

**IMPACT OF DOMESTIC AGRICULTURAL TRADE ON ECONOMIC GROWTH  
IN NIGERIA**

**BY**

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**NSU/MSC/ECO/0124/16/17**

**A DISSERTATION SUBMITTED TO THE SCHOOL OF POSTGRADUATE  
STUDIES, NASARAWA STATE UNIVERSITY KEFFI, IN PARTIAL  
FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF DEGREE  
MASTER OF SCIENCE (MSC) IN ECONOMICS**

**DEPARTMENT OF ECONOMICS  
FACULTY OF SOCIAL SCIENCES  
NASARAWA STATE UNIVERSITY, KEFFI**

**NIGERIA**

**MARCH, 2021**

## DECLARATION

I hereby declare that this dissertation has been written by me and it is a report of my research work. It has not been presented in any previous application for the award of Masters of Science (MSc) Economics all questions are indicated and sources of information specifically acknowledged by means of references.



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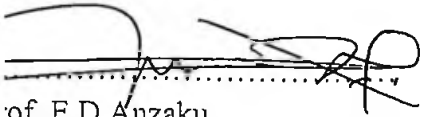
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CERTIFICATION

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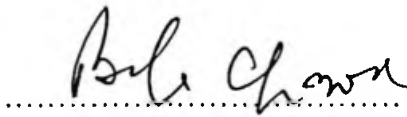


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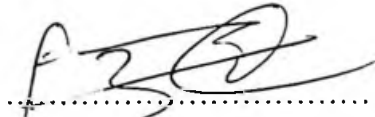
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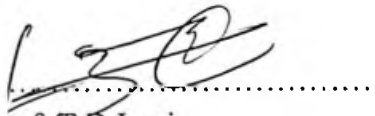
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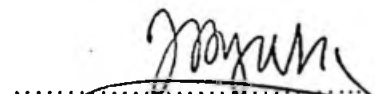
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## Dedication

This research work is dedicated to almighty ALLAH for everything

## ACKNOWLEDGEMENT

I wish to express my sincere gratitude to Almighty Allah for His love, protection, provision throughout the duration of this programme.

My unreserved gratitude goes to my Supervisor Prod. E. D. Anzaku for his time and criticism and to all my lecturers in the Department thank you all for making this possible.

My sincere appreciation goes to Dr. Abdul Adamu my cousin brother, my mentor, my role model for his role of provide me finance, advice and tutor me on how to go about this dissertation. I cannot thank you enough may Allah protect you and provide for you whatever you need in this world and beyond.

My special appreciation goes to my mother AYA for her prayer all through my life and to lovely wife Aisha for her patience, prayer and advise thank you baby and to my senior brother Audu Usman, Audu muhammed Nuru my siblings Aliyu Hassan and Khamisu Hassan, Alhaji Shittu Hassan, Hassan Abdulrazak (ogbo), marryam alburah (Uwa) to all my family members at large for their total support, love, encouragement, prayers and advice thank you all.

Let me use this opportunity to pray for my late father Alhaji Hasan Haruna Gago may his soul rest in perfect peace, may your grave be wide enough for you and May Allah lighting your grave.

I appreciate all the Staff on National Bureau of Statistics for provide me data and staff and student of Nasarawa State University Keffi thank you all.

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## ABSTRACT

The study investigated into the impact of domestic agricultural trade on economic in Nigeria using secondary data with the aid of relevant statistical packages. The broad study objective examine the impact of domestic agricultural trade on Nigeria economy. The Augmented Dickey Fuller test for unit root was thus conducted to determine whether the data set were 'stable at same level so as to permit a linear equation, ADF reported the data to be stationary of order  $I(1)$  at First difference.

The Johansen co-integration test (both trace test and the maximum eigenvalue test) for long-run relationship reported two cointegrating equations at the 0.05 critical value, the co-integration reports are the presence of a long-run relationship between two variables of study. Domestic Agricultural trade trends in Nigeria have shown increasing patterns over time. The results of the long run relationship show a positive and significant relationship between crop production and economic growth. This reject the first hypothesis of the study that state that crop production have no significant impact on economic growth in Nigeria Secondly the result of the long run relationship showed that there is a positive relationship between forestry production trade and economic growth in f Nigeria this reject the hypothesis of the study. Thirdly, the finding shows a positive but insignificant relationship between livestock trade and economic growth of Nigeria. This sustain the third hypothesis that state, livestock trade has no significant contribution towards economic growth of Nigeria.

The study found that there is long-run relationship between the variables of study and this relationship happens to be present for two of the three variables.

# CHAPTER ONE

## INTRODUCTION

### 1.1 Background to the Study

Domestic Trade originated with human communication in prehistoric times, Trading was the main facility of prehistoric people, who bartered goods and services from each other (Watson, 1981). The original form of trade saw the direct exchange of goods and services for other goods and services, Modern traders generally negotiate through a medium of exchange, such as money, as a result, buying can be separated from selling, or earning. The invention of money and later credit, paper money and non-physical money greatly simplified and promoted trade (Williams, 2000), Trade involves the transfer of goods or services from one person or entity to another, a network that allows trade is called market Carr (1901).

Trade exists due to the specialization and division of labor, in which most people concentrate on a small aspect of production, but use that output in trade for other products and needs (Okoh, 2004). Trade in different specialization benefit both traders in the production of tradable commodities including production of natural resources scarce or limited, other specialization may encourage mass production, as such, trade at market prices between specialization can benefit both specialization Carr (1999).

Domestic trade is categorized into wholesale trade and retail trade. Wholesale trade is the sale of goods that are sold as merchandise to retailers, industrial, commercial, institutional, or other professional business users, or to other wholesalers and related subordinated services. While Retail trade consists of the sale of goods or merchandise from a very fixed location, such as a department, store, boutique or kiosk, online or by

mail, in small or individual lots for direct consumption or use by the purchaser Iyoha (2002).

The importance of domestic trade in a country is that it facilitates exchange of goods within the country. By doing this it also makes sure that factors of production reach to the right places so that the economy of the country can grow. By allowing all different types of goods and services reach all parts of the country, it improves the standard of living of the residents of the country as well as the employment rate of the country. And it helps the growth of an industry by ensuring the availability of raw materials. Traders from outside the country will have to come in contact with internal traders, because it is not easy to come directly into another country and get the required products (Iyoha 2002)

Historically, there seems to be a consensus among economic historians that in the nineteenth century, Domestic trade acted as an engine of growth (Uniamikogbo, 1995). Domestic Trade contributed to optimal allocation of resources within countries and the transmission of growth from one part of the country to another (Uniamikogbo, 1995 & Iyoha, 1995). These stem from the static and dynamic gains associated with Domestic trade, for which the former is referred to as allocative or efficiency effect, while the latter is known as the “growth effect” of domestic trade (Iyoha, 1995).

In recent times, the growth records of the Asian Newly Industrializing Countries (NICs) such as Hong Kong, Singapore, South Korea, Taiwan, Malaysia, Thailand and China are common examples of countries that achieved economic growth through domestic trade (Giles and Williams 2000, Uniamikogbo, 1995). Meanwhile, one cannot conclude that the growth of an economy is caused only by the expansion of Domestic Trade alone, as there are numerous growth determining variables such as investment, saving, and technical progress among others these growth determinants can equally be responsible for growth individually or as a package. More so, in some

cases domestic trade inhibits growth and economic development Iyoha (1995) this could occur when the export sector stands to compete with other sectors in the economy, in other cases domestic trade growth leads to exports expansion, In Nigeria, the exports earning is expanding on the average but the composition of the exports is the area of concern to economists, Policy makers and government (CBN Statistical bulletin 2001 & 2004).

However domestic trade in Nigeria is predominantly an agricultural trade, Nigeria is an agrarian state and agriculture play a significant role in economic growth of Nigeria economy because of its potential to provide food, creation of job for teeming population, raw material for domestic industry, serve as such of foreign exchange and contribute greatly to gross domestic product, the major crops traded domestically include yam, cassava, rice, sorghum, millet, maize, beans, dried, cowpea, groundnut, cocoyam, sweet potato, tomatoes, Mellon, sesame, cashew, banana, onion, pepe, Ginza etc. other sector of agriculture in Nigeria include forestry, fishing and livestock all contribute to economic growth of Nigeria Ireen &Iyoha (2002).

Moreover, Nigeria is blessed with abundance of fertile soil along with a climate suitable for agriculture and human resources with more than 70 percent of the population live in rural areas and their main source of income is agriculture (iyoha 2004) agriculture account for 27.4 percent of gross domestic product (GDP), employed 35 percent of the labour force and generate 27.3 percent of export earnings Ayodele & iyoha (2010).

Nigeria farming is largely characterize by peasant who grow food mainly for family consumption thus leaving little for commercial purpose this inadequate volume of production is mainly due to tardy progress in farming methods and scattered pieces of land holding most of the farm land is cultivated by small scale farmers with their

traditional agricultural practices (mahamud, 2013), however the rural agriculture is the foundation of Nigeria development due to this the sector gets priority in government policies, development and transformation among others, the rural agriculture development policy encourage the expansion of large-scale farms which would have a relative advantage to introduce modern technology and farm management to raise crop production and promote domestic consumption, therefore, Nigeria has renewed its commitment in promoting domestic trade policies and adhering to multilateral and regional based trade agreement that could help in promoting and diversifying her export (Iyoha 2010).

Economic growth is measured by the Gross Domestic Product (GDP) in Nigeria. GDP is a total market value of a country's output of goods and services, which are exchanged for money or traded in a market system in a year periods. This indicates that trade is an essential aspect of Economic growth. The Gross Domestic Product (GDP) of Nigeria is \$166 billion in 2007. The economy has overdependence on the capital intensive oil sector, which provides 20 per cent of GDP, 95 per cent of foreign exchange earnings, and about 65 per cent of government revenue for 2005 (Soludo 2010 rate of economic growth in Nigeria p23), the over dependence of oil revenue in Nigeria has made the government, policy makers and stakeholders in Nigeria neglect the Nigeria domestic trade. It is against this background this study is out to examine the impact of domestic agricultural trade on economic growth in Nigeria.

## **1.2 Statement of the Problem**

Domestic trade in Nigeria depends heavily on agricultural goods and the market for these goods are largely unstable in terms of volume and price and carry a high degree of risk and uncertainty as well as low income elasticity. Such features are not

conducive to the contribution of domestic economy, the domestic trades of agricultural product weigh less against manufactured goods. Nigeria domestic market is faced with numerous challenges such as poor transport infrastructure, multiple taxation, price instability, insecurity, lack of local content, smuggling, low market penetration, high cost of production, poor government policy, trade and market malpractice, all these are further compounded by high interest rate which made it difficult for domestic traders to borrow.

Despite this, the country still depends on agricultural product for its domestic transactions, based on this problems this study is out to unravel the impact of domestic agricultural trade on economic growth in Nigeria with reference to crops production, forestry and livestock towards enhanced economic performance of the Nigerian economy.

### **1.3 Research Questions**

- i. What is the impact of crop production on economic growth in Nigeria?
- ii. To what extent has forestry impacted on economic growth in Nigeria?
- iii. What is the contribution of livestock trade on economic growth in Nigeria?

### **1.4 Research Objectives**

The major objective of this study is to examine the impact of domestic agricultural trade on Nigeria economy with reference to crop production, forestry trade and livestock trade the specific objectives are to

- i. Evaluate the impact of crop production trade on economic growth in Nigeria
- ii. Examine the extent in which forestry trade has contributed to economic growth of Nigeria

- iii. Investigate the level of contribution of livestock trade to economic growth in Nigeria

## 1.5 Research Hypotheses

From the specific objectives listed, this study formulated the following hypothesis to guide the study

- i.  $H_{01}$ : crops production has no significant impact on economic growth in Nigeria
- ii.  $H_{02}$ : forestry trade has no significant impact on economic growth in Nigeria
- iii.  $H_{03}$ : livestock has no significant contribution towards economic growth in Nigeria

## 1.6 Significance of the Study

This study is relevant to policy makers, stakeholders, researchers, student and government in domestic trade.

Policy makers will find this study useful because it will help in formulating policies on domestic trade in agricultural product and also in advising government in an efficient and effective ways by which policy formulated could be implemented. The study will benefit the policy makers in further deliberations on the impact of domestic trade on economic growth in Nigeria.

Stakeholders such as traders, famers, consumers and policy makers will find this study relevant and important because it will assist them in their deliberation and discussions on the impact of domestic trade in agricultural product on economic growth in Nigeria. This study provide other researchers with reference materials to further explore the future role of domestic trade in economic growth.

Students will find the findings of this study useful in their academic pursuit most especially the area of development economics and particularly on its impact of

domestic trade towards economic growth in Nigeria. The result of this will assist government with respect to future development in terms of technical guidance so as to promote domestic trade in Nigeria.

## **1.7 Scope of the Study**

This study covers the impact of domestic agricultural trade on economic growth in Nigeria, it centered on Domestic agricultural output traded from 1985 to 2018 it unveiled the role of domestic trades in promoting domestic market in domestic agricultural product in Nigeria, this study use only officially available data in Nigeria, the data was sources from central bank of Nigeria (CBN) statistical bulletin and national bureau of statistics (NBS).

## **3.4 Definition of Operational Terms and Acronyms**

### **3.4.1 Crops production**

Crops production is the quantity produced and actually harvested for a particular crop during the reference period (Alikali 2011). It includes those harvested but damaged, stolen, given away, consumed, given as harvesters' and threshers' shares, reserved etc. Excluded are those produced but not harvested due to low price, lack of demand and force majeure or fortuitous events, etc. are crops other than those used for food consumption. Nonfood crops these are crops grown for their aesthetic values such as ornamental plants and cut-flowers. These also include agriculture-derived products such as rice hay and coconut leaves. Industrial crops are crops that are used as inputs to other industries, crop production is affected by a number of abiotic factors including temperature, salinity, drought, pesticides, pH of the soil, and heavy metals as they affect all metabolic activities of the plant. When the plant is unable to grow normally, it is said

to be affected by water deficit. The mechanism involved in combating water stress is not clear in spite of the various research programs and practices Adeniye & Alikali (2010).

### 3.4.2 Forestry

**Forestry** is the science and craft of creating, managing, using, conserving, and repairing forests, woodlands, and associated resources to meet desired goals, needs, and values for human and environment benefits Forestry is practiced in plantations and natural stands (vresghe 2007). The science of forestry has elements that belong to the biological, physical, social, political and managerial sciences. Forestry is an important economic segment in various industrial countries For example, in Africa, forests cover nearly a third of the land area, wood is the most important renewable resource, and forestry supports more than a million jobs and about \$181 billion of value to the Africans economy each year Cruches (2014)

Modern forestry generally embraces a broad range of concerns, in what is known as multiple-use management, including the provision of timber, fuel wood, wildlife habitat, natural water quality management, recreation, landscape and community protection, employment, aesthetically appealing landscapes, biodiversity management, watershed management, erosion control, and preserving forests as 'sinks' for atmospheric carbon dioxide. A practitioner of forestry is known as a forester. Other common terms are: a verderer, or a Silviculture is narrower than forestry, being concerned only with forest plants, but is often used synonymously with forestry. Forest ecosystems have come to be seen as the most important component of the biosphere, and forestry has emerged as a vital applied science, craft, and technology. Timber is the world's most valuable wildlife commodity in trade (Ifre 2012). The FAO estimated the total value of global exports of timber products in 2016 to be worth a staggering US\$227 billion. When managed legally and sustainably, timber trade can be an

invaluable source of revenue to both local communities and entire nations. However, in certain countries, particularly those in Africa and South America, between 50 and 90% of timber is harvested and traded illegally. Government mismanagement, weak enforcement and corruption are all factors resulting in dangerous levels of deforestation, habitat loss and loss of revenue.

### 3.4.3 Livestock

**Livestock** are domesticated animals raised in an agricultural setting to produce labor and commodities such as meat, eggs, milk, fur, leather, and wool. The term is sometimes used to refer solely to those that are bred for consumption, while other times it refers only to farmed ruminants, such as cattle and goats' maigari & Arumese (2012)

In recent years, some organizations have also raised livestock to promote the survival of rare breeds. The breeding, maintenance, and slaughter of these animals, known as animal husbandry, is a component of modern agriculture that has been practiced in many cultures since humanity's transition to farming from hunter-gatherer lifestyles. Animal husbandry practices have varied widely across cultures and time periods. Originally, livestock were not confined by fences or enclosures, but these practices have largely shifted to intensive animal farming, sometimes referred to as "factory farming". Now, over 99% of livestock are raised on factory farms these practices increase yield of the various commercial outputs, but have also led to negative impacts on animal welfare and the environment. Livestock production continues to play a major economic and cultural role in numerous rural communities

### 3.4.4 Economic Growth

Economic growth is an increase in the capacity of an economy to produce goods and services, compared from one period to another. It can be measured in nominal or real terms, the latter of which is adjusted for inflation traditionally, aggregate economic growth is measured in terms of gross national product (GNP) or gross domestic product (GDP), although alternative metrics are sometimes used (Solodo 2013)

Concept of Economic growth is the increase in the inflation-adjusted market value of the goods and services produced by an economy over time. It is conventionally measured as the percent rate of increase in real gross domestic product, or real GDP

Growth is usually calculated in real terms i.e. inflation-adjusted terms to eliminate the distorting effect of inflation on the price of goods produced. Measurement of economic growth uses national income accounting since economic growth is measured as the annual percent change of gross domestic product (GDP), it has all the advantages and drawbacks of that measure. The economic growth rates of nations is commonly compared using the ratio of the GDP to population or per-capita income Olukemi (2002).

The "rate of economic growth" refers to the geometric annual rate of growth in GDP between the first and the last year over a period of time. Implicitly, this growth rate is the trend in the average level of GDP over the period, which implicitly ignores the fluctuations in the GDP around this trend.

An increase in economic growth caused by more efficient use of inputs (such as labor productivity, physical capital, energy or materials) is referred to as intensive growth. GDP growth caused only by increases in the amount of inputs available for use (increased population, new territory) is called extensive growth

The concept of economic growth is not new in literature. It was however conceived differently at different periods in the history. According to the mercantilists, growth was seen as an increase in the total amount of specie that is circulating medium such as silver and gold, under the control of the state. While the physiocrats, conceived economic growth to be a derivative of an increase in the productive capacity mayomi (2006).

Conventionally, economic growth is the increase in the value of goods and services produced by an economy. In the same vein, Henderson and Poole (1991) pointed out that economic growth means two things. First, an increase in national output, as measured by the GNP or GDP; second; growth in individual standard of living or size of each person's slice of pie, as measured by the GNP per capita.

However, the two measures of growth had been criticised on the ground that, they neither provide information on the distribution of income nor take into account the externalities resulting from economic activities. They equally exclude activities that take place outside the market place and unpaid for services. Despite these deficiencies, the GDP is universally accepted as an indicative of economic performance by economists, National Bureau of Statistics (NBS).

## **1.8 Organization of the Study**

This study is organized in five chapters. Chapter one centered on the introduction, which includes background to the study, statement of the problem, research questions, objective of the study, research hypothesis, significant of the study, scope of the study. Chapter two focuses on conceptual framework, empirical review and literature gap.

Chapter three had its focus on research design, population sample and sampling techniques, the model, model specification, appriori expectation, sources of data, method of data analysis, augmented dicker fuller test, co-integration test, error correction mechanism and justification of method

Chapter four focus on data presentation, data analysis and result and discussion of findings.

Chapter five is centered on summary, conclusion, recommendations, limitation of the study, and suggestion for further studies.

## CHAPTER TWO

### LITERATURE REVIEW

#### 2.1 Conceptual Framework

##### 2.1.1 Concept of Domestic Trade

Domestic trade is the sector of the national economy that carries on the selling of commodity products from various sectors of production in country's domestic market it encompasses wholesale and retail trade (Ali, 2012).

The nature and forms of domestic trade, the relationships it expresses, and the economic laws that control its development are determined by the corresponding mode of production, and as such they are change in transition from one socio-economic system to another (Nwachukwu & Arene 2012).

Domestic trading enables mutual exchange of goods and services and is also the foundation of markets comprising diverse goods and services. Goods and services are in turn, an embodiment of the division of labour in a society since they represent diverse kinds of labor and skills (Ademola, Makoji & Ireem 2013).

They believe that the advent of various modes of transportation and development of diverse means of communication helped expand the scope of trade in goods and services. If local exchange and barter led to the division of labor on a small scale, national and global trade ensured division of labor on a larger scale. With the expansion of trade beyond the local level, the functions of market increased manifold to take care of the needs of processing, storage, packaging and transportation (Ireem 2010).

Monetization of the economy further facilitated trade in a big way the process, credit and insurance as added characteristics of trading activity. In order to ensure that demand and supply matched each other, over time and regions, the distribution system

acquired more sophistication with the introduction of 'wholesale trade' and 'retail trade'. The State as an institution has been favorably disposed towards trade as it enabled it to collect taxes (Hassan 2013).

### **2.1.2 Concept of Crops production**

Crops production is the quantity produced and actually harvested for a particular crop during the reference period (Alikali 2011). It includes those harvested but damaged, stolen, given away, consumed, given as harvesters' and threshers' shares, reserved etc. Excluded are those produced but not harvested due to low price, lack of demand and force majeure or fortuitous events, etc. are crops other than those used for food consumption. Nonfood crops these are crops grown for their aesthetic values such as ornamental plants and cut-flowers. These also include agriculture-derived products such as rice hay and coconut leaves. Industrial crops are crops that are used as inputs to other industries, crop production is affected by a number of abiotic factors including temperature, salinity, drought, pesticides, pH of the soil, and heavy metals as they affect all metabolic activities of the plant. When the plant is unable to grow normally, it is said to be affected by water deficit. The mechanism involved in combating water stress is not clear in spite of the various research programs and practices (Adeniyeye & Alikali 2010).

### **2.1.3 Concept of Forestry**

Forestry is the science and craft of creating, managing, using, conserving, and repairing forests, woodlands, and associated resources to meet desired goals, needs, and values for human and environment benefits. Forestry is practiced in plantations and natural stands (Vresghe 2007). The science of forestry has elements that belong to the biological, physical, social, political and managerial sciences. Forestry is an important economic segment in various industrial countries for example, in Africa, forests cover

nearly a third of the land area, wood is the most important renewable resource, and forestry supports more than a million jobs and about \$181 billion of value to the Africans economy each year (Cruches 2014)

Modern forestry generally embraces a broad range of concerns, in what is known as multiple-use management, including the provision of timber, fuel wood, wildlife habitat, natural water quality management, recreation, landscape and community protection, employment, aesthetically appealing landscapes, biodiversity management, watershed management, erosion control, and preserving forests as 'sinks' for atmospheric carbon dioxide. A practitioner of forestry is known as a forester. Other common terms are: a verderer, or a Silviculture is narrower than forestry, being concerned only with forest plants, but is often used synonymously with forestry. Forest ecosystems have come to be seen as the most important component of the biosphere, and forestry has emerged as a vital applied science, craft, and technology. Timber is the world's most valuable wildlife commodity in trade (Ifre 2012).

The FAO estimated the total value of global exports of timber products in 2016 to be worth a staggering US\$227 billion. When managed legally and sustainably, timber trade can be an invaluable source of revenue to both local communities and entire nations. However, in certain countries, particularly those in Africa and South America, between 50 and 90% of timber is harvested and traded illegally. Government mismanagement, weak enforcement and corruption are all factors resulting in dangerous levels of deforestation, habitat loss and loss of revenue (Iyoha 2010).

#### **2.1.4 Concept of Livestock**

Livestock are domesticated animals raised in an agricultural setting to produce labor and commodities such as meat, eggs, milk, fur, leather, and wool. The term is sometimes used to refer solely to those that are bred for consumption, while other

times it refers only to farmed ruminants, such as cattle and goats maigari & Arumese (2012)

In recent years, some organizations have also raised livestock to promote the survival of rare breeds. The breeding, maintenance, and slaughter of these animals, known as animal husbandry, is a component of modern agriculture that has been practiced in many cultures since humanity's transition to farming from hunter-gatherer lifestyles. Animal husbandry practices have varied widely across cultures and time periods. Originally, livestock were not confined by fences or enclosures, but these practices have largely shifted to intensive animal farming, sometimes referred to as "factory farming". Now, over 99% of livestock are raised on factory farms these practices increase yield of the various commercial outputs, but have also led to negative impacts on animal welfare and the environment. Livestock production continues to play a major economic and cultural role in numerous rural communities.

### **2.1.5 Concept of Economic Growth**

Economic growth is an increase in the capacity of an economy to produce goods and services, compared from one period to another. It can be measured in nominal or real terms, the latter of which is adjusted for inflation traditionally, aggregate economic growth is measured in terms of gross national product (GNP) or gross domestic product (GDP), although alternative metrics are sometimes used (Solodo 2013)

Economic growth is the increase in the inflation-adjusted market value of the goods and services produced by an economy over time. It is conventionally measured as the percent rate of increase in real gross domestic product, or real GDP

Growth is usually calculated in real terms i.e. inflation-adjusted terms to eliminate the distorting effect of inflation on the price of goods produced. Measurement of economic

growth uses national income accounting since economic growth is measured as the annual percent change of gross domestic product (GDP), it has all the advantages and drawbacks of that measure. The economic growth rates of nations is commonly compared using the ratio of the GDP to population or per-capita income (Olukemi 2002).

The "rate of economic growth" refers to the geometric annual rate of growth in GDP between the first and the last year over a period of time. Implicitly, this growth rate is the trend in the average level of GDP over the period, which implicitly ignores the fluctuations in the GDP around this trend.

An increase in economic growth caused by more efficient use of inputs (such as labor productivity, physical capital, energy or materials) is referred to as intensive growth. GDP growth caused only by increases in the amount of inputs available for use (increased population, new territory) is called extensive growth (Solodo 2002).

The concept of economic growth is not new in literature. It was however conceived differently at different periods in the history. According to the mercantilists, growth was seen as an increase in the total amount of specie that is circulating medium such as silver and gold, under the control of the state. While the physiocrats, conceived economic growth to be a derivative of an increase in the productive capacity (Mayomi 2006).

Conventionally, economic growth is the increase in the value of goods and services produced by an economy. In the same vein, Henderson and Poole (1991) pointed out that economic growth means two things. First, an increase in national output, as measured by the GNP or GDP; second; growth in individual standard of living or size of each person's slice of pie, as measured by the GNP per capita.

However, the two measures of growth had been criticised on the ground that, they neither provide information on the distribution of income nor take into account the externalities resulting from economic activities. They equally exclude activities that take place outside the market place and unpaid for services. Despite these deficiencies, the GDP is universally accepted as an indicative of economic performance by economists.

## **2.2 Empirical Review/Reviews of previous Studies**

Kouassi, Yifur, Dawson, syad, shida, Ekiranet (2004) investigate the impact of domestic agricultural trade growth hypothesis using sample of agricultural output (2000 to 2015) and the time series models adopted include; ADF unit root test, Johansen Julius co-integration test and Granger causality tests. At panel level, the panel unit root tests conducted includes (i) the Im-pesaran-shin (IPS) (ii) the levin-lin chu (ILC) (iii) the MADF and (iv) the HARDI, while the levin-lin, the pedroni and IPS panel cc-integration tests were adopted. Also, adopted in the study at panel level are; the common, fixed and random effect panel data models. And it was found that domestic agricultural trade have positive impact on economic growth in Nigeria.

Ezike et al (2012) macroeconomic impact of domestic agricultural trade on Nigerian economy. Using the Ordinary Least Square (OLS) regression technique and applying a combination of bivariate and multivariate models from the data covering the period 1970 – 2008 observed that the two predictors used, direct investment have a positive and significant impact on Nigeria's economic growth during the period.

Dawson, (2005) the contribution of domestic agricultural trade to economic growth of the selected 62 less developed countries was done by using panel data for the period 1974 to 1995. The study used the two theoretical models in the analysis, the first model

based on agricultural production function, including agricultural and non- agricultural trade as inputs. The second model was dual economy model, that is, agricultural and non- agricultural where each sector was sub divided into domestic trade and non-export trade. The results of the study highlighted the role of domestic agricultural trade in economic growth. The study suggested that the domestic agricultural trade promotion policies should be balanced.

Oluwanseun et al (2013) The empirical analysis of agricultural output trade and economic growth in Nigeria was done by different Authors studied the existence of long run relationship between agricultural output trade and economic growth by using time series data from 1980 to 2010. The study made use of unit root tests and Johansen maximum likelihood test of co-integration and discovered that, the long run equilibrium relationship exists between agricultural output trade and economic growth and the relationship is elastic in nature meaning that a unit increase in agricultural trade would bring a more than proportionate increase in the Real Gross Domestic Product in Nigeria.

Ekiran et al.(2014) Examined the relationship between agricultural output trade and economic growth by using a multivariate Johansen co-integration analysis for the period covering 1980 to 2012 and found that, agricultural output trade are long run determinants of economic expansion. The study recommended that the government of Nigeria should direct efforts to improve agricultural output in the process of economic growth in the country. Another empirical analysis of agricultural output trade and economic growth in Nigeria was done by Victor (2015) using time series data from 1970 to 2012. The variables used in the study were gross domestic product as the endogenous variables measuring economic growth as a function of interest rate, agricultural output, trade and inflation as the endogenous variables. The study used

economic techniques of Augmented Dickey-fuller (ADF) Unit root test, Johansen co-integration test and error correction method (ECM) for empirical analysis. The findings of the study showed that agricultural output trade has contributed positively to the Nigerian economy. Based on the findings, the study recommended that, the government reform agenda should be systematic and sustained irrespective of the professional background of the successive president of the country and that; Agricultural should be more desired than other sectors that are exhaustive in nature.

Ekanayake (1999) analyzed the causal relationship between economic growth and domestic agricultural trade growth by using error correction and co-integration models and time series data of eight Asian developing countries covering period 1960 to 1997. The results of the study concluded that there was a bi-directional causality between domestic agricultural trade growth and economic growth in all the developing countries included in the analysis except Malaysia. There existed strong evidence for long run Granger causality in all countries.

Nadeem (2007) provided the empirical analysis of the dynamic influences of economic reforms and domestic agricultural trade policy on the performance of agricultural output in Pakistan. The author examined the effect of both domestic supply side factors and demand on the performance of agricultural output. The major finding of the study was that domestic agricultural trade diversification contributed more in agriculture output performance. The results of the study suggested that agricultural output performance is more elastic to change in domestic factors.

Sanjuan, Lopez & Dawson (2010) study the contribution of agricultural output trade to economic growth of 42 selected under developed countries the study was done using panel co-integration techniques. Agriculture and nonagricultural output trade were used as independent variables to determine the dependent variable which is economic

growth (GDP). The results showed that 33 developing countries had positive elasticity for agricultural trade. By the same token for 37 countries, the elasticity of non-agricultural trade was also positive. Based on the empirical results, the study suggested that the poor countries should adopt promotion policies but the rich countries might attain high economic growth from non-agricultural trade.

Syed et al. (2015) Analyze The impact of domestic agricultural trade on microeconomic performance of Nigeria by using secondary data from the period 1972-2008. The study estimated the relationship between Gross domestic product (GDP) and agricultural and non-agricultural trade as dependent and independent variables respectively by employing Johansen co-integration technique. The main findings of the study depict that agricultural exports have a negative relationship with economic growth of Nigeria while non-agricultural exports have positive relation with economic growth. Basing the empirical results the study suggested that Nigeria have to do structural changes in domestic agricultural trade by converting its domestic agricultural sector into value added products.

Noula et al. (2014) studied the impact of domestic agricultural output trade on economic growth of Cameroon specifically with reference to coffee, banana and cocoa using co-integration test. Results found mixed effects on economic growth in Cameroon. Coffee trade and banana trade has a positive and significant relationship with economic growth. cocoa trade was found to have a negative and insignificant effect on economic growth. Basing the empirical result the study recommended that, implementation of policies aimed at increasing the productivity and quality of these cash crops and value addition to cocoa and coffee beans should be intensify to increase the growth of economy in Cameroon.

Boansi et al. (2014) examined economic and policy foundations of domestic agricultural trade in Ghana by using co-integration analysis. The study undertaken to help bridge information gap and inform domestic agricultural trade policy prescriptions on how growth observed in Ghana's domestic agricultural trade sector could be sustained and scaled up. To achieve the purpose of the study the Johansen Full Information Maximum Likelihood test was used. The study found that, structural weaknesses in production, trade and marketing environments preclude the country from exploiting growth enhancing opportunities in the short-run, while potential barriers to trade yield similar implication in the long-run and minimization of both short and long-run inhibitions could further enhance domestic trade growth for Ghana. Based on the result found, the study recommended, sustenance and scaling up of the Ghanaian domestic agricultural trade sector requires addressing of existing structural weaknesses and inefficiencies in production, trade and marketing, increased diversification of domestic agricultural trade, attraction of specialization encourage investments, and increased domestic production.

Ousmanou et al. (2003) examined the relationship between domestic agricultural trade and economic growth in 21 Sub-Saharan Africa Countries by using time series data. The study emphasized on the questions; Are domestic agricultural trade and economic growth correlated in Sub-Saharan Africa? If yes, what is the direction of this causation? Is this direction reversed with the change of these countries from import-substitution (IS) to export promotion (EP) strategies? To answer these questions the study used Hsiao's Granger-causality and found that during the IS period, economic growth unidirectional causes total exports in five countries, manufactured exports unidirectional cause economic growth in one country, bidirectional causality exists between economic growth and domestic agricultural trade in three countries,

bidirectional causality exists between economic growth and agricultural trade in one country and bidirectional causality exists between economic growth and manufactured trade in three countries. During the EP period, agricultural trade unidirectionally cause economic growth in nine countries, manufactured exports unidirectionally cause economic growth in three countries, economic growth unidirectionally causes agricultural exports in five countries, economic growth unidirectionally causes manufactured exports in six countries and bidirectional causality exists between economic growth and agricultural exports in three countries.

Muhammad (2010) examined the contribution of domestic agricultural trade on economic growth of Pakistan by estimating the relationship between agricultural trade and non- agricultural trade on economic growth of Pakistan by employing Johansen co-integration technique for the period 1972 to 2008. The results of the study indicated that there was negative and insignificant relationship between the agricultural trade and economic growth. The agriculture trade elasticity of GDP was  $-0.14$  which means that one percent increase in agricultural trade decreases the country's GDP by 0.14 and the non-agricultural trade elasticity of GDP was 0.58. Based on the empirical results, the study suggested that nonagricultural trade should be promoted than agricultural trade.

Barbara et al (2011) investigates the relationship between domestic agricultural trade and real GDP in Italy from 1863 to 2004 by using co-integration analysis and causality tests. The outcome of the study suggested that these variables co-move in the long run but the direction of causality depends on the level of economic development: in the period prior to world war 1<sup>st</sup> the growth of the Italian economy led that of domestic agricultural trade, while in the post-world war 2<sup>nd</sup> period the causal relationship was

reversed with the expansion of domestic agricultural trade that determined the growth of the Italian economy.

Ruba et al (2015) examine the causal relationship between economic growth and domestic agricultural trade in Jordan by using the Granger methodology in order to determine the direction of the relationship between the two variables during the period 2000-2015. The study found that there is a causal relationship going from the economic growth to domestic agricultural trade, and not vice versa. Based on the outcome of causality tests, the changes in the economic growth help explain the changes that occur in the domestic trade. The study suggested that, the directed effect towards policies that will enhance economic growth such as agriculture, industrialization

Omoju, & Adesanya (2014), Study domestic trade growth in developing country using Nigeria as a case study. They make use of secondary data from 1980 – 2010 and applying the Ordinary Least Square (OLS) regression method, they find out that domestic trade, government expenditure and interest rate have a significant positive impact on economic growth in developing countries.

Eravwoke and Oyivwi (2012) Studies growth perspective via domestic trade in Nigeria, employ the Ordinary Least Square (OLS) method, Augmented Dickey Fuller (ADF) and the Johansen co-integration statistical approach on data covering the period 1970 - 2010. It was found that the ADF reveals that the series are integrated of order one  $I(1)$ , but for domestic trade, the series became stationary after taking the second difference  $I(2)$  and concludes that the variables are non-stationary. The Johansen co-integration test shows that there exist one co-integration equation at 5% level of significance which means that there is long run relationship between domestic trade, interest rate, and gross domestic product of Nigeria. The OLS result revealed that

domestic trade and interest rate are not statistically significant in explaining economic growth in Nigeria.

Mackviriy (2007) Examine the domestic agricultural trade and economic growth nexus in Indonesia employing vector autoregressive (VAR) model. The findings indicate the significance of both domestic agricultural trade and economic growth to economy of Indonesia as indicated in GIRF analysis. It was concluded that domestic agricultural trade and economic growth exhibits bi-directional cause structure, which is trade Led Growth in long-run and Growth Led trade in short-run.

Erfani (1999) Examined the causal relationship between economic performance and domestic agricultural trade over the period of 1965 to 1995 for several developing countries in Asia and Latin America. The result showed the significant positive relationship between domestic agricultural trade and economic growth. This study also provides the evidence about the hypothesis that domestic agricultural trade lead to higher output.

Vohra (2001) Showe the relationship between domestic agricultural trade and growth in India, Pakistan, Phillipines, Malaysia, and Thailand form 1973 to 1993. The empirical results indicated that when a country has achieved some level of economic development, the domestic agricultural trade have a positive significant impact on economic growth. The study also showed the importance of domestic agricultural market policies by pursuing domestic agricultural trade expansion strategies and by attracting foreign investment.

Balaguer (2002) Examine the hypothesis of domestic agricultural trade - led growth from the Spanish process initiated four decades, for 1961 to 2000. Both the domestic agricultural trade expansion and the progression from 'traditional' trade to manufactured trade are considered for this purpose. It is proved that the structural

transformation in domestic agricultural trade composition has become a key factor for Spain's economic development along with the relationship between domestic agricultural trade and real output.

Shiraz (2004) Effect of short run and long run relationship between domestic agricultural trade, and economic growth on the basis of co-integration and multivariate Granger causality for the period 1960 to 2003. This study showed a long-run relationship between domestic agricultural trade, and economic growth.

Mah (2005) Empirical Reviews of the long-run causality between domestic agricultural trade and growth with the help of significance of error correction term, ECt-1. This study also indicated that trade expansion is insufficient to explain the patterns of real economic growth.

Tang (2006) Stated that there is no long run relationship among trade, real Gross Domestic product and domestic agricultural trade in crop production. This study further shows no long-run and short-run causality between trade expansion in crop production and economic growth in China on the basis of Granger causality which economic growth does Granger-cause domestic agricultural trade in timber in the short run.

Pazim (2009) tested the validity of domestic agricultural trade-led growth hypothesis in three countries by using panel data analysis. It is concluded that there is no significant relationship between the size on national income and amount of domestic agriculture trade for these countries on the basis of one-way random effect model. The panel unit root test shows that the process for both GDP and trade at first difference is not stationary while the panel co integration test indicates that there is no cointegration relationship between the trade and economic growth for these countries.

Helpman and Krugman (1985), Domestic agricultural trade crop production promotes specialization in production of exports products which in turns boosts the production level, and causes general level of skills to rise in the domestic market sector.

Prasad & Gable (1998) Empirical perspectives on the relationship between domestic agricultural trade in crop production and macroeconomic fluctuations in industrial economies. First, a comprehensive set of stylized facts concerning fluctuations in domestic agricultural trade crop production variables and their determinants was presented. A measure of the quantitative importance of domestic trade for the propagation of domestic agricultural business cycles was then constructed, focusing on the role of domestic agricultural trade as a catalyst for cyclical recoveries. Finally, structural vector auto regression model were used to characterize the joint dynamic of output and trade variable in response to different types of microeconomic shocks.

## **2.3 Theoretical Framework**

### **2.3.1 Physiocrate Theory of Trade**

Physiocrate is a group of philosophical thought which is popularized by Montesquieu (1749) by proclaiming the importance of natural law in social matters. However, his concern with economics was incidental and, as such, he showed a general acceptance of certain mercantilist views. They broke completely with the past, and established a new order of economic life.

Their attitude toward trade was a direct outgrowth of their basic concept of a natural law which applied to all nature. The individual had a right to whatever natural enjoyments he could procure through his labor (Quesnay 1758). The right to hold and transfer property was therefore undeniable. Once having granted these assumptions, it followed that competition should not be restricted by law, by the creation of

monopolies, or by the granting of special privileges. Quesnay (1982) considered commerce as unproductive labor. The mere exchange of wealth, he claimed, was not the same as the production of wealth. The gain made by merchants was at the expense of the agriculturalists who alone were the producers of all value (Turgot 1992).

He denied the value of a favorable balance of trade since its effect would be to raise prices; and the wealth of a state could not be judged by the quantity of money it possessed since money was sterile, having no value in itself except as it effected an exchange of commodities. To conduct commerce at the expense of another nation was impossible, since commerce can only take place as long as there exist reciprocal advantages (Turgot 1984).

Nevertheless, the Physiocrat defense of free trade cannot be accepted as evidence of this high estimate of its worth. Just the opposite was the case Quesnay (1992). Foreign trade was a liability since the expenses of it were deducted from the real production of agriculture. Domestic trade at least kept all true values within the nation.

Calrs (1995) modified some of the details of Quesnay's ideas but did not changed the important feature, i.e the obligation of the state to prevent monopoly and special privilege to the extent of preserving natural liberty (Helpman 1999), he especially objected to extending the state's responsibility to the degree of a paternalistic care of the careless, lazy, or indifferent. Hence the free trade doctrine of the Physiocrats and their opposition to Mercantilism arose more from their philosophical world view than from any critical appraisal of the value of either in itself.

### **2.3.2 Micro Dynamic Trade theory**

Trade widens the total market for a country's producers especially if they are operating at levels of increasing returns to scale. It enables the producers to move to higher points in the production possibility frontier. Demand encourage better use of under-employed

and unutilised resources; cause expansion of economy of scales, reduce unit cost of production, raise income, savings, and capital accumulation and engender growth (Park, 1981; Lee 1971). These are dynamic gains.

Myint (1958) in his 'vent for surplus' theory also identified trade as an outlet for a country's surplus commodities. The theory contends that there is gain from trade only if the 'surplus' exports resources have no alternative uses and cannot be switched to domestic uses. He argued that the vent for surplus theory provides more plausible explanation to the rapid expansion of export production in most countries in the 19th Century. He argued that if unutilized resources were not existing, the expansion process would have stopped comparative cost theory has no answers to why, when two countries possess similar endowments, one would have developed export sector and the other would not vent for surplus is more reasonable explanation for the start of trade.

In line with the foregoing Thirwall (1978) noted that there is a difference between the question of the "type of commodity traded and basis for trade, in the sense of what gets trade started". He believes that "vent for surplus" explains better the original basis for trade, while comparative cost theory explains the type of commodity traded. It is, therefore, widely believed among economist that in addition to the static gains from trade, there are dynamic gains too.

### **2.3.3 Staple Theory of Growth**

Theory state that a staple economy is a primary product, production of which it enjoys rising demand, then stimulate overall economic growth. This will have economy-wide impact as idle resources are brought into use, and under-employment and unemployment are reduced, increased rate of domestic saving and investment is induced, and linkages are established with other sectors of the economy (Innis, 1985).

In order to integrate both historical and theoretical aspects of the domestic trade promotion hypothesis, we will adopt the staple theory of economic growth as the framework of analysis. In the discussion of the staple theory, the literature of formal mathematical and geometrical growth models is not emphasized because these are unable to handle conveniently the number of variables required to explain the complex phenomenon of trade growth (Roemer 1970).

The staple approach to the study of economic history is primarily a Canadian innovation, the leading innovator being Harold Innis in his pioneering historical studies, notably of the cod fisheries, fur trade and timber Grant & Watkins (1993).

A staple is a primary product that faces a large and growing demand in world markets, does not require elaborate processing, and has a high enough value-to-weight (volume) ratio to bear transportation costs. In other words, it is a profitable primary commodity trade. Trade industry may be established as a consequence of recent discovery, increased demand, cost-reducing technological change, or any combination of these. Staple production necessarily uses natural resources intensively (Grant 1996).

The early emphasis on the supply side, all too often ignored by critics of staple and export-led theories of economic growth and development, was reiterated and elaborated upon by North (1976) in his articulation of models of economic development. Focusing upon the demand side paints a distorted picture of the growth process and distorts the analyses of the role, which exports play in this process. More recently Irving (1916–1992) argued that domestic supply-side variables were of overriding importance in the determination of export-led growth in the nineteenth and twentieth centuries. The heart and soul of economic growth are internal to the economy (supply side) and relate to how the economy and its endowments are managed

economically, socially, and politically. Thus, exports expansion is a "handmaidens" of growth, not the true engines of growth.

Of the various extensions and amendments to the staple theory, particular importance has been the explicit introduction of linkages into analytical framework. Albert (1915) introduced the notion of backward, forward, demand, and fiscal linkages. Backward and forward linkages relate to economic activities associated with the production and servicing of the staple economy and further processing of the staple economy, respectively. Backward linkages refer not simply to activities related to the immediate production of the staple product, but also to the production of the infrastructure, such as transportation, necessary to make staple production economically viable. Demand linkages refer to the manner in which staple related income is distributed and spent and how this affects the economy. Fiscal linkages relate to how government income accruing from staple production is spent. Melvin (1990) argued that key to staple theory is the extent to which staple production links positively with the rest of the economy. In other words, the extent and strength of spread effects is critically important in determining the ultimate effect of staple economy upon per-person output growth. North (1991) heeds to demand linkages with respect to what he refers to as residentiary industries in the secondary or tertiary sectors of the economy, which develop to meet the needs of the local staple-producing population. Such staple-related industries can generate cost savings or economies to other unrelated industries thereby fostering the growth of these industries and attracting new industries. These non-staple industries can, in time, become export oriented given their low production costs, which are partially attributed to the development of the staple-related residentiary industries. North also finds that staple production and the economic linkages that they generate can give rise to the growth of nodal centers that are home to staple and related

industries. These nodal centers can themselves become export centers not simply or even largely of staples, but of non-staple outputs, wherein the latter's base is the staple sector. In time, a vibrant non staple sector may become delinked from the staple sector, fostering economic growth on its own. Thus, North further emphasizes the significance of linkages and related spread effects as critical dimension of staple theory and staple economic growth.

Staple exports or their growth appear to be of little or diminishing importance to so-called staple regions as a percentage of exports, output (GDP), employment, or the growth in these variables. But, as North points out, even if staple production does not dominate an economy directly, this does not mean that staple production is not the dominant force in the economy by way of its complex linkages with the rest of economy.

#### **2.3.4 Solow – Swan Theory**

The Solow – Swan model the model was developed independently by Robert Solow and Trevor Swan in 1956, and superseded the Keynesian Harrod – Domar model is an economic model of long-run economic growth set within the framework of neoclassical economics. It attempts to explain long-run economic growth by looking at capital accumulation, labour or population growth, and increases in productivity, commonly referred to as technological progress. At its core is a neoclassical (aggregate) production function, often specified to be of Cobb Douglas type, which enables the model “to make contact with microeconomics”.

A standard Solow model predicts that in the long run, economics coverage to their steady state equilibrium and that permanent growth is achievable only through technological progress. Both shifts in saving and in population growth cause only level

effects in the long run (i.e. in the absolute value of real income per capita). An interesting implication of Solow's model is that poor countries should grow faster and eventually catch-up to richer countries. The contribution of domestic agriculture to aggregate economic growth could be modeled through its effects on total factor productivity (Timmer, 1995 Ruttan, 2000). Early theories of growth regarded domestic agriculture as a vital source of resources to finance the growth of the industrial sector. Thus, agriculture production growth serves as an engine of growth for the entire economy. Hawa (1988) posits that domestic agriculture is an engine of growth and added agriculture to the standard Solow-Swan growth equation as a measure of linkages between the rural and industrial sector of the economy.

#### **2.4 Gaps in Literature\***

Study have been carried out on the impact of domestic agricultural trade on economic growth and it is necessary to review some that are relevant to this study, the work of Vohra (2014), Erfani (1999), Mackviriy (2007), Omoju & Adeanya (2014), Ruba (2015), Ndeem (2015) and Ezike et al (2012) were all review in this study, they all study domestic agricultural trade as a whole without studying the various component of domestic agricultural trade in a disaggregated form to give a clear understanding on which particular variable that add more value on the economy, most time when we cluster variables it denies us the opportunity of knowing the individual impact of those variables.

Hence this study help us to know the individual impact of these variables on economic growth so as to give government and private sector a clear cut direction on where to channel resources properly, therefore, this study unveil disaggregated impact of domestic agricultural trade on economic growth in Nigeria to fill the literature gap.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Research Design**

The study adopts the ex-post facto research design in order to answer the raised research questions in the study. Kerlinger (1973) describes the ex-post facto research design, which is also called causal comparative research, as a design used when the researcher intends to determine cause-effect relationship between the dependent and independent variables with a view to establishing a causal link between them. This research type is based on analysis of the dependent and independent variables.

This research design makes it possible for a researcher to verify and validate already existing data by various researchers. Ex-post facto research is a systematic empirical inquiry in which the researcher does not have direct control of independent variables because their manifestations have already occurred or because they are inherently not manipulated. This research design hinges on secondary sources of data for examination.

#### **3.2.1 The Model**

This study uses the Solow-Swan model, an economic model of long-run economic growth as a basis to develop the economic growth model. The model attempts to explain long-run economic growth and due to its particularly attractive mathematical characteristics, (Solow 1956, 1957, Mankiw, Romer, Weil 1992, Sachs and Warner, 1999, Dornbusch, Fischer and Startz, 2004). Modified by Tigri (2015), and expanded by (Dornbusch, et al 2004), Adam and Oyetola (2014) Solow-Swan shows to be a convenient starting point for various extensions as it is further modified by (Daramola

2015& yusuf 2016) by adding variable of domestic agricultural output. Therefore, the model adopted for this study is stated as adopted from Yarif (2016).

$$\log(\text{GDP}) = \beta_0 + \beta_1 \log(\text{CPT}) + \beta_2 \log(\text{FT}) + \beta_3 \log(\text{LT}) + \mu$$

Where

GDP = Gross Domestic Product

CPT = Crop production trade

FT = Forestry trade

LT = Livestock trade

### 3.3 Model Specification

The model considered for this study originates under the Solow swan economic growth theory, which posits that changes in the output are responsible for economic growth (Solow 1956, 1957, Mankiw, Romer, Weil 1992 Sachs & Warner, 1999, Dornbusch, Fischer and Startz, 2004). Solow Swan growth model is designed to show the way in which the simplest form of economic system would transform during the process of development (Dornbusch, et al 2004). Considering this, the study employs the augmented solow model. Solow postulates a continuous production of domestic agricultural output which are substitutable to economic growth (Dornbusch, et al 2004). The model provides a quantitative linkage between variables, the model is inform of multiple linear equations as specified below.

$$Y_t = \beta_0 + \beta_1 X_t + \mu_t \dots\dots\dots 1$$

$$\text{GDP} = f(\text{CP}, \text{FT}, \text{LT}, \mu) \dots\dots\dots 2$$

$$\text{GDP} = \beta_0 + \beta_1 \text{CP} + \beta_2 \text{FT} + \beta_3 \text{LT} + \mu \dots\dots\dots 3$$

Where;

GDP = Gross Domestic Product

CP = Crop Production Trade,

FT= Forestry Trade

LT = Livestock Trade

$\mu$  = Error term

$\beta_0$ , = Slope of the model

$\beta_1, \beta_2$  and  $\beta_3$  are parameter of independence variable to be estimated

### 3.3.1 A priori Expectation

For the economy to experience growth, it is expected that domestic agricultural trade is to express a positive relationship that is the coefficients of the variables  $\beta_1 \beta_2 \beta_3 > 0$ . The expectation from this study is that independent variables should have positive relationship with the dependent variable, economic growth. Each of the exogenous variables crop production trade, forestry trade, and livestock trade is expected to exhibit a positive sign on the endogenous variable Gross Domestic Product. Therefore a priori expectations are that the variables are expected to reflect in increased growth in the economy. Therefore the a priori expectation is stated as:

$\beta_1, \beta_2$ , and  $\beta_3 > 0$

### 3.5 Nature and Sources of Data

This study utilizes secondary data which are aggregated data collection and published by central bank of Nigeria (CBN) statistical bulletin, National Bureau of Statistics (NBS) Nigerian Economic Society annual conference proceedings, journals, articles, textbooks, reports and documents were consulted for literature content the data set for this study are yearly data on domestic agricultural trade from 1985 to 2018.

### **3.5.1 Methods of data collection**

This study is mainly based on secondary data collected from statistical bulletin of Central Bank of Nigeria (CBN) and National Bureau of Statistics and is a yearly data covering the period from 1985 to 2018 on selected domestic agricultural output such as crops production trade, forestry production trade and livestock production trade.

### **3.6 Technique for Data Analysis**

The data for this study is analyzed using robust least square estimator (RLS) on E-Views software, (this is due to the fact that the data are not normal and the presence of heteroskedasticity. This is because the use of OLS in the presence of heteroskedasticity provide spurious regression problem that can lead to statistical bias and whatever conclusion drawn may be misleading (Granger and Newbold 1974 and Gujarati 2004)).

The questions are in form of multiple regression, the assumption underlying the analysis of time series data is that it must be stationary to avoid spurious and nonsense result. In view of this proposition, stationary test, i.e augmented Dicker Fuller (ADF) test use to ascertain the stationarity of the data set Another test of significance is the co-integration test to test for the long run relationship among the variable and granger causality test to test the relationship between domestic agricultural trade and economic growth to know if domestic agricultural trade granger cause economic growth in Nigeria.

#### **3.6.1 Augmented Dicker-Fuller Test (ADF)**

In order to achieve a meaningful regression with time series data, it is necessary to test the existence of unit root in the variables. The variables used in the analysis need

to be stationary and/or should be co-integrated in order to infer meaningful relationship from the regression. The unit root test provides the order of integration at which the variables can be stationary. The tests was performed for all series (gross domestic product, crop production, forestry and livestock) by using the Augmented Dickey-Fuller (1978) and Phillips-Peron (1988) tests, the ADF test is a parametric test (pre-determined parameters) and it has low power whereas pre-determine parameter test is based on non- parametric modification of Augmented Dickey-Fuller tests.

The results of Augmented Dickey fuller test and Phillips-Peron tests will applied to the variables mentioned in the model of this study at level (0) meaning testing the existence of unit root of the raw data as it is without differencing and first difference (1) which means testing the existence of unit root of once differenced data to see if there is presence of co-integration and if there is we will test for all the variable in the model for error correction model and add the error correction to the model as follow

From the equation 3 above we take the first differentiation of the model at level (0)

$$\Delta Z_0 \ln GDP_t = \beta_0 + \beta_1 \Delta Z_1 \ln GDP_{t-1} + \sum \beta_4 \Delta Z_1 \ln DT_{t-1} + \mu \dots \dots \dots 4$$

Where  $\Delta$  = first order difference operator

$t_{-1}$  = other explanatory variable

If the unite root test show the evidence of co-integration in the equation we test all the variable in the model i.e. error correction model or if there evidence of co-integration equation 4 will be transformed into error correction model which is we test all the variable in the model and add error correction model which is

$$\Delta Z_0 \ln GDP_t = \beta_0 + \beta_1(\Delta Z_1 \ln DT_{t-1}) + \beta_2(\Delta Z_2 \ln CP_{t-1}) + \beta_3(\Delta Z_3 \ln FT_{t-1}) + \beta_4(\Delta Z_3 \ln LT_{t-1}) + ECM + \mu \dots\dots\dots 5$$

### 3.6.2 Co-integration test

Granger (1981) introduced the concept of co-integration. Co-integration is the statistical implication of the existence of long run relationship between the variables which are individually non-stationary at their level form but stationary after first difference (Gujarati,-2004).The theory of co integration can therefore be used to study series that are non-stationary but a linear combination of which is stationary. Two main procedures are used to test for co-integration: The Engle and Granger (1987) test and the Johansen (1988) co- integration test. The Engle and Granger test is a two-step test which first requires that the variables be integrated of the same order. The first step consists of estimating the equation in level form while the second step consists of testing the stationarity of the residuals of the estimated equation. The existence of co-integration is confirmed if the residuals are stationary at level form (Engle & Granger 1987).The Engle and Granger (1987) co-integration test is based on residuals.

### 3.6.3 Error Correction Mechanism (ECM)

In order to examine the short run relationships of the model, the error correction model will be used. Error correction term included in the model, explains the speed of adjustment towards the long run equilibrium. Initially, if the variables confirm the existence of co integration, then the Error Correction Model (ECM) will be estimated. Granger and Weiss (1983)and Engle and Granger (1987) pointed out that if two variables are co-integrated in first difference, their relationship can be expressed as the ECM by taking past disequilibrium as explanatory variables for the dynamic behavior of current variables. The ECM method corrects the equilibrium error in one period by

the next period (Maddala, 1992). Therefore, the deviation from the long run relationship should be included as an explanatory variable in an Error Correction Model which can be presented as follows:

$$\Delta Y_t = \beta_0 + \beta_1 \Delta X_t + \beta_2 \mu_{t-1} + \epsilon_t \dots \dots \dots 6$$

Where  $\Delta Y_t = Y_t - Y_{t-1}$ ,  $\Delta X_t = X_t - X_{t-1}$ ,  $\beta_1$  and  $\beta_2$  are the dynamic adjustment coefficients,  $\mu_{t-1}$  is the lag of residual representing short run disequilibrium adjustments of the estimates of the long run equilibrium error, while  $\epsilon_t$  is the random error term (Gujarati, 2004). The error correction coefficient must be negative which indicates the existence of a short-run relationship. The size of the error correction coefficient determines the speed of adjustment towards equilibrium. In this study the Error correction model (ECM) is estimated as follows;

$$\Delta GDP_t = \beta_0 + \beta_1 \Delta DT_t + \beta_2 \Delta CP_t + \beta_3 \Delta FT_t + \beta_4 \Delta LT_t + \beta_5 \Delta IR_t + ECM_{t-1} + \epsilon_t \dots \dots \dots 7$$

Where,  $\beta_0, \beta_1, \beta_2$ , and  $\beta_3$  are parameters of the independent variables and  $\epsilon_t$  is the stochastic error term.  $ECM_{t-1}$  represents short run disequilibrium adjustments of the estimates of the long run equilibrium error and  $\alpha$  is the coefficient of the error correction term

### 3.7 Justification of the Methods

The main objective of this study is to examine the impact of domestic agricultural trade on economic growth in Nigeria. The analytical framework of the model specification is such that it incorporates the major feature of an econometric analysis in a systematic manner. For instance, in the model, provisions is made to ensure numerical accuracy and the stationary of all the data. Also provision is made for the elimination of co-

integration by the application of Error term that is if co-integration exists in the model. And the error correction model will help us to capture the long-run behaviour of the variables. Thus, the data that will be use are yearly time series data of the CBN statistical bulletin for the period of 32 years (1985-2018) which were obtained from publications of the CBN and National bureau of statistic. The multiple regression models will be used because it helps to determine the cause and effect relationship between the variables. It is expected that the result of the study would aid policy makers in their effort to revamp the Nigerian economy through aggressive domestic trade promotion as the study will demonstrate in quantitative terms, the relationship between domestic trade and economic growth in Nigerian. That is to say, the study will yield coefficients of elasticities which could guide policy makers in estimating the impacts of domestic trade on economic growth, Crops production, forestry, livestock trades and interest rate it will also show the implication of domestic trade on economic growth in Nigeria it will also assist students through the provision of a framework on which further research in the development economics discipline can be carried out.

## CHAPTER FOUR

### DATA PRESENTATION AND ANALYSIS

#### 4.1 DATA PRESENTATION

To enable the research reach a valid conclusion of the importance and impact of Domestic Agricultural Trade on economic growth, data were obtained from official sources and analyzed through appropriate statistical packages. The data used are presented in appendices 1. Various statistical techniques were also adopted for the analysis.

#### 4.2 Data Analysis and Results

To enable the research arrive at a dependable result, it was necessary to conduct various statistical tests to ensure that the data used for the study were purified to avoid spurious results. To achieve this objective various tests were conducted and they are specified below. The results of these test techniques are presented in the various tables indicated.

In time series analysis, the first and foremost test that must be conducted is the stationarity test. Stationary implies that the mean, variance and covariance of the time series is constant over time. Carry out a regression analysis without knowing the stationarity of the time series will lead to spurious and nonsensical results. The stationarity test used for this study is Augmented Dickey-fuller (ADF) test.

**Table 4.1**

Augmented Dickey-fuller (ADF) test table.

NO	VARIABLE	ADF Critical Values	ADF Test Statistics	STATIONARITY
1	RGDP	-3.552973	-3.602986	I(1)
2	LIVESTOCK	-3.540328	-4.074238	I(1)
3	FORESTRY	-3.540328	-6.559205	I(1)
4	CROP PRODUCTION	-3.540328	-5.792516	I(1)

The results in table 4.1 shows that all the variables are stationary at first difference I(1). This means that the estimation technique earlier discussed in the methodology (OLS) is appropriate for the estimation of our model. Since the ADF critical values are greater than the ADF test statistic, we reject the null hypothesis that the variables have a unit root at 5% level of significance. Hence we proceed to see if there is cointegration among the variables

#### 4.2.1 Cointegration Analysis (Results)

In economic time series analysis, we conduct cointegration test to see if variables can be used to forecast their future values.

**Table 4.2 Unrestricted Cointegration Rank Test (Trace)**

Hypothesized	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.895861	180.0480	95.75366	0.0000
At most 1 *	0.731542	105.4012	69.81889	0.0000
At most 2 *	0.588642	62.00420	47.85613	0.0014
At most 3 *	0.416179	32.69062	29.79707	0.0226
At most 4	0.359617	14.93132	15.49471	0.0607
At most 5	0.006753	0.223605	3.841466	0.6363

Trace test indicates 4 cointegrating eqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

\*\*MacKinnon-Haug-Michelis (1999) p-values

The result from Table 4.2 shows that there are about four cointegration equations, showing that there is a high level of cointegration among the time series, hence i can use the variables to forecast and make policy recommendations.

### 4.3 Robust Least Square Results .

Dependent Variable: INRGDP

Method: Robust Least Squares

Date: 05/12/19 Time: 13:00

Sample (adjusted): 1981 2015

Included observations: 35 after adjustments

Method: M-estimation

M settings: weight = Bisquare, tuning = 4.685, scale = MAD (median centered)

Huber Type I Standard Errors & Covariance

Variable	Coefficient	Std. Error	z-Statistic	Prob.
INCROPROD	0.311112	0.065136	4.776322	0.0000
INFORESTRY	0.431608	0.144899	2.978687	0.0029
INLIVESTOCK	0.266546	0.188423	1.414616	0.1572
C	2.993006	0.305384	9.800795	0.0000

#### Robust Statistics

R-squared	0.739418	Adjusted R-squared	0.694490
Rw-squared	0.996967	Adjust Rw-squared	0.996967
Akaike info criterion	69.27855	Schwarz criterion	76.81862
Deviance	0.036266	Scale	0.025565
Rn-squared statistic	4165.282	Prob(Rn-squared stat.)	0.000000

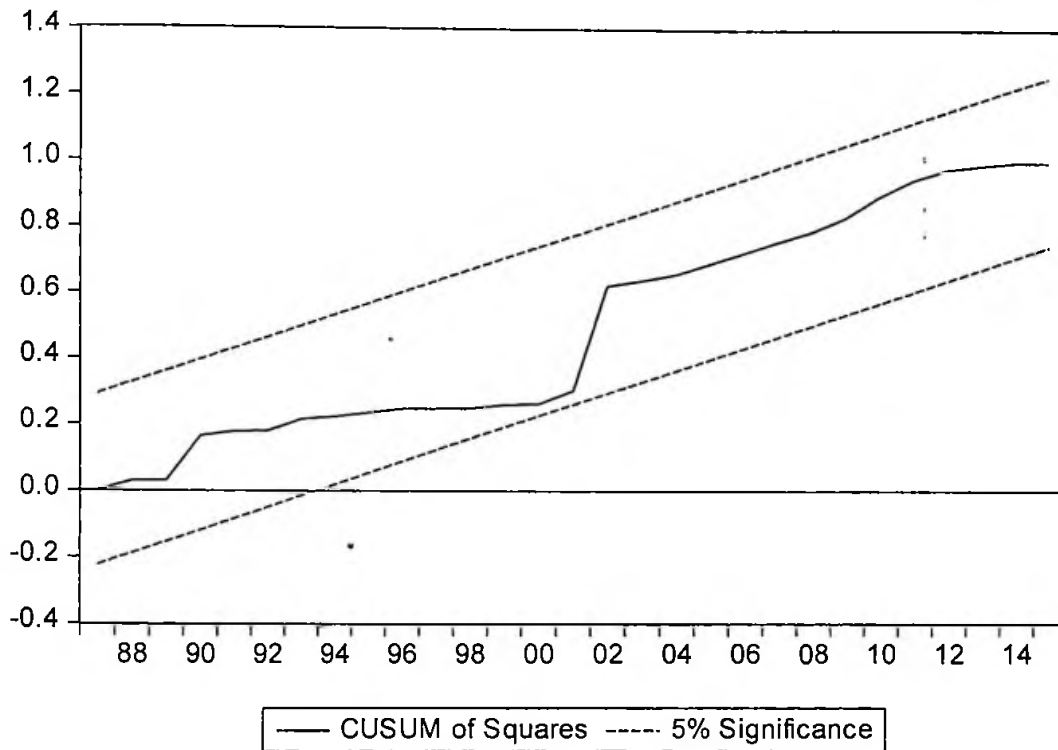
#### Non-robust Statistics

Mean dependent var	10.19444	S.D. dependent var	0.519951
S.E. of regression	0.042359	Sum squared resid	0.052035

$$\text{INRGDP} = 0.31 \cdot \text{INCROPROD} + 0.43 \cdot \text{INFORESTRY} + 0.27 \cdot \text{INLIVESTOCK} + 2.99 \cdot \text{C}$$

The first estimation (OLS) showed a high presence of heteroscedasticity and serial autocorrelation, hence to correct this problem; we used the robust least squares estimator which could solve these problems. The results show that all variables apart from livestock were significant determinants of economic growth in Nigeria. The result shows that for an increase in crop production, forestry and livestock, GDP will be increased by 0.31, 0.18 and 0.43 percent respectively. Furthermore, the value of the adjusted  $R^2$  is 0.69 showing that the model could explain 69% of the variations in the GDP of the country. The constant is 2.99 showing how GDP fares apart from the variables in the model.

#### 4.4 STABILITY RESULTS



The RLS is a linear estimator. Hence in order for us to make inference from its results, we need to be sure that the parameters are stable so that we can have accurate estimators. In order to check for the stability of our parameters we use the cusum of squares test. Since the blue curve is within the 5% significance bound, it shows that our parameters are stable and we can use them for prediction.

#### 4.6 Discussion of Results and Findings

The findings from the results show the importance of domestic agricultural trade to economic growth of Nigeria. Most of the agro based variables significantly contributed to economic growth of Nigeria within the study period.

Domestic Agricultural trade trends in Nigeria have shown increasing patterns over time. The results of the long run relationship showed a positive and significant relationship between crop

production and economic growth. This reject the first hypothesis of the study that state that crop production have no significant impact on economic growth in Nigeria Findings of the study agree with studies such as Tang (2006), Prasad & Gable(1998), Helpman & Krugman(1985)

Secondly the result of the long run relationship showed that there is a positive relationship between forestry production trade and economic growth in Nigeria this reject the second hypothesis of the study. This finding is in line with Yifri (2014), Ayodele and Abdullah (2012). Luthfi, and Fatah (2007).

Thirdly, the finding shows a positive but insignificant relationship between livestock trade and economic growth of Nigeria. This sustain the third hypothesis that state, livestock trade has no significant contribution towards economic growth of Nigeria. This finding is in line with the finding of Luthfi, Fatah (2007), Iyoha and Oriakhi (2002), and Odetola and Chinonso (2013).

Furthermore, the causality result shows some interesting scenarios. For instance the result shows that crop production and livestock production causes economic growth of Nigeria. This invariable means that if these two variables are given due priority in the agro sector, they will be great help to the ailing economic condition of the country. Investing and improving crop production would create employment opportunities, improve nutritional status a result of improved food supply and provide raw materials to local industries which could help reduce their cost of production. Also, the result further shows that GDP causes livestock production, and forestry production revealing that these variables also depend on the improvement of GDP meaning that their effectiveness is tied to economic growth. Again, the causality result also shows that crop production predicts, forestry and livestock production showing its importance to agricultural sector. This result is reasonable appealing because animals depend on crops for

their survival. Most animal feeds are made from crops which are cultivated. This shows that crop production is a major determinant of the agro sectorial progress in the Nigeria.

Despite having abundant land and human resources, Nigeria's domestic agricultural trade potential has not been fully utilized with it contributing just 24 percent to nominal GDP in 2017 (NBS 2017). This is not farfetched from the fact that the sector is plagued by poor policy implementation, orthodox methods of practice, and lack of deterministic perspectives on agro-industry performance. Several studies substantiate the strong correlations between economic growth and the mechanization of agriculture; countries that have achieved economic growth and resolved their food problems have also advanced to higher levels of agricultural mechanization, while countries with stagnating economies and extreme poverty have lagged behind in agro-industrial mechanization (Yumkella et al., 2011). This shows that since the findings has reveals positive relationship between the agro variables and economic growth, if policies could be implemented to improve the sectorial output, the country's GDP will greatly be improved. Findings of the study agree with studies such as Luthfi, Fatah (2007), Iyoha and Oriakhi (2002), and Odetola and Chinonso (2013).

This shows that if government and private sector could invest in the domestic agricultural trade sector, it will boost the growth of the country economy. Especially in periods such as this where the country is bedeviled by high rates of unemployment and weak economic growth due to the fluctuations in the price and output of crude oil, these areas could be looked into in order to improve and stabilize the growth of the country and reduce unemployment. even though livestock production was not significant, the results shows a positive relationship with economic growth meaning it also possesses the potential to be of use to the growth of the country economy.

## CHAPTER FIVE

### SUMMARY, CONCLUSION AND RECOMMENDATIONS

#### 5.1 Summary of the Major Findings

The study investigate the impact of domestic agricultural trade on economic in Nigeria using secondary data with the aid of relevant statistical packages. Given the revelation of growth accounting research works by various authors on the role of domestic agricultural trade, these premise informed the quest to seek whether it can be proven to be so in Nigeria.

The broad study objective examine the impact of domestic agricultural trade on Nigeria economy. The Augmented Dickey Fuller test for unit root was thus conducted to determine whether the data set were stable at same level so as to permit a linear equation, ADF reported the data to be stationary of order  $I(1)$  at First difference. The Johansen co-integration test (both trace test and the maximum eigenvalue test) for long-run relationship reported two cointegrating equations at the 0.05 critical value, the co-integration reports are the presence of a long-run relationship between two variables of study.

Domestic Agricultural trade trends in Nigeria have shown increasing patterns over time. The results of the long run relationship showed a positive and significant relationship between crop production and economic growth. This reject the first null hypothesis of the study that state that crop production has no significant impact on economic growth in Nigeria

Secondly the result of the long run relationship showed that there is a positive relationship between forestry production trade and economic growth in Nigeria this reject the second hypothesis of the study.

Thirdly, the finding shows a positive but insignificant relationship between livestock trade and economic growth of Nigeria. This sustain the third hypothesis that state, livestock trade has no significant contribution towards economic growth of Nigeria.

The study found that there is long-run relationship between the variables of study and this relationship happens to be present for two of the three variables considering the values obtained from the test as presented above. In a country endowed with enormous resources where states are allocated certain amounts of found, the results report domestic agricultural trade having a weak allocation this can be corroborated with the high unemployment rates and even low access market penetrations

## **5.2 Conclusion**

Domestic Agricultural trade trends in Nigeria have shown increasing patterns over time. The results of the long run relationship showed a positive and significant relationship between crop production and economic growth. This reject the first hypothesis of the study that state that crop production have no significant impact on economic growth in Nigeria

Secondly the result of the long run relationship showed that there is a positive relationship between forestry production trade and economic growth in Nigeria this reject the second hypothesis of the study.

Thirdly, the finding shows a positive but insignificant relationship between livestock trade and economic growth of Nigeria. This sustains the third hypothesis that states, livestock trade has no significant contribution towards economic growth of Nigeria.

The study found that there is a long-run relationship between the variables of study and this relationship happens to be present for two of the three variables. Based on the facts above, the study concludes that there is a positive and significant relationship between domestic agricultural trade and economic growth in Nigeria.

### **5.3 Recommendations**

In line with findings of the study, the following recommendations were made which are based on the research variable.

- i. The study recommends that the public and private should invest in crop production to engage more unemployed youths in crop production and funds should be made available to increase production through Anchor Borrower Scheme to increase its contribution to the economic growth of Nigeria.
- ii. The study suggests that government should establish more forest plantations across the nation to boost forest production and its contribution to Gross Domestic Product in Nigeria.
- iii. Government and private sector should sponsor or give grants to researchers on livestock to come up with improved breeds of animals to improve the quality of production that can impact significantly on the economic growth of Nigeria.

#### **5.4 Limitations of the study**

This study is majorly constrain with time frame and finance and the reluctance attitude of the officers of the statistical bulletin office to make the data available to and long protocol that can lead to access denial to data, lack of electricity and poor internet service to enable me,study my work as at when due

This study is limited to the impact of domestic agricultural trade on economic growth in Nigeria and using yearly total traded data from 1985-2018. It did not cover earlier periods because of the absence of complete data set. Though Nigeria trade more than domestic agricultural output including non-agricultural products, the study is limited to Crop production, forestry production and livestock production, This means the study does not consider the overall impact of domestic agricultural trade on economic growth.

#### **5.5 Contribution to Knowledge**

The major gap of this study is that it unveil the disaggregated impact of domestic agricultural trade on economic growth in Nigeria, most time when variable are clustered it denies us the opportunity of knowing the individual impact of those variables, hence this study help us to know the individual impact of these variables on economic growth so as to give government and private sector a clear cut direction on where to channel resources properly, therefore this is the contribution of this study to knowledge.

#### **5.6 Suggestion for Further Studies**

This study could not exhaust all aspects of domestic agricultural trade, in relation to the economic growth. For example, looking at the contribution of

other agricultural trade other than the ones examined in this study, again issues on the effect of non-agricultural trade to economic growth are not discussed. Since it is clear from this study that domestic agricultural trade contributes to economic growth, the direct contribution of primary commodity trade on economic growth needs to be assessed in terms of scope and degree of impact.

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**APPENDICES**  
**Appendix I: Regression Data**

YEAR	AGRIC TO GDP (=V= Volume)	CROP PRODUCTION (=V= Volume)	LIVESTOCK PRODUCTION (=V= Volume)	FORESTRY PRODUCTION (=V= Volume)
1985	2,731.06	2,180.91	428.10	78.08
1986	2,986.84	2,427.10	421.63	86.59
1987	2,891.67	2,330.00	433.43	87.59
1988	3,174.57	2,581.60	444.27	88.91
1989	3,325.95	2,710.67	453.16	67.31
1990	3,464.72	2,828.59	462.22	72.61
1991	3,590.84	2,955.88	454.82	74.79
1992	3,674.79	3,044.55	458.92	76.51
1993	3,743.67	3,132.84	461.67	78.04
1994	3,839.68	3,226.83	466.29	80.07
1995	3,977.38	3,336.54	485.87	81.83
1996	4,133.55	3,463.00	499.96	82.24
1997	4,305.68	3,611.91	512.46	82.98
1998	4,475.24	3,752.77	526.30	83.98
1999	4,703.64	3,949.42	541.03	85.07
2000	4,840.97	4,067.90	553.48	86.35
2001	5,024.54	4,222.48	570.08	88.07
2002	7,817.08	6,977.88	597.50	88.69
2003	8,364.83	7,493.02	622.56	90.02
2004	8,888.57	7,956.66	663.03	95.87
2005	9,516.99	8,524.15	707.87	101.55
2006	10,222.47	9,162.65	756.73	107.66
2007	10,958.47	9,826.77	809.16	114.25
2008	11,645.37	10,437.99	864.19	121.22
2009	12,330.33	11,046.16	920.20	128.31
2010	13,048.89	11,683.90	979.56	135.72
2011	13,429.38	12,017.19	999.40	142.46
2012	14,329.71	12,919.54	972.76	146.09
2013	14,750.52	13,247.80	1,030.94	154.31
2014	15,380.39	13,793.45	1,086.85	161.34
2015	15,952.22	14,274.94	1,151.32	167.26
2016	16,607.34	14,894.45	1,185.12	171.64
2017	17,179.50	15,437.05	1,204.21	177.33
2018	17,544.15	15,786.44	1,208.13	182.75

Sources: (i) Central Bank of Nigeria (CBN) Statistical Bulletin, Vol. 27, No. 64.  
(ii) National Bureau of Statistics (NBS) Publications. 2018.

Null Hypothesis: D(INCROPROD) has a unit root

## Appendix II:

### Augmented Dickey-Fuller (ADF) Unit Root Tests Results using E-Views 9 Software

#### ADF Unit Root Test at Level

Exogenous: Constant, Linear Trend  
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-5.792516	0.0002
Test critical values:		
1% level	-4.234972	
5% level	-3.540328	
10% level	-3.202445	

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

Augmented Dickey-Fuller Test Equation  
Dependent Variable: D(INCROPROD,2)  
Method: Least Squares  
Date: 05/12/19 Time: 12:25  
Sample (adjusted): 1983 2018  
Included observations: 36 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INCROPROD(-1))	-1.010192	0.174396	-5.792516	0.0000
C	0.055300	0.032927	1.679506	0.1025
@TREND("1981")	0.000213	0.001444	0.147603	0.8836
R-squared	0.504564	Mean dependent var		-4.91E-06
Adjusted R-squared	0.474538	S.D. dependent var		0.123888
S.E. of regression	0.089805	Akaike info criterion		-1.902700
Sum squared resid	0.266142	Schwarz criterion		-1.770740
Log likelihood	37.24860	Hannan-Quinn criter.		-1.856642
F-statistic	16.80401	Durbin-Watson stat		1.990067
Prob(F-statistic)	0.000009			

Null Hypothesis: D(INFISHERY) has a unit root  
Exogenous: Constant, Linear Trend  
Lag Length: 3 (Automatic - based on SIC, maxlag=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-8.752621	0.0000
Test critical values:		
1% level	-4.262735	
5% level	-3.552973	
10% level	-3.209642	

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

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(INFISHERY,2)  
 Method: Least Squares  
 Date: 05/12/19 Time: 12:27  
 Sample (adjusted): 1986 2018  
 Included observations: 33 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INFISHERY(-1))	-1.534095	0.175273	-8.752621	0.0000
D(INFISHERY(-1),2)	0.537068	0.147531	3.640371	0.0011
D(INFISHERY(-2),2)	0.565004	0.124815	4.526735	0.0001
D(INFISHERY(-3),2)	0.604317	0.101077	5.978790	0.0000
C	0.069950	0.039843	1.755639	0.0905
@TREND("1981")	0.000748	0.001804	0.414508	0.6818
R-squared	0.808362	Mean dependent var		0.013710
Adjusted R-squared	0.772874	S.D. dependent var		0.195081
S.E. of regression	0.092971	Akaike info criterion		-1.750089
Sum squared resid	0.233378	Schwarz criterion		-1.477997
Log likelihood	34.87647	Hannan-Quinn criter.		-1.658538
F-statistic	22.77813	Durbin-Watson stat		2.318639
Prob(F-statistic)	0.000000			

Null Hypothesis: D(INFORESTRY) has a unit root  
 Exogenous: Constant, Linear Trend  
 Lag Length: 0 (Automatic - based on SIC, maxlag=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-6.559205	0.0000
Test critical values:		
1% level	-4.234972	
5% level	-3.540328	
10% level	-3.202445	

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

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(INFORESTRY,2)  
 Method: Least Squares  
 Date: 05/12/19 Time: 12:30  
 Sample (adjusted): 1983 2018  
 Included observations: 36 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INFORESTRY(-1))	-1.123020	0.171213	-6.559205	0.0000
C	-0.003341	0.019944	-0.167522	0.8680
@TREND("1981")	0.001605	0.000946	1.696880	0.0991
R-squared	0.566673	Mean dependent var		0.002296

Adjusted R-squared	0.540411	S.D. dependent var	0.082644
S.E. of regression	0.056027	Akaike info criterion	-2.846328
Sum squared resid	0.103586	Schwarz criterion	-2.714368
Log likelihood	54.23390	Hannan-Quinn criter.	-2.800270
F-statistic	21.57749	Durbin-Watson stat	1.987456
Prob(F-statistic)	0.000001		

Exogenous: Constant,  
Linear Trend

Null Hypothesis: D(INRGDP) has a unit root  
Exogenous: Constant, Linear Trend  
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.602986	0.0450
Test critical values:	1% level	-4.262735	
	5% level	-3.552973	
	10% level	-3.209642	

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

Augmented Dickey-Fuller Test Equation  
Dependent Variable: D(INRGDP,2)  
Method: Least Squares  
Date: 05/12/19 Time: 12:34  
Sample (adjusted): 1983 2015  
Included observations: 33 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INRGDP(-1))	-0.626979	0.174017	-3.602986	0.0011
C	0.011074	0.013361	0.828779	0.4138
@TREND("1981")	0.001026	0.000773	1.326248	0.1948
R-squared	0.309617	Mean dependent var		0.001380
Adjusted R-squared	0.263592	S.D. dependent var		0.041801
S.E. of regression	0.035872	Akaike info criterion		-3.731232
Sum squared resid	0.038603	Schwarz criterion		-3.595186
Log likelihood	64.56534	Hannan-Quinn criter.		-3.685457
F-statistic	6.727082	Durbin-Watson stat		1.843621
Prob(F-statistic)	0.003858			

### Appendix III:

#### Cointegration Test Results using E-Views 9 Software

Date: 05/12/19 Time: 12:41  
 Sample (adjusted): 1983 2015  
 Included observations: 33 after adjustments  
 Trend assumption: Linear deterministic trend  
 Series: INFORESTRY INCROPROD INFISHERY INRGDP INTEREST\_RATE  
 INLIVESTOCK  
 Lags interval (in first differences): 1 to 1

##### Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.895861	180.0480	95.75366	0.0000
At most 1 *	0.731542	105.4012	69.81889	0.0000
At most 2 *	0.588642	62.00420	47.85613	0.0014
At most 3 *	0.416179	32.69062	29.79707	0.0226
At most 4	0.359617	14.93132	15.49471	0.0607
At most 5	0.006753	0.223605	3.841466	0.6363

Trace test indicates 4 cointegrating eqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

\*\*MacKinnon-Haug-Michelis (1999) p-values

##### Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.895861	74.64680	40.07757	0.0000
At most 1 *	0.731542	43.39698	33.87687	0.0027
At most 2 *	0.588642	29.31358	27.58434	0.0297
At most 3	0.416179	17.75929	21.13162	0.1391
At most 4 *	0.359617	14.70772	14.26460	0.0425
At most 5	0.006753	0.223605	3.841466	0.6363

Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

\*\*MacKinnon-Haug-Michelis (1999) p-values

##### Unrestricted Cointegrating Coefficients (normalized by b\*S11\*b=I):

	INFORESTRY	INCROPROD	INFISHERY	INRGDP	INTEREST_RATE
	-7.118377	-9.012910	-0.726972	27.28413	-0.196129
	-10.83972	5.535194	-0.371499	1.278373	-0.229426
	16.79832	6.611514	-1.262416	1.363600	0.018071
	19.04338	9.931626	7.279945	-23.42320	0.127310
	-4.599483	-0.312542	0.731413	-6.739915	-0.286359
	-9.933050	4.910325	-1.638134	-2.672742	-0.123035

Unrestricted Adjustment Coefficients (alpha):

D(INFORESTRY )	0.007179	0.033669	-0.017275	-0.009752
D(INCROPROD)	0.000152	-0.001677	-0.017833	0.011503
D(INFISHERY)	-0.026618	-0.029542	0.074598	-0.057305
D(INRGDP)	-0.022478	0.008251	-0.003434	0.007760
D(INTEREST_RATE)	-0.448824	-0.222153	0.634146	-0.157961
D(INLIVESTOCK )	0.004538	0.014379	0.009193	0.007945

1 Cointegrating Equation(s):      Log likelihood      213.0164

Normalized cointegrating coefficients (standard error in parentheses)

INFORESTRY	INCROPROD	INFISHERY	INRGDP	INTEREST_RATE
1.000000	1.266147 (0.13803)	0.102126 (0.05874)	-3.832915 (0.30237)	0.027552 (0.00325)

Adjustment coefficients (standard error in parentheses)

D(INFORESTRY )	-0.051104 (0.07105)
D(INCROPROD)	-0.001080 (0.11617)
D(INFISHERY)	0.189475 (0.21206)
D(INRGDP)	0.160009 (0.03512)
D(INTEREST_RATE)	3.194901 (4.63342)
D(INLIVESTOCK )	-0.032300 (0.03507)

2 Cointegrating Equation(s):      Log likelihood      234.7149

Normalized cointegrating coefficients (standard error in parentheses)

INFORESTRY	INCROPROD	INFISHERY	INRGDP	INTEREST_RATE
1.000000	0.000000	0.053773 (0.05009)	-1.185601 (0.19165)	0.023001 (0.00278)
0.000000	1.000000	0.038189 (0.04924)	-2.090843 (0.18841)	0.003595 (0.00273)

Adjustment coefficients (standard error in parentheses)

D(INFORESTRY )	-0.416062 (0.09554)	0.121657 (0.07793)
D(INCROPROD)	0.017103 (0.21158)	-0.010653 (0.17257)
D(INFISHERY)	0.509697 (0.37866)	0.076385 (0.30884)
D(INRGDP)	0.070569 (0.06030)	0.248267 (0.04918)
D(INTEREST_RATE)	5.602975 (8.42136)	2.815555 (6.86856)

D(INLIVESTOCK )	-0.188167 (0.05188)	0.038696 (0.04232)
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3 Cointegrating Equation(s):      Log likelihood      249.3717

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Normalized cointegrating coefficients (standard error in parentheses)

INFORESTRY	INCROPROD	INFISHERY	INRGDP	INTEREST_RATE
1.000000	0.000000	0.000000	-0.405017 (0.13391)	0.014283 (0.00232)
0.000000	1.000000	0.000000	-1.536476 (0.17392)	-0.002597 (0.00301)
0.000000	0.000000	1.000000	-14.51632 (1.63240)	0.162134 (0.02826)

Adjustment coefficients (standard error in parentheses)

D(INFORESTRY )	-0.706251 (0.13809)	0.007444 (0.08117)	0.004081 (0.00978)
D(INCROPROD)	-0.282466 (0.33787)	-0.128558 (0.19859)	0.023026 (0.02394)
D(INFISHERY)	1.762815 (0.53266)	0.569589 (0.31308)	-0.063848 (0.03774)
D(INRGDP)	0.012888 (0.09759)	0.225564 (0.05736)	0.017611 (0.00691)
D(INTEREST_RATE)	16.25556 (13.5157)	7.008218 (7.94407)	-0.391744 (0.95749)
D(INLIVESTOCK )	-0.033738 (0.07540)	0.099476 (0.04432)	-0.020246 (0.00534)

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4 Cointegrating Equation(s):      Log likelihood      258.2513

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Normalized cointegrating coefficients (standard error in parentheses)

INFORESTRY	INCROPROD	INFISHERY	INRGDP	INTEREST_RATE
1.000000	0.000000	0.000000	0.000000	0.009282 (0.00211)
0.000000	1.000000	0.000000	0.000000	-0.021567 (0.00456)
0.000000	0.000000	1.000000	0.000000	-0.017095 (0.01080)
0.000000	0.000000	0.000000	1.000000	-0.012347 (0.00181)

Adjustment coefficients (standard error in parentheses)

D(INFORESTRY )	-0.891966 (0.17701)	-0.089411 (0.09898)	-0.066914 (0.04615)	0.443789 (0.22354)
D(INCROPROD)	-0.063407 (0.44920)	-0.014313 (0.25119)	0.106768 (0.11711)	-0.291761 (0.56727)
D(INFISHERY)	0.671529 (0.63671)	0.000455 (0.35604)	-0.481028 (0.16599)	0.679988 (0.80407)
D(INRGDP)	0.160659 (0.12343)	0.302631 (0.06902)	0.074101 (0.03218)	-0.789193 (0.15587)
D(INTEREST_RATE)	13.24745 (18.1373)	5.439409 (10.1422)	-1.541691 (4.72850)	-7.965105 (22.9047)

D(INLIVESTOCK )	0.117561 (0.09062)	0.178383 (0.05067)	0.037593 (0.02362)	-0.031376 (0.11444)
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5 Cointegrating Equation(s):      Log likelihood      265.6052

Normalized cointegrating coefficients (standard error in parentheses)

	INFORESTRY	INCROPROD	INFISHERY	INRGDP	INTEREST_RAT E
	1.000000	0.000000 *	0.000000	0.000000	0.000000
	0.000000	1.000000	0.000000	0.000000	0.000000
	0.000000	0.000000	1.000000	0.000000	0.000000
	0.000000	0.000000	0.000000	1.000000	0.000000
	0.000000	0.000000	0.000000	0.000000	1.000000

Adjustment coefficients (standard error in parentheses)

D(INFORESTRY )	-0.883279 (0.17897)	-0.088821 (0.09882)	-0.068296 (0.04628)	0.456518 (0.22700)
D(INCROPROD)	-0.153460 (0.44073)	-0.020433 (0.24335)	0.121088 (0.11398)	-0.423721 (0.55901)
D(INFISHERY)	0.685031 (0.64472)	0.001372 (0.35599)	-0.483175 (0.16674)	0.699774 (0.81775)
D(INRGDP)	0.140912 (0.12254)	0.301289 (0.06766)	0.077241 (0.03169)	-0.818129 (0.15542)
D(INTEREST_R ATE)	4.779131 (14.9806)	4.863974 (8.27164)	-0.195054 (3.87429)	-20.37427 (19.0011)
D(INLIVESTOCK )	0.114731 (0.09172) *	0.178190 (0.05064)	0.038043 (0.02372)	-0.035523 (0.11634)

## Appendices IV

### ROBUST LEAST SQUARES RESULTS

Dependent Variable: INRGDP

Method: Robust Least Squares

Date: 05/12/19 Time: 13:00

Sample (adjusted): 1981 2015

Included observations: 35 after adjustments

Method: M-estimation

M settings: weight=Bisquare, tuning=4.685, scale=MAD (median centered)

Huber Type I Standard Errors & Covariance

Variable	Coefficient	Std. Error	z-Statistic	Prob.
INCROPROD	0.311112	0.065136	4.776322	0.0000
INFISHERY	0.181567	0.034399	5.278232	0.0000
INFORESTRY	0.431608	0.144899	2.978687	0.0029
INLIVESTOCK	0.266546	0.188423	1.414616	0.1572
INTEREST_RATE	0.001695	0.002309	0.734092	0.4629
C	2.993006	0.305384	9.800795	0.0000

#### Robust Statistics

R-squared	0.739418	Adjusted R-squared	0.694490
Rw-squared	0.996967	Adjust Rw-squared	0.996967
Akaike info criterion	69.27855	Schwarz criterion	76.81862
Deviance	0.036266	Scale	0.025565
Rn-squared statistic	4165.282	Prob(Rn-squared stat.)	0.000000

#### Non-robust Statistics

Mean dependent var	10.19444	S.D. dependent var	0.519951
S.E. of regression	0.042359	Sum squared resid	0.052035

INRGDP = 0.311111772363\*INCROPROD + 0.181566959656\*INFISHERY + 0.431608123337\*INFORESTRY + 0.266546165032\*INLIVESTOCK + 0.00169496942022\*INTEREST\_RATE + 2.99300587497

Appendix V

STABILITY TEST RESULTS

