

Post-independence, with the discovery of crude oil and the boom that marked that era, agriculture lost its position as the main export earner to crude oil. To enhance the importance of the sector and ensure food security, several agricultural policies were initiated to improve the performance of the sector.

These initiatives focused on four broad areas within the agricultural value chain. These include to; improve access to land, boost the production of selected crops, provide input support mechanisms through import waivers and export incentives as contained in fiscal policies of the government as well as the provision of credit to agriculturalists at single digit rates. Various agencies such as NEXIM, CBN, Bank of Industry (BoI), Bank of Agriculture (BoA), etc. have been involved in providing credit to agriculturalists at single digit rates. These interventions (especially those of the CBN) are done through various programmes as summarised below (Adamgbe, Belonwu, Ochu & Okafor 2020):

**Interest Drawback (IDP),** Under the IDP of the CBN, farmers could borrow from lending banks at market–determined rates, while the programme pays an interest rebate of 40.0 per cent to farmers who repay their loans on schedule; **Agricultural Credit Guarantee Scheme Fund (ACGSF)**, Administered by the Central Bank of Nigeria, the fund was introduced in 1978 to assist banks to support agricultural activities. It provides up to 75.0 per cent

guarantee for loans granted by the commercial banks for approved agricultural activities. A total of 1,020,299 loans valued N98.860 billion had been guaranteed from inception in 1978 to May, 2016; **Commercial Agricultural Credit Scheme (CACS),** was established in March 2009 by the CBN in partnership with the Federal Ministry of Agriculture and Rural Development (FMARD) to fast track the development of commercial agriculture in the country. The applicable interest rate under the fund was retained at 9.0 per cent. From inception in 2009 to May 2016, the sum of N364.477 billion had been released to the economy for 452 projects; **Agricultural Credit Support Scheme (ACSS),** the ACSS is granted at 14.0 per cent interest rate, while beneficiaries who fully repay their loans on schedule are entitled for a refund of 6.0 per cent of interest paid. 62 Central Bank of Nigeria Economic and Financial Review March 2020; **Anchor Borrowers' Programme,** Under the programme, the CBN set aside N40 billion, out of the N220 billion Micro, Small and Medium Enterprises Development Fund (MSMEDF) to be given to farmers at single digit interest rate of maximum 9 per cent per annum (Adamgbe, Belonwu, Ochu & Okafor 2020).

## The Nigerian Incentive-Based Risk Sharing system for Agricultural Lending (NIRSAL).

The programme was launched in 2011 and incorporated in 2013 by the CBN as a dynamic, holistic USD500 Million public-private initiative. Its aim is to define, measure, price and share agribusiness related credit risk. Its approach involves fixing the agricultural value chain, so that banks can lend to the sector with confidence; and encouraging banks to lend to the agricultural value chain by offering strong incentives and technical assistance. It has ve pillars which include: Risk-sharing Facility (USD300 Million). NIRSAL uses this facility to address banks' perception of high-risks in the sector by sharing losses on agricultural loans; Insurance Facility (USD30 Million). The facility's primary goal is to expand insurance products for agricultural lending from the current coverage to new products, such as weather

index insurance, new variants of pest and disease insurance etc; Technical Assistance Facility (USD60 Million). NIRSAL uses this facility to equip banks to lend sustainably to agriculture, producers to borrow and use loans more effectively and increase output of better quality agricultural products; Holistic Bank Rating Mechanism (USD10 Million). This mechanism is used by NIRSAL to rate banks based on two factors, the effectiveness of their agricultural lending and the social impact; Bank Incentives Mechanism (USD100 Million). This mechanism offers winning banks in Pillar four, additional incentives to build their long-term capabilities to lend to agriculture. It will be in terms of cash awards (Adamgbe, Belonwu, Ochu & Okafor 2020).

## Cassava Bread Development Fund.

Established by the Government in 2008 to fund the cassava value chain (from processors to bakers), including providing equipment to master bakers. N3.44 billion was disbursed to farmers at 5 per cent interest per annum in the funding structure of 50 per cent term loan and 50 per cent grant (Adamgbe, Belonwu, Ochu & Okafor 2020).

## National Programme for Food Security Fund.

It was established in 2009 to benefit registered members of Apex Farmers' Associations (AFA), Adamgbe, Belonwu, Ochu and Okafor (2020): Analysis of the Impact of Central Bank of Nigeria's Agricultural Intervention Funds on the Economy, 63 registered co- operative groups and SMEs, in the structure of 40 per cent grant and the balance divided into 80 per cent loan and 20 per cent equity contribution by the beneficiaries.

## Constraints of Agricultural Finance

Famogbiele, (2013) explains that; the relative to the amount of money lent to the other sectors of the economy, the total amount lent to agriculture is structurally deficient, insignificant and inadequate, relative to the following constraints and/or challenges:

## Mis-Match of Banks Financial Resources

Agriculture is a profession of long gestation period which requires long term financing to be successful. Using short term funds of the commercial banks to finance such projects is a mis- match which banks, as profit oriented private commercial entities, would always find a way of resenting, regardless of any amount of moral suasion or other enticements from the government. This is why only 2% of the total banks lending goes to agriculture compared to other sectors. This justify (ies) the insignificance and structural deficiency. A ready solution to this is to give the banks the opportunity of sourcing their funds especially for agricultural developments from the capital market (i.e. long term availability of usable money for development purposes). It is in this respect that one sees the N200bn agricultural development bond of the CACS sourced from the capital market as a right step in the right direction. More of this capital market opportunity should be exploited for this strategic sector of the economy. The over N2tn Pension Funds lying idle could be rightly employed for agricultural development with good management and sense of committed patriotism to national well-being. I am also suggesting that BOA Ltd, as the largest single development financial institution in the country should be included as a participant, along with other banks in the CACS, if only because of the availability of the long term funds of the scheme.

## Budgetary Allocation

Budgetary allocation towards agriculture has consistently been inadequate and short of expectations despite the assumed interests of the respective governments in the past

yearsEven if the money channel to this sector was adequate, there could not have been much result as expected for the following constraining factors which have been bedeviling the economy for a long time and have actually set the country back rather than progressing. It is important to stress again that finance, per se, cannot perform the magic of economic revival without the elimination of these other factors (Famogbiele, 2013).

## Corruption

This is the greatest cankerworm and bane of economic recovery in Nigeria. It cuts across every facet of the society and unless something is done seriously, the country may as well be going around in circles. Ariyo (2006) in Famogbiele (2013) opined that “the level of corruption in this country had gone beyond mere corruption but leaning more on the side of insanity on the part of eminently corrupt Nigerians, and has become a major precipitator of the avoidable three development gaps experienced by the nation, especially through the endemic budget deficit. Corruption and related vices account for not less than 40% of public expenditure; this was estimated at a savings loss of over N10tn in the last two decades. No amount of developing finance flows would make any positive impact on the Nigerian economy, unless and until the problem of economic corruption was effectively contained.” Or how do you describe the 2009/2010 scenario of the ‘missing’ N200bn CACS fund during the late President (Musa Yar’dua)’s illness in Saudi Arabia. But for the ingenuity, inquisitiveness and investigations of the NASS, this situation would not have been revealed. Though the money was eventually ‘found and released from its bondage,’ I am not sure the N32bn accrued interest - at 16% per annum was ever recovered. Indeed, the country is reported to have lost about N5.0tn to corruption within the last two years of the current democratic disposition (Famogbiele, 2013).

## Policy Inconsistency and Somersaults

It is very unfortunate that government policies largely found to be consistently inconsistent and continuously somersaulting have particularly contributed to the failure of the agricultural sector. Every new government wants to pursue its own political agenda without consideration for the economic well-being of the nation; it is forever jettisoning the policies of the predecessor to start a new policy of its own which is soon dropped by the successor. This is antithetic to continuity, a characteristic of any ideal democratic, good and progressive government, irrespective of the party in government. It is in this light one wonders what becomes the fate of the Agricultural Transformation Agenda [ATA] of the current government after it might have completed its term (Famogbiele, 2013).

## Commodity Marketing Boards

Since the Commodity Marketing Boards were scrapped in the late 1980s, the life of the farmers in Nigeria has never been the same. Their life has been negatively turned around and the country has been the worse. Owofemi (2011) in Famogbiele (2013) said,”….when the commodity board was scraped, that was when we decided as a country, that we were no longer interested in agriculture because the board was the one ensuring the link between the peasant farmers, the commercial farmers and the outside market, beginning with the provision of all the structures and inputs required.” From the experience of the immediate pre and post-independence era, commodity boards played an effective channel of stable, good market and pricing for farm produce; consequently, they were a vehicle for value added chain and sustainable agricultural and economic development (Famogbiele, 2013).

## Challenges of agricultural financial policies

According to Eze, Eze, Awulonu and Okori (2010); these challenges have been the reason for failure of previous policies, and they continue to threaten existing ones.

Lack of adequate skills to deliver services effectively. Most of the credit institutions undertook lending to agriculture without the use of trained agricultural credit officers vested with knowledge of agriculture and the constraints to farmer performance. Additionally, supervision of credit programmes has often been below acceptable standards. Invariably, the schemes fail due to poor repayment performance; Low management capacity of farmer- clients. Most farmers who should benefit from the financing policies, especially the financing schemes, lack the basic skills of farm management, including record keeping. And when these are called up as requirement for accessing facilities, as is always the case, they become ineligible; Unwillingness of conventional banks to support agriculture. Even with mandatory (preferred sector) lending, guarantee of exposure and subsidized fund schemes, most banks prefer not to lend for farming, citing its lower productivity and higher risk relative to the non- agricultural sector as their reason; Paucity of loanable funds. Most of the loanable funds have come from government sources and is not sufficient for any meaningful agricultural investment. The government cannot go it all alone. This creates a finance supply deficit relative to demand. Statistics show that bank credit to agriculture as a proportion of total bank credit to the economy has hardly exceeded 17 per cent since recorded history in 1970, yet the sector contributes over 35 per cent of the gross domestic product annually (CBN, 2007b); Financial institutions cannot deliver effectively in the face of this dearth in funding; Some of the policies have been criticized for being excessively skewed against the small farmer, given the eligibility requirements and documentation e.g. Agriculture Credit Support Scheme etc. Those schemes that are within the reach of these farmers often have cumbersome procedures which soon prove insurmountable; Save for the RRF, most policies does not favour long gestation farm enterprises. This leaves much to be desired as the implication is that the major agricultural exports which are long gestation crops such as oil palm and cocoa may not be rehabilitated soon; Undue political interference in lending operations. Any time Government initiates a credit policy; most beneficiaries are those close to corridors of power. The result is

diversion of the fund and default in repayment; Government belief that the appropriate interest rates for agricultural loans be kept low to promote agricultural development and to assist small farmers ends up in the hands of big farmers who now invest this fund in their farm business leaving their own funds free for investment outside farming thereby negating the intention of government to increase agricultural output and encourage adoption of new technologies as well as develop the rural areas; Credit flowing into unproductive areas leads to policy dislocation or distortion. Example, River Basin Development Authority building an irrigation facility in an irregular flowing river which is not likely to produce the necessary water for irrigation. Or the same scheme engaging in food production with unnecessary high over head costs; The most challenging is the issue of inconsistency and lack of continuity as well as insider abuse in the implementation of policies (Eze, Eze, Awulonu & Okori 2010).

## Farmers’ Credit Sources, Borrowing Decisions, and Loan Demand

This section examines farmers’ sources of credit, factors affecting farmers’ participation in the credit market, and determinants of loan demand. With access to credit, the first priority of farmers (both crop and livestock farmers) is to cover production costs relating to inputs. Whereas farming enterprises yield income at specific periods, costs are incurred throughout the production season. Farmers acquire household assets and cover nonfarm expenses out of this income, with little or no savings to finance production activities in the following season. A reasonable level of profitability and regular access to credit will therefore be required for them to maintain or expand the level of operation of their businesses. Due to a number of factors, including a high incidence of poverty, low savings, and harsh economic conditions, it is difficult for farmers to rely on equity capital to meet production costs. They have therefore continued to seek debt capital from various formal sources (Aderibigbe & Kwbena 2014)

## Sources of Credit

With regard to the 2012 production season, farmers included in the study; Aderibigbe and Kwbena (2014) sourced financing from contract farming (CF) arrangements; the BOA, CACS, the National Programme for Food Security (NPFS), and MFBs. The highest proportion of farmers patronized the BOA, followed by NPFS, CACS, and MFBs, while the lowest number is associated with CF. Credit under CF is applicable only to the north, while MFB loans apply only to the south, based on data availability. In general, the proportion of beneficiaries of nonbank loans was double (66 percent) that of bank loans (33 percent), and the number of beneficiaries was higher in the north (75 percent) than south (58 percent). A higher proportion of males (69 percent) benefitted from nonbank loans than females (59 percent), whereas in the case of bank loans the proportion of female beneficiaries was higher (41 percent) than that of males (31 percent). Bank loans refer to loans from the Bank of Agriculture (BOA) and Microfinance Banks (MFBs), while nonbank loans were from the Commercial Agriculture Credit Scheme (CACS) (on-lending programs), National Program on Food Security (NPFS), and contract farming (CF). The CACS provided the highest loan amounts, which averaged ₦897,815, followed by the BOA, with an average of ₦108,137; NPFS (₦100,855); MFBs (₦101,350); and CF (₦14,872). Overall, the average loan size among the sampled farmers was ₦275,663, but there are regional and gender variations. As shown in Table 3.1, the average loan size was higher in the north (₦316,987) than south (₦176,411). It was also higher for male farmers (₦307,773) than females (₦176,411). In what follows we highlight the characteristics of the various loan sources in terms of lending procedures and governance structures. The proportion of female beneficiaries was higher than the proportion of males for BOA and MFB loans, while the reverse is the case for CACS and CF loans (Aderibigbe & Kwbena 2014).

## Factors Affecting Borrowers (farmers)’ Borrowing Decisions

With regard to the borrowing decisions of farmers, studies show that older farmers have a higher probability of deciding to borrow compared to younger ones. Farmers who are married are also more likely to decide to borrow than their unmarried counterparts. These results are consistent with the findings of Pastrapa (2011), which show that the probability of receiving a loan is positively correlated with age and that married persons are more likely than unmarried persons to receive loans. Farmers whose nonfarm income is rising have a higher probability of deciding to borrow. However, the probability is lower for farmers with rising household size (Aderibigbe & Kwbena 2014).

## Determinants of Loan Demand

A rising wage is likely to lead to increased production costs, and thus farmers will need credit to finance these costs. The need may arise directly from rising labor costs or from the fact that farmers may want to substitute mechanization for labor. Either way, funds will be required to pay for relevant services or to acquire necessary equipment. The relationship between output price and loan demand shows that farmers tend to plow back the additional earnings realized into farming to meet any intended expansion needs and so reduce demand for loans, possibly in the face of heightening borrowing constraints. Although credit demand is expected to depend negatively on the interest rate, we found a positive relationship. This is not an entirely unique finding and may be due to the policy incentives aimed at lowering the cost of borrowing in the Nigerian agricultural sector (Sadikov 2012). Research shows that more experienced farmers are likely to request lower loan amounts, while less experienced farmers tend to request more. Here the managerial ability of the farmer is a crucial factor that can explain the situation. Farmers with more farming experience tend to be better managers of funds and are likely to be able to more accurately determine the amount of loan they need or how much they expect to receive from the lending institutions, compared to their

inexperienced counterparts. Farmers with higher nonfarm income can expect to be granted more loans, while those with lower nonfarm income are likely to receive lower loan amounts. We found that farmers with larger farms request more loans (ostensibly to provide the necessary working capital to acquire additional productive inputs) than those with smaller farms. The fact that loan demand increases as household size increases suggests that the proportion of nonearning members may be higher than that of the earning members of the household, and this implies more expenditure on consumption and less income to finance farm operations, thus exacerbating the need for credit. Moreover, the demand for loans is found to be higher in the southern part of the country than in the north, while the demand for loans from commercial banks is found to be lower than demand for loans from nonbank sources. This finding corroborates the well-known fact that small-scale farmers in Nigeria are not well served by the banking sector as far as credit facilities are concerned (Aderibigbe & Kwbena 2014).

## Value Chain Finance

Value chain finance is not a new concept in the agricultural finance literature, but its application to agricultural financing in Nigeria remains at an embryonic stage. The flow of funds to and among the various links within a value chain comprises what is known as value chain finance. Value chain finance makes use of the business relationships among the value chain partners (who are interdependent but share business information) and in this way reduces performance, market, and credit risks (Miller 2011). Thus, the partners that farmers regularly do business with, such as input suppliers and buyers, provide or facilitate credit to these farmers this study finds that asymmetric information is at the root of the credit-rationing phenomenon experienced by small-scale farmers in the country. Adopting a value chain approach to credit transactions in the agricultural sector is likely to reduce the information asymmetries that banks and other formal lenders are confronted with and lead to more

optimal credit participation by smallholder farmers. The approach has the following potential advantages: (1) the mere fact of being in the value chain is a tremendous boost to the farmers’ creditworthiness, as the assurance of a close marketing relationship between farmers and buyers in the value chain is an element of loan surety cherished by lenders; (2) technical advice provided to farmers in CF tends to reduce farmers’ performance risk (harvest failure or substandard yield); and (3) loan transaction costs, in terms of lower costs for loan appraisal, loan disbursement, and recovery, are reduced. The various mechanisms through which value chain financing can be used to enhance farmers’ access to finance. Although some of these mechanisms, such as CF, out grower schemes, and loan guarantees, are being practiced in Nigeria, others, such as warehouse receipt systems and trade credit, have yet to be implemented. These financing approaches will therefore receive further elaboration below. It is important to emphasize, however, that fairness and transparency must prevail in the pricing and credit conditions to ensure that farmers derive the desired benefits from their participation in this type of financing framework. Otherwise, farmers will resort to defending themselves against abuses by credit providers by engaging in side-selling of their commodities to redress any unfair treatment and recoup the perceived revenue loss. The framework should therefore be backed up by appropriate legislation that will guarantee ownership rights, transferability of title documents, and timely resolution of disputes (Miller, 2011).

## Agriculture Financing and Economic Growth.

The study (Egwu, 2016) examined the impact of agricultural financing on agricultural output, economic growth and poverty alleviation in Nigeria. The empirical result of the study confirmed that credit Guarantee Scheme Fund Loan to Nigeria’s Agricultural sector and the commercial banks credit to agricultural sector has significantly impacted positively no agricultural output thereby alleviated poverty rate in Nigeria within this observation period.

The study also confirmed that credit rationing is resorted to by banks to meet higher demands for loan applications, a downward review of the cash- reserve ratios and growth impact to Agricultural sector output percentage to gross domestic will enable banks to accommodate more applications from the farmers. With this, the farmers would have to make do with the existing requirements and seek for more funds from other financial institutions such as micro finance banks and finance houses as well as cooperative associations. Finally it was believed from the results that in the long-urn, farmers should be able and also encouraged to apply judiciously for their own funds for agricultural development without even the Guarantee Scheme Fund Loan, and once this been achieved, will in turn yield to economic growth alleviation of poverty in Nigeria. The study, therefore recommended that there is the need for the Central Bank of Nigeria to reduce the cash reserve ratio. However, funds that accrue from such policies should be added to the agricultural credit portfolios. Finally, agricultural commercialization has been found in the study to be of high significance. To this extent, there is need for government to put in place policies to stimulate agricultural commercialization through cooperative system, agricultural subsidies and zero-tariff for importation of agricultural inputs (Egwu, 2016).

## The Role of Agricultural Financing and its Implication on Economic Growth, Food Security and Poverty Reduction

There has been serious argument on agricultural financing as a declining sector in the course of development in many developing countries; it is still a leading economic sector, the main exporter, and the major employer, especially for the poor and women even among Nigerians. Improved financial markets accelerate agricultural and rural growth. Financial services assist households in maintaining food security and smoothening consumption, thereby safeguarding or enhancing labour productivity which have been the most important production factor of the poor. Studies also have not identified any effects of financial liberalization on the price

and availability of informal credit to agriculture. Nigeria Agricultural Cooperative and Rural Development Bank (NACRDB) cost of loan to agricultural sector have not been stable since 1990 to 2006, but from 2007 till date, the cost of loan to agricultural sector has been stable at 8 percent rate. At present; Nigerian banks lend less that 3 percent of their commercial loans to agricultural sector. In 2005, agricultural lending was only 2.44 percent of commercial banks total loan portfolio, it fell to 1.96 percent in 2006, 3.11 percent in 2007 and 1.37 percent in 2008. Yet, most of the poor still live in rural areas because of not having access to agricultural credit. There is serious need for agricultural credit to farmers to increase or improve on the present dispensation. Any student of an introductory course in micro- economics, business finance or development economics or even entrepreneurship studies learns that access to savings, credit and insurance services could have beneficial effects on households and their enterprises and by extension on economic growth, and that microfinance in particular, might also contribute to more equitable growth of the nation’s economy. Access to credit especially agricultural sector, however, has an economic benefit only if and when that access generates a broadly defined net economic surplus after having deducted the private and social costs of loan provision (including the opportunity costs of scarce public funds in alternative poverty reduction policies) of government. While the evidence on the impact of credit on household welfare, agricultural technology adoption, and on agricultural sector growth is mixed, many practical constraints (i.e. in terms of time and money) and methodological difficulties in estimating the impact of a policy or project with a reasonable probability of error exists. Simple common sense tells us that savers who continue to deposit money for different motives, borrowers who continue to repay their loans and clients paying regular premiums for health and life insurance over long periods actually derive an economic benefit. In addition, the process of acquiring a loan entails a lot of paperwork and many bureaucratic procedures which lead to extra transaction costs. The formal financial institutions are not motivated to lend to farmers due to vulnerability of agricultural practice to

risk and inability in yields as a result of the vagaries of weather. These institutions show a preference for large scale transaction over small scale associated credit transaction and non- agricultural over agricultural loans. In Africa, only 5 percent of the farmers had access to formal credit; hence this situation calls for a shift in attention by the Government to the recognition and development of the informal financial institutions that are predominantly found in the rural areas where agriculture thrives (Mehrteab (2005)

## Financing to Support Women in the Agricultural Sector

Providing financing to agriculture is challenging for both male and female farmers, however women face some unique challenges. These challenges relate to the role of women in the household that often restricts their control over assets and constrains their available time for productive activities. Their role in the household is often invisible, particularly when it comes to their economic and financial contributions. As such, women have lower access to economic and financial services (World Bank 2015).

Women often have limited control and ownership over large assets such as land. They also lack the ability to post hard collateral for loans. In addition, the literature points out that women have limited opportunities to develop human and social capital. Indeed, they face constraints in accessing training and capacity building and membership in producer organizations. These unique challenges make access to finance a much bigger challenge for women compared to men in the agricultural sector (Synthesis Report, 2015). Some of the constraints for women that are the most difficult to address are not financial, nor can they be addressed simply through economic or market opportunities. Cultural issues and constraints such as the purdah (female seclusion) system in rural Islamic areas can have an overwhelming influence on the role that women can play. The challenge for financial service providers is to understand the varied interests and cultures and, together with the target group, adapt culturally appropriate products and services to meet those interests. The research on

this topic reviews the existing literature and summarizes the key issues and challenges regarding the access of women to financial services in the agricultural sector. Research and experience so far demonstrate that there is a business case to be made for closing the financing gap between men and women in agriculture. Research also highlights some examples of various private and public initiatives that aim to achieve greater economic growth in agriculture by closing this gender gap (Synthesis Report, 2015).

Comparing various experiences across a number of institutions that serve female clients in the agricultural sector shows that the same areas and issues that make an institution successful in serving agricultural clients overall also make institutions successful in serving female clients in agriculture. Although this is a pre-condition, it is not the only one. In addition, for an institution to develop capabilities in serving agricultural clients, it needs to identify what the role and contributions of women are in agricultural households. Further, the institution needs to adapt this understanding to products, services and delivery channels accordingly. In this context, it needs to apply a “gender lens” and see within an agricultural household. It needs to learn how women contribute since their role often tends to be underestimated, even in their own assessment. Women’s World Banking has characterized women’s contributions in agriculture as often invisible — despite women fulfilling a wide range of roles within the household, from doing housework, taking care of the children, working alongside their male counterparts in farming, and supplementing family incomes with side activities (on and off of the farm). Women’s workload and lack of time is often a limiting factor for their full participation in work other than housework activities. It also affects their ability to start or expand a business and request financing.

According to Synthesis Report (2015); Studies have found a disconnect between the economic and financial contributions of women to the household and their perceived role. Even these same women underestimate how much they contribute and have difficulty seeing themselves as entrepreneurs. This is also reinforced by certain cultural aspects and norms that

create disincentives for women in rural areas to engage in entrepreneurial activities. Both men and women often view the role of women in agricultural-dependent households primarily in terms of housework and helping the male farmer. However, anecdotal evidence and research findings have shown that women often contribute a significant amount of income to their households. Financial institutions that apply the usual assessment of borrowers (such as those done in urban areas for small businesses) can often miss the financial contributions of women in agricultural household production. Furthermore, understanding that women are lacking in time means that financial institutions would need to seek alternative delivery channels (such as mobile banking) and appropriate marketing channels. Understanding the roles and contributions of women in an agricultural household would facilitate an improved risk assessment of the whole household. It would also present new opportunities to offer financial services to female clients to grow their businesses and purchase additional products for their households, such as establishing savings accounts, buying insurance products and pension annuities, among others. Adding women as clients requires senior management and shareholder prioritization, a targeted allocation of resources, training, planning, data/metrics and patience in growing this long-run profitable business sub- segment. In addition, it requires that financial institutions perceive women as valuable and profitable clients. In this context, it is important for these institutions to fully understand women’s needs and preferences and to strategically target them. Despite the challenges presented in this paper and various solutions being implemented, the potential to achieve greater economic growth by closing the financing gap for women in agriculture is still very significant. Closing this gap requires a call to action by policy makers, the private sector, and civil society to prioritize, advocate, and devise solutions for reducing and eventually closing the gender gap in access to finance in the agricultural sector.

## Commercial bank credit effect in the agricultural sector

Commercial bank credit is the borrowing capacity provided to an individual, government, firm or organization by the banking system in the form of loans. According to CBN (2003), the amount of loans and advances given by the banking sector to economic agents, constitute bank credit. Bank credit is often accompanied with some collaterals that helps to ensure the repayment of the loan in the event of default. Credit channels savings into productive investment, thereby encouraging economic growth. Thus, the availability of credit allows the role of intermediation to be carried out, which is important for the growth of the economy. The total domestic bank credit can be divided into two: credit to the private sector and credit to the public sector. Credit to the private sector is the aggregation of all loans and advances granted by banks to the business units and households while public credit is the loans and advances to the government and its agencies (Sunny, 2013). Credit is the extension of money from the lender to the borrower. Credit implies to a promise by one party to pay another for money borrowed or goods and services received. Credit cannot be divorced from the banking sector, as banks serve as a conduit pipe for funds to be received in the form of deposits from the surplus units of the economy and passed on to the deficit units who need funds for productive purposes (Sunny, 2013).

## Agricultural Credit by Deposit Money Banks

Agricultural lending market in any country is made up of participating financial institutions and units that can effectively lend resources to facilitate the production of farm produce, crops and livestock. These markets are primarily made up of deposit money banks (DMBs) and other financial institutions, firms and individuals. However, the market also includes specialized institutions such as Nigeria Agricultural Cooperative and Rural Development Bank (NACRDB), which is the principal institution involved in agricultural financing in Nigeria. The banks have been playing prominent role and will continue to do so under a

package of incentives. The insurance companies can also find useful avenues to invest their long-term funds by buying equipment’s for hiring; the informal financial market which includes the family and friends who can also make funds available to interested farmers will continue to be active as before. The informal financial market had grown out of the financial assistance from their different groups (Udry 1993). The size of the borrower is of great importance in negotiating the terms and cost of credit.

Gurdensonl (2005) believes that a cost in agricultural delivery shows how farmers cannot avail themselves of available credit, since the Nigerian bank is not oriented toward development financing. According to the CBN (2000), the face of agriculture in Nigeria has changed to reflect a dwindling of interest of the youth in the sector. In addition to the perennial problem, there is lack of fertilizer to improve crop yields, a dualistic structure reflecting large scale as well as peasant farming. The peasant farmer dominates the landscape and very little of Nigeria agricultural output is produced using modern methods (CBN 2003). With different types of ecological system, farming can be easily practiced from the dense rainforest belt of the south to the Sudan Savannah of the north. The agricultural output in Nigeria is grouped into cassava, yams, rice, vegetables, maize and rice. Though some of the staples can be cultivated with mechanization, this is constrained by the smallholder land methods and inadequate finance. Finance should be made available to the farmer who have sufficient cultivable land to enable the mechanization of the process, as it is increasingly becoming clearer that the available crops fits well into the Nigerian ecological system. From 1978 to 1989, with special credit allocation to the agricultural sector in place, there was a consistent increase in the lending portfolios of banks to the agricultural sector. This has now been lost to the financial system deregulation as agricultural lending is considered more risky, problematic and unprofitable relative to other sectors. Banks credits to this sectors had increased from about N230 million in 1978 to over N262 billion in 2005, but food imports

cost have equally increased (CBN, 2007). For bank credit to be effective there must be soft landing for both the bank and the farmer in terms of cost.

## Trends in Financing Agricultural Value Chains – Promising Practices and Emerging Recommendations for Policy Development

With increasing market liberalization and the integration of the agricultural sector of developing economies into world markets, rural transformation is accelerating. Commodity and financial flows and the processing of agricultural goods up to the final consumers have become more sophisticated (Synthesis Report, 2015). This enables an understanding of both financing within a value chain and financing that is tailored to fit a value chain (Miller & Jones 2010).

A number of trends have had significant influence on emerging market economies. These are fundamentally altering the way in which agribusiness cooperates with the financial sector including: value addition, the emergence of supermarkets, and agro-industries emerging as a major source of income and livelihood development. In sum, value chains are ever more important to the understanding of agricultural markets. Producers that are left out of value chains run the risk of being marginalized in terms of prices and market integration. Financing requirements, above all the small units in the rural non-farm sector, have typical patterns. These small processing units may operate out of the home premises or in small village based and family-operated facilities. They usually operate on high ratios of operating costs to fixed assets. Liquid resources are needed to pre-finance the procurement of produce during harvesting periods. In addition to these cash requirements, chain actors closer to primary producers often do not have sufficient own liquidity and need financial backing by the wholesale buyers, processors and chain actors closer to the end consumer. As a result, the demand for financing often goes beyond what banks or other financial institutions offer. Requirements are usually for highly leveraged liquid resources at short notice, and for short

to very short lending periods. For midlevel chain actors such as traders and produce buyers, these short and often flexibly secured funds for short-term loans during harvest campaigns can add up to large ticket transactions in relation to the total asset and security base of the concerned chain actor or agri-food small industry (Synthesis Report, 2015);

## Product, Process and System Innovations

There are three principal avenues for innovating in agricultural value chain financing. First are product innovations. Miller and Jones (2010) highlight different financial products used for agricultural value chain financing. some examples of new (agricultural investment funds) and adapted (Sharia-compliant structured financing) products for agricultural value chain financing. Financial enhancements comprise an increasingly important part of these product- driven innovations. Synthesis Report (2015) captured some of these new products in Europe; Process innovations in agricultural value chain finance often improve the transparency of market conditions for different actors in the chain. Synthesis Report (2015) outlines a case from Uganda. Automation or increased transparency for different contractual partners can make a substantial difference to the way financing works and can penetrate into niches previously considered too costly or risky. Systems innovations are those driven by new actions or changes required by internal value chain actors and/or by framework- and environment-related innovations. Synthesis Report (2015) illustrates how market framework conditions can affect the functioning of value chains and influence their financing. Of particular importance are the different types of product safety, hygiene and health standards introduced and enforced through large market players. These also include a different type of system innovation that is based on demand pressures from advanced agri-food markets, that is, certification and special labelling systems, in particular certification for organic and differentiated food and agricultural products. The three types of innovations in agricultural value chain financing all follow the innovation path from more basic structures, such as

informal credit advances between single and mutually known producers and buyers, to more complex mechanisms, such as warehouse receipts and systems that strengthen market and price transparency overall. In some cases, known approaches were adapted to the financing of value chains, as in the case of Islamic financing and the liquidity injections through agents on a commission basis demonstrate. In more complex cases, such as the ICT example highlighted from Uganda and in the case of special agricultural investment funds, the innovations strengthened the enabling environment and introduced entirely new systems of financing aggregators into local financial markets.

## Critical Success Factors

Synthesis Report, 2015; noted the important factors to consider regarding the supply, demand and the sector environmental perspective for financing within and into value chains (VCs). First, it is important to look at supply side factors affecting the producer. These include, but are not restricted to, the financial and borrowing status of smallholder farmers and their producer associations, the underlying formal and informal contractual relationships and incentive structures, the reliability of and marketable surplus over time, and the interest to be included in informal or more formalized financial relations On the demand side, the market requirements, VC competitiveness and market trends are the drivers. For mid-level chain actors (“the aggregator perspective”), the engagement levels of lead firms and market players make the difference. Security of contract and transparency of contract obligations - both toward the producer and the off-taker - help to maintain and cement agricultural value chains. Conclusions of the analysis and developmental recommendations for the macro environment focus on: Creating or leaving space (tax and registration requirements) for chain actors; Promoting industry competitiveness; Ensuring proper VC governance and control; and Providing flexibility in risk assessment by central bank and supervisory authorities for considering collateral substitutes and contract-based financing (Synthesis Report, 2015).

## Effect of banks' lending rates on the agricultural sector

As a result of instability in the banking sector due to the regular increase in its leading rates; lending rates was reduced from two percent to one per cent and exchange rate kept at eight percent by the Central Bank of Nigeria. These are part of the decisions reached by the monetary policy committee (MPC) after it reviewed local and global economic conditions in the first two months of the year. The MPC left interest rate unchanged because of concern that inflation rate may accelerate as government prepares to remove subsidy. Monetary policy rate was held at six per cent. This has spurred lending to customers with credit growth accelerating to an annual 27 percent, from 25 per cent the previous month, according to CBN data. It was growing at the rate of almost 100 percent in December 2007. The MPC noted that the rebound in global economic activity, which started in the second half of 2009, has continued. The rebound is driven largely by the unprecedented fiscal stimulus in both developed and emerging market economies in the wake of the global financial melt-down as a consequence; monetary policy had been largely accommodative with interest rates down to record lows in most countries, coupled with the considerable expansion of Central Bank Balance Sheets. The key concerns, however, remain the strength and sustainability of the recovery process which is proceeding at varying speeds across the 'continuing rebound in commodity prices, particularly for crude oil, which is helping to support growth in commodity producing regions (Harvey, 2006). However, the inflation risk of the rise in energy prices appear to be mitigated by low level capacity utilization, weak private demand, and well anchored inflation expectation. Although financial markets have recovered remarkably faster than expected, the MPC observed that financing conditions, especially for businesses and firms are likely to remain difficult in the near term as financial institutions remain cautious about credit extension. Bank lending is likely to sluggish, given the need to rebuild capital and maintain liquidity, and the possibility of further credit write downs, mostly related to non-performing exposures to commercial real estates and stock markets.

The MPC added that although the bond markets have rebounded the households, small and medium size enterprises, that have only limited access to capital markets are likely worldwide to continue to face credit constraint except where public lending programmes and government guarantees are in place (Anyanwu, 2010).

## Interest Rates Policy in Nigeria

The 1970s saw different interest rates for different sectors through to the mid 1980s. One main component of the Structural Adjustment Program (SAP) in Nigeria and the deregulation measures that followed it is the deregulation of the financial sector of the economy especially the deregulation of interest rates. This institutional arrangement has had various impacts on the different sectors of the economy especially the agricultural sector, Nigerian agriculture is largely subsistence and access to adequate funds have been a major bottleneck. In the early part of the last decade, the government of Nigeria was pursuing a market-determined interest rate regime, which does not permit a direct state intervention in the general direction of the economy. The market demand and supply was the driving force of resource allocation. Thus, the formal lending policy did not give special interest rate concession to the agricultural sector. The interest on loan was based on the risk factor of the sector or sub-sector that the loan was meant for. The pricing model would thus also disclose the basis for the spread and provide visibility on the relative efficiency of banks. Although aggregate domestic credit in the Nigerian economy continues to grow, its composition suggests that the private sector is being crowded out. The rate of inflation decreased in 2010 to the annual average of 13.7 per cent from 12.5 per cent in 2009. The stability in domestic prices in 2010 can be attributed to a number of factors, including the continuing monetary contraction, the delay in the passage of the 2010 federal budget and the improvement in the supply of petroleum products. There is nonetheless a real threat of inflationary pressure in the near-to-medium term, in particular, an inflation risk due to high energy prices as the economy rebounds (Anyanwu, 2010).

## Agricultural Extension, Education and Training in Nigeria

The Federal Department of Agricultural Extension was formed in 2012 and is now working on Nigeria’s first legislated extension policy with the assistance of IFAD21. The goal of this new extension policy is to develop the private sector to provide services and the public sector to ensure quality control. The focus is therefore on promoting pluralistic delivery, and ensuring that extension services are demand-led, incorporate market needs, and target farmers who do not have access to markets today (Rechard & Olajide, 2020).

1. KNARDA, the Kano Agricultural and Rural Development Authority, reportedly has some 1400 full-time extension workers (estimated 30% of whom are women), according to interviewed sources, who are supported through fortnightly or monthly trainings. According to NAERLS26, KNARDA reached 1.6m farm families in 2018, mostly using Management Training Plots, with 1118 village extension agents, each extension agent attending to some 1,000 farmers. Only a minority of these staff have formal agricultural qualifications, according to interviewed sources. KNARDA collaborates with GIZ (training in contract farming), Sassakawa Global 2000 (maize production), ICRISAT, IITA, and OCP (Morocco). Work is organized into 4 “extension blocks” (Rechard & Olajide 2020).
2. KADA, the Kaduna State Agriculture Development Agency, has a total staff of 334, including approximately 185 extension workers, active in 23 local governments of Kaduna State. According to the NAERLS Agricultural Performance Survey, 218 extension agents 2018 each attended over 5,000 farm families. Each of the 255 wards in Kaduna state is expected to have at least an extension worker but due to the inadequate number of extension workers, lead farmers are chosen in places where they lack extension worker. Monthly Technical Review Meetings (MTRMs) are used for training of the staff or extension worker, and fortnightly trainings using Farmers Field School (FFS) for farmers (Rechard & Olajide 2020).
3. The Agricultural & Rural Management Training Institute (ARMTI) at Ilorin in the North-Central Zone of Nigeria is a parastatal and thus not under ARCN. ARMTI aims to be the centre of excellence in agricultural and rural development management training, and provides management training, consultancy and advisory services and the dissemination of agricultural and rural information. The Institute also conducts applied management research and contributes to policy development (Rechard & Olajide 2020).
4. Institute for Agricultural Research (IAR); at Zaria in Kaduna State was originally established in 1922, and has been affiliated with Ahmadu Bello University (ABU) since 1975, staff of IAR and ABU interchanging roles and interacting strongly (similar to the WUR model), even though ABU falls under the Federal Ministry of Education, and IAR under FMARD. IAR and ABU have a combined technical staff of around 5,000. ABU also manages the “Division of Agricultural Colleges” or DAC (see chapter 4). With a focus on crops in the savannah region (Sokoto, Kebbi, Zamfara, Kaduna, Kano, Kastina and Jigawa states), it uses an Integrated Agricultural Research for Development approach, with focus across the value chain, with programmes in cereals, cotton, oilseeds and legumes, fibres. It also has programmes in mechanization, irrigation, farming systems research, biotechnology and product development, as well as services in (field crop) seed production and extension. The Artemisia Research Programme also includes research in horticultural crops for the Northwest zone, with selection of varieties of tomato, pepper, onions and okra (Rechard & Olajide 2020).
5. Sassacawa Global 2000 (SG2000). Working closely with FMARD and ADPs, SG2000 has trained some 2,000 extension agents and one million smallholder farmers in eight states of the north (including Kano and Kaduna – the SG2000 office is located in Kano). It conducts these trainings of government extension agents three to five times per year on various technical topics related to agricultural production, mostly using demonstration plots with field crops (wheat, maize, rice, cowpea, soybean, groundnut, millet, sorghum,

sesame, cassava). The Sasakawa Africa Association (Sasakawa) has piloted an Open Innovation Platform (OIP), a series of networking sessions set up between farmers, local governments, research institutes and private sector companies. These sessions are being conducted in 10 LGAs in Kano and 10 in Kaduna. The intention is that LGAs will take over management of these OIP sessions. The Sasakawa Africa Fund for Extension Education (SAFE) also provides an opportunity for mid-career extensionists to obtain BSc degrees, and (by 2017) some 400 extensionists had participated in SAFE programmes at ABU and 3 other Nigerian Universities (Rechard & Olajide, 2020).

## Issues on Agricultural Education in Nigeria

The role of agriculture in the national economy should be re-emphasized and factors influencing agricultural activities and food security put in place. There is the need for sensitization and enlightenment of the rural areas which accommodate the greater percentage of the populace. The use of media such as the radio, posters and the television could assist in informing the people of the latest developments in agriculture. There is the need for rural roads to feed the rural areas with farm inputs and evacuate farm produce. Engineering of small unit co-operatives may be ideal; with members agreeing to come together on their own volition rather than imposition. This will engender more self-commitment to the course of the society and mutual respect for co-operators. Through farm co-operatives, farm inputs can be distributed and information disseminated to farmers; and large farm area cultivation can be encouraged (Ola, 2014).

## Prospects of Teaching and Learning Agricultural Education

Agricultural remains the major employers of labour either directly or indirectly. It is the main stay of Nigeria and world economy. Agriculture provides food and drinks, raw materials for industries, income for farmers, revenue for government and source of foreign exchange. In

addition source of fuel and power, recreation, tourism and aesthetic value among other things. In view of these numerous benefits, it is important to give the teaching and learning of agricultural education the position it deserves for the millennium goals to be achieved (Ola, 2014).

Avenues are created for people to be engaged in the following areas among others; Teacher. Though acquisition of knowledge and skills in agricultural education, one may end up becoming a trainer of agriculture in schools and institution of higher learning.; Opportunity in crop production; Opportunity is also opened in horticulture; Opportunity in poultry keeping; Opportunity in ruminant and non-ruminant livestock production; Fish farming; Bee keeping; Grass cutter farming; Feed industry- formulation and manufacture; Venturing into agro-allied products- chemicals ,pesticide leads, herbicides, fungicides, fertilizers among others. If the learner is well groomed or well taught and properly baked, he can go into any of the areas mentioned above and through that assist in the attainment of the millennium development goals by the year 2015. The objective of vocational and technical education in Nigeria today according to FRN, (2004) are such that if and quietly implemented, will bring about the revocation and technical development in Nigeria thereby having a significant and positive impact on the national. Economy (FRN, 2004). The fact remains, however, that none of these will be accomplished of student in schools are improperly trained i.e of poor teaching and learning takes place). Effective training of student cannot be accomplished in the absence of certain ingredients that create conductive environment for teaching and learning The following, however, among others, are challenges to teaching and learning of agricultural education in schools. Inadequate infrastructural facilities. Inadequate laboratories classrooms, staff offices and the like in terms of number and adequately are some of the experiences in schools. This to a large extent may pose challenge to teaching and learning. Lack of equipment and tools. If the equipment and tools expected in the crop and animal laboratories mechanical workshop, horticultural garden are not there, there cannot be effective teaching

and learning and the consequence is that students will be half- backed. This will have a negative impact on the society and economy; you cannot give what you don’t have. Inadequate teaches/ instructors/ technicians. For effective implementation of any educational programme, adequate human and material resources must be made available to the school. In particular , a large enough number of trained teachers with different types of expertise must be recruited and posted to the school and when required in addition, academic staff must be complemented by non-teaching staff. Also, adequate instructional materials must be made available to the trainers for the sake of effectiveness. Lack of interest in agricultural education programme. The interest of student in agricultural education does not commensurate with the enormous benefits derivable from agricultural. Interest in a course of study is an important fact for achievement. Furthermore; people hardly learn anything well unless they are interested in what they are learning. Success and any endeavor is very much tied to interest in such endeavor. The interest of students may be stimulated in particular field through societal attitude, training and quality of lectures, peer group opinions and home factor (Fowlee, 2002).

## Agricultural Education and Millennium Developments Goals

The idea of a millennium development goals came into being in a contentious reached among member nations (Africa inclusive) on September 8, 2000. It represents a global commitment to improve the economic and social conditions in low income countries of the world. It is a declaration that changed United Nations members’ states to improve economic and social conditions in developing countries through operationalizing a list of 8- point millennium development goals (MDGS) that should be achieved by 2015. These MDGS are as highlighted below (Ola, 2014);

To eradicate poverty and hunger - Reduce by half the proportion of people living on less than a doller per day($ 1/ day); To achieve universal primary education - Ensure that all boys and

girls complete a full course of primary schooling; To promote gender equality and empower women. - Eliminate gender inequality in primary and secondary education performable by 2005 and at all levels by 2015; To reduce child morality - Reduce by two-third the mortality rate among children under five; To improve material health - Reduce by three quarter the material mortality ratio; To combat HIV/AIDS, malaria and other diseases - Halt and begin to reverse the speed of HIV/AIDS - Halt and begin to reverse the incidence of malarial and other major diseases; To ensure environmental sustainability. - Integrity the principles of sustainable development in to country’s policies and programmers reverse loss of environmental resources. - Reduce by half the proportion of people without sustainable access to safe drinking water. - achieve significant improvement in lives of at least 100 million slum dwellers by 2020; To develop a global partnership for development - integrate a simultaneous pursuit of policies that promote growth among developing countries. - Looking at the first issue on the goals eradication of poverty and hunger, this is particularly of interest to Agricultural education (Ola, 2014).

The school, as a social institution for education has a capacity and needs to facilitate, promote and possibly guide certain form of value equipped for the overall success of various government schemes for our national development. Agricultural education provides avenue through which knowledge, abilities and skills of a farmers and all agricultural stakeholders can be increased towards attainment of food security for the alleviation of poverty and hunger. To achieve this, agricultural research should be given premium. Such will not find solutions to problem of food alone. Problems confronting teaching and learning of practical agriculture at different levels since agricultural education curriculum in most Africa countries covers issues of philosophical objectives, values, psychological administrative considerations and technological development. Furthermore, agricultural educations is capable of empowering women, as it built on individuals the knowledge and skills required for individuals to be independent. “Knowledge is power”. Though the acquisition of necessary

skills in agriculture, women can be involved in various aspects of agricultural activities ranging from production, distribution and marketing of produce. Also, for good health living and reduction in mortality rates, good quality and quantity food cannot be left out. This has direct impact on human health as well as combats so many diseases. This comes from agriculture (Ola, 2014).

* + - 1. **Key challenges of Technical and Vocational Education and Training in Nigeria** Since the creation of the National Board for Technical Education (NBTE) in 1977 and the enacting of various decrees and instruments aimed at creating an enabling environment for the development and advancement of TVET in Nigeria (implementation of the national policy on education, decree No. 16 of 1985, together with the constitution of 1999, empowering the Ministry of Education to ensure Minimum Standards in technical and vocational education and training through the Federal Inspectorate Service (FIS) Department and other relevant services of the Ministry of Education, decree No. 17 of 1991 formally establishing the National Commission for Mass Literacy, Adult and Non-formal education and decree No. 31 establishing the Teachers’ Registration Council of Nigeria – TRCN which became operational in June 2000), the technical and vocational education sector has rather been faced with a lot of challenges (Sola & Aseh 2020). According to Egwu (2009) the most salient of these challenges include but are not limited to: Inadequate and obsolete infrastructure and equipment such as poorly equipped workshops, libraries and classrooms; Unattractive conditions of service for teachers; Inadequate funds for the implementation of TVET curricula; Inadequate collaboration between tertiary institutions; High incidence of examination malpractices and other social/academic vices; Inadequate capacity in the institution for internal/peer quality assessment and Brain drain or human capital flight (Sola & Aseh 2020).

## The Major Challenge of Extension Education and Training in Nigeria

The greatest challenge of pre and post extension education and training in Nigeria is the political system. The system has the following faulty features (Nzeribe, 2011):

The system is unstable, turbulent, selfish, corrupt, infested with chronic and deeply rooted tribalism, nepotism, unpatriotism and sectionalism. Presently, cultism is seriously attacking the system**;** The system seems to seek the welfare of the players more than that of the citizens. The political interest overrides any other interest no matter the intensity and importance. This is why the system considered N5m a year as adequate for a university professor, whereas a senator, a minister or a commissioner may use N10m to furnish his or her house. His or her salary is another matter that needs not be mentioned here; The political system is immature, weak and loose. The players are unstable and terribly political. The system, by the action of the players does not allow adequate fund to be provided for skill development. Funds may be placed in the system but only small amount may be devoted for equipping people with the right skills for living; Misplaced priority of the players of the system is obvious. The political Party determines priority not the citizens need.

## The need for improving Agricultural and Rural Training (ART) in Nigeria

The population of Nigeria is very high (201 million inhabitants) and is rising rapidly (at an annual growth rate of some 2.6%). This places the country in 7th position globally, with a 2.64% share of the world population. At this pace, it is estimated that Nigeria will become the world’s third largest country by 2050. On the other hand, Nigeria’s population is quite young as those under 15 years of age account for some 40% of the total population and it is expected that the population will get even more youthful over the next few decades. In parallel to the high and rising population, the rate of unemployment and underemployment in Nigeria is very high (about 40%) with some 60% of those affected being youths. As a result of the inability of the labour market to absorb the youths seeking employment each year, an average

of about 0.7 million of them are added to the ranks of the unemployed, leading to severe financial hardship and rising poverty. It is estimated that over 133.4 million Nigerians are living below the absolute poverty line of 1.90 US dollars per day. Less favourable conditions in rural areas and the pull by opportunities and perceived better conditions in the country’s urban centres have continuously attracted rising numbers of youths to urban towns in search of jobs. This has led to a rapidly growing urban population (currently estimated at 51.2%) against a declining rural population, which is progressively ageing, with fewer prospects of engaging in productive activities (Sola & Aseh 2020).

Since the 70s, Nigeria’s economy has largely depended on crude oil and other extractive industries to the detriment of the construction and agriculture sectors which are labour intensive and unattractive to youths. Nonetheless, the contribution of agriculture to the Nigerian economy in her recovery from the 2004 to 2016 recession indicates that despite her rich oil resources, agriculture remains the base of the country’s economy, providing livelihoods to the 84% of the population employed in the sector. This suggests that Nigeria’s economic recovery and growth can be steadily propelled by the transformation of her agriculture. However, Nigeria’s agriculture is faced with a host of problems that have accounted for low production and productivity, which successive governments have tried to solve by formulating and implementing various policies. Prominent among the recent policies are the Agricultural Transformation Policy (2011 to 2016) followed by the Agricultural Promotion Policy (2016 - 2020) which have culminated to more or less mixed results (Sola & Aseh 2020).

## Empirical Review

The review on the empirical literature on the study subject matter are categorized as follows; Empirical review on the impact of agriculture on the Nigerian economy; Empirical review on the impact of agricultural financing on the Nigerian economy; Empirical review on the

impact of agricultural interest rate on the Nigerian economy; Empirical review on the impact of agricultural education/ training on the Nigerian economic growth, Empirical review on Exchange and Inflation rates respectively.

* + 1. **Empirical Review on the Impact of Agriculture on the Nigerian Economy** Ahungwa (2014); studied the trend analysis of the impact of agriculture to GDP between 1960 to 2012 covering a period of 53 years using time series data. The study shows that the agricultural sector has a superior lead over other sectors between 1960 and 1975 although there was a decline in the agricultural sector's share of GDP. The study revealed a fluctuation between the industrial sectors from 1967 to 1989 period. The regression analysis reveals a positive and significant relationship between the agricultural sector and GDP with the sector accounting 66.4 percent of the variation in the economy. It also reveals the dominance in the agricultural sector relative to other sectors of the economy.

Oji-Okoro (2011) employs multiple regression analysis to examine the contribution of the agricultural sector on the Nigerian economic development. They found that a positive relationship between Gross Domestic Product (GDP) vis a vis domestic saving, government expenditure on agriculture and foreign direct investment between the period of 1986-2007. It was also revealed in the study that 81% of the variation in GDP could be explained by Domestic Savings, Government Expenditure and Foreign Direct Investment.

The study (Kenny, 2019) critically examines the role of agricultural sector performance on economic growth in Nigeria. Key findings indicated that there is a significant long run relationship between agricultural domestic production and its explanatory variables (Agricultural Credit Guarantee Scheme Fund, Federal Government current expenditure on agriculture, total employment and effect of trade liberalisation). The VECM result found 35

percent speed of adjustment of the endogenous growth model which includes Agricultural Credit Guarantee Scheme Fund, Federal Government current expenditure, total employment and effect of liberalisation (SAP) on agricultural domestic production implying that Interventions in agriculture will take at least 24 months for one half of its effect to be significant on production in Nigeria. Therefore, Policy consistency and commitment of government is required before such intervention. Conclusively; publicly supported agricultural interventions in Nigeria had positive and significant effect on agricultural development though the gestation period is not quick. Policy consistency and commitment is required before such intervention can yield the desired results. The review of literature on impacts of publicly supported agricultural interventions supported this conclusion. (Taiwo, 2007).

Oguwuike (2018) in his study which objective was specifically to examine the effect of crop production, livestock, fishery and forestry on economic growth in Nigeria. Secondary data on GDP, crop production, livestock, fishery and forestry was obtained from the CBN statistical bulletin. The econometrics methods of ordinary least square, Cointegration, error correction mechanism were used for the analysis. The outcome of the ADF unit root test show that the variables (GDP, crop production, livestock, fishery and forestry) were stationary. Also the co- integration result showed that there exists cointegration amongst the variables in the model. The Parsimonious Error Correction Model 2 indicates that the R is 86% meaning that the dynamic model is a good fit. The Durbin Watson value of approximately 2.0, indicates a lesser level of autocorrelation, meaning that the successive values of the error term are serially dependent or correlated. Moreover, the first and third lags of GDP are positively and significantly related to current level of economic growth. The coefficient of crop production is positively signed and statistically significant at 5 percent level with GDP. The coefficient of fishing is positively signed but statistically not significant at 5 percent level with GDP. The

coefficient of livestock is positively signed and statistically significant at 5 percent level with GDP. The coefficient of forestry is negatively signed but statistically significant at 5 percent at level with GDP. Based on these results, this study recommends the following: Nigerian government should put good structures in place that allows better and higher agricultural output; The various state government should look beyond the monthly federation allocation account as their major source of revenue for developmental projects but work towards utilization and exploitation of fallow lands in their states for farming; Agricultural institutions should be revived, revamped and some privatized with proper supervision for better productivity; Long term agricultural development plans/projects that are realistic should be created and executed; Nigeria government should increase budgetary allocation to the agricultural sector and ensure effective utilization of the funds/budgets that translates into improved and increased production or output annually; Agricultural credit schemes should be encouraged, strengthened and made easily accessible to farmers for increased agricultural output; Subsidization and availability of agricultural inputs for farmers that translates into higher output; Nigerian government should create secured and enabling environment for commercial farming that minimized subsistence farming and there should be workable and lasting solution towards resolution of crisis between farmers and herdsmen.

According to the study conducted by Kamil, Sevin and Festus (2017) which empirically examines the impact of agricultural sector on the economic growth of Nigeria, using time series data from 1981 to 2013. The study reveals that in the short run, a positive statistical relationship exists between natural logarithm value of agricultural output and RGDP. This shows that agriculture is a viable source of economic growth in Nigeria. The study also found out that from the Johansen multivariate test that, there is a long run relationship between all variables. We observed in the long run, the effect of agriculture on RGDP is restricted to zero when oil rent is controlled for, meaning that the neglect of the agricultural sector for the oil

sector in Nigeria has negative long run implication as oil has a negative statistical relationship with RGDP.

In a study carried out by Olajide, Akinlabi and Tijani (2012) on agricultural resources and economic growth in Nigeria he observed a positive relationship between GDP and agricultural output using ordinary least squares (OLS) econometric techniques in the period covering 1970 to 2010. From his work it was shown that agricultural sector reported for about 35 percent of the GDP. Although agricultural sector gain less support at the discovery of crude oil in commercial quantity.

Bekun (2015) In an empirical study on the contribution of agricultural sector on the economic growth of Nigeria, by covering the period of 33 year (1981 to 2013). The study shows the pivotal and important role agricultural sector could play to the economic growth of Nigeria if given full attention. In contradiction to other studies, Dim (2013) in his work titled “Does agriculture matter for economic development, empirical evidence from Nigeria”, he used unit root test and Neweywest method to observe a different result that agricultural output has a negative impact on economic development but statistically significant in Nigeria.

The study conducted by Karimou (2018) aim at analyzing the impact of agricultural output on economic growth in West Africa using the case of Benin. Time series data covering the period of 1961 to 2014 were used. The data were analysed through a Vector Error Correction Model (VECM). The results reveal that there is a long run, or equilibrium, relationship between agricultural output, industrial output, capital and GDP. The error correction model indicates that 21.6 percent of the discrepancy between long run and short run GDP is corrected within a year. The variance decomposition shows that the largest contribution to shocks in GDP is its feedback shocks. The contribution of agricultural output to shocks in

GDP is less than 2% for the first three year period and about 6% for the ten year period. Capital contribution to shocks in GDP is about 3% or the first three years and more than 15% for the ten year period. Hence, apart from feedback and capital shocks, GDPs most influenced by agricultural output. Therefore, capital formation is primordial to economic growth in Benin but the economic activity upon which capital should be primarily invested is agricultural production.

The study conducted by Ekine and Onu (2018) examined the impact of agricultural output on economic growth in Nigeria. The data were obtained from the CBN statistical bulletin and analysed using econometric methods being the Ordinary Least Squares (OLS), Co- integration, Augumented Dickey Fuller Unit Root test, Error Correction Mechanism (ECM) and Causality tests. Conclusively from the result; It was asserted from the study that agricultural production/output have impact on the economic growth in Nigeria especially livestock and fish production. Therefore, there is urgent call to the government to make much more conscious efforts towards improving agricultural productivity in Nigeria. Based on the findings of this study, the following are recommended; The Nigerian government should consider promoting the agricultural sector of the economy so as to boost agricultural productivity and as such improve the growth of the economy because based on this study, agricultural productivity have impact on the growth of the economy.; The government should intensify efforts towards improving crop production in order to increase its share of contribution to the nation's GDP.

## Empirical Review on the impact of Agricultural Financing on the Nigerian Economy

The study (Ademola, 2019) empirically assesses the impact of agricultural financing on the growth of Nigerian economy. The study revealed that the size and amount of credit available

to agriculture of the total amount of credit granted by the government has not been able to impact on the level of economic growth in Nigeria. This is as it shows a negative influence on the level of output in Nigeria. This may be attributed to the fact the Country has recorded so much in terms of misappropriation of funds meant to be issued to the agricultural system as credits for the improvement of the system. This also goes with the level of agricultural output which maintained a negative but insignificant influence on the output level of Nigeria. Meanwhile, the real interest rates and the total commercial bank loans to agriculture showed positive impact on the output level in Nigeria. The reason is that when it has to do with the private sectors and individual entities, the loans and advances will have a bit of regularity in terms of disbursements. This is evident in the level and frequencies of loans made available by the apex banks through the commercial and specialized banks in Nigeria.

Bidemi (2013) examined the impact of development finance on agricultural growth in Nigeria from 2000-2010. The data gathered was presented in tables and analyzed using simple percentage method. Hypothesis was also tested using the chi-square method. Data analyzed indicated that there is a direct relationship between development finance and agriculture development and therefore it was recommended that farmers should be provided with adequate funds and that adequate extension services should be granted so as to improve farmer’s capacity to produce more food.

Uger (2013) examined the impact of Federal Government’s expenditure on the agricultural sector. The data used was sourced from the Central Bank of Nigeria Statistical Bulletin. Simple regression method was used to analyze the data which indicated impact of agricultural expenditure on its output from 1991 to 2010. The R2 was 1 percent indicating a weak relationship between the variables ware as a result of inadequate funding. It was recommended that government should reinforce its budgetary allocations to the agricultural

sector, ensure proper release of funds, monitor agricultural inputs distribution to farmers and create commodity markets.

Ewubare and Eyitope (2015), examined the effects of government spending on the agricultural sector in Nigeria using quasi-experimental research design. The time series data adopted in the study were generated from the Central Bank of Nigeria (CBN) Annual Statistical Bulletin 2013 and National Bureau of Statistics Bulletin 2013. The ordinary least square of multiple regression, the Johansen co-integration techniques, and the error correction model were used for the tests and analysis. The results showed that the coefficient of determination was 0.9468 (94.68%) and the coefficient of the ECM exhibited a negative sign and statistically significant. Durbin-Watson statistics value was 1.954 and the F-statistics of

33.84 was significant at 5% level. In specific terms, the lag two and three forms of the explanatory variables on government agricultural expenditure were positive and statistically significant. Based on the findings, the study recommended increased funding of these agricultural sector in Nigeria.

Alabi (2014), also investigated the impact of foreign agricultural aid on agricultural GDP and productivity in Sub-Saharan Africa (SSA) using the right multiple regression analysis and data. The results revealed that the average sectoral aid allocation to agriculture in SSA was 7 percent during the period studied, growing from 18 million USD in 2002 to about 47 million USD in 2010. The econometric analysis results suggested that foreign agricultural aid had a positive and significant impact on both agricultural GDP and agricultural productivity at 10 percent level of significance, and that disaster and conflict also have a positive and significant impact on aid receipt at 5 percent significance.

Lawal (2011) examined the impact of informal agricultural financing on agricultural production in the rural economy of Kwara State, Nigeria. The source of data for this study was mainly primary which was collected using structured questionnaires from sampled farmers who were participating in three informal financing schemes namely: (i) periodic savings; (ii) money lending; and (iii) rotating savings in nine Local Government Areas spread through the three senatorial districts of Kwara State, Nigeria. Using a multi-stage random sampling method, a total of 1,350 farmers were selected for the study. The returned 1,249 copies of questionnaires were then processed using Ordinary Least Square method of regression analysis. The findings indicated that the institutions had a positive impact on agricultural production through only rotating savings being statistically significant at 10 percent level. Based on the results, the study recommended that the rotating loans should serve as an impetus to agricultural financing among the farmers in the rural areas with the improvement on the other informal financing sources with a view to increasing the membership drive of all the informal institutions.

Obansa and Maduekwe (2013) investigated the impact of agriculture financing on economic growth in Nigeria. This paper employed secondary data and some econometric techniques such as Ordinary Least Square (OLS); Augmented Dickey-Fuller (ADF) unit root test; Granger Causality test. The results of the various models used suggest that there is bidirectional causality between economic growth and agriculture financing; and there is bidirectional causality between economic growth and agricultural growth. It further suggests that productivity of investment will be more appropriately financed with foreign direct private loan, share capital, foreign direct investment and development stocks. And also capital-output ratio will be more appropriate financed with multilateral loan, domestic savings, Treasury bill, official development assistant, foreign direct investment and development stock. It is recommended that maintenance of credible macroeconomic policies

that is pro-investment; and debt-equity swap option are necessary for an agricultural-led economic growth.

In Nigeria the literature employing the foregoing methods of analysis is just developing. A typical example is the study on small-scale farmers’ access to formal sources of credit in Ogbomosho zone of Oyo state (Sanusi & Adedeji 2010), which also employs a probit model based on a purposive sample of 150 farmers. The study reveals that level of education, membership in a cooperative, and contact with an extension agent and presence of collateral security positively and significantly affect the likelihood of farmers’ access to formal credit, while farming experience negatively affects the probability of farmers having access to formal credit.

In a more recent and more relevant study, Eneji (2013) go beyond the issue of access and attempt to consider credit rationing. The study focuses on the analysis of rural households’ access to the credit market as well as factors favoring credit constraints in Nigeria’s Cross River State. Households that had borrowed from semiformal (MFIs) and informal sources are included in the study. However, the only aspect of rationing considered in the analysis involves borrowers being able to receive only a part of the loan applied for or nothing; no model is specified to substantiate the determinants of rationing.

According to Olomola (2011), the critical areas in which banks need to intensify the development of capacity include (1) risk assessment and identification of strategic opportunities to strengthen value chains, (2) determining how cohesive value chains can be used to reduce risks and facilitate access to finance, (3) determining how to apply value chain financial products to meet the needs of various actors in the chain, and (4) designing appropriate financial products to meet the needs of small-scale farmers. The banks can also

assist in mobilizing financial and human resources to organize training for potential borrowers in the areas of (1) farm accounting and business management, (2) understanding financial risks, (3) identifying opportunities and managing risks, and (4) loan application writing for bankable agricultural projects, with emphasis on cash flows and project costs. Greater portfolio diversification by banks is required, with an emphasis on a variety of agricultural enterprises (especially along the value chains of the various commodities), geographical locations, and borrowers’ risk-based socioeconomic characteristics such as gender, collateral substitutes, and social insurance. A social mechanism involving lenders setting up loan-monitoring committees at the grassroots level may work as insurance against the risk of loan default. The committees, which may include officials of agricultural agencies and community leaders, could work with lenders to identify true farmers and monitor the use of loans from the beginning of farm operations to the end of the loan period. This will ensure that loans are effectively utilized and repayment obligations are complied with conscientiously.

According to Aderibigbe and Kwbena (2014); the credit market serving agriculture in Nigeria is encumbered by operational and administrative inadequacies and the discriminatory tendencies of financial institutions. The government has implemented policies to redress the situation, but small-scale farmers have not benefitted from these incentives to any reasonable degree. This makes it imperative to examine the factors circumscribing loan demand and the various rationing mechanisms. To this end, this study seeks to (1) examine the nature of risks facing small-scale farmer-borrowers in Nigeria, (2) analyze the demand for agricultural credit by farmers and highlight the key determinants of this demand, (3) ascertain the extent to which farmers are credit rationed and the factors influencing the emerging rationing scenarios, and (4) suggest policy measures to address the problem of agricultural credit rationing and enhance the demand for credit. The study employs primary data obtained from

1,200 small-scale farmers through a survey conducted in 2013 across the six geopolitical zones of the country. Methodologically, the study extends the analysis of credit rationing beyond quantity rationing and presents explicit econometric models for analyzing the determinants of three types of credit rationing: quantity rationing, risk rationing, and price rationing. The seemingly unrelated regression model is employed to ascertain the determinants of credit rationing. The results show that there is a higher probability that farmers will be rejected than that they will be given a loan amount lower than what was requested. We find that gender, geographical location, and marital status have no statistically significant effect on the probability that farmers will be quantity rationed. To address the credit rationing challenges and improve demand for loans by small-scale farmers, we urge banks to mobilize their resources to train potential borrowers and establish loan-monitoring committees at the grassroots level to serve as insurance against the risk of loan default.

Lawal (2011) using time series data, attempted to verify the amount of federal government expenditure on Agriculture in the thirty-year period of 1979–2007. Significant statistical evidence obtained from the analysis showed that government spending does not follow a regular pattern and that the contribution of the agricultural sector to the GDP is in direct relationship with government funding to the sector.

Nwanyanwu (2010) employed OLS econometrics techniques in determining the impact of bank credit on the growth of Nigerian economy. The study revealed that bank credit positively and significantly impact on the growth of Nigerian economy.

Heidhues, (1995) in his own contribution to the literature like other researchers absented in respect of Nigeria that no matter how much development, agriculture will retain its

dominance in the economy for many decades to come. More importantly he observed that only agriculture and particularly from agricultural report that the economy can receive its principal stimulus to the economy's growth. Thus his argument though look like a fallacy as the economy now enjoy more agricultural product even on the emergence of oil in Nigeria, therefore the importance of agriculture cannot be underestimated. However, Credit policies are policies directed at developing and encouraging certain sectors of the economy. Essentially, it involves giving loan on prefential terms and conditions to priority sectors of the economy particularly agriculture.

Also, Udah and Obafemi (2011) examine the impact of financial sector reforms on agricultural and manufacturing sectors in Nigeria using the VAR methodology. The results indicate that bank credit to the private sector as a ratio of GDP has a positive effect on manufacturing and agricultural sectors in the short run, medium term and long term. The findings of the study provide a strong evidence to confirm that the reforms in the financial sector succeeded in deepening the financial system, albeit the success achieved so far is below the threshold needed to spur the development of the manufacturing and agricultural sectors. However, it is important to sustain the reform efforts in the country in order to achieve the underlining objectives as they were.

The study conducted by Sebastian, Florence and Charity (2018**)** examined the effect of government agricultural expenditure on agricultural output in Nigeria using time series data from 1981 to 2014. The findings of this paper revealed that there exists positive and significant relationship between government agricultural expenditure (financing) and its output, although a weak one, as rightly shown in our regression analysis. As a sector that provides basic foundation to the Nigerian economy, increased improvement in agricultural production would not only enable Nigeria to feed its teeming population but it would also

assure a return to its former position (glory) as an exporter of agricultural products to global markets in the years ahead.

The study conducted by Asukwo, Owui, Olugbemi, and Ita (2020) examined “The effect of Commercial Banks Lending on the Growth of the Agricultural Sector in Nigeria. The findings revealed that there was a significant relationship between loans and advances, interest rate, liquidity, bank asset on agricultural output. The study recommended that bank should make efforts to grant agricultural loans at the appropriate time. Also, recommended that the rate of lending should not be more than single digit and adequate funds should be available to commercial banks. Conclusively; Based on the analysis of the result, it is shown that there is a significant relationship between loans and advances and agricultural output liquidity and asset had a significant relationship on agricultural output. Commercial bank finances agricultural projects in Nigeria and federal government directs commercial banks to allocate a part of their lending to agriculture at reduced rates. It is concluded that commercial bank plays a vital role in agricultural sector and they give loans to this sector of the economy in order to improve agricultural output. The following recommendations are proffered:

1. Banks should make efforts to grant agricultural loans at the appropriate time
2. The rate of lending should not be more than single digit
3. Adequate funds should be available to commercial banks.

According to Udih (2014), bank lending is expected to impact positively on the investible sectors of the economy, through improved agricultural production of goods and services. He opined that sufficient financing of agricultural projects will not only promote food security, but also enhance the entrepreneurship performance of our young investors. Qureshi (2004) contributes that bank credit has the capacity to remove the financial constraints faced by

farmers, as it provides incentives to enable famers to switch quickly to new technologies, which can enhance the achievement of rapid productivity and growth.

Ijere (2006) viewed bank lending as a catalyst that can activates the engine of growth, enabling it to mobilize its inherent potentials and to advance in the planned or expected direction. However, the Nigerian agricultural sector, which is significantly made up of peasant farmers, relies more on the informal sources of fund for credit supply. These include: Cooperatives, community development association, thrift associations, family, friends and money lenders. Nwankwo (2013) asserts that the informal sources cannot meet the credit needs of the farmers adequately. Consequently, in order to enhance credit flow to the sector, the government established The Nigerian Agricultural Cooperative Bank (NACB), now The Nigerian Agricultural Cooperative and Rural Development Bank.

## Empirical Review on the Impact of Agricultural Interest Rate on the Nigerian Economy

The study (Abubakar, 2019); using regression analysis tried to find connection between lending interest rate and agricultural sector activity in Nigeria for real and nominal values from the beginning of the fourth and current republic (1999) to 2016. Tests showed that interest rate had a strong significant negative relationship with agricultural sector activity. Because interest rate and monetary policy is currently not the main tool used by the federal government to improve this sector this recommended more favorable lending interest rates for farmers and industries to be used in sync with government spending in the agricultural sector as an effective way of improving its performance. conclusively; In line with the theoretical framework, the negative relationship shown by tests between interest rate and agricultural activity confirmed that lower interest rates encouraged movement in this sector and higher interest rates correlated with stunted growth in the sector. This relationship was

also found to be significant. Currently interest rates and monetary policy in general isn’t being pursued as a means of jolting productivity in all sectors of the country and interest rates remain relatively high. But evidently it is an effective way of achieving this goal and not only should lower interest rates be offered to investors and farmers in the agricultural industry, cost free loans should also be considered. This along with more spending will undoubtedly produce the desired effects and lead to optimum productivity. To enhance the effect of lower interest rates, the government should also consider pursuing a flexible exchange rate as this is best suited monetary policy given capital mobility as lower exchange rates results in capital outflow, weakening the currency and making local products cheaper. This will stimulate production in the local industries in the country.

Asekome and Okojie (2018) in their study; An Empirical Investigation on the impact of interest rate on agricultural investment in Nigeria for the period 1980–2015. In a bid to finding the nexus between interest rate and agricultural investment in Nigeria, the study relied on agricultural investment, lending interest rate, deposit interest rate and agricultural output as variables. The study employed the ARMA Least Square technique to determine the impact of interest rate on agricultural investment in Nigeria. The empirical findings showed that deposit interest rate and agricultural output have positive impact on agricultural investment, growth and development while lending interest rate impacts negatively on agricultural investment in Nigeria. Based on the findings, the study recommends that government and various stakeholders in the agricultural sector should improve on the macroeconomic policies such as interest rates, inflation, income level that could impact on the level of investment that would contribute positively to agricultural development in Nigeria.

Onyishi (2015) examined the impact of interest rate reforms on Agricultural growth and finance in Nigeria from between 1970 and 2011. The underlying theory behind the study

highlighted that deregulation of interest rate would increase inflow of resources into the agricultural sector and propel its contribution to national development. They uncovered that interest rate deregulation did have a positive and significant effect on agricultural growth. Furthermore, they found that average interest rate in addition to exchange rate of the naira influenced the agricultural sectors fragment of the country’s GDP and economy by long, medium and short term estimations while inflation had no significant effect. Noting the contradictory effect interest rate has on savings and investments where high interest rates increase supply of credit through savings but lowers investment, they stressed the need to find a proper rate that can counter or at least minimize this effect. They also advised the need for the state to give incentives for instance through lower interest rates for agricultural businesses in order to encourage both local and foreign investors to patronize this sector of the country.

Ehinomen and Charles (2012) in exploring ways for sustainable ways for growth for Nigeria investigated the agricultural sector in the country and how monetary policy impacted its development. They found that interest rate had a monumental effect on agricultural development especially through stimulation of investments. Though lauding the efforts of the central bank, they reiterated the need for further policies to support gains and to punish banks and other financial institutions that do not conform to their policies.

Akpaeti (2013) sought to understand how investments in the agricultural sector in Nigeria responds to reforms in financial institutions between 1970 and 2009. The study found that these reforms significantly impacted investments in the agricultural sector positively. One of the recommended reforms by this research was for the state to introduce interest rate reforms as such an incentive would encourage investments in this sector. Furthermore, the economy

should be liberalized as this would vitalize the business sector as a whole and this will in turn create a sustainable financial sector that can help improve the agricultural sector.

Kareem (2013) explored macroeconomic factors to examine which had the most effect on agricultural output. They detected interest rate as one of the factors that had a significant effect on agricultural output.

Ajudua et al (2015) examined the effects of monetary policy in the form interest rate, inflation rate, money supply and monetary policy rate on Nigerias agricultural sector between 1986 and 2013 Using OLS regression, they found a strong relationship between these facets of monetary policy and the agricultural sector. Studying interest rate, the model predicted that a 1% increase in interest rate would cause a 0.032% fall in agricultural growth while a 1% increase in monetary policy rate will cause a 0.0036% contraction of this sector. They also concluded that making low interest rates available to farmers would be a sure fire boosting agricultural productivity in the country.

Amassoma (2011) delved into interest rate and lending rate deregulation would affect agricultural output. Though finding a correlation between interest rate and agricultural output, this correlation was insignificant concluding that mandatory interest rate policy by the government hinders the lending efficiency of banks as they are forced to rely on first rate borrowers. Therefore, this study called for a total deregulation of interest rates as this would make more funds available for loans. Furthermore, it advocated for more complimentary lending and borrowing rates and for state focus on making agricultural credit more available to competent people after proper screening and scrutiny.

Ugwuoke, Ume and Ihedioha (2018); studied the effects of interest rate deregulation on agricultural financing in Nigeria (1970-2014). The study also specifically examined the trend in the rate of interest, volume of credit to agricultural sector and agricultural GDP contribution under the period (1970-2014). The results showed that interest rate has a strong influence in the volume of credit to the agricultural sector and it also has weak influence on the agricultural GDP contribution. It was also observed that interest rate has been fluctuating under the period (1970-2014) that have resulted to low productivity, and unemployment in agricultural sector but makes the financial institutions to be willing to disburse credit to the public. The agricultural GDP contribution has a downward and upward trend during the period which is as a result of the neglect of the government based on the discovery of oil and lastly there was an upward trend in the volume of credit to the agricultural sector, which means funds were sent to the sector by government but because of bureaucratic processes most farmers are unable to access it.

Onyishi, Arene and Ifiorah (2015); examined the impact of interest rate reform on

agricultural finance and growth in Nigeria. The a priori expectation during deregulated period

was met because increase in lending interest rate was expected to increase the aggregate

credit volume to agricultural sector. While the a priori expectation during the regulated

regime was not met, because most of the financial institutions were not willing to lend to

agriculture as at that period due to low interest lending rate. This is true, since most of the

lending was not for productive purposes and banks concentrated on short-term consumer

lending without bothering to finance productive sector like agriculture.

Study conducted by Ali, Agbo, Ukwuaba and Chiemela (2017); examined the effect of interest rates on access to agro-credit by farmers in Kaduna State, Nigeria. Conclusively from the result; it was discovered that agricultural credit has an effect on agricultural production in

Nigeria and hence the introduction of agricultural credit as one of the independent variables. It was observed at the end of the study that the variation in agricultural output was accounted for by changes in the independent variables. Interest rate plays insignificant role in enhancing economic activities. High interest rate attracts domestic savings, but at the same time it discourages local investors. Monetary policy should therefore ensure appropriate determination of interest rate level that will break the double edge effect of interest rate on savers and local investors. Only the interest rate policy that can attract savings mobilization and encourage domestic investment will help the economy.

This study; Utile, Okwori, and Ikpambese (2018) investigated the effect of interest rate on the economic growth of the Nigerian economy. The aim of the study was to determine the effect of inflation rate, exchange rate and deposit interest rates on the gross domestic product of the country. The data for the study was obtained from the statistical bulletin of the Central Bank of Nigeria from 1980-2016. The research design adopted for the study was the ex-post facto research design. Multiple regression technique was used for the analysis of data. The student t-test was used to test the hypotheses formulated. It was found that INF and EXR have negative and insignificant effect on GDP. Also it was found that DIR has positive and significant relationship with GDP.

In the study conducted by Udoka and Anyingang (2012), with evidence from 1970- 2010 the study found that interest rates and economic growth have an inverse relationship. The researcher collected data from the CBN using the ex post facto research design and an ordinary least square multiple regression analysis to arrive at findings.

Itodo, Eche and Kamo (2012) found that interest rates have insignificant association with economic growth in Nigeria using OLS regression technique for data analysis. The data was collected from 1987- 2009.

Babalola, Oladepo, Danladi, Akomolate and Ajiboye (2015) found that inflation and interest rate have a negative effect on economic growth using 1981-2014 as the study period with data collected from the Central Bank of Nigeria.

The study (Bashir, 2013) empirically investigates the impact of interest rates and some macroeconomic variables on agricultural performance in Nigeria by employing co-integration and an error correction mechanism (ECM) technique with annual time series data covering the period 1980 to 2011. The results reveal that there is a negative relationship between agricultural value added, interest rate spread, and inflation in the country. By implication, the study deduces that the higher the level of inflation and interest rate spread in the country, the lower the level of agricultural value added will be. Conclusively; The findings reveal clearly that causation between agricultural value added and credit to the agricultural sector; and between agricultural value added and inflation could not be established in the Nigerian context, at least at the conventional 1% and 5% levels of significance, such that an agricultural value added cannot be influenced by the both of credit to the agricultural sector and inflation but by an inverse relation with the both of interest rate spread and exchange rate. In essence, as causality cannot be established, causation between agricultural value added, the credit to the agricultural sector and inflation in Nigeria is weak and insignificant, and as such if the levels of interest rate spread and the exchange rate are increased, the size of agricultural value added will decline in the country.

## Empirical Review on the Impact of Agricultural Education/ Training on the Nigerian Economy

Adama, Ohwofa and Ogunjobi (2016) examines the transformation of agricultural education and the implication for food security in Nigeria.. The paper argues that one sure way to transform the agricultural sector and ensure food security is adequate education of the populace on the use and application of agricultural tools and implements. They concluded that; at independence in 1960, the level of hunger in Nigeria was minimal because majority of the people engaged in agriculture which they saw as means of sustenance. However, from 1970s when crude oil was discovered and subsequently exported, over 90% of government revenue came from crude oil export. This enables government to embark on a number of projects which injected much money into the economy. Consequently, agriculture was abandoned to the rural poor who continue to use crude implements. The result is food insecurity and hunger resulting in mal-nutrition in many homes. In order to transform the agricultural sector and ensure food security there must be adequate education especially on the use and application of agricultural tools and implements

In his study Egun (2009) expresses the need for increased productivity in Agricultural sector of Nigerian economy through effective agricultural education of the populace, especially the youth and women in the rural areas necessitates that education in agriculture be refocused. This paper suggests among other things that agricultural education be vocationalised, girls/ women empowerment, and productive agriculture seen as a national issue and overhauling of agricultural administrative machineries. He further Concluded that; due to little emphasis on the practical (vocational) aspect of the training of the youths in schools, low level of women empowerment in agriculture, poor avenues for training and re-training in agricultural production and poor administration on the part of agricultural agencies, production has remained low with attendant importation of food items. Nigeria is endowed with good

agricultural land space; it is therefore necessary to direct its practices in a manner that the ultimate objectives of self-sufficiency in food is attained through gradual but consistent induction of the youth into agriculture and increasing the production capacities of human labour involved in Agriculture.

Ola (2014); Concluded in his study that; for the attainment of the millennium, development goals not to be a mirage in the year 2015 and in the generations to come, agricultural education must be given a proper attention and placed in the right position. This is only possible through quality teaching and learning. The study further made the following recommendations; Government at all levels should ensure adequate funding of agricultural education programmes for effective curriculum implementation. Non-governmental organizations and individual should also give a support.; Provision of adequate infrastructural facilities, equipment and manpower for effective teaching and learning; Agricultural educators should lay more emphasis on practical aspects for the asked of skill acquisition; In view of the enormous benefits in agriculture and the job opportunities there-in, parents and membership of the society at large should encourage youth to take up agriculture as profession and therefore enroll in agricultural education programmes instead of clustering in some programmes where they will not be independent.

Adavbiele (2016), argued that though the Education Trust Fund which was set up to solve the bulk of these challenges, its very existence was seriously undermined by fraud, lack of proper accounting system and records, poor management and the lack of a suitable formula for the sharing of the funds among different tertiary institutions.

## Empirical Review on Inflation

Obasi (2007) in his study to establish quantitative relationships among the relative price volatility of agricultural commodities, inflation and agricultural polices in Nigeria, covering the period 1970–2003. The results show that the effect of inflation on relative price variability among agricultural commodities in Nigeria is non-neutral. Inflation has a significant positive impact on relative price variability in both the long run and the short run. The findings suggest the need for policies that will buffer the agricultural sector from the effects of inflation in the short run, and in addition the crops subsector from the long-run effect of inflation. Similarly, policies that reduce the rate of inflation will minimize relative price variability among agricultural commodities and consequently reduce inefficiency, distortions and misallocation of resources in agriculture that might be caused by inflation.

Enoma (2011) in a study on exchange rate depreciation and inflation in Nigeria noted that theoretically, exchange rate is an important determinant of inflation rate. Although exchange rate depreciation may not directly control inflation, it helps to restructure the price mechanism of both import and export, such that Naira depreciation subtly tends to moderate prices in Nigeria, especially imported price inflation

Sani (2006), Berelrix and Lanel (2009) advised that, to reduce or eliminate the over-valuation of the naira, the inflation rate should be brought down through fiscal and monetary restraint and the application of appropriate supply increasing measures. Sani (2006) went further to state that, although the market driven exchange rate has succeeded in removing the problems of over-valuation, he argued that, problem of over-valuation is as a result of over-liquidity in the system resulting from expansionary fiscal and monetary developments, and the indiscipline of some speculative market operators.

## Theoretical Frame Work

The following are the related theoretical literature reviewed; Dual-gap analysis; Endogenous growth theory; Input-output theory; Rostow's stages of economic growth theory; and the demand – following theory. This study will be anchored on the Endogenous growth theory.

## Dual-gap analysis

It has been established that capital imports can raise the growth rate, but we have not considered how capital imports are financed and how the terms of borrowing may affect the growth rate. A model which incorporates these considerations is developed by Thirlwall, (1983) as presented as follows;

Let O = Y + rD (1)

where O is output, Y is income, r is the interest rate, and D is debt. The difference between domestic output and national income is factor payments abroad. From equation (1) we have: ΔO = ΔY + Rδd… (2)

Now ΔO = σI (3)

Where σ is the productivity of capital, and

I = sO + ΔD – srD (4)

and is the propensity to save. Substituting equation (4) into (3). ΔO = σ(sO + ΔD - srD) (5)

Equation (6) shows that the growth of output (ΔO/O) will be higher than the rate obtainable from domestic saving alone as long as ΔD >srD, that is as long as new inflows of capital exceed the amount of outflow on past loans that would otherwise have been saved. On the other hand, making the rate of growth of income as the dependent variable, then from equation (1) we have:

ΔY = ΔO – rΔD… (6)

Substituting (4) into (3) and the result gives the following: ΔY = σ(sO + ΔD - srD) - rΔD (7)

Now since Y = O- rD, we can also write (7) as:

ΔY = σsY + ΔD(σ- r) (8)

And dividing through by Y we have an expression for the rate of growth of income of: ΔY = σs + (σ - r) ΔD (9)

Equation (9) shows that the growth of income (ΔY/Y) will be higher than the rate obtainable from domestic saving alone as long as ΔD >srD, that is as long as new inflows of capital exceed the amount of outflow on past loans that would otherwise have been saved. The Equations (5) and (9) lay out the basis for agriculture financing and economic growth. However, Thirlwall (1983) have it that the basic underlying assumption of dual-gap analysis is a lack of substitutability between foreign and domestic resources. This may seem a stringent assumption, but nonetheless may be valid particularly in the short period. If foreign exchange is scarce, it is not easy in the short run to use domestic resources to earn more foreign exchange or to save foreign exchange by improving the productivity of imports. If it were easy, the question might well be posed: why do most developing countries suffer chronic balance-of-payments deficits over long periods despite vast reserves of unemployed resources? If domestic saving is scarce, it is probably easier to find ways of using foreign exchange to substitute, raising the domestic savings ratio and the productivity of capital (Cited in Ayodele, 2019).

## Endogenous Growth Theory

The theory states that for any country to experience economic growth, investment in human capital, innovation and knowledge are inevitable. The theory emphasizes why it's very important for both the public and private sector to motivate people to be innovative. The theory believes that diversifying an economy properly in other non-oil sector is likely to influence the economic growth via the following three ways; performance of the agricultural sector, manufacturing sector and solid mineral (Oguweike, 2018).

## Input-Output Theory

The theory explained the inter-relationship that exists between industries in an economy as input in one industry is regarded as output of another industry. The development of the theory was focused towards evaluating and measuring the relationship that exist between major sectors of an economy. The theory proposed that all sectors of an economy are mutually dependent on one another as the output produced from one sector makes up the input of another sector in the same economy. For instance, the output from agricultural sector say maize is seen as a raw material input for the manufacturing sector for the manufacture of cornflakes, flour, starch, etc. Recognizing and harnessing the role inter-dependence of different sectors play as provided by the input-output theory is essential for greater economic growth (Oguweike, 2018).

## Rostow's Stages of Economic Growth Theory

In this theory, Rostow (1982) historically approaches economic and development process through five stages which are; traditional society; pre-conditions for take-off or transitional stage; take-off itself; drive to maturity and age of high mass-consumption. According to Rostow, the take-off stage is the most essential figure in the life of a society when growth becomes its normal condition. The significance and essence of the traditional society makes a positive progress and a multiple interest gets built into the society structure with agriculture playing an important role at this stage. It was the source of income of the state and the nobles. It is evident from the theory that agriculture is a force. In the first three stages of economic growth and development (traditional society, pre-conditions for take-off and take-off stages), the agricultural output strongly affects industrial and economic structure from which nation's economic growth and development can take-off. Thus, agricultural productive activities are more centered, focused and more implemented in the less developed economies where there

is pressing need for rural transformation, income redistribution, poverty reduction and socio- economic growth and development.

## The Demand – Following Theory

According to the theory, the growth of the economy generates additional and new demand for financial services, “which bring about a supply response in the growth of the financial system” (Patrick 1966). The theory suggests a demand following relationship between financial and economic development. High economic growth creates the demand for modern financial institutions, their services, assets, liabilities and arrangements, by investors and savers. In this case, the evolutionally development of the financial system is a continuing consequence of the pervasive, and sweeping process of economic development. The level of demand for financial services depends upon growth of real output, commercialization and monetization of agriculture and other traditional substance sectors (Patrick 1966). An accelerated growth rate of real national income stimulates greater demand for external funds by enterprises, and this will bring about as firms find it increasingly difficult to pursue expansion policy form internally generated funds. Moreover, the greater the differences in the growth rates among the different sectors of the economy, the greater will be the responsibility of the financial system to perform the role of financial intermediation, by allocation saving to fast-growing industries away from slow-growing industries and firms. In this way, the system can support and sustain the leading sectors in the process of growth. The demand – following financial hypothesis assumes that there is a high elasticity in the supply of entrepreneurship in the financial services “relative to growing opportunities for profit from provision of financial services”, to the extent that there is sufficient expansion in the number and diversity of types of financial institutions. It is also assumed that there is in existence, favourable legal, institutional and economic environment.

**Having examined various theories,** this work is anchored on the Endogenous Growth theory this is because; the theory believes that diversifying an economy properly in other non-oil sector is likely to influence the economic growth via the following three ways; performance of the agricultural sector, manufacturing sector and solid mineral.

# CHAPTER THREE METHODOLOGY

## Introduction

This chapter shall describe the methodology employed in this study; which covers the areas of Research design, Method of data collection, Sources of data collection, Techniques of data collection, model specification and A Priori expectation. This research examined to what extent in which agricultural financing has affected the Nigerian economy. Since the data to be employed are time series data, an ordinary least square (OLS) method will be used among others to estimate the model parameters. In order to facilitate time series analysis, data such as Gross Domestic Product (GDP), Agricultural loan (AL), Agricultural Output (AO), Agricultural interest rate (INTR), Agricultural Expenditure on Training (AET) and control variable (Inflation rate).

## Research Design

This study adopted the longitudinal research design approach. The choice of this design is predicated on the fact that it involves repeated observations of the same variables over a period of time. This design approach is a correlational research in which researchers observe and collect data on a number of variables without trying to influence those variables. On this study a time series data of 39 years were collected and used.

## Sources of Data Collection

The secondary data for this study shall be collected from the following sources e.g. Federal Ministry of Agriculture and Rural development (FMA&RD), National Bureau of Statistics (NBS) and Central Bank of Nigeria (CBN) Statistical Bulletins in addition to Journal publications. The secondary data shall comprise of Gross Domestic Product, Agriculture

loans, Agricultural output, interest rate and Agricultural Education and Training from 1981 to 2019.

## Method of Data Collection

The method of data collection is secondary. These will comprise Data on Gross Domestic Product, Agriculture loans, Agricultural output, interest rate and Agricultural Education and Training, Inflation and Exchange rate extracted from; Articles in Journals, Annual statistical bulletins of Central Bank of Nigeria (CBN) and Nigeria Bureau of Statistics (NBS).

## Techniques of Data Analysis

The Ordinary Least Square (OLS), method is used for the estimation of parameters of the model specified earlier on. This estimation technique is relevant to the objectives of this study because it has been used in the study of a range of economics relationship with satisfactory result. The evaluation method is based on the various test of significance which will be carried out to know whether the estimates of the parameter confirm with the assumption of ordinary least square and to ascertain the forecasting ability of the model. Other tools of data analysis include: Unit Root Test, Vector Error Correction Model (VECM), and Autoregressive Distributive lag Model.

## Unit Root Test

In statistics, a unit root test tests whether a times series variable is non-stationary and possess a unit root. The null hypothesis is generally defined as the presence of a unit root and the alternative hypothesis is either stationarity, trends stationarity depending on the test used. The unit root test is conducted first before actual model estimation. The unit root test is carried out in order to ascertain the underlying properties of the time series variables in the model. The importance of unit root test is that it enables us to avoid the problem of spurious

regression output (Gujarati & Porter, 2009). In this study, the Augmented Dickey-Fuller (1981) unit root test method will be utilized. The Augmented Dickey-Fuller (ADF) unit root test equation to be estimated is specified as follows:

𝑚

∆𝑦𝑡 = 𝜔 + 𝛿𝑦𝑡−1 + ∑ 𝜃𝑖∆𝑦𝑡−𝑖 + 𝜇𝑡

𝑖=1

Where ∆ is the first difference operator;𝑦𝑡 is a time series variable at current time (t); 𝜔 is the drift term; 𝑦𝑡−1 is the one period lagged value of 𝑦𝑡; 𝛿 is the coefficient of 𝑦𝑡−1; ∆𝑦𝑡−𝑖is the lagged valued of the first difference of 𝑦𝑡; m is the maximum lag length; 𝜗𝑖 is the coefficients of ∆𝑦𝑡−𝑖; and 𝜇𝑡 is the white noise error term. The null hypothesis is such that the time series contains a unit root which implies that 𝛿=0. The null hypothesis is rejected if 𝛿 is negative and statistically significant. The ADF unit root test is based on t-statistic test.

Hypothesis:

𝐻0: 𝛿 = 0 (Variable has unit root i.e.; time series is non-stationary)

𝐻1: 𝛿 < 0 (Variable do not have unit root i.e.; time series is stationary) Decision Rule:

(i) If 𝑡∗> ADF critical value in absolute terms, reject the null hypothesis

1. If 𝑡∗< ADF critical value in absolute terms, do not reject the null hypothesis Note: 𝑡∗ is the calculated value of the ADF unit root test.

## Cointegration Test

The Cointegration test is used to confirm whether time series variables which might be individually non-stationary can be linearly combined to give a meaningful long-run equilibrium relationship. In other words, cointegration test is conducted to ascertain if the time series variables under consideration are cointegrated i.e., if they have a long-run relationship (Gujarati & Porter, 2009). In this study, the Johansen and Juselius (1990) cointegration test procedure will be used. The Johansen and Juselius (1990) cointegration test

are based on vector autoregression framework. The two statistics to be obtained are the Trace and Maximum Eigen-Value statistics. The *Trace statistic* is defined by the equation:

𝑘

𝐿𝑅𝑡𝑟𝑎𝑐𝑒(𝑟0) = −𝑇 ∑ log(1 − 𝜆̂𝑡)

𝑖=𝑟0+1

While the *Maximum Eigen-Value Statistic* is defined by the equation:

𝐿𝑅𝑚𝑎𝑥(𝑟0) = −𝑇𝑙𝑜𝑔(1 − 𝜆̂𝑟0+1)

Critical values for the asymptotic distribution of 𝐿𝑅𝑡𝑟𝑎𝑐𝑒(𝑟0) and 𝐿𝑅𝑚𝑎𝑥(𝑟0) statistics are tabulated in MacKinnon, Haug and Michelis (1999) for 𝑘 − 𝑟0 = 1, … , 10.

Hypothesis:

𝐻0 : No cointegration

𝐻1 : Cointegration exists Decision Rule:

1. If Trace statistic > Critical values, cointegration exists
2. If Maximum Eigen-Value Statistic > Critical values, cointegration Exists.

## Vector Error Correction Mechanism (VECM)

The error correction mechanism is a means of reconciling the short-run behavior of an economic variable with the long run behavior, it was first used by Sargen and later popularized by Engle and Granger corrects for equilibrium. Vector autoregressive model as non-structural approach is often to provide a dynamic specification the identified all of the known relationships (Nwaobi 2012). For example;

Δy = a+bΔx+ut-1 +vt Where

a+b𝜟x denotes the short run dynamic Ut-1+vt denote Long run equilibrium

t-1 is the one period lagged value of the error term from the co-integrating regression.

Traditionally, the testing procedure is to set null cointegration as against alternative, rejection is evidence in favor of the mode.

## Model Specification

Having examined various theories**,** this work is anchored on the Endogenous Growth theory which believes that diversifying an economy properly in other non-oil sector is likely to influence economic growth; where the contribution of agricultural sector to the Nigeria economic development was examined and where Real Gross Domestic Product (RGDP) as proxy for economic growth was the dependent variable while Agricultural Loan (AL), Agricultural Output (AO), Interest Rate on Agricultural Loans (INTR) and Agricultural Expenditure on Training (AET) were the independent variables while Inflation rate serve as control variable. Hence, in line with these and a little modification; the model adopted in this study is functionally expressed as;

RGDP = F (AO, AL, AET, INTR, INFR)

𝑅𝐺𝐷𝑃𝑡 = 𝛽0 + 𝛽1𝐴𝑂𝑡 + 𝛽2𝐴𝐿𝑡 + 𝛽3𝐴𝐸𝑇𝑡 + 𝛽4𝐼𝑁𝑇𝑅𝑡 + 𝛽5𝐼𝑁𝐹𝑅𝑡+𝜇𝑡 … … (3.1)

|  |  |  |
| --- | --- | --- |
| Where: |  | |
| RGDP | = | Real Gross Domestic Product (Proxy for Economic Growth) |
| AL | = | Agricultural Loan |
| AO | = | Agricultural Output |
| INTR | = | Interest Rate on Agricultural Loan |
| AET | = | Agricultural Expenditure on Training |
| INFR | = | Inflation Rate |

𝛽0= Intercept (constant term)

𝛽1*,* 𝛽2, 𝛽3, 𝛽4 , 𝛽5 = Slope Parameters to be estimated

μ = Error Term t = Time

In variable Identification Real Gross Domestic Product (RGDP), was chosen as a dependent variable in this study because it is used as an indicator for assessing the growth of Nigerian economy, while Agricultural Loan (AL), Agricultural Output (AO), Interest Rate on Agricultural Loans (INTR) and Agricultural Expenditure on Training (AET) were chosen as independent (explanatory) variables in order to capture their effects on the Nigerian economy; which it serve to show how significant changes in these independent variables explains the variation in the Nigerian economy. These variables include; the amounts of debt financing allocated to agricultural sector to enhance annual agricultural productivity in the nation’s economy as a whole. Agricultural loan (AL), Agricultural Output (AO), Interest rate on Agricultural Loans (INR) and Agricultural Expenditure on Training (AET) was employed also as an explanatory variable in this study because they both affect the GDP. Inflation Rate (INFR) served as control variable.

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## 3.8 A Priori Expectations

*A priori* expectations are principally determined by the economic theory guiding the relationship between study variables ; In line with the economic theory (Endogenous Growth Theory); Agricultural Output, agricultural Loan and Agricultural Extension and Training are expected to have a positive relationship with RGDP while Interest and Inflation rates are expected to have a negative relationship with RGDP. These *a priori* expectations are mathematically expressed as follows:

𝛽1, > 0 = Positive relationship between AO and RGDP

𝛽2 > 0 = Positive relationship between AL and RGDP

𝛽4 > 0 = Positive relationship between AET and RGDP

𝛽3 < 0 = Negative relationship between INTR and RGDP

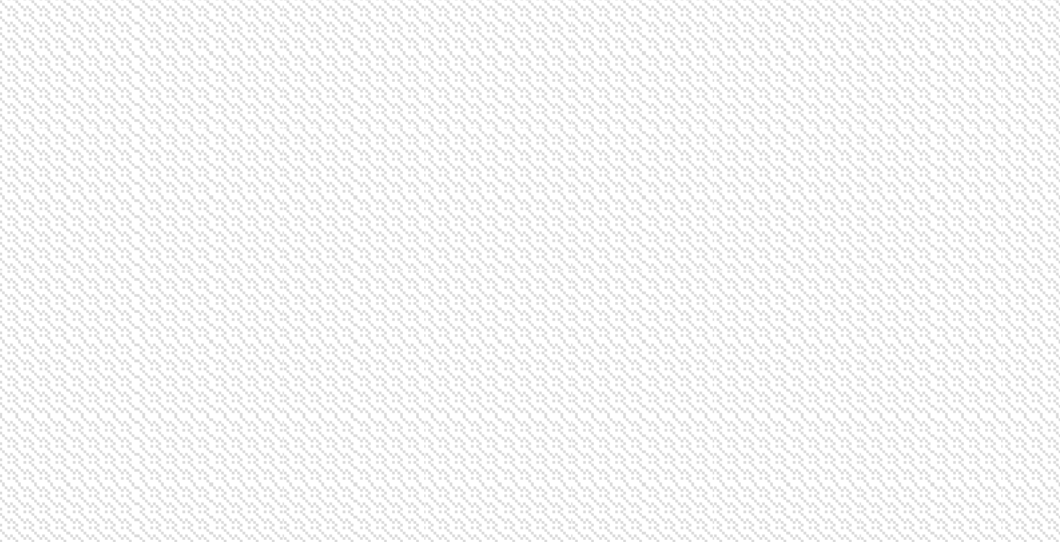
𝛽5 < 0 = Negative relationship between INFR and RGDP

# CHAPTER FOUR

**Million Naira**

**DATA PRESENTATION AND RESULT**

Source: Researcher’s own computation using Microsoft Excel Output, 2021



**4-0 Introduction**

In this chapter, data on Appendix 1 page 145 were presented in Line charts showing the distributions of the dependent and independents variables in their units from the study period of 1981 to 2019 respectively. The results on the descriptive statistics, Augmented Dickey- Fuller (ADF) unit root test, Autoregressive Distributive Lag Model (Regression Result),

Hypotheses test and decisions made were all presented as follow;

**4.1 Trend Analysis**

**Figure 4.1.1: A Line chart showing distribution of Nigeria’s Real Gross Domestic Product (RGDP) (Million Naira) from 1981– 2019**

80000

70000

60000

50000

40000

30000

20000

10000

0

**Year**

1981

1982

1983

1984

1985

1986

1987

1988

1989

1990

1991

1992

1993

1994

1995

1996

1997

1998

1999

2000

2001

2002

2003

2004

2005

2006

2007

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2009

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2011

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2014

2015

2016

2017

2018

2019

Fig. 4.1.1 above showed that real Gross Domestic Product (RGDP) is generally in zigzag trend. An examination of fig. 4.1,1 above showed that real gross domestic product (RGDP) expresses an upward trend. The figure also reveals that RGDP proportionally increases as the time series during the period 2001 – 2015. The time series data on appendix 1 underscore the upward trend in RGDP. The data showed that real gross domestic product (RGDP) which stood at =N=19,748.53 billion in 1981 rose consistently to =N=72,094.09 billion in 2019. This indicates that GDP has an upward trend.

## Figure 4.1.2: A Line chart showing distribution of Nigeria’s Loans to Crop Production, Livestock, Forestry and Fishery sector (Billion Naira) from 1981– 2019

BILLION NAIRA

Fig. 4.1.2 above showed that **Agricultural Loans to Crop Production, Livestock, Forestry and Fishery sector** (AL) was almost constant during the period from 1981 to 2006 then unsteadily rise from the period of 2006 to 2017 and later steeply increases upwardly from the year 2017 to 2019. An examination of fig. 4.1.2 above showed that AL displayed almost a constant an upward and downward trend towards the end study period of 2019. The time series data on appendix 1 underscore the steady, upward and down trend in AL. The data showed that AL which stood at =N=0.59 billion in 1981 rose consistently to =N=2,720.10 billion in 2019. This indicates that AL has an upward trend.



Source: Researcher’s own computation using Microsoft Excel Output, 2021

3000

2500

2000

1500

1000

500

0

YEAR

1981

1982

1983

1984

1985

1986

1987

1988

1989

1990

1991

1992

1993

1994

1995

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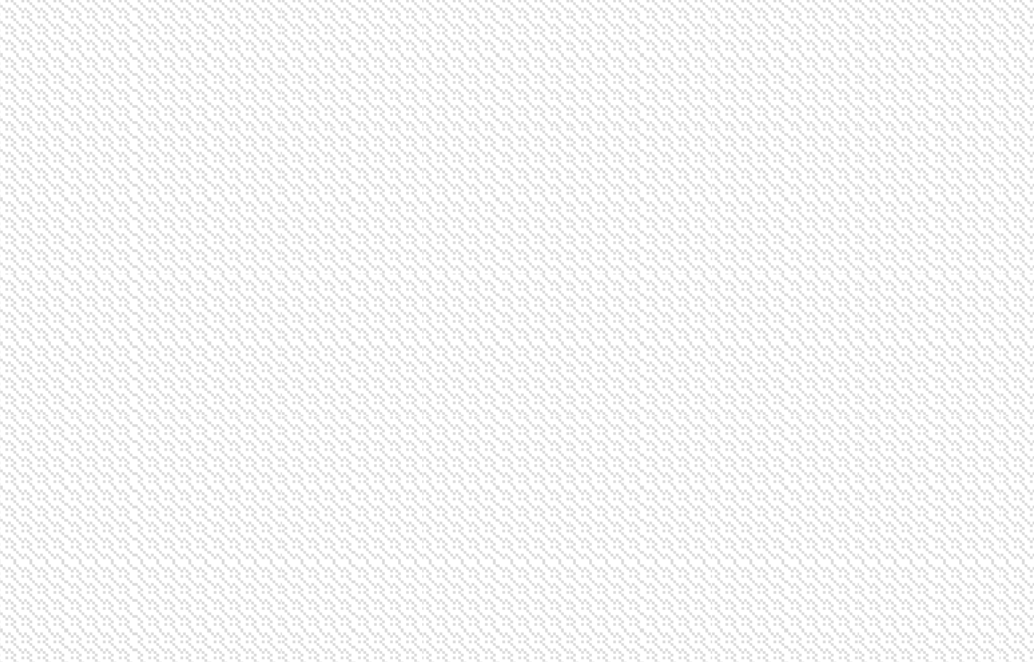
2016

2017

2018

2019

## Figure 4.1.3: A Line chart showing distribution of Nigeria’s Agricultural sector Output (=N= Billion) from 1981-2019



20,000.00

18,000.00

16,000.00

14,000.00

12,000.00

10,000.00

8,000.00

6,000.00

4,000.00

2,000.00

-

**Year**

**Billion Naira**

Source: Researcher’s own computation using Microsoft Excel Output, 2021

1981

1982

1983

1984

1985

1986

1987

1988

1989

1990

1991

1992

1993

1994

1995

1996

1997

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2000

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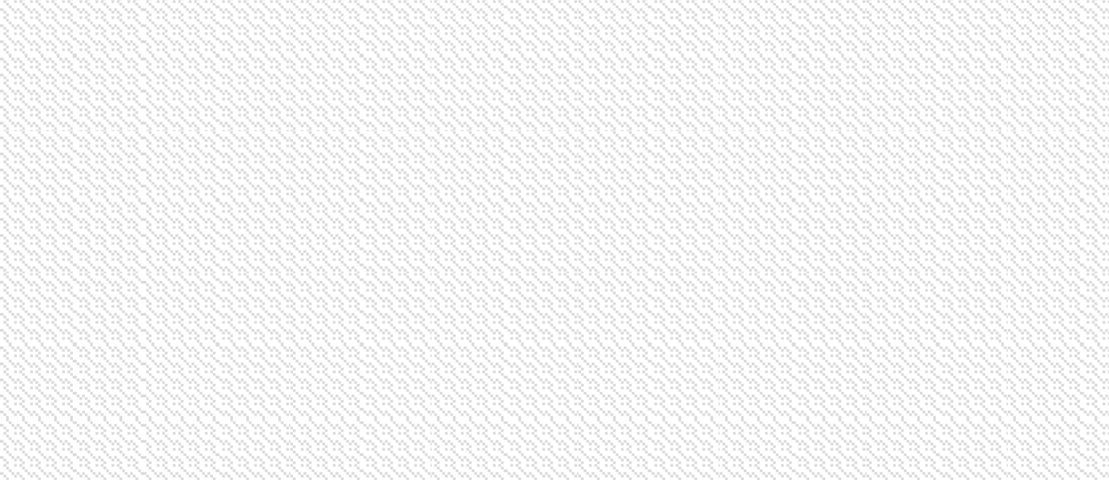
2019

Fig. 4.1.3 above showed that **Agricultural sector Output** (AO) was almost stable from 1981 to 1984 then slowly rises from 1984 to 2001 then followed by a steep rise in 2002. The period from 2002 to 2019 shows a much rapid increase in AO. An examination of fig. 4.1.3 above showed that AO displayed almost a constant and then upward trend towards the end of the study period of 2019. The time series data on appendix 1 underscore the steady, upward and down trend in AL. The data showed that AL which stood at =N=2,364.37 billion in 1981 rose consistently to =N=17,958.58 billion in 2019. This indicates that AO has an upward trend

## Figure 4.1.4: A Line chart showing distribution of Nigeria’s Agricultural Expenditures on Trainings (=N= Billion)

**Billion Naira**

constant during the period from 1981 to 1992 then followed by a partial rise in AET from 1993 to 1998. An unsteady zigzag rise in AET from the 1998 to the end of the study period 2019. An examination of fig. 4.1.4 above showed that AET displayed from the beginning of the study period almost a constant AET and then displayed an upward and downward zigzag trend towards the end of the study period of 2019. The time series data on appendix 1 underscore the steady, upward and down trend in AET. The data showed that AET which stood at =N=0.01 billion in 1981 rose consistently to =N=70.27 billion in 2019. This indicates that AET has an upward and down trend.



Source: Researcher’s own computation using Microsoft Excel Output, 2021

Fig. 4.1.4 above showed that Agricultural Expenditure on Training (AET) was almost

80

70

60

50

40

30

20

10

0

**Naira**

1981

1982

1983

1984

1985

1986

1987

1988

1989

1990

1991

1992

1993

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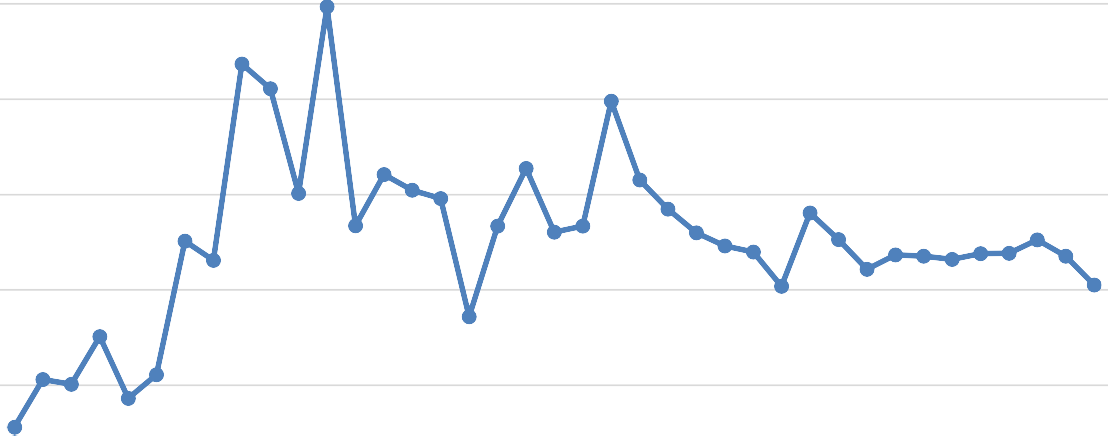
2016

2017

2018

2019

## Figure 4.1.5: A Line chart showing distribution of Nigeria’s Interest rate (%) from 1981 – 2019



35

30

25

20

15

10

5

0

Year

%

Source: Researcher’s own computation using Microsoft Excel Output, 2021

1981

1982

1983

1984

1985

1986

1987

1988

1989

1990

1991

1992

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1994

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2002

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2019

Fig. 4.1.5 above showed that Interest Rate (INTR) is generally in a zigzag trend. An examination of fig. 4.1.5 above showed that INTR expresses an upward and downward zigzag trend. The figure also reveals that the highest INTR of 29.8% was recorded in the year 1992. The time series data on appendix 1 underscore the zigzag trend in INTR. The data showed that INTR which stood at 7.75% in 1981 rose in a zigzag manner to 15.21% in 2019. This indicates that INTR was unstable all through the study period exhibiting a zigzag trend.

## Figure 4.1.6: A Line chart showing distribution of Inflation rate (%) from 1981 – 2019

PERCENTAGE

1981

1982

1983

1984

1985

1986

1987

1988

1989

1990

1991

1992

1993

1994

1995

1996

1997

1998

1999

2000

2001

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2018

2019

at it highest of 76.76 % in the year 1994 and also displayed an upward and downward zigzag trend all through the study period. The time series data on appendix 1 underscore the upward and down trend in INFR. The data showed that INFR which stood at 20.56% in 1981 fell in a zig-zag manner to 9.16% in 2019. This indicates that INFR has an upward and down trend.



Source: Researcher’s own computation using Microsoft Excel Output, 2021

Fig. 4.1.6 above showed that Inflation rate (INFR) was unstable all through the study period

from 1981 to 2019 (zigzag trend). An examination of fig. 4.1.6 above showed that INFR was

90

80

70

60

50

40

30

20

10

0

YEAR

## Table 4.1: Summary of the description of variables and their corresponding unit and sources

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable** | **Description** | **Unit** | **Source** |
| RGDP | Real Gross Domestic Product | Billions of Naira | NBS |
| AO | Agricultural Output | Billions of Naira | NBS |
| AL | Agriculture Loans | Billions of Naira | FMA&RD/CBN |
| AET | Agric. Expenditure on Trainings | Billions of Naira | FMA&RD |
| INR | Interest Rate | Percentage | CBN |
| INFR | Inflation Rate | Percentage | NBS |

Source: Researcher’s own computation

## Descriptive Statistics Table 4.2 Descriptive Statistics

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Descriptive Statistics** | **RGDP** | **AO** | **AL** | **AET** | **INTR** | **INFR** |
| Mean | 4.50 | 3.80 | 6.42 | 3.26 | 11.03 | 15.89 |
| Median | 4.41 | 3.68 | 2.50 | 1.51 | 10.25 | 6.25 |
| Maximum | 4.86 | 4.25 | 33.26 | 59.32 | 29.80 | 76.76 |
| Minimum | 4.21 | 3.36 | 0.59 | 0.01 | 1.18 | 0.70 |
| Std. Dev. | 0.22 | 0.31 | 9.30 | 9.48 | 9.43 | 20.67 |
| Skewness | 0.36 | 0.14 | 1.95 | 5.52 | 0.26 | 1.44 |
| Kurtosis | 1.60 | 1.47 | 5.20 | 33.10 | 1.63 | 3.99 |
| Jarque-Bera | 4.04 | 3.94 | 32.61 | 16.71 | 3.50 | 14.97 |
| Probability | 0.13 | 0.14 | 0.00 | 0.00 | 0.17 | 0.00 |
| Sum | 17.56 | 14.81 | 25.05 | 12.70 | 43.03 | 61.99 |
| Sum Sq. Dev. | 1.91 | 3.57 | 3.29 | 3.41 | 3.38 | 16.24 |
| Observations | 39 | 39 | 39 | 39 | 39 | 39 |

Source: *E-views output, version 9.0*

Table 4.2 above presents the descriptive statistics of the variable data. It shows the mean, median, maximum, Minimum, standard deviation, skewness and kurtosis of all the variables. The Skewness statistic which shows the degree of asymmetry observed in a frequency distribution revealed that RGDP, LGEE, AO. Al, AET, INTR and INFR were positively

skewed. The Kurtosis statistic which depicts the flatness of the graph of a frequency distribution revealed that RGDP, AO, AL, AET, INTR and INFR are normally distributed.

## : Augmented Dickey-Fuller (ADF) Unit Root Test

Since the seminar work of Granger and Newbold (1974) on possible spurious regression among non-stationary variables, testing for the unit root test has been greatly developed in the time series approach data series. The unit root testing result shown on the table 4.2.2 below.

## Table 4.3: Augmented Dickey-Fuller (ADF) Unit Root Test

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Series** | **ADF Test**  **Statistics** | **5% Critical Value** | **Prob Value** | **Order of Co-integration**  **(Order of Stationarity)** |
| RGDP | -3.85848 | -2.94327 | 0.0054 | 1(1) |
| AO | -5.907054 | -2.943427 | 0.0000 | 1(1) |
| AL | -5.265637 | -2.94327 | 0.0001 | 1(1) |
| INTR | -6.733006 | -2.951125 | 0.0100 | 1(2) |
| AET | -4.263008 | -2.94327 | 0.0018 | 1(1) |
| INFR | -3.071803 | -2.941145 | 0.0373 | 1(0) |

Source: *E-views output, version 9.0*

The results of unit root test shown on table 4.2.2 above revealed that all the absolute values of ADF test statistics are greater that their critical values at 5% as well as probability values of the probability benchmark is stationary at 5% and implying that RGDP, AL, INR, AET, and INFR are all stationary at 5%. Their order of cointegration (stationarity level) were; 1(0), 1(1) and I(2) respectively. The results also showed that all the variables are stationary at 5% since their absolute values of ADF statistics are greater than their critical value at 5% as well as probability values computed less than probability bench mark.

## Autoregressive Distributive Lag Model: The Regression Result Table 4.4 Autoregressive Distributive Lag Model: The Regression Result

RGDPt = β0+β1AO-β2AL+B3AET+B4INTR+β5INFRt-1+Ut-1

Dependent Variable: RGDP Method: ARDL

Date: 09/03/21 Time: 04:52 Sample (adjusted): 1982 2019

Included observations: 38 after adjustments Maximum dependent lags: 4 (Automatic selection) Model selection method: Akaike info criterion (AIC)

Dynamic regressors (0 lag, automatic): AO AL AET INTR INFR

Fixed regressors: C

Number of models evalulated: 4 Selected Model: ARDL(1, 0, 0, 0, 0, 0)

Note: final equation sample is larger than selection sample

Variable

RGDP(-1)

Coefficien

t Std. Error t-Statistic Prob.\*

0.659733

0.052428

12.58366

0.0000

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| AO | 0.271915 | 0.038144 | 7.128675 | 0.0000 |
| AL | 0.009091 | 0.003885 | 2.340179 | 0.0259 |
| AET | 0.000215 | 0.000147 | 1.464823 | 0.1530 |
| INTR | 0.001534 | 0.000495 | 3.097660 | 0.0041 |
| INFR | -0.000249 | 0.000117 | -2.132867 | 0.0410 |
| C | 0.496954 | 0.104975 | 4.734038 | 0.0000 |
| R-squared | 0.998161 | Mean dependent var | | 4.508341 |
| Adjusted R-squared | 0.997805 | S.D. dependent var | | 0.224680 |
|  |  |  | | - |
| S.E. of regression | 0.010527 | Akaike info criterion | | 6.104920 |
|  |  |  | | - |
| Sum squared resid | 0.003435 | Schwarz criterion | | 5.803259 |
|  |  | Hannan-Quinn | | - |
| Log likelihood 122.9935criter. 5.997591 | | | | |
| F-statistic | 2803.930 | Durbin-Watson stat | | 2.328791 |
| Prob(F-statistic) | 0.000000 |  | |  |

\*Note: p-values and any subsequent tests do not account for model

selection.

*Source:* E-views output, version 9.0

## Model:

InRGDP = 0.497+0.272AO+0.009AL+0.002AET+0.0021INTR-0.0003INFR +Ut (4.734) (7.127) (2.340) (1.465) (3.097) (-2.133)

R2 = 0.998 Adjusted R2 =0.987 DW = 2.33 F= 2603.93

The result on table 4.3 above revealed the following:

The equation shows that α = 0.497 which is the intercept. This is the base level of prediction for the dependent variable when all the independent variables are equal to zero. The coefficients of the independent variables measure how a percentage change in independent variables affect the dependent variable.

(i.) 1% increase in agricultural output (AO) leads to about 0.272% increase in real gross domestic product (RGDP). It was found that coefficient of AO is positively sign, indicating positive relationship between AO and RGDP in Nigeria during the 1981- 2019, and this is in line with a priori expectation. This result is statistically significant at 5% with the p-value of 0.0000. The standard error measures the statistical reliability of the coefficient estimates- the larger the error, the more statistical noise in the estimates. The standard error is 0.038144% which is small or insignificant and thus shows that AO is statistically reliable to predict real Gross Domestic Product (RGDP) in Nigeria since agricultural sector provides between 21 to 23 percent of Nigeria’s Gross domestic Product (GDP).

(ii.) 1% increase in agricultural loans (AL) leads to about 0.009% increase in real gross domestic product (RGDP). It was found that coefficient of Al is positively sign, indicating positive relationship between AL and RGDP in Nigeria during the 1981- 2019, and this is in line with a priori expectation. This result is statistically significant at 5% with the p-value of 0.0259. The standard error measures the statistical reliability of the coefficient estimates- the larger the error, the more statistical noise in the estimates. The standard error is 0.003885% which is small or insignificant and thus shows that AL is statistically reliable to predict real Gross Domestic Product (RGDP) in Nigeria since agricultural sector provide between 21 to 23 percent of Nigeria’s Gross domestic Product (GDP).

(iii.) 1% increase in agricultural expenditure on training (AET) leads to about 0.0022% increase in real gross domestic product (RGDP). It was found that coefficient of AET is positively sign, indicating positive relationship between AET and RGDP in Nigeria during the 1981-2019, and this is in line with a priori expectation. This result is statistically insignificant at 5% with the p-value of 0.1530. The standard error measures the statistical reliability of the coefficient estimates- the larger the error, the

more statistical noise in the estimates. The standard error is 0.000147% which is small or insignificant and thus shows that AET is statistically reliable to predict real Gross Domestic Product (RGDP) in Nigeria since agricultural sector provide between 21 to 23 percent of Nigeria’s Gross domestic Product (GDP).

(iv.) 1% increase in interest rate (INTR) leads to about 0.002% increase in RGDP. It was found that coefficient of interest rate in Nigeria during the 1981-2019, is positively sign (0.002)), indicating positive relationship between interest rate and RGDP in Nigeria during the 1981-2019, and this is in line with a priori expectation. This result is statistically significant at 5% with the p-value of 0.0041. The standard error measures the statistical reliability of the coefficient estimates- the larger the error, the more statistical noise in the estimates. The standard error is 0.000495% which is small or insignificant and thus shows that interest rate is statistically reliable to predict real Gross Domestic Product (RGDP) in Nigeria.

(v.) 1% increase in Inflation rate (INFR) leads to about -0.00025% decrease in RGDP. It was found that coefficient of INFR in Nigeria during the 1981-2019, is negatively sign (-0.00025), indicating negative relationship between INFR and RGDP in Nigeria during the 1981-2019, and this is in line with a priori expectation. This result is statistically significant at 5% as the p-value of 0.0410. The standard error measures the statistical reliability of the coefficient estimates- the larger the error, the more statistical noise in the estimates. The standard error is 0.000117% which is small or insignificant and thus shows that INFR is statistically reliable to predict real Gross Domestic Product (RGDP) in Nigeria.

R-square (R2) is the fraction of the variance of the dependent variable explained by the independent variable. In this result, the R2 is about 99.8% meaning that about 99.8% of the Real Gross Domestic Product (RGDP) in Nigeria is explained by the independent variables put together. If more regressors are added, the R2 never decreases; Adjusted R2 penalizes the R2 for the repressors which do not contribute to the explanatory power of the model and in this case is close R2. Sum of squared residual is a measure of error in using the estimated regression equation values of the RGDP, AO, AL, AET, INR, and INFR. From the result, it shows that AO, AL, INTR, and INFR have significantly impacted on RGDP proxies’ economic growth in Nigeria over the period 1981-2019 and the reverse is the case with AET.

## Test of Hypotheses and Decision

In accepting or rejecting the stated Research Null Hypotheses; Table 4.4 shows the Regression result; which further indicates the calculated probability values of the variable test results. Therefore, the decision rule for Rejection of the stated Null hypotheses is as follows; **Decision Rule**

P-Value > Alpha = (Fail to reject H0)

P-Value < or equal to Alpha = (Reject H0)

Where Apha is the Level of Significance at 5% (0.05)

## Table 4.5 Probability values of Variables and Decisions Made on Stated Hypotheses

|  |  |  |  |
| --- | --- | --- | --- |
| **VARIABLE** | **P-VALUE** | **ALPHA** | **DECISION ON NULL HYPOTHESIS** |
| **AO** | 0.0259 | 0.05 | Reject |
| **AL** | 0.0000 | 0.05 | Reject |
| **AET** | 0.1530 | 0.5 | Accept |
| **INTR** | 0.0041 | 0.5 | Reject |

**Hypothesis 1:**

The **Null Hypothesis (H01)**; ‘The Agricultural output has no significant effect on the Nigerian economic growth’ is REJECTED on the condition that it P-Value (0.0000) is less than the P-bench mark value at 5% level of significant (Alpha) and hence its **Alternative Hypothesis (H11)** was hereby ACCEPTED that is; ‘There is significant effect of Agricultural output on the Nigerian economic growth’.

## Hypothesis 2:

The **Null Hypothesis (H02)**; ‘There is no significant effect of Agricultural loans on the Agricultural output in Nigerian’ is REJECTED on the condition that it P-Value (0.0259) is

less than the P-bench mark value at 5% level of significant (Alpha) and hence its **Alternative Hypothesis (H12)** is hereby ACCEPTED that is; ‘There is significant effect of Agricultural loans on the Agricultural output in Nigeria’.

## Hypothesis 3:

The **Null Hypothesis (H03)**; ‘: Agricultural Expenditure on Training have no significant effect on the Nigerian economic growth’ is ACCEPTED on the condition that its P-Value (0.1530) is greater than the P-bench mark value at 5% level of significant (Alpha).

## Hypothesis 4:

The **Null Hypothesis (H04)**; ‘There is no significant influence of Agricultural Loan interest rate on the Nigerian economic growth’ is REJECTED on the condition that it P-Value (0.0041) is less than the P-bench mark value at 5% level of significant (Alpha) and hence its **Alternative Hypothesis (H14)** is hereby ACCEPTED that is; ‘There is significant influence of Agricultural Loan interest rate on the Nigerian economic growth’.

# CHAPTER FIVE DISCUSSION

## Introduction

The general objective of this study is to determine how impactful agricultural financing on

the Nigerian economic growth is. The discussions here are specifically on the revealed major findings on the four study independent variables which are; Agricultural loans, Agricultural output, Interest rate and Agricultural expenditure on training, plus the control variable; Inflation rate on how they all impact on the economic growth of Nigeria within the study period of 1981 to 2019 respectively.

## Discussion on Agricultural output (AO)

The research objective; ‘To determine the impact of Agricultural output on the Nigerian economic growth’ the result which revealed that; Agricultural Output (AO) have a

positive and significant impact on the Real Gross Domestic Product (RGDP) which

proxy economic growth in Nigeria within the study period of 39 years (1981 -2019).

This finding is in agreement with a priori expectation of positive relationship

between AO and RGDP. The finding is intended with the following researchers

outcomes; Ekine and Onu (2018) studied the impact of agricultural output on the economic growth in Nigeria. The findinds showed that, livestock/fish production were positive and statistically significant at 5 percent level of significance. Olutoye and Olutoye, (2014) also examined the contribution of agricultural sector to Gross Domestic Product (GDP) between 1990 and 2013; results showed a positive relationship between agricultural output and GDP in Nigeria. Specifically, the study clearly shows that Agricultural Output has a strong influence on the GDP.

## Discussion on Agricultural Loans (AL)

The research objective; ‘To Assess the effect of agricultural loans on the Agricultural output

in Nigerian’ and in extension economic growth in Nigeria; the result which revealed that; Agricultural Loans (AL) have a positive and significant impact on the Real Gross Domestic Product (RGDP) which proxy economic growth in Nigeria within the study period of 39 years (1981-2019). This finding is in agreement with a priori expectation of positive relationship between AL and RGDP. This finding is also consistent with the findings of the following researchers; Akintunde (2013) analyzed the effectiveness of government annual budgetary allocation to agriculture and the role of monetary policy instruments in the growth of agricultural GDP, covering the period of 1980- 2012. The results of the analysis showed that Agricultural Credit Guarantee Scheme Fund, previous year GDP and Consumer Price Index contributed positively to the growth of

agricultural GDP. Adetiloye (2012) examined the provision of credit to agricultural sector

along with the performance of the Agricultural Guarantee Credit Scheme Funds (ACGSF) while at the same time evaluating the food security status of Nigeria. It found out that though credit to the agricultural sector was significant, it has not been growing relative to the economy. Ammani (2012) investigated the relationship between agricultural production and formal credit supply in Nigeria. Findings of the paper indicated that formal credit was positively and significantly related to the productivity of the crop, livestock and fishing sectors of the Nigerian agriculture. Nwanyanwu (2010) determine the impact of bank credit on the growth of Nigerian economy. The study revealed that bank credit has positively and significantly impact on the growth of Nigerian economy.

This study is in contrary with the findings of Ademola (2019) whom empirically assesses the impact of agricultural financing on the growth of Nigerian economy. The study revealed that the size and amount of credit available to agriculture of the total amount of credit granted by the government has not been able to impact on the level of economic growth in Nigeria,

that it shows a negative and insignificant influence on the level of output in Nigeria which he attributed to the fact the Country has recorded so much in terms of misappropriation of funds

meant to be issued to the agricultural system as credits for the improvement of the system.

**5.4 Discussion on Interest Rate**

The research objective; ‘To examine whether interest rate on Agric. Loans influences the economic growth in Nigeria’ having the result which revealed that; Interest rate (INTR) have positive and significant impact on Real Gross Domestic Product (RGDP) which proxy economic growth in Nigeria within the study period of 39 years (1981 -2019). This finding is not in agreement with a priori expectation of negative relationship which makes it debatable going by the data analyzed in this study. The findings is in agreement with Shaw (2000) who holds that deregulation of interest rate is like a double-

edged sword, which either stimulates or mars the economy. Previous research has shown that

decreasing the interest rate may revive the economy because of increased economic activities (Jelilov, 2016), thereby creating a positive and statistically significant impact on economic growth (Campos, 2012). On the other hand, slow economic growth which may be due to high interest rate regime can lead to a fall in the economic growth (Foo, 2009), which may be due to the negative and statistically significant impact of interest rate (Udoka, 2012). Yet, others, including Hansen and Seshadri (2014) found no significant relationship between interest rate and economic growth. Ojo and Ani’s position are supported by Okopi (2008). Also Onyishi,

Arene and Ifiorah (2015); in there study examined the impact of interest rate reform on agricultural finance and growth in Nigeria. The study specifically ascertained the factors that determine the aggregate credit volume to agriculture within the periods of regulation and deregulation in the Nigerian economy; Average lending interest rate was positive on both regimes but statistically significant at 5% during the period of deregulation and statistically insignificant during the regulated regime. The a priori expectation during deregulated period

was met because increase in lending interest rate was expected to increase the aggregate credit volume to agricultural sector. While the a priori expectation during the regulated

regime was not met, because most of the financial institutions were not willing to lend to agriculture as at that period due to low interest lending rate. This is true, since most of the lending was not for productive purposes and banks concentrated on short-term consumer

lending without bothering to finance productive sector like agriculture.

**5.5 Discussion on Agricultural Expenditure on Training**

The research objective; ‘To evaluate the effect of Agricultural Training Expenditure on the Nigerian economic growth’ in having the result which revealed that; Agricultural expenditure on trainings (AET) have a positive and insignificant impact on Real Gross Domestic Product (RGDP) which proxy economic growth in Nigeria within the study period of 39 years (1981-2019). This finding is in agreement also with a

priori expectation of positive relationship. The possible reasons behind the

insignificant outcome of the result may be linked to the argument of Adavbiele (2016), whom argued that though the Education Trust Fund which was set up to solve the bulk of these challenges, its very existence was seriously undermined by fraud, lack of proper accounting system and records, poor management and the lack of a suitable formula for the sharing of the funds among different tertiary institutions. In my personal experience as a Training consultant to few Federal ministries, multilateral and bilateral projects in Nigeria e.g World Bank, AfDP and IFAD supported projects in Nigeria such as Fadama III Project, Commercial Agricultural Development Project (CADP), Rural Urban Mobility Project (RAMP), IFAD-RUFIN project e.t.c where in some cases consultants were forced to compromise quality of deliverables by monetizing knowledge and skills to be delivered. In this case funds meant for training are misappropriated and that affects the ability of the staffs to deliver their purpose and impact on the industry, negatively affecting the economy.

## 5.6 Discussion on Inflation Rate

Inflation rate (INFR) adopted as a control variable in this study; result revealed that INFR

have a negative and significant impact on Real Gross Domestic Product (RGDP) which proxy economic growth in Nigeria within the study period of 39 years (1981 - 2019). This finding is in agreement with a priori expectation of negative relationship between INFR and RGDP. This finding is also partly consistent with Utile, Okwori, and Ikpambese (2018) whom investigated the effect of interest rate on the economic growth of the Nigerian economy. The aim of the study was to determine the effect of inflation rate, exchange rate and deposit interest rates on the gross domestic product of the country. It was found that INFR have negative but insignificant effect on GDP.

# CHAPTER SIX

**SUMMARY, CONCLUSION AND RECOMMENDATIONS**

## Summary of findings

This study employed regression to examine the impact of agricultural financing on economic growth in Nigeria from 1981 to 2019. The study made use of five explanatory variables which included Real Gross Domestic Product (RGDP), Agricultural output (AO), Agricultural Loans (AL), Agricultural Expenditure on Trainings (AET), Interest rate (INTR), and Inflation rate (INFR) to establish the impact, explanatory variables have on the dependent variable (Real Gross Domestic Product) which serve as a dependent variables proxy for economic growth.

## The study revealed the following major findings:

The results of unit root test revealed that; all the variables are stationary at 5% since their absolute value of ADF statistics are greater than their critical value at 5%. Which Implies that; RGDP, AL, INTR, AET, and INFR are all stationary at 5%. Their order of cointegration (stationarity level) were; 1(0), 1(1) and I(2) respectively.

The regression result revealed the following;

1. **AO**, Agricultural outputs have positive and significant impact on the real gross domestic product (RGDP) proxy economic growth. It is significant at 5% based on t-statistics computed. This finding is in agreement with the a priori expectation. Therefore, the stated Null hypothesis; ‘Agricultural output has no significant effect on the Nigerian economic growth’ was rejected on the condition that it Probability Value (0.0000) was less than its bench mark value at 5% and hence the Alternative hypothesis was Accepted. Therefore, the stated Null hypothesis; ‘Agricultural output has no significant effect on the Nigerian economic growth’ was rejected on the condition that it Probability Value (0.0000) was less than its probability bench mark value at 5% and hence the Alternative hypothesis was Accepted.
2. **AL**, Agricultural Loans have positive and significant impact on the real gross domestic product (RGDP) proxy economic growth. It is significant at 5% based on t-

statistics computed. This finding is in agreement with the a priori expectation. Therefore, the stated Null hypothesis; ‘There is no significant effect of Agricultural loans

on the Agricultural output in Nigerian’ was Rejected on the condition that it Probability Value (0.0259) was less than its probability bench mark value at 5% and hence the

Alternative hypothesis was Accepted.

**3) AET**, Agricultural expenditure on trainings have a positive and insignificant impact on real gross domestic product (RGDP) proxy economic growth. It is insignificant at 5% based on t-statistics computed. This finding is in agreement with a priori expectation. Therefore, the stated Null hypothesis; ‘Agricultural Expenditure on Training have no significant effect on the Nigerian economic growth’ was Accepted on the condition that it Probability Value (0.1530) was greater than its probability bench

mark value at 5%.

1. **INTR**, Interest rate on Agricultural loans have a positive and significant impact on

real gross domestic product (RGDP) proxy economic growth. It is significant at 5%

based on t-statistics computed. This finding is in contrary to a priori expectation.

Therefore, the stated Null hypothesis; ‘There is no significant influence of Agricultural Loan interest rate on the Nigerian economic growth’ was Rejected on the condition that it

Probability Value (0.0041) was less than its probability bench mark value at 5%.

Hence, it Alternative hypothesis was Accepted.

1. **INFR**, Inflation has a negative and significant impact on economic growth. It is significant at 5% based on t-statistics computed. This finding is in agreement with a priori expectation.

## Conclusion

This research work was conducted to find out the impact of agricultural financing on economic growth in Nigeria. This study was necessitated by the fact that the

economy is often said to be hindered for growing in terms of poor access to funds by farmers to finance their Agricultural production in order to promote economic growth and the cankerworm called corruption in disbursement and mismanagement of such funds. Therefore, this study employed the regression method, stationarity test and autoregressive distributed lags (ARDL) model to investigate whether or not agricultural financing have impacted on the economic growth in Nigeria. In conclusion, the result of this study revealed that Agricultural financing has positively and significantly impacted on the economic growth of Nigeria within the

study period of 39 years (1981-2019).

**6.3 Recommendations**

It was obvious from the study that real gross domestic product (RGDP), Agricultural

output (AO), Agricultural Loans (AL), Agricultural expenditure on trainings (AET), Interest rate (INTR) and Inflation (INFR) statistically make significant impact on

economic growth individually as well as collectively. Therefore, this study recommends the following:

* + 1. There is an urgent need to improve on Agricultural output (AO) by Government providing and ensuring internal security; away from banditry and kidnapping so as to enable our farmers operate without hindrance to improving on their agricultural productivity.
    2. In order for agricultural loans (AL) to further have more impact on economic growth; policy makers should intensify efforts towards making policies that will enforce and encourage financial institutions to timely and adequately disburse Agricultural Loans to it end users and further monitor to ensure it judicious and effective utilization to avoid corruption by it members and mismanagement of such funds by the user of such funds.
    3. The Government of Nigeria through it Federal and State Ministries of Education and Agriculture should encourage the

training of more Agricultural Extension workers that will work in the rural areas to further train our local farmers on the use of improve technologies and also effectively monitor all Agricultural

* + 1. ​

training funds to it effective use.

INTR The government through the Central bank of Nigeria and Federal Ministry of Finance and National Planning as well as Federal Ministry of Agriculture and Rural Development should formulate and implement institutional strengthening policies in the areas of effective agriculture financing by providing lower interest rate to the real sector of the economy that have direct

effects on the citizenry to encourage more domestic investment.

INFR in order to bring down the inflation rate, the government should make implementable policies through CBN to the Federal Ministry of Agriculture to establish marketing boards aim at controlling Agricultural

price variability in its inputs and outputs (price control).

* + 1. ​

## 6.4 Contribution to Knowledge

The essence of research is to find more knowledge and add to the existing body of knowledge. This study contributes to knowledge in the following ways:

Based on the objectives of the study, it was discovered that previous empirical works on the relationship between Agricultural financing and Economic growth in Nigeria did not empirically include agricultural expenditure on trainings as an independent variable in their model to investigate its impact on the economic growth of Nigeria. This study has contributed to the body of knowledge in this regard. Policy makers can now see at a glance as they examine the impact of agricultural training expenditure on economic growth.

Another major contribution of this study to knowledge lies in the fact that it clearly confirmed that Federal Government agricultural expenditure on trainings over the years have not individually contributed significantly in promoting economic growth in Nigeria. However, collectively with other variables in the model, they have contributed to promote economic growth generally.

Finally, this study has also contributed to knowledge in terms of the recommendations, it has proffered on the way forward, especially on how agricultural financing particularly agricultural output could be a major source of economic growth driver in Nigeria.

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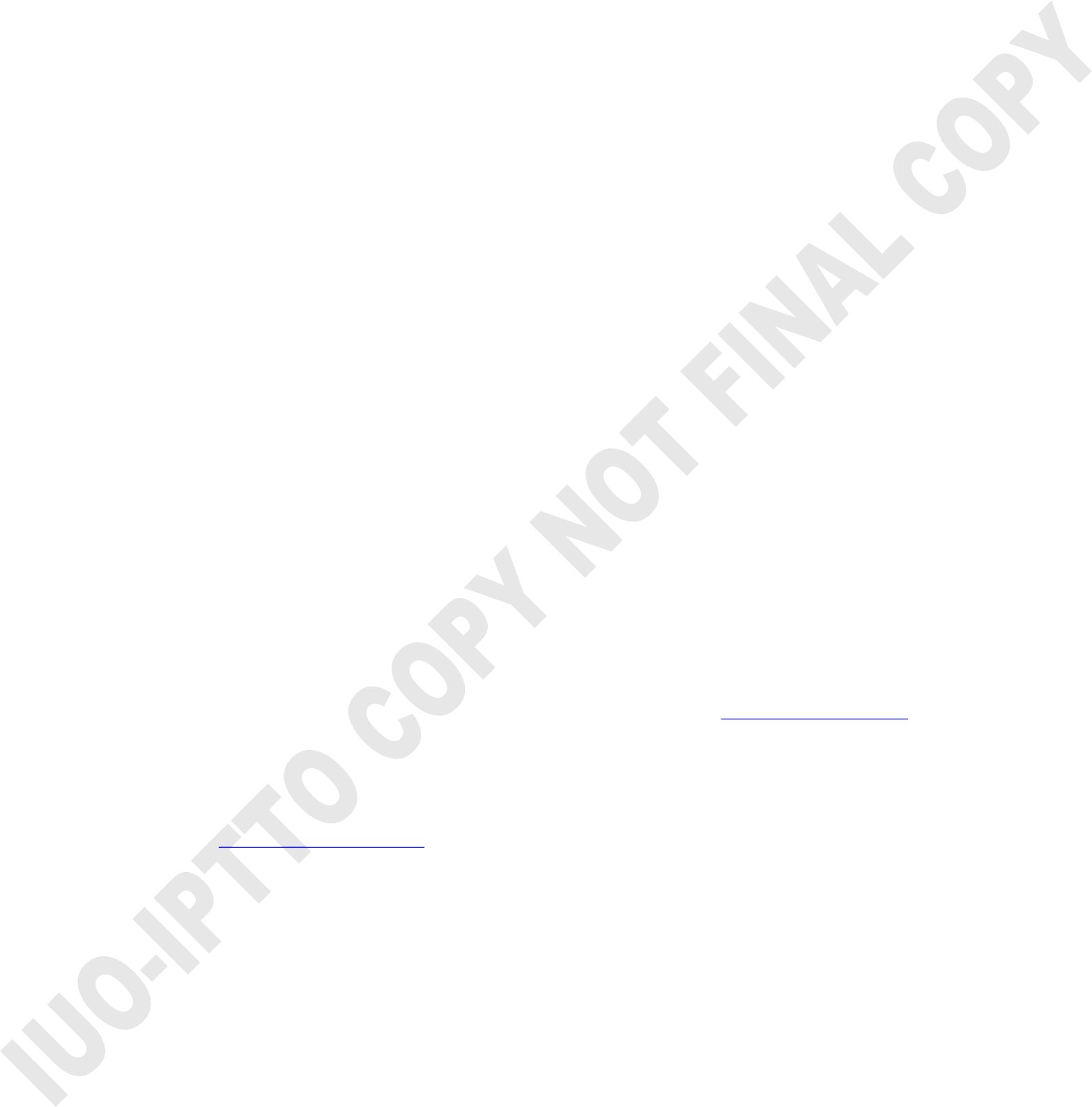
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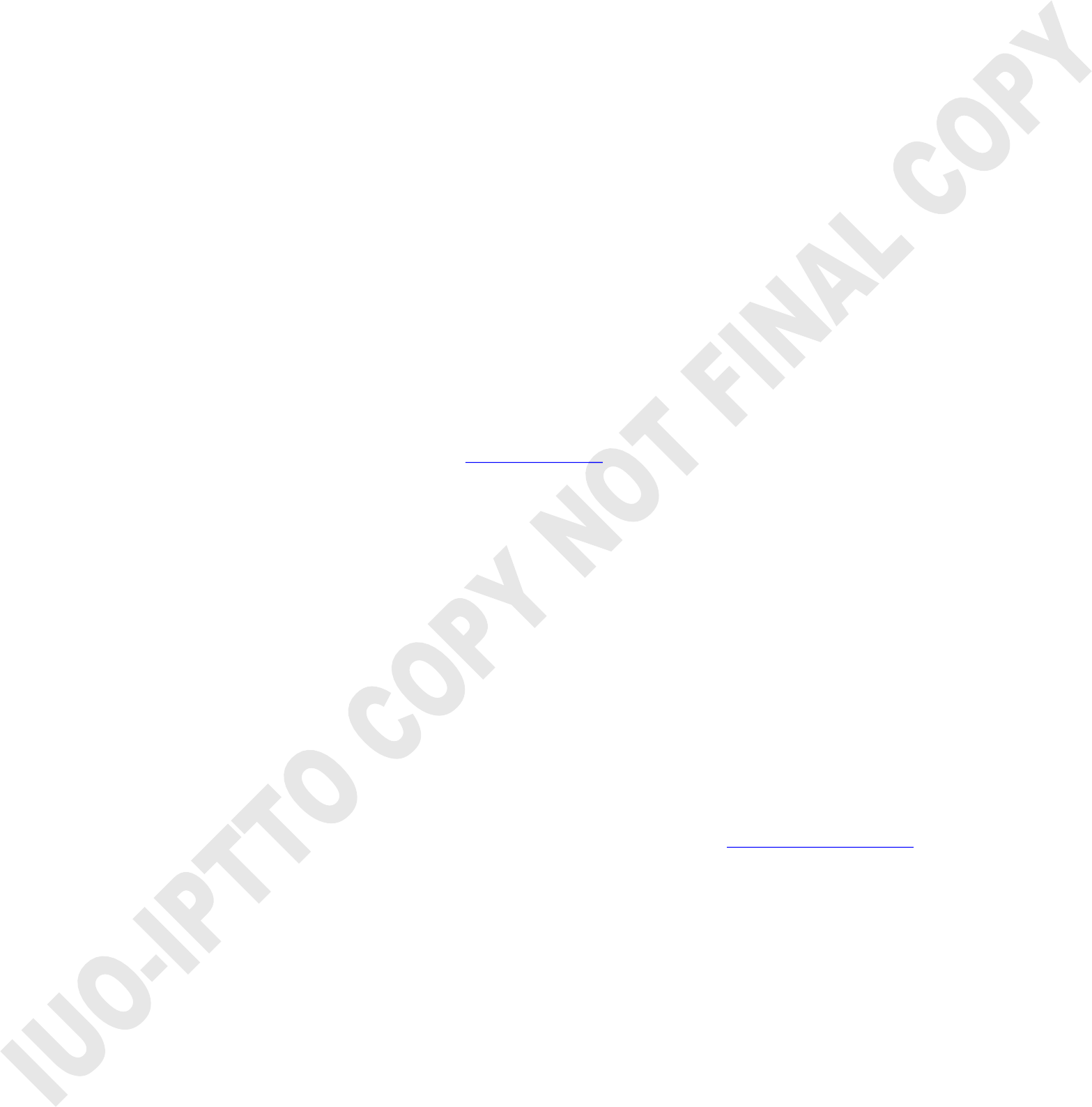
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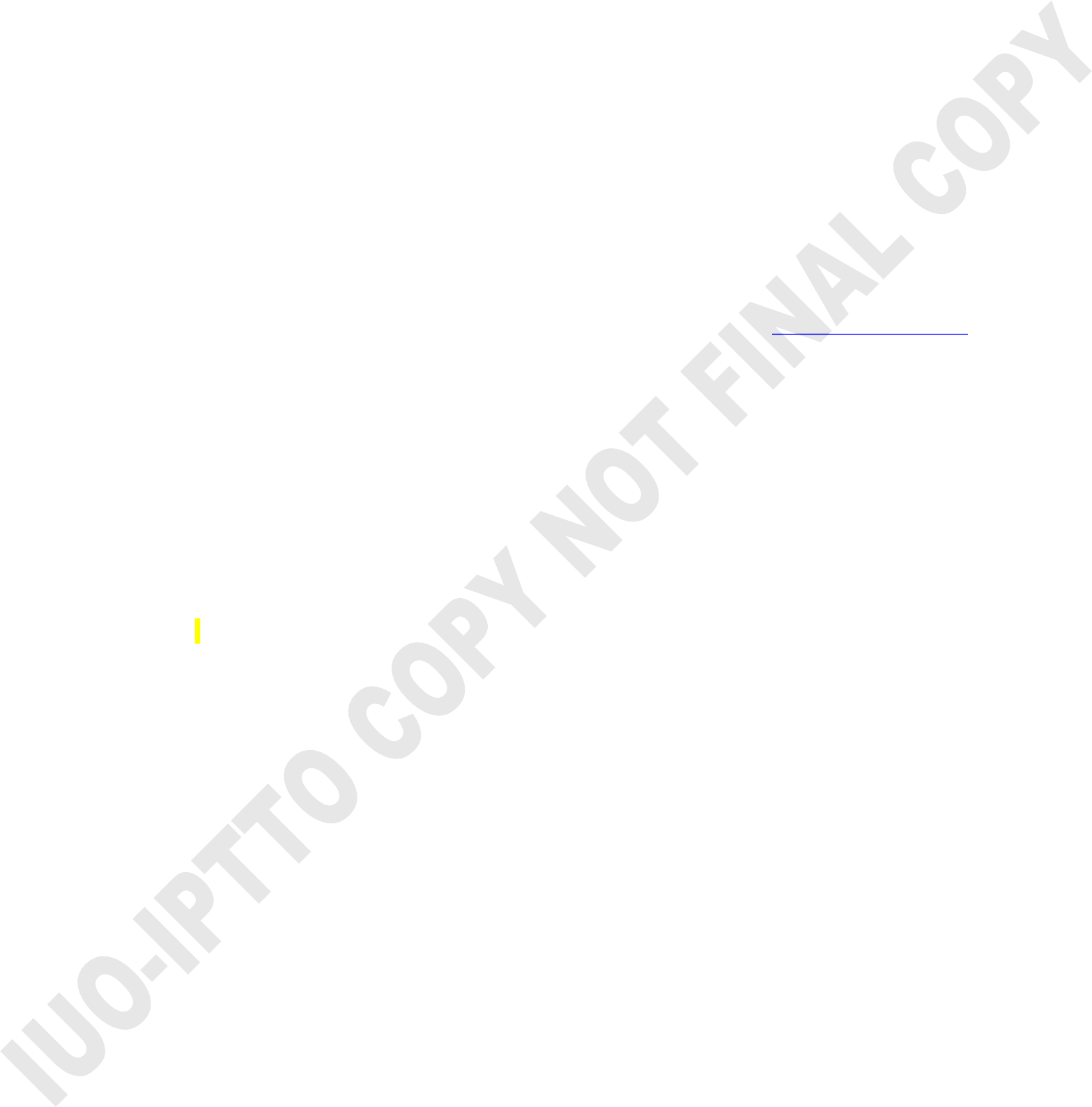
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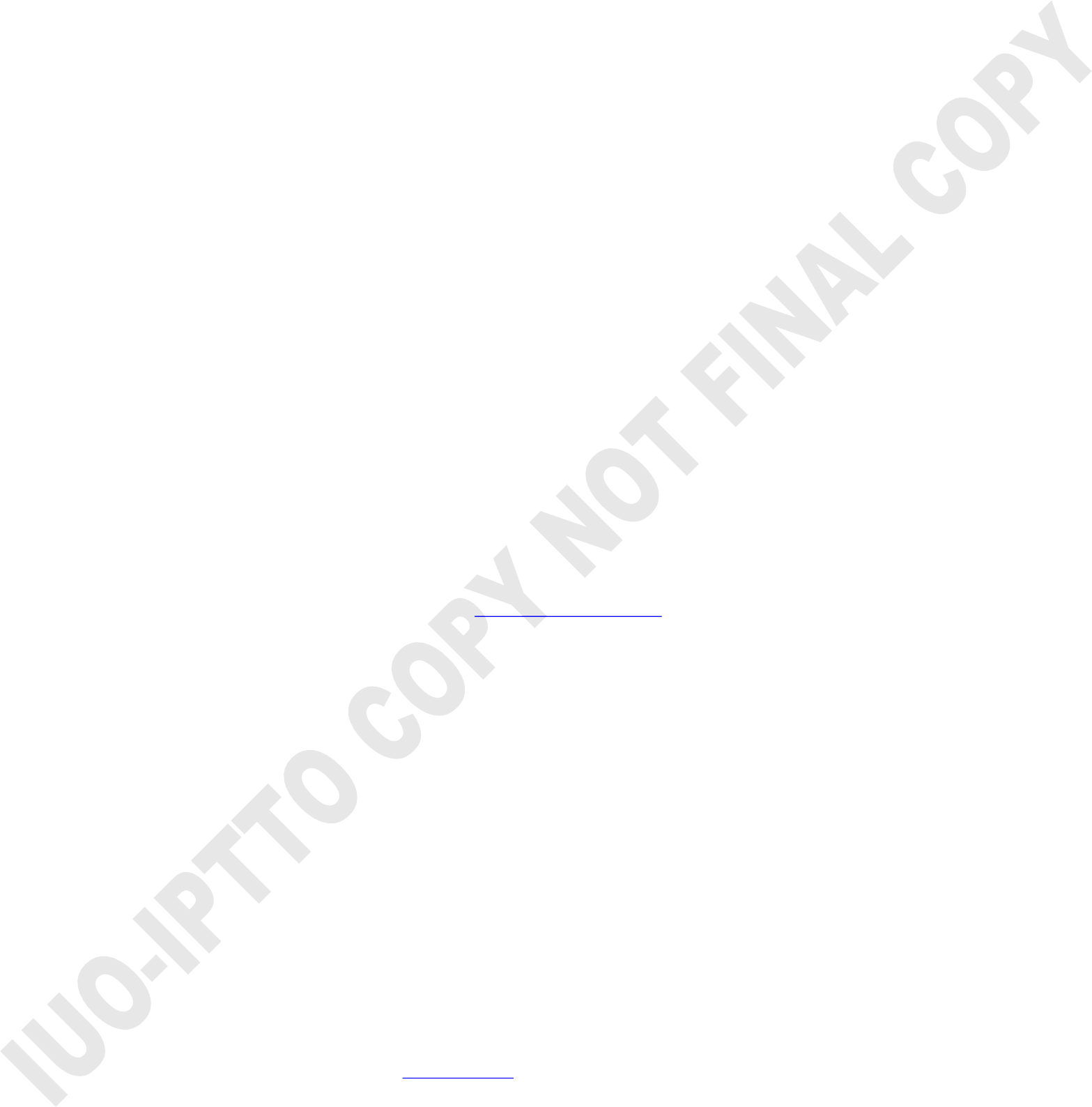
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## Appendix

## Appendix 1: Original Sourced Data

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Year** | **Real GDP (=N=**  **Billion)** | **Agric Output (=N=**  **Billion)** | **Loans to Crop, Livestock, Forestry and Forestry sectors (=N= Billion)** | **Expenditures on Trainings (=N= Billion)** | **Interest rate (%)** | **Inflation Rate (%)** |
| 1981 | 19748.534 | 2,364.37 | 0.59 | 0.01 | 7.75 | 20.56 |
| 1982 | 18404.965 | 2,425.96 | 0.79 | 0.01 | 10.25 | 5.88 |
| 1983 | 16394.391 | 2,409.08 | 0.94 | 0.01 | 10 | 22.22 |
| 1984 | 16211.491 | 2,303.51 | 1.05 | 0.02 | 12.5 | 40.91 |
| 1985 | 17170.081 | 2,731.06 | 1.31 | 0.02 | 9.25 | 3.23 |
| 1986 | 17,180.55 | 2,986.84 | 1.83 | 0.02 | 10.5 | 6.25 |
| 1987 | 17,730.34 | 2,891.67 | 2.43 | 0.05 | 17.5 | 9.69 |
| 1988 | 19,030.69 | 3,174.57 | 3.07 | 0.08 | 16.5 | 61.21 |
| 1989 | 19,395.96 | 3,325.95 | 3.47 | 0.15 | 26.8 | 44.67 |
| 1990 | 21,680.20 | 3,464.72 | 4.22 | 0.26 | 25.5 | 3.61 |
| 1991 | 21,757.90 | 3,590.84 | 5.01 | 0.21 | 20.01 | 22.96 |
| 1992 | 22,765.55 | 3,674.79 | 6.98 | 0.46 | 29.8 | 48.8 |
| 1993 | 22,302.24 | 3,743.67 | 10.75 | 1.8 | 18.32 | 61.26 |
| 1994 | 21,897.47 | 3,839.68 | 17.76 | 1.18 | 21 | 76.76 |
| 1995 | 21,881.56 | 3,977.38 | 25.28 | 1.51 | 20.18 | 51.59 |
| 1996 | 22,799.69 | 4,133.55 | 33.26 | 1.59 | 19.74 | 26.45 |
| 1997 | 23,469.34 | 4,305.68 | 27.94 | 2.06 | 13.54 | 7.07 |
| 1998 | 24,075.15 | 4,475.24 | 27.18 | 2.89 | 18.29 | 14.32 |
| 1999 | 24,215.78 | 4,703.64 | 31.05 | 59.32 | 21.32 | 16.51 |
| 2000 | 25,430.42 | 4,840.97 | 41.03 | 6.34 | 17.98 | 13.45 |
| 2001 | 26,935.32 | 5,024.54 | 55.85 | 7.06 | 18.29 | 6.95 |
| 2002 | 31,064.27 | 7,817.08 | 59.85 | 9.99 | 24.85 | 12.53 |
| 2003 | 33,346.62 | 8,364.83 | 62.1 | 7.54 | 20.71 | 26.83 |
| 2004 | 36,431.37 | 8,888.57 | 67.74 | 11.26 | 19.18 | 16.94 |
| 2005 | 38,777.01 | 9,516.99 | 48.56 | 16.33 | 17.95 | 8.99 |
| 2006 | 41,126.68 | 10,222.47 | 49.39 | 17.92 | 17.26 | 12.79 |
| 2007 | 43,837.39 | 10,958.47 | 149.58 | 32.48 | 16.94 | 9.35 |
| 2008 | 46,802.76 | 11,645.37 | 106.35 | 65.4 | 15.14 | 5.06 |
| 2009 | 50,564.26 | 12,330.33 | 135.7 | 22.44 | 18.99 | 9.24 |
| 2010 | 55,469.35 | 13,048.89 | 128.41 | 28.22 | 17.59 | 12.4 |
| 2011 | 58,180.35 | 13,429.38 | 255.21 | 41.2 | 16.02 | 11.73 |
| 2012 | 60,670.05 | 14,329.71 | 316.36 | 33.3 | 16.79 | 13.87 |
| 2013 | 63,942.85 | 14,750.52 | 343.7 | 39.43 | 16.72 | 7.73 |
| 2014 | 67,977.46 | 15,380.39 | 478.91 | 36.7 | 16.55 | 6.86 |
| 2015 | 69,780.69 | 15,952.22 | 449.31 | 41.27 | 16.85 | 8.21 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 2016 | 68,652.43 | 16,607.34 | 525.95 | 36.3 | 16.87 | 15.24 |
| 2017 | 69,205.69 | 17,179.50 | 528.24 | 50.26 | 17.58 | 13.55 |
| 2018 | 70,536.35 | 17,544.15 | 2,226.68 | 53.99 | 16.72 | 10.54 |
| 2019 | 72,094.09 | 17,958.58 | 2,720.10 | 70.27 | 15.21 | 9.16 |

Source: National Bureau of Statistics and Central Bank of Nigeria

## Appendix 2: Transformed Data

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Year** | **RGDP** | **AO** | **AL** | **AET** | **INTR** | **INFR** |
| 1981 | 19748.534 | 2,364.37 | 0.59 | 0.01 | 7.75 | 20.56 |
| 1982 | 18404.965 | 2,425.96 | 0.79 | 0.01 | 10.25 | 5.88 |
| 1983 | 16394.391 | 2,409.08 | 0.94 | 0.01 | 10 | 22.22 |
| 1984 | 16211.491 | 2,303.51 | 1.05 | 0.02 | 12.5 | 40.91 |
| 1985 | 17170.081 | 2,731.06 | 1.31 | 0.02 | 9.25 | 3.23 |
| 1986 | 17,180.55 | 2,986.84 | 1.83 | 0.02 | 10.5 | 6.25 |
| 1987 | 17,730.34 | 2,891.67 | 2.43 | 0.05 | 17.5 | 9.69 |
| 1988 | 19,030.69 | 3,174.57 | 3.07 | 0.08 | 16.5 | 61.21 |
| 1989 | 19,395.96 | 3,325.95 | 3.47 | 0.15 | 26.8 | 44.67 |
| 1990 | 21,680.20 | 3,464.72 | 4.22 | 0.26 | 25.5 | 3.61 |
| 1991 | 21,757.90 | 3,590.84 | 5.01 | 0.21 | 20.01 | 22.96 |
| 1992 | 22,765.55 | 3,674.79 | 6.98 | 0.46 | 29.8 | 48.8 |
| 1993 | 22,302.24 | 3,743.67 | 10.75 | 1.8 | 18.32 | 61.26 |
| 1994 | 21,897.47 | 3,839.68 | 17.76 | 1.18 | 21 | 76.76 |
| 1995 | 21,881.56 | 3,977.38 | 25.28 | 1.51 | 20.18 | 51.59 |
| 1996 | 22,799.69 | 4,133.55 | 33.26 | 1.59 | 19.74 | 26.45 |
| 1997 | 23,469.34 | 4,305.68 | 27.94 | 2.06 | 13.54 | 7.07 |
| 1998 | 24,075.15 | 4,475.24 | 27.18 | 2.89 | 18.29 | 14.32 |
| 1999 | 24,215.78 | 4,703.64 | 31.05 | 59.32 | 21.32 | 16.51 |
| 2000 | 25,430.42 | 4,840.97 | 41.03 | 6.34 | 17.98 | 13.45 |
| 2001 | 26,935.32 | 5,024.54 | 55.85 | 7.06 | 18.29 | 6.95 |
| 2002 | 31,064.27 | 7,817.08 | 59.85 | 9.99 | 24.85 | 12.53 |
| 2003 | 33,346.62 | 8,364.83 | 62.1 | 7.54 | 20.71 | 26.83 |
| 2004 | 36,431.37 | 8,888.57 | 67.74 | 11.26 | 19.18 | 16.94 |
| 2005 | 38,777.01 | 9,516.99 | 48.56 | 16.33 | 17.95 | 8.99 |
| 2006 | 41,126.68 | 10,222.47 | 49.39 | 17.92 | 17.26 | 12.79 |
| 2007 | 43,837.39 | 10,958.47 | 149.58 | 32.48 | 16.94 | 9.35 |
| 2008 | 46,802.76 | 11,645.37 | 106.35 | 65.4 | 15.14 | 5.06 |
| 2009 | 50,564.26 | 12,330.33 | 135.7 | 22.44 | 18.99 | 9.24 |
| 2010 | 55,469.35 | 13,048.89 | 128.41 | 28.22 | 17.59 | 12.4 |
| 2011 | 58,180.35 | 13,429.38 | 255.21 | 41.2 | 16.02 | 11.73 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 2012 | 60,670.05 | 14,329.71 | 316.36 | 33.3 | 16.79 | 13.87 |
| 2013 | 63,942.85 | 14,750.52 | 343.7 | 39.43 | 16.72 | 7.73 |
| 2014 | 67,977.46 | 15,380.39 | 478.91 | 36.7 | 16.55 | 6.86 |
| 2015 | 69,780.69 | 15,952.22 | 449.31 | 41.27 | 16.85 | 8.21 |
| 2016 | 68,652.43 | 16,607.34 | 525.95 | 36.3 | 16.87 | 15.24 |
| 2017 | 69,205.69 | 17,179.50 | 528.24 | 50.26 | 17.58 | 13.55 |
| 2018 | 70,536.35 | 17,544.15 | 2,226.68 | 53.99 | 16.72 | 10.54 |
| 2019 | 72,094.09 | 17,958.58 | 2,720.10 | 70.27 | 15.21 | 9.16 |

Source: Own computation

## Appendix 3: Null Hypothesis: D(RGDP) has a unit root

Null Hypothesis: D(RGDP) has a unit root Exogenous: Constant

|  |  |  |
| --- | --- | --- |
| Lag Length: 0 (Automatic - based on SIC, | maxlag=9) |  |
|  | t-Statistic | Prob.\* |
| Augmented Dickey-Fuller test statistic | -3.859848 | 0.0054 |
| Test critical values: 1% level | -3.621023 |  |
| 5% level | -2.943427 |  |
| 10% level | -2.610263 |  |

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation Dependent Variable: D(RGDP,2) Method: Least Squares

Date: 09/03/21 Time: 04:22 Sample (adjusted): 1983 2019

Included observations: 37 after adjustments

Coefficien

Variable t Std. Error t-Statistic Prob.

|  |  |  |  |
| --- | --- | --- | --- |
| D(RGDP(-1)) | -0.521563 | 0.135125 -3.859848 | 0.0005 |
| C | 0.008877 | 0.003447 2.575490 | 0.0144 |
| R-squared | 0.298575 | Mean dependent var | 0.001083 |
| Adjusted R-squared | 0.278534 | S.D. dependent var | 0.020004 |
|  |  |  | - |
| S.E. of regression | 0.016991 | Akaike info criterion | 5.259683 |
|  |  |  | - |
| Sum squared resid | 0.010105 | Schwarz criterion | 5.172607 |
|  |  | Hannan-Quinn | - |
| Log likelihood 99.30414criter. 5.228985 | | | |
| F-statistic | 14.89843 | Durbin-Watson stat | 2.308523 |
| Prob(F-statistic) | 0.000467 |  |  |

## Appendix 4: Null Hypothesis: D(AO) has a unit root

Null Hypothesis: D(AO) has a unit root Exogenous: Constant

|  |  |  |
| --- | --- | --- |
| Lag Length: 0 (Automatic - based on SIC, | maxlag=9) |  |
|  | t-Statistic | Prob.\* |
| Augmented Dickey-Fuller test statistic | -5.907054 | 0.0000 |
| Test critical values: 1% level | -3.621023 |  |
| 5% level | -2.943427 |  |
| 10% level | -2.610263 |  |

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation Dependent Variable: D(AO,2)

Method: Least Squares

Date: 09/03/21 Time: 04:12 Sample (adjusted): 1983 2019

Included observations: 37 after adjustments

Coefficien

Variable t Std. Error t-Statistic Prob.

|  |  |  |  |
| --- | --- | --- | --- |
| D(AO(-1)) | -0.998826 | 0.169090 -5.907054 | 0.0000 |
| C | 0.023469 | 0.006692 3.507085 | 0.0013 |
|  |  |  | -2.78E- |
| R-squared | 0.499237 | Mean dependent var | 05 |
| Adjusted R-squared | 0.484929 | S.D. dependent var | 0.045610 |
|  |  |  | - |
| S.E. of regression | 0.032734 | Akaike info criterion | 3.948273 |
|  |  |  | - |
| Sum squared resid | 0.037503 | Schwarz criterion | 3.861196 |
|  |  | Hannan-Quinn | - |
| Log likelihood 75.04305criter. 3.917574 | | | |
| F-statistic | 34.89329 | Durbin-Watson stat | 1.993748 |
| Prob(F-statistic) | 0.000001 |  |  |

## Appendix 5: Null Hypothesis: AL has a unit root

Null Hypothesis: D(AL) has a unit root Exogenous: Constant

|  |  |  |
| --- | --- | --- |
| Lag Length: 0 (Automatic - based on SIC, | maxlag=9) |  |
|  | t-Statistic | Prob.\* |
| Augmented Dickey-Fuller test statistic | -5.265637 | 0.0001 |
| Test critical values: 1% level | -3.621023 |  |
| 5% level | -2.943427 |  |
| 10% level | -2.610263 |  |

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation Dependent Variable: D(AL,2)

Method: Least Squares

Date: 09/03/21 Time: 04:29 Sample (adjusted): 1983 2019

Included observations: 37 after adjustments

Coefficien

Variable t Std. Error t-Statistic Prob.

|  |  |  |  |
| --- | --- | --- | --- |
| D(AL(-1)) | -0.881129 | 0.167336 -5.265637 | 0.0000 |
| C | 0.014888 | 0.040224 0.370124 | 0.7135 |
|  |  |  | - |
| R-squared | 0.442026 | Mean dependent var | 0.002973 |
| Adjusted R-squared | 0.426084 | S.D. dependent var | 0.321817 |
| S.E. of regression | 0.243799 | Akaike info criterion | 0.067596 |
| Sum squared resid | 2.080335 | Schwarz criterion | 0.154673 |
|  |  | Hannan-Quinn |  |
| Log likelihood 0.749467criter. 0.098295 | | | |
| F-statistic | 27.72693 | Durbin-Watson stat | 2.037403 |
| Prob(F-statistic) | 0.000007 |  |  |

## Appendix 6: Null Hypothesis: D(AET) has a unit root

Null Hypothesis: D(AEXT) has a unit root Exogenous: Constant

|  |  |  |
| --- | --- | --- |
| Lag Length: 1 (Automatic - based on SIC, | maxlag=9) |  |
|  | t-Statistic | Prob.\* |
| Augmented Dickey-Fuller test statistic | -6.879418 | 0.0000 |
| Test critical values: 1% level | -3.626784 |  |
| 5% level | -2.945842 |  |
| 10% level | -2.611531 |  |

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation Dependent Variable: D(AEXT,2) Method: Least Squares

Date: 09/03/21 Time: 04:17 Sample (adjusted): 1984 2019

Included observations: 36 after adjustments

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Variable | Coefficien  t | Std. Error | t-Statistic | Prob. |
| D(AET(-1)) | -1.946867 | 0.282999 | -6.879418 | 0.0000 |
| D(AET(-1),2) | 0.345334 | 0.166221 | 2.077558 | 0.0456 |
| C | 3.335660 | 2.468038 | 1.351543 | 0.1857 |

R-squared 0.750440 Mean dependent var 0.452222 Adjusted R-squared 0.735315 S.D. dependent var 28.38364

S.E. of regression 14.60269 Akaike info criterion 8.279944 Sum squared resid 7036.873 Schwarz criterion 8.411904

Hannan-Quinn

Log likelihood -146.0390criter. 8.326001

F-statistic 49.61630 Durbin-Watson stat 2.043212

Prob(F-statistic) 0.000000

## Appendix 7: Null Hypothesis: INTR has a unit root

Null Hypothesis: D(INTR,2) has a unit root Exogenous: Constant

|  |  |  |
| --- | --- | --- |
| Lag Length: 2 (Automatic - based on SIC, | maxlag=9) |  |
|  | t-Statistic | Prob.\* |
| Augmented Dickey-Fuller test statistic | -6.733006 | 0.0000 |
| Test critical values: 1% level | -3.639407 |  |
| 5% level | -2.951125 |  |
| 10% level | -2.614300 |  |

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation Dependent Variable: D(INTR,3) Method: Least Squares

Date: 09/03/21 Time: 04:32 Sample (adjusted): 1986 2019

Included observations: 34 after adjustments

Coefficien

Variable t Std. Error t-Statistic Prob.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| D(INTR(-1),2) | -3.545933 | 0.526649 | -6.733006 | 0.0000 |
| D(INTR(-1),3) | 1.267354 | 0.382341 | 3.314723 | 0.0024 |
| D(INTR(-2),3) | 0.299283 | 0.171169 | 1.748463 | 0.0906 |
| C | -0.069673 | 0.709732 | -0.098169 | 0.9225 |
| R-squared | 0.912154 | Mean dependent var 0.150000 | | |
| Adjusted R-squared | 0.903369 | S.D. dependent var 13.30717 | | |
| S.E. of regression | 4.136594 | Akaike info criterion 5.787753 | | |
| Sum squared resid | 513.3422 | Schwarz criterion 5.967325 | | |
|  |  | Hannan-Quinn | | |
| Log likelihood | -94.39181 | criter. 5.848992 | | |
| F-statistic | 103.8356 | Durbin-Watson stat 2.061595 | | |
| Prob(F-statistic) | 0.000000 |  | | |

## Appendix 8: Null Hypothesis: INFR has a unit root

Null Hypothesis: INFR has a unit root Exogenous: Constant

|  |  |  |
| --- | --- | --- |
| Lag Length: 0 (Automatic - based on SIC, | maxlag=9) |  |
|  | t-Statistic | Prob.\* |
| Augmented Dickey-Fuller test statistic | -3.071803 | 0.0373 |
| Test critical values: 1% level | -3.615588 |  |
| 5% level | -2.941145 |  |
| 10% level | -2.609066 |  |

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation Dependent Variable: D(INFR)

Method: Least Squares

Date: 09/03/21 Time: 04:38 Sample (adjusted): 1982 2019

Included observations: 38 after adjustments

Coefficien

Variable t Std. Error t-Statistic Prob.

|  |  |  |  |
| --- | --- | --- | --- |
| INFR(-1) | -0.419987 | 0.136723 -3.071803 | 0.0040 |
| C | 8.168375 | 3.710411 2.201475 | 0.0342 |
|  |  |  | - |
| R-squared | 0.207676 | Mean dependent var | 0.300000 |
| Adjusted R-squared | 0.185667 | S.D. dependent var | 16.96419 |
| S.E. of regression | 15.30855 | Akaike info criterion | 8.345896 |
| Sum squared resid | 8436.660 | Schwarz criterion | 8.432085 |
|  |  | Hannan-Quinn |  |
| Log likelihood -156.5720criter. 8.376561 | | | |
| F-statistic | 9.435974 | Durbin-Watson stat | 1.655726 |
| Prob(F-statistic) | 0.004037 |  |  |

## Appendix 9: Vector Error Correction Estimates

Vector Error Correction Estimates Date: 09/03/21 Time: 04:44 Sample (adjusted): 1984 2019

Included observations: 36 after adjustments

Standard errors in ( ) & t-statistics in [ ]

Cointegrating

Eq: CointEq1

RGDP(-1)

1.000000

AO(-1)

-0.887799

(0.01722)

[-51.5535]

AL(-1) 0.034756

(0.00228)

[ 15.2489]

AEXT(-1) -6.79E-05

(0.00020)

[-0.33557]

INTR(-1) -0.006097

(0.00046)

[-13.2152]

EXR(-1) 0.000452

(5.8E-05)

[ 7.76832]

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| INFR(-1) | 0.001227 |  | | | | | |
|  | (0.00013) |
|  | [ 9.45322] |
| C | -1.109392 |
| Error Correction: | D(RGDP) | D(AO) | D(AL) | D(AEXT) | D(INTR) | D(EXR) | D(INFR) |
| CointEq1 | 0.066609 | 1.017797 | 2.707800 | 45.55983 | 127.2874 | 531.4325 | -399.8597 |
|  | (0.24338) | (0.39385) | (4.46033) | (206.497) | (44.2438) | (260.063) | (258.768) |
|  | [ 0.27368] | [ 2.58421] | [ 0.60709] | [ 0.22063] | [ 2.87696] | [ 2.04348] | [-1.54524] |
| D(RGDP(-1)) | 0.134702 | 1.162765 | -1.326272 | -49.66949 | -64.71944 | 32.89839 | -286.6446 |
|  | (0.25732) | (0.41641) | (4.71578) | (218.323) | (46.7777) | (274.957) | (273.588) |
|  | [ 0.52348] | [ 2.79236] | [-0.28124] | [-0.22750] | [-1.38355] | [ 0.11965] | [-1.04772] |
| D(RGDP(-2)) | 0.207412 | 0.400769 | 2.285887 | 87.65702 | 211.0120 | 654.5704 | -105.5516 |
|  | (0.30679) | (0.49646) | (5.62233) | (260.294) | (55.7702) | (327.814) | (326.183) |
|  | [ 0.67608] | [ 0.80725] | [ 0.40657] | [ 0.33676] | [ 3.78360] | [ 1.99677] | [-0.32360] |
| D(AO(-1)) | 0.004397 | 0.097923 | 0.715454 | -8.265780 | 45.72951 | 115.4766 | -87.13435 |
|  | (0.11859) | (0.19191) | (2.17332) | (100.617) | (21.5580) | (126.717) | (126.086) |
|  | [ 0.03708] | [ 0.51027] | [ 0.32920] | [-0.08215] | [ 2.12123] | [ 0.91130] | [-0.69107] |
| D(AO(-2)) | 0.123412 | 0.193443 | 0.244300 | -0.936479 | -22.68417 | -21.80172 | -162.9278 |
|  | (0.11462) | (0.18548) | (2.10055) | (97.2479) | (20.8362) | (122.474) | (121.865) |
|  | [ 1.07672] | [ 1.04292] | [ 0.11630] | [-0.00963] | [-1.08869] | [-0.17801] | [-1.33696] |
| D(AL(-1)) | -0.010846 | -0.050292 | -0.083759 | -32.58313 | -5.575851 | -23.58555 | 21.47413 |
|  | (0.01698) | (0.02748) | (0.31120) | (14.4073) | (3.08689) | (18.1446) | (18.0543) |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | [-0.63870] | [-1.83018] | [-0.26915] | [-2.26157] | [-1.80630] | [-1.29987] | [ 1.18942] |
| D(AL(-2)) | -0.020110 | -0.071330 | -0.040574 | 12.43544 | -10.00106 | -57.16677 | 11.65723 |
|  | (0.01821) | (0.02947) | (0.33371) | (15.4494) | (3.31017) | (19.4570) | (19.3601) |
|  | [-1.10442] | [-2.42070] | [-0.12159] | [ 0.80491] | [-3.02132] | [-2.93811] | [ 0.60213] |
| D(AEXT(-1)) | -0.000304 | -0.000823 | -0.000148 | -0.467427 | -0.076306 | -0.354339 | -0.049920 |
|  | (0.00026) | (0.00042) | (0.00473) | (0.21915) | (0.04695) | (0.27600) | (0.27462) |
|  | [-1.17778] | [-1.96882] | [-0.03131] | [-2.13293] | [-1.62510] | [-1.28386] | [-0.18178] |
| D(AEXT(-2)) | -0.000253 | -0.001050 | 0.000169 | -0.267875 | -0.036039 | -0.057386 | -0.209756 |
|  | (0.00023) | (0.00037) | (0.00422) | (0.19531) | (0.04185) | (0.24598) | (0.24475) |
|  | [-1.09697] | [-2.81897] | [ 0.04010] | [-1.37153] | [-0.86121] | [-0.23330] | [-0.85701] |
| D(INTR(-1)) | 0.001276 | 0.003237 | 0.019652 | 0.683388 | 0.403510 | 3.407235 | -0.938656 |
|  | (0.00157) | (0.00255) | (0.02884) | (1.33535) | (0.28611) | (1.68174) | (1.67337) |
|  | [ 0.81070] | [ 1.27102] | [ 0.68133] | [ 0.51177] | [ 1.41033] | [ 2.02602] | [-0.56094] |
| D(INTR(-2)) | 6.68E-05 | -0.000378 | 0.013061 | -0.461614 | 0.292848 | 0.747584 | 0.919074 |
|  | (0.00096) | (0.00155) | (0.01761) | (0.81526) | (0.17468) | (1.02674) | (1.02163) |
|  | [ 0.06952] | [-0.24308] | [ 0.74167] | [-0.56622] | [ 1.67652] | [ 0.72812] | [ 0.89962] |
| D(EXR(-1)) | 8.43E-06 | 0.000409 | 0.000157 | -0.223022 | -0.025661 | 0.388556 | -0.012223 |
|  | (0.00019) | (0.00031) | (0.00354) | (0.16380) | (0.03510) | (0.20629) | (0.20526) |
|  | [ 0.04365] | [ 1.30846] | [ 0.04448] | [-1.36156] | [-0.73118] | [ 1.88355] | [-0.05955] |
| D(EXR(-2)) | -2.06E-05 | -0.000442 | 0.000780 | 0.200093 | -0.023131 | -0.134433 | 0.090721 |
|  | (0.00019) | (0.00031) | (0.00354) | (0.16390) | (0.03512) | (0.20642) | (0.20539) |
|  | [-0.10683] | [-1.41324] | [ 0.22018] | [ 1.22081] | [-0.65867] | [-0.65126] | [ 0.44170] |
| D(INFR(-1)) | -0.000148 | -0.000556 | -0.001695 | 0.010599 | -0.019424 | -0.264893 | 0.236170 |

(0.00022) (0.00035) (0.00402) (0.18608) (0.03987) (0.23435) (0.23318)

[-0.67452] [-1.56532] [-0.42181] [ 0.05696] [-0.48720] [-1.13033] [ 1.01281]

D(INFR(-2)) 9.09E-05 -3.91E-05 0.000294 -0.117830 -0.092844 -0.368138 -0.361379

(0.00019) (0.00031) (0.00356) (0.16487) (0.03533) (0.20764) (0.20661)

[ 0.46770] [-0.12424] [ 0.08254] [-0.71467] [-2.62822] [-1.77294] [-1.74910]

C

0.010751 -0.002884 -0.032754 3.229534 -1.854647 -5.093650 10.78989

(0.00814) (0.01318) (0.14925) (6.90977) (1.48048) (8.70219) (8.65887)

[ 1.32008] [-0.21881] [-0.21945] [ 0.46739] [-1.25273] [-0.58533] [ 1.24611]

R-squared 0.399041 0.605872 0.117843 0.596872 0.702069 0.447917 0.384364

Adj. R-squared -0.051678 0.310276 -0.543774 0.294527 0.478621 0.033855 -0.077363

Sum sq. resids 0.005535 0.014496 1.859123 3984.755 182.9274 6320.200 6257.434

S.E. equation 0.016636 0.026922 0.304887 14.11516 3.024297 17.77667 17.68818

F-statistic 0.885344 2.049661 0.178114 1.974138 3.141978 1.081764 0.832449

Log likelihood 106.9601 89.63166 2.259666 -135.8026 -80.34206 -144.1056 -143.9259

Akaike AIC -5.053340 -4.090648 0.763352 8.433478 5.352337 8.894753 8.884772

Schwarz SC -4.349554 -3.386861 1.467138 9.137264 6.056123 9.598539 9.588559

Mean dependent 0.017867 0.024234 0.015833 1.951667 0.144722 8.505556 -0.362778

S.D. dependent 0.016223 0.032417 0.245385 16.80527 4.188395 18.08545 17.04128

Determinant resid covariance

(dof adj.) 0.076094

Determinant resid covariance 0.001243 Log likelihood -237.1472 Akaike information criterion 19.78596 Schwarz criterion 25.02037