

UNIVERSITI PUTRA MALAYSIA

***POPULATION, ECONOMIC GROWTH AND ENVIRONMENTAL
EMISSIONS IN NIGERIA***

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**POPULATION, ECONOMIC GROWTH AND ENVIRONMENTAL
EMISSIONS IN NIGERIA**

By

LAWAL SULEMAN GAMBO

**Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia,
in Fulfillment of the Requirements for the Degree of Master of Science**

October 2017

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DEDICATION

This research work is dedicated to the late memory of my father Alhaji Lawal Gambo, my mother Hajiya Fatima Abubakar as well as dearest wife Sa'adatu Ibrahim and my children for their, love, patience, sacrifices and continues support towards the realization of this noble aim.



Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfillment of the requirement for the degree of Master of Science

POPULATION, ECONOMIC GROWTH AND ENVIRONMENTAL EMISSIONS IN NIGERIA

By

LAWAL SULEMAN GAMBO

October 2017

Chairman : Suryati Binti Ishak, PhD
Faculty : Economics and Management

This study provides empirical studies on some important issues concerning population, economic growth and environmental emissions in Nigeria over the period from 1970-2014, and the study aims to contribute to the existing literature on the effect of population growth on environmental emissions and impact of environmental emissions on economic growth. It is generally agreed that the country has a high population density and large fossil fuel resources but very poorly managed energy infrastructure which may lead to produces more carbon dioxide emissions which are a gas that is harmful to the ecosystem. Firstly, it examines the effect of population growth on the environmental emissions in Nigeria. To achieve this objective, the study was used Autoregressive distributed lag (ARDL) bounds test approach. The results for the this objective reveal that, in the short and long-run analysis, the relationship between carbon dioxide emissions and population growth, fossil fuel, and energy consumption are statistically significant and positive. In general, population growth, fossil fuel and energy consumption will eventually cause environmental emissions in Nigeria. However, the finding is consistent with the Ehrlich's theory, which argued that overpopulation and affluence are gradually stressing the worldwide environmental emissions. Similarly, the result on the average, suggests that population control and higher oil price can also mitigate CO₂ emissions and improves environmental excellence. Thus, the study recommends measures and policies to protect our physical environment. The second objective of the study examined the impact of environmental emissions on economic growth in Nigeria, specifically by employing the ARDL bounds test approach. Thus, the results for this objective also reveal that, in the short-run and long-run analysis, the relationship between economic growth and energy consumption is significant and positive. Hence, an increased in energy consumption is highly interconnected and cointegrated with the economic growth while the relationship between economic growth and foreign direct investment (FDI) and fossil fuel are significant and negative related to growth in the case of

Nigeria. However, the finding is consistent with the classical theories which considered that an energy consumption as an intermediate factor for the economic growth. Thus, the results is suggested that renewable source of energy such as solar and wind could be explored and considered as an alternative source of energy since Nigeria is well endowed with solar energy. This will assist in reducing CO₂ emissions and at the same time sustaining long-run growth in GDP.



Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains

**PENDUDUK, PERTUMBUHAN EKONOMI DAN PELEPASAN ALAM
SEKITAR DI NIGERIA**

Oleh

LAWAL SULEMAN GAMBO

Oktober 2017

Pengerusi : Suryati Binti Ishak, PhD
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Kajian ini memberikan kajian empirikal terhadap beberapa isu-isu penting berkenaan populasi, pertumbuhan ekonomi dan pelepasan alam sekitar di Nigeria sepanjang tempoh dari 1970-2014. Kajian ini dapat menyumbang kepada kajian lepas yang sedia ada mengenai kesan pertumbuhan populasi terhadap pelepasan alam sekitar dan kesan pelepasan alam sekitar terhadap pertumbuhan ekonomi. Secara umumnya dipersetujui bahawa negara ini mempunyai kepadatan penduduk yang tinggi dengan sumber-sumber bahan api fosil yang besar, namun, pengurusan infrastruktur tenaga yang tidak diuruskan dengan baik menyebabkan lebih banyak pelepasan karbon dioksida yang merupakan gas yang berbahaya kepada ekosistem. Objektif kajian ini yang pertama ialah untuk mengkaji kesan pertumbuhan populasi terhadap alam sekitar di Nigeria dengan menggunakan pendekatan ujian terikat *Autoregressive distributed lag* (ARDL). Keputusan untuk tujuan ini mendedahkan bahawa, dalam analisis jangka pendek dan jangka panjang, hubungan antara pelepasan karbon dioksida dan pertumbuhan populasi, bahan bakar fosil, dan penggunaan tenaga adalah penting dan positif. Secara umumnya, pertumbuhan penduduk, bahan api fosil dan penggunaan tenaga akhirnya akan menyebabkan pelepasan alam sekitar di Nigeria. Walau bagaimanapun, penemuan ini adalah selaras dengan teori Ehrlich, yang berpendapat terlalu banyak penduduk dan kemakmuran secara beransur-ansur menekankan pelepasan alam sekitar di seluruh dunia. Begitu juga, secara purata, menunjukkan bahawa kawalan populasi dan harga minyak yang lebih tinggi juga dapat mengurangkan pelepasan CO₂ dan meningkatkan kecemerlangan alam sekitar. Oleh itu, kajian ini mencadangkan langkah dan dasar untuk melindungi persekitaran fizikal kita. Objektif kedua kajian mengkaji kesan pelepasan alam sekitar terhadap pertumbuhan ekonomi di Nigeria, khususnya dengan menggunakan pendekatan ujian batas ARDL. Oleh itu, keputusan untuk objektif ini juga mendedahkan bahawa, dalam jangka pendek dan jangka panjang analisis, hubungan antara pertumbuhan ekonomi dan penggunaan tenaga adalah signifikan dan positif. Oleh itu, peningkatan dalam

penggunaan tenaga adalah sangat saling berkaitan dengan pertumbuhan ekonomi manakala hubungan antara pertumbuhan ekonomi dan pelaburan langsung asing (FDI) dan bahan bakar fosil adalah signifikan dan negatif yang berkaitan dengan pertumbuhan dalam kes Nigeria. Bagaimanapun, penemuan ini selaras dengan teori-teori klasik yang menganggap bahawa penggunaan tenaga sebagai faktor pertengahan bagi pertumbuhan ekonomi. Oleh itu, hasilnya dicadangkan bahawa sumber tenaga boleh diperbaharui seperti solar dan angin boleh diterokai dan dianggap sebagai sumber tenaga alternatif sejak Nigeria mempunyai tenaga solar. Ini akan membantu mengurangkan pelepasan CO₂ dan pada masa yang sama mengekalkan pertumbuhan jangka panjang dalam KDNK.



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I certify that a Thesis Examination Committee has met on 30 October 2017 to conduct the final examination of Lawal Suleman Gambo on his thesis entitled "Population, Economic Growth and Environmental Emissions in Nigeria" in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student be awarded the Master of Science.

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Declaration by graduate students

I hereby confirm that:

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This is to confirm that:

- the research conducted and the writing of this thesis was under our supervision;
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TABLE OF CONTENTS

	Page
ABSTRACT	i
ABSTRAK	iii
ACKNOWLEDGEMENTS	v
APPROVAL	vi
DECLARATION	viii
LIST OF TABLES	xii
LIST OF FIGURES	xiii
LIST OF ABBREVIATIONS	xv
CHAPTER	
1 INTRODUCTION	1
1.1 An Overview	1
1.2 General Background	1
1.2.1 Population Trends in Nigeria	6
1.2.2 An Overview of the Nigerian Economy	9
1.2.3 An Overview in Environmental Issues in Nigeria	13
1.2.4 Relationship between the Population and Environment	16
1.3 Problem Statements	17
1.4 Research Questions	19
1.5 Objectives of the study	19
1.6 Significance of the study	19
1.7 Scope and Limitation of the Study	21
1.8 Thesis Organization	21
2 REVIEW OF LITERATURE	23
2.1 Introduction	23
2.2 Population and Environmental Emissions	23
2.2.1 Theoretical	23
2.2.2 Empirical literature on Population and Environmental Emissions	25
2.3 Environment Emissions and Economic Growth	28
2.3.1 Theoretical	28
2.3.2 Empirical Review on Economic growth and Environmental Emissions	29
2.3.3 Empirical Literature Review on Environmental Emissions and Growth	30
2.4 Methodological Review	32
2.4.1 Methods based on time series analysis	33
2.5 Gaps in the Literature	34
3 METHODOLOGY	35
3.1 Introduction	35

3.2	Research Framework	35
3.3	Population and Environmental Emissions	37
3.3.1	Model Specification	37
3.3.2	Descriptions of Variable	38
3.3.3	Data sources, variables and measurements	42
3.4	Environmental Emissions and Economic growth	42
3.4.1	Model Specification	42
3.4.2	Description of the Variables	43
3.4.3	Data sources, variables and measurements	47
3.5	Methods: Autoregressive Distributed Lag	47
3.5.1	Estimation Procedures	48
3.5.2	Stationary Test	48
3.5.3	Augment Dickey Fuller (ADF) Test	48
3.5.4	Phillips Peron (PP) Unit Root Test	49
3.5.5	Autoregressive Distributed Lag (ARDL) Bounds Test	50
3.5.6	Bounds Test for Cointegration	51
3.5.7	Determining the Long Run Coefficient	52
3.5.8	Determining the Short-Run Coefficient	53
3.6	Model Diagnostic Test	56
4	RESULTS AND DISCUSSION	58
4.1	Introduction	58
4.2	Population growth and Environmental emissions	58
4.2.1	Descriptive Statistics	58
4.2.2	Unit Root	59
4.2.3	Bounds Test Approach for Cointegration	61
4.2.4	Estimation Results of the Basic Model	62
4.3	Environmental Emissions and Economic Growth	69
4.3.1	Descriptive Statistics	69
4.3.2	Unit root	70
4.3.3	Estimation Results of the Basic Model	73
5	SUMMARY, CONCLUSION AND POLICY RECOMMENDATION	79
5.1	Introduction	79
5.2	Summary of the Study	79
5.3	Recommendations and Policy Implication	80
5.4	Limitations of the Study and Future Research Direction	82
	REFERENCES	83
	APPENDICES	104
	BIODATA OF STUDENT	115
	LIST OF PUBLICATIONS	116

LIST OF TABLES

Table		Page
1.1	Growth Rate by Populous Countries	4
1.2	Sectoral Contributions to GDP	12
3.1	Expected signs for objective I	41
3.2	Expected signs for objective II	47
3.3	Summary of variables, data sources and measurements	57
4.1	Summary of Descriptive Statistics and Correlation Matrix	59
4.2	Augmented Dickey-Fuller and Phillips-Perron unit root test results.	60
4.3	ARDL Bounds Test for Cointegration	61
4.4	Results of the Long run Cointegration relationship Objective 1	62
4.5	Results of the Short run Cointegration relationship Objective 1	64
4.6	Diagnostic Test for Objective 1	68
4.7	Summary of Descriptive Statistics and Correlation Matrix II	70
4.8	Results of the Unit Root Test Objective II	71
4.9	ARDL Bounds Test for Cointegration Objective II	72
4.10	Results of the Long run Cointegration relationship Objective II	73
4.11	Results of the Short run Cointegration relationship Objective II	75
4.12	Diagnostic Test for Objective II	77

LIST OF FIGURES

Figure		Page
1.1	Percentage of world population	2
1.2	World's 10 Largest Countries in Population	3
1.3	World historical and predicted populations (in billion)	5
1.4	Nigeria population trends	6
1.5	Annual population growth rate	7
1.6	Percentage of Nigerians living in urban areas	8
1.7	Total fertility rate area in Nigeria	8
1.8	GDP per capita in Nigeria	10
1.9	Nigeria population and GDP	11
1.10	Nigeria carbon dioxide emissions (CO ₂)	15
1.11	Nigeria Carbon Dioxide Emissions (CO ₂) Transport	15
1.12	Interaction between population growth and environment	16
3.1	Conceptual framework	36
4.1	Cumulative Sum of Recursive Residuals	69
4.2	Cumulative Sum of Squares of Recursive Residuals	69
4.3	Cumulative Sum of Recursive Residuals	77
4.4	Cumulative Sum of Squares of Recursive Residuals	78

LIST OF ABBREVIATIONS

UN	United Nations
USA	United State of America
WB	World Bank
WDI	World Development Indicators
NPC	National Population Commission
CIA	Central Intelligence Agency
TFR	Total Fertility Rate
NDHS	Nigeria Demographic and Health Survey
GDP	Gross Domestic Products
NBS	National Bureau of Statistics
PPP	Purchasing Power Parity
USD	United State Dollars
CO2	Carbon Dioxides Emission
UNDP	United Nations Development Programmes
Kt	Kilotonnes
MBBL/D	Million Barrels Per Day
WWF	World Wildlife Fund
IPAT	Environmental Impacts, Population size, Affluence and Technology
ARDL	Autoregressive Distributive Lags
VECM	Vector Error Correction Model
VAR	Vector Autoregressive
EKC	Environmental Kuznets Curve
OLS	Ordinary Least Square
FDI	Foreign Direct Investment
LDCs	Less Developed Countries
IPDI	Integrated Population Development Index
IRUI	Integrated Resources-Environment Utilization Index
ADF	Augumented Dickey-Fuller
PP	Phillip-Perron
PMG	Pooled Mean Group

CGE Computable General Equilibrium
D-OLS Dummy Ordinary Least Square



CHAPTER 1

INTRODUCTION

1.1 An Overview

The issue on population growth and environment has been passionately discussed whether on its land degradation, human congestion, carbon dioxide emissions (CO₂), weather modification, pollution, production and depletion of resources due to its significance in our day-to-day life. The present study aims to carry out a widespread investigation the effects of population growth especially in urban areas which lead to urbanization. This study varies from earlier studies in many respect. The foremost objective of this thesis to find out the long run relationship between the population growth and environment in Nigeria and to study the pass through consequence of population growth on environment. Second research objective of this study also seeks to investigate the connection amongst our environment and economic growth.

World has been continuous with population growth and environmental emissions frequently in developing countries. Situation in population growth have a negative effect on environment leading to urbanization and population densities, land depletion, carbon dioxide emissions deforestation, pollution and increasingly affecting overall economic growth. Issues such as rapid urban population growth, climate change, natural disaster, food crises and weakening of the natural resources have serious effect to the environmental quality. These problems have worldwide concerns and are recognized globally as a population explosion. World population growth, if unimpeded might lead to a foremost catastrophe and contemporary major challenges to our environment.

1.2 General Background

Since the 21st century begins, the universal human population was estimated to be approximately 7.4 billion inhabitants (UN 2015). Projection by the United Nations positioned the number at more than 9.2 billion people by the year 2050 prior to attainment an utmost of 11 billion by 2200 more than 90 percent of that population will dwell in the developing countries (Todaro and Smith, 2006). “Two thousand years ago human population growth and environment were positively interrelated more people meant greater productivity and more harm to the environment.” The earth has experiencing the highest population growth rates by approximately two percent (2%) per annum which happened temporarily in 1950’s while, the scenario persistent for longer in 1960’s and 1970’s.

Therefore, the worldwide population progression rate peaky at 2.2 percent (2.2%) by the 1963, then the growth rate persistently decline to 1.13 percent as of 2014. The

highest annual births rate were recorded in the late 1980's at about 139 million people added to the global population annually, then the annual birth rate also remain essentially constant to 2011 whereas, total deaths rate is about fifty six (56) million people were recorded per annum between periods of late 1980's to 2011. Although, the growth also are expected to increase to eighty (80) million people per annum as a natural annual growth rate. Thus, worldwide population reached seven (7) billion people in 2011 according to the United Nations Population Fund and US Census Bureau as figure 1.1 shows the largest countries in population and their percentage of the world population.

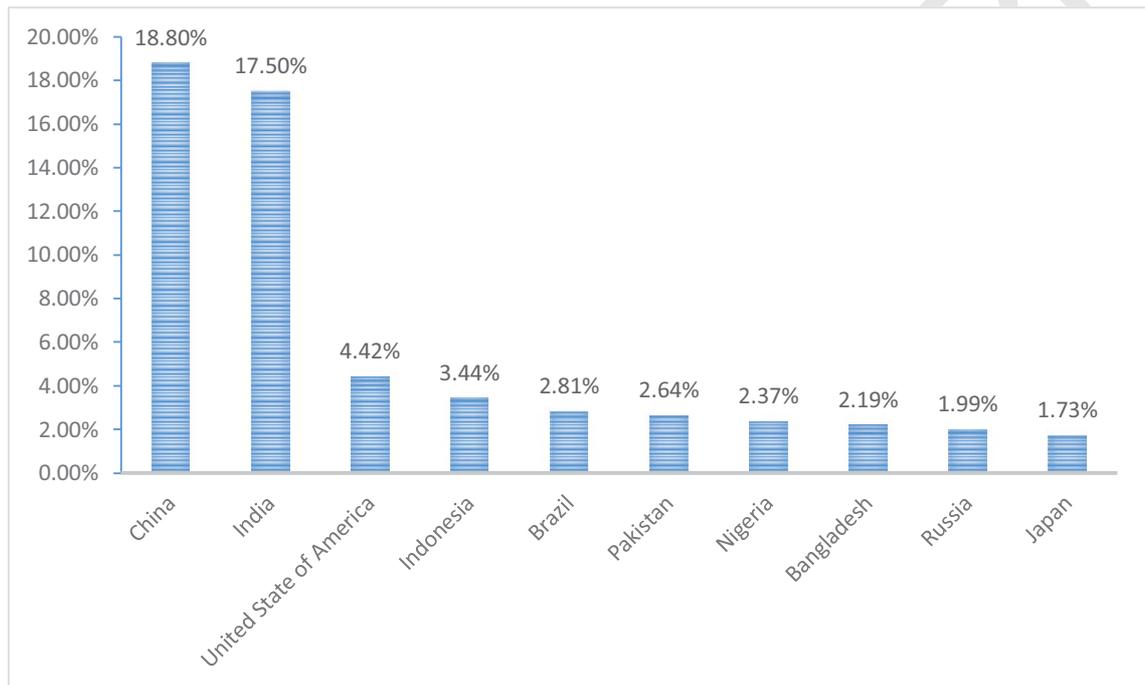


Figure 1.1 : Percentage of world population
(Source : World population prospect (2012))

The above figure shows that the estimated percentage of world population by the most populous countries which clearly the figure indicated that China still remain the largest with the 18.80 percent of the world population and Nigeria as the number seventh most populous country with the 2.37 percent of the world population. As figure 1.1 shows the approximation percentage of world population. Though, about 4.3 billion persons live in these ten (10) countries listed above in figure 1.1, representing nearly 58 percent of the global human population as at March, 2016 estimate and almost 3.7 billion persons. Half of the world population, live in the six (6) most populous countries that is China, India, United States of America, Indonesia, Brazil and Pakistan. America, Indonesia, Brazil and Pakistan.

The earth population is rapidly growing faster than ever before, besides this high growth rate is a recent occurrence, although going back less than fifty (50) years or to

be precisely half of a century. Even though the population has relatively decreased in developed nations, the growth rate has been less than one percent (1%) per annum while the developing countries population grow faster above two percent (2%) per annum. Henceforth, by the mid 1960's it was rising by 2.5 percent while in some countries the increase was at the rate of 3 percent and even higher. Since then, contrary to expectations rate has begun to decline, except in sub-Saharan Africa and Middle East countries where it is still around 3 percent (Elkan, 1995:141). As figure 1.2 shows the world's 10 largest countries in population.

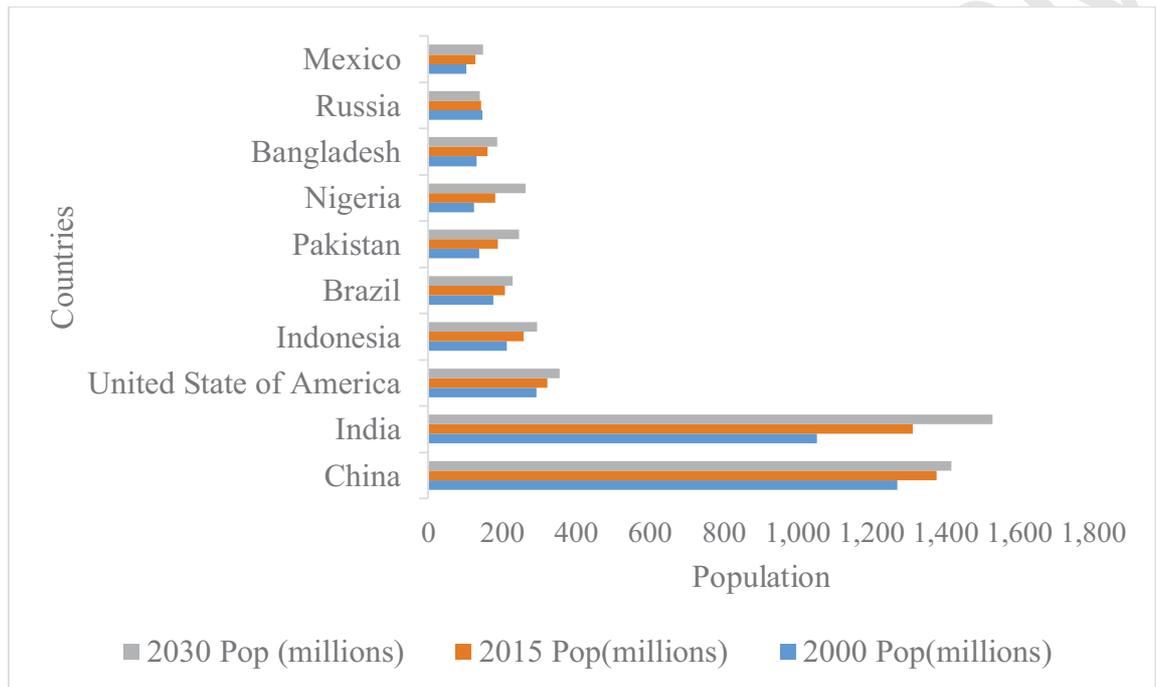


Figure 1.2 : World's 10 largest countries in population
 (Source: UN [World Population Prospects \(2012\)](#))

By the year 2000, the UN projected that the global human populace was keeping rising at an annual rate of 1.14 percent, equivalent to 80 million persons down from a peak of 88 million people in 1989. As at present in some of the developed countries recorded negative annual population growth such as Germany with -0.18%; Japan with -0.13% and Russia with -0.03% per annum while some was recorded less than one (1) percent, annual growth in 2012 like France with 0.45% and UK with 0.54% respectively, due to low fertility rates that is a net decrease or static in population over time.

Despite the population growth rate decline in the developed countries while in developing nations still was recorded high population growth rate, Nigeria as an example experiencing high population explosion between the period of 2000's to 2014's from 123 million to 178.5 million people which equivalent to 45 percent or 55.5 million people and also the population keeping growing rapidly. World

population grew by 30 percent, or 1.6 billion people, between periods of 1990 to 2010. Countries like India and China was recorded high population growth for the period; 350 and 196 million people respectively. Thus, United Arab Emirates and Qatar also experience high growth rate with 315 and 271 percent respectively (UN, 2013). Table 1.1 shows world population growth by country.

Table 1.1 : Growth Rate by Populous Countries

	Countries	Population 1990	Population 2010	Growth (%) 1990–2010
	World	5,306,425,000	6,895,889,000	30.0%
1	China	1,145,195,000	1,341,335,000	17.1%
2	India	873,785,000	1,224,614,000	40.2%
3	United State of America	253,339,000	310,384,000	22.5%
4	Indonesia	184,346,000	239,871,000	30.1%
5	Brazil	149,650,000	194,946,000	30.3%
6	Pakistan	111,845,000	173,593,000	55.3%
7	Nigeria	97,552,000	158,423,000	62.4%
8	Bangladesh	105,256,000	148,692,000	41.3%
9	Russia	148,244,000	142,958,000	-3.6%
10	Japan	122,251,000	128,057,000	4.7%

(Source: UN World Population Prospects (2012))

The table above clearly shows that Nigeria is among the world most populous countries, the nation as a developing country has recorded the highest population growth rate in terms of percentage with 62.4 percent between the year 1990 to 2010 meanwhile, the Russia as a Developed nation have recorded negative population growth rate with minus 3.6 percent between the period. The figure 1.3 below shows that the past and projected continent population figures in millions.

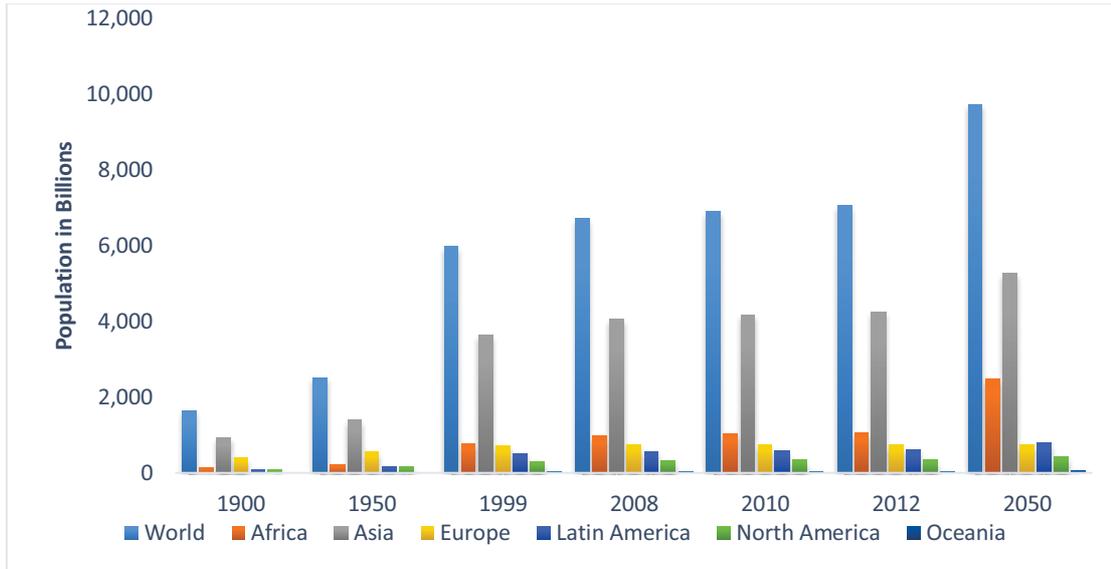


Figure 1.3 : World historical and predicted populations (in billion)
 (Source: World population perspective (2015))

The trend of population in Europe's and others industrialized countries is quite sharp decline in terms of fertility rate in the last 2 to 3 decades due to the population control measures. Thus, the total fertility rates in the European countries is about 1.3 to 1.4 per woman, and even lower than that took demographers by surprise as a result of this structural changes the Europeans populace is likely to decline from 740 million people to 734 million people by the year 2050. Asia's total fertility rate is approximately 2.2 per woman and sub-Saharan Africa's total fertility rate per woman will decline from 5.1 to nearly 3.0 by 2050. For example majority of the developed countries was recorded less one (1) percent and some of the countries recorded negative population growth rate that is for example; France 0.7 percent, Germany 0.1, United Kingdom 0.4 percent, United State of America 1.1 percent and Poland minus one (-1) percent between the period of 2011 to 2015 while, in developing countries population grew very faster and growth rate exceed 2 percent in majority of these countries i.e. Afghanistan 3.4 percent, Bahrain 4.0 percent, Chad 3.7 percent, Liberia 5.3 percent, Niger 3.7 percent and Nigeria 2.8 percent.

Even though Nigeria as a developing country while Russia represent as the developed nation have almost the same population size by the year 2010. However, Nigeria's population is projected to be more than double of its population size from 148,692 million in 2010 to 398 million people in 2050. Though Russia's population size is approximately 142,958 million people in 2010 and human population will decline to mere 111 million people by the year 2050, a slightly decreased from 142,958 million in 2010 to 111,258 million people by the year 2050 the population persistently decline of average 30 million people for the period. Therefore, the cause of this huge changes is lifetime births per woman, Nigeria as an example total fertility rate are 5.7 children per woman in her lifetime is virtually four times bigger than Russia's rate of 1.5

children per woman in 2011 and also the Russian rate keep decline (US census bureau).

1.2.1 Population Trends in Nigeria

Nigeria as a nation with the populace of 178.5 million people in 2014 from 45.2 million people in 1960 as an independence year, during the periods the country's experiencing rapid population growth by 295 percent changes in the last 50 years with a Gross domestic product (GDP) per capita of \$1097 in 2013 (World Bank). Nigeria is the utmost populated nation in Africa, and the 7th utmost populated country of the world. Nigeria is amongst the fastest growing population in the world with an average of 2.70% annual population growth rate. It might become third most populated country after Indian and China with a population around 400 million, people by the 2050 (UN, 2014). Fertility is an important factor in economic growth process while economic growth also has some influence on the level of fertility (Herzer, Strulik, and Vollmer, 2012; Oladuso, 2001).

The population of Nigeria was increased by three times during the period of 1970 - 2014. The population had grown and the number has multiplied due to high fertility rate, the last population census 2006, revealed that the country's population size reached 140 million people. The rural population of Nigeria has augmented about two and half times from the period "between" 1960 - 2014; whereas, the urban population has grown up drastically from 17.03 to 46.9 percent between the periods of 1960's to 2014. The decade growth rates of the population are uneven; as it augmented from 45.2 million people in 1960 to 56.12 million people in 1970 to 73.68 million in 1980 to 159.7 million in 2010 until 2015, attain an all-time high of 182 million in 2014 and a record lowest of 45.15 million in 1960. As shown in figure 1.4 population trend in Nigeria.



Figure 1.4 : Nigeria population trends
(Source: World Bank (2014))

In Nigeria populace raised at an average yearly speed of 2.7 to 3.2 percent over a period of time. Thus the rapid population growth occurred due to the persistently high fertility rate (roughly seven (7) child per woman) that have been witnessed for the past fifty years. The mortality rate was decline persistently for the period of the study, as a result of some improvement in health facilities and nutrition in the country (NPC, 2006). As shown in figure 1.5 the trend of annual population growth rate in Nigeria.



Figure 1.5 : Annual population growth rate
(Source: World Bank (2014))

Therefore, several causes for this discrepancy in the trend of population growth rate in Nigeria, such as the increase in inhabitants when the fertility rate more than mortality rate which is denoted as a natural growth rate. Additional, roots of speedy population growth in Nigeria, comprise an upsurge in nourishment, food supply and even distribution, enhancement in health sectors, absence of population control and the eradication of numerous sicknesses. The population density in the country has grown up from 50.66 in 1961 to 190.62 people in 2013 and also the number it continuously demonstrates an increasing population trend over the years. Hence, many people's living per square kilometer. Consequently, if the existing population growth rate outlooks and Nigeria's inhabitants' retains growing, there will be an infinite adverse consequence on the nation's environment. The figure 1.6 below has revealed that the population trends remains rise especially in urban cities. Even though, the number of people living in urban cities are less than 20 percent of total population in 1960's while, this number has augmented increasingly in the subsequent years attained up to 50 percent of the aggregate population which has negative effect to the environment (Stern, 2006).



Figure 1.6 : Percentage of Nigerians living in urban areas
 (Source: <http://www.tradingeconomics.com/nigeria/population>)

As people raises, so also the number of individuals living in the urban regions are keeping growing in 2011, 49.6 percent lived in the urban cities and also this figure was augmented to 50 percent in 2014. Then, as at present, half of Nigerians found in the urban cities with an annual estimated growth rate of 3.75 percent from 2010 to 2015 (CIA, 2014). The figure 1.7, shown the trends total fertility rate in Nigeria by geo-political zone.

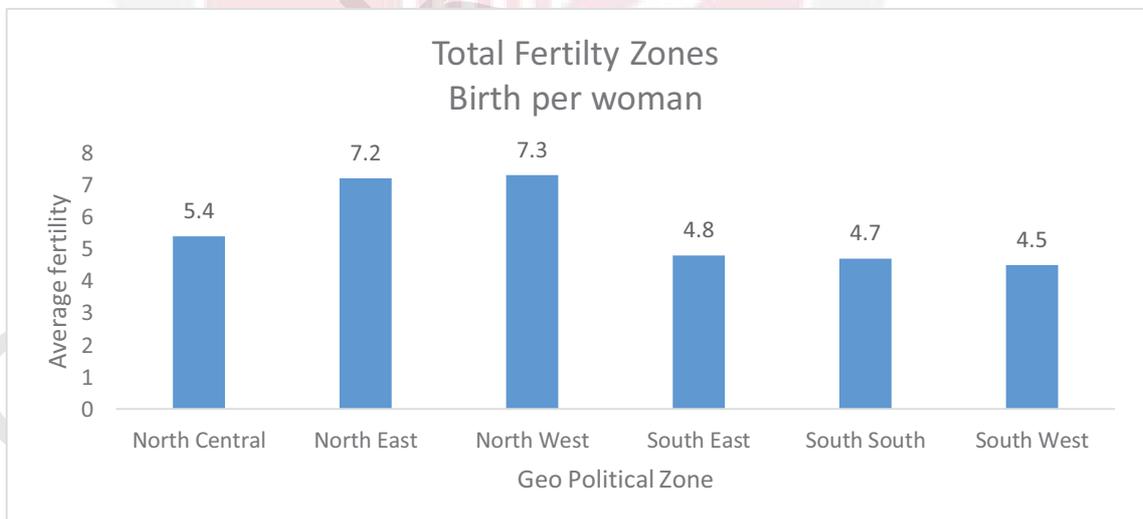


Figure 1.7 : Total fertility rate area in Nigeria
 (Source : National Population Commission Nigeria)

The above figure shows that fertility differs dramatically by geo-political region. Woman in the south west region have an average of 4.5 child likened with 7.3 child per woman in the North West geo political zone. Fertility rate also differs with mother's level of education as well as their economic status. Woman whose have more than secondary school's education have an average of 2.9 child per woman, while woman with no or little formal education level have 7.3 child roughly per woman. Fertility rate also increases as household means decreases, henceforth the more the birth rate was persistently increases it would affect environmental quality and land degradation.

However, the illiterate and poorest woman have nearly twice as many children as woman who's live in the wealthiest households (i.e. 7.1 child versus 4.0 child per woman respectively). Though fertility rates have drop in most of the developed and Europeans countries. Thus, this unprecedented population growth is largely due to increase in fertility rate especially in Africa's and Asia's countries. Furthermore, in numerous Middle East and Sub-Saharan Africa countries the average total fertility per woman would be expected to have given present-day fertility levels remains above 6.0 per woman for example; 6.4 child per woman in Saudi Arabia; 6.7 child in Yemen; 6.9 child in Uganda and 7.5 child in Niger Republic (Alcott, 2012).

1.2.2 An Overview of the Nigerian Economy

Nigeria is a one of the middle income nation, operating mixed economy system and emerging market due to the rapid population growth and expanding the financial sector, services sector, film and entertainments industry, communications and information technology sectors. Nigeria economy was ranked as the 21st largest economy in the world in terms of nominal gross domestic product (GDP) which equivalent \$492.989 billion and per GDP nominal \$2,758 as well as the 20th biggest in terms of Purchasing Power Parity \$1.105 trillion and per capita \$6184. However, Nigeria's economy is the largest in Africa and its re-emergent but at present underachieving due to world oil market crises, in terms of manufacturing sector. Nigeria is the third-biggest in African continent, besides produces a huge amount of goods and services for the West African sub region. Recently, country's transformed its economic analysis to interpretation, for the speedily increasing contributors to its gross domestic product such as; film and entertainment industry, banking and telecommunications sectors (NBS 2015).

Though, the Nigeria's economy has liked with the continuous growing for the period of time. With annual real gross domestic products by roughly seven (7) percent rate of increasing; it was 6.3 percent growth in 2014. Therefore, the non-oil sector of the economy has been the foremost driver of progression, with services sector contributing approximately 57 percent, whereas manufacturing industry and agriculture sector, contributed nearly 9 percent and 21 percent respectively. The economy is consequently, expanding and is attractive more services-oriented economy, in precise

through commerce i.e. wholesale trade and retail; real estate; information and communication technology sectors.

Hitherto, the economy was delayed by years of due to mismanagement and corruption among the government officials while economic restructuring of the previous decade have placed. Nigeria back on pathway near to attaining its full economic prospective. Nigeria's gross domestic product at purchasing power parity (PPP) has virtually augmented from \$170 billion in 2000 to \$451 billion in 2012, even though estimations of the scope of the informal sector (which is not encompassed in official statistics) placed the real figures nearer to \$630 billion. Similarly, the gross domestic product per capita almost doubled from \$1400 per person in 2000 to an assessed \$2,800 per person in 2012 (once more, with the presence of the informal sector, it is estimated that GDP per capita hovers nearby \$3,900 per person). However, population increased from 120 million in 2000 to 160 million in 2010 while, World Bank reported that GDP per capita in Nigeria was last recorded at 1091.64 US dollars in 2014. The GDP per capita in Nigeria is equivalent to nine (9) percent of the world's average. Hence, GDP per capita in Nigeria be an average of 693.69 USD from 1960 up until 2014, attaining an all-time tall of 1091.64 USD in 2014 and a record low of 468.10 USD in 1968 GDP per capita in Nigeria (World Bank, 2015). As shown in figure 1.8.



Figure 1.8 : GDP per capita in Nigeria
(Source : World Bank (2014))

Though, much has been complete of its position as a foremost exporter of petroleum products which country's produces nearly 2.7 percent of the world's oil supplier (Saudi Arabia 12.9 percent, Russia 12.7 percent, and USA 8.6 percent). To placed oil revenues in perspective as at an assessed export rate of 1.9 to 2.4 Mbb/d (300,000 m3/d), with an anticipated sales price of \$65 per barrel in 2011 and above \$100 between 2012 and 2013, Nigeria's expected income from petroleum products is around \$52.2 billion and later world petroleum crashed down to the less than \$50 per barrel

equally affecting the Nigeria economy. This accounts nearly 11 percent of official GDP statistics (and drops to 8 percent when the informal economy is comprised in these calculations). Though, the petroleum sector is also essential, it's also remains important in the country's economy, in fact a small part of the Nigeria's largely lively and also need to diversified economy. The mainly subsistence agricultural industry has not retained up with population growth rate, and country's once a large net exporter of foodstuff to other countries, but now imports a huge amount of its foodstuff for local consumption, although there is a renaissance in manufacturing sector and exporting of food products. As shown in Figure 1.9 the Nigeria population and GDP.

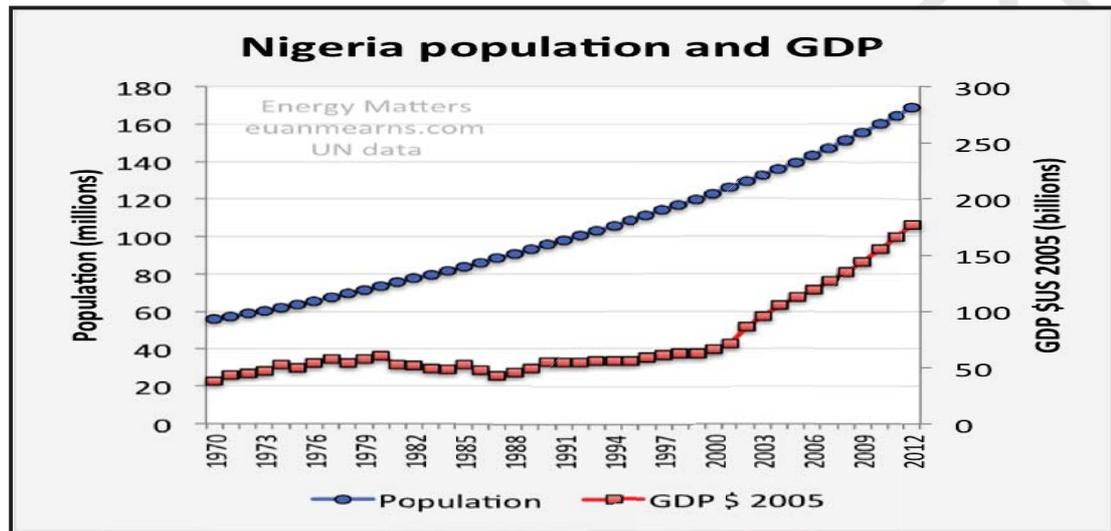


Figure 1.9 : Nigeria population and GDP
(Source: World Bank (2013))

Nigerian economy has been classified into three major sectors, they are primary sector which is made up of agricultural and natural resources sector, then the next is sector of the economy is a 'secondary' which comprises of manufacturing and processing industry and finally 'tertiary' sector which is the services sectors (Sanusi, 2010). Agricultural sector is remain the most significant sector of the Nigeria's economy in terms employment in that, it employed nearly 70 percent of the labor force. Despite that the impotant of the sector the farming holdings in Nigeria are generally small and scattered and are subsistence in nature which is characterized by the using of simple methods of farming and tools and shifting cultivation. These small farms produce nearly 80 percent of the total food requirement of the country. The contribution of agriculture to gross domestic product (GDP) in Nigeria has decrease and start to appreciate over the years.

Table 1.2 : Sectoral Contributions to GDP

Activity Sector	1960-1970	1971-1980	1981-1990	1991-2000	2001-2009
Agriculture	55.8	28.4	32.3	34.2	40.3
Oil Industry	11.3	29.1	41.0	38.6	28.4
Service	15.3	16.5	9.8	11.5	15.5
Wholesale & Retail Trade	12.8	17.6	14.5	13.8	14.0
Manufacturing	6.6	7.3	6.1	4.9	3.9
Building & Construction	4.8	8.3	2.3	1.8	1.8
TOTAL Value Added	100.0	100.0	100.0	100.0	100.0

(Source: National Bureau of Statistics, 2010)

The production of subsistence food crops has also declined, and food imports have increased considerably due to the rapid increase in population and low production. The agricultural sector is highly dominated by smallholder farmers, who account for more than 75 percent of the total domestic output (Attah, 2012). Thus, agricultural sector has been neglected due to the growing significance of the oil and gas sector, causing some certain changes in prices in favour of non-tradable commodities, thus penalizing the agricultural tradable sector. Price incentives to small-scale farmers were also not supportive, as the government marketing boards set low producer prices for each crops which bore no reasonable relation to their international prices (Oshikoya,.1990). Despite the significant decline in the agricultural sector's in terms of output, but the sector also continues played an important role in the countrt's economy and still remains as a major employer for an unemployment people in the country.

The oil share of the norminal GDP was 38.6 percent in 2000 and 28.4 percent in 2010, the petroleum industry has been the leading industry not only within the industrial sector but also among the economic sectors in the Nigerian economy. This sector accounted for over 43.1 percent in 2009 of total export earnings and around 70 percent of government incomes. However, the petroleum products sector is capital intensive and linkage between the petroleum sector and the rest of the economy is very low, indicating a rentier economy whose rent comes exclusively from foreign exchange.

The services sector's contribution to GDP averaged 10 percent from 1960 to 2014, until recently, when some activities were included which were previously unaccounted for, making it the highest contributor 15.5 percent to the GDP. The services sector has become the second largest employer of the labour force in the economy after the agricultural sector. Wholesale and retail trade is thye leading activity in the srvice group in terms of its contribution to the total increase in GDP from 12.8 percent in 1960 to 17.6 percent in 1980. The trade share of GDP contribution declined to 14.5 percent in 1990 to 13.8% in 2000 but increased around 14.0% in 2010

1.2.3 An Overview in Environmental Issues in Nigeria

The external space of the Nigeria is roughly 923, 770 m² around 35 percent of this land mass is thought to be arable land which used to produce crops though 15 percent is said amount to be used as meadows, 10 percent remains as a forest reserve region, 10 percent also for settlements and the remaining 30 percent is measured as an unproductive, for one reasons or the other. Though, an appraisal places the external space as 91.07 million hectares, 57 percent of which is thought to be one or the other under crops production, or meadows but the remaining 43 percent is separated amongst forest area, water bodies and other usages (Cleaver and Shreiber, 1994).

Thus, semi-arid or grasses region of the country, which by its natural surroundings and appearances is vulnerable to desertification course, at the similar time, founds the biggest grain producing zone of the country. Therefore, is in addition to the fact that furthestmost of the livestock's are focused in the area. This region is regarded, as the locus of human being's utmost wager with landscape. In the existences of good and plentiful shower, the area induces and plunders human advances with generous agricultural produces and livestock production. Contrariwise, in the periods of deprived rain, there is an increasing stress, which sometime consequences in food shortage and other social costs (Sawa et al., 2015 and Newborne, 2016).

Another problem of environments is urbanization which can be caused by population growth due to high fertility rate and rural-urban migration in the country. Urbanization in Nigeria was described by cities favelas with severe environmental costs. Hence, the difficulties has been labeled as severe and demonstrates the incapability of development measures to preserve stride with the rate of population growth (Omofonmwan, 2008). However, an additional problem related to urbanization is the dumping of sewage and garbage is relatively thoughtful because of the speedy rate of generation of non-biodegradable materials such as plastics (Daramola and Ibem, 2010). Solid waste dumping problems are initiate nearly in all the large metropolises in Nigeria (Onwuendo, 2007). This is mainly due to the aggregate speed of population growth lead to overpopulation and urban congestion, commercial and industrial activities in the cities (Onibokun and Kumuyi, 2012). Thus, a problem of waste administration practices may be as a result of poverty among the household, homemakers' conservational illiteracy and the absence of laws (legislation) and enforcement. This has caused to ineffectual management of solid waste in many cities in Nigeria (Usoro and Akpan, 2011; Olajide, 2014).

Another problems to environmental emissions in Nigeria are industrialization process, oil exploration, agriculture and increasing urban population it accompanied by demanding more agricultural land for food production and population density also are triggering a high rate of deforestation in the country. Nigeria have the highest deforestation rate amongst the sub-Saharan Africa with the 3.5 percent, roughly 350,000 to 400,000 hectares per annum. (WWF, 2010). Thus, the deforestation may

stop Nigeria on fulfilling with one of the UN Development Goals that necessitates to an increase in forest area from 2.5 percent to 6 percent by the year 2015.

Nigeria has also confronted thrilling natural catastrophes in the recent ages in line for conservational challenges. Here remained uninterrupted downpours witnessed in 2010 and 2011, and it is likely that such natural catastrophes will be more repeated in future years. The changing environmental conditions due to rapid population growth and also an increase in land for agriculture and commercial purposes have consequently increased the risk to the natural setting besides the erraticism within species, between species, and between ecosystems. However, fishing, the lifeline of most inhabitants of some areas is almost made impracticable and unprofitable as a result of incessant oil spillages, leading to pollution and other hazards of oil exploration (Aluko, 2013 and Ashton-Jones et al., 1998).

Energy consumption is another issue related to the environmental emissions in Nigeria. The aggregate sum of energy used in a household for work, the quantity of energy consumed per family in Nigeria differs extensively dependent on the household income or depending on the firms, energy consumption is one of the responsible for the climate change. Fossil fuel such as petroleum, gas and coal that is formed in the globe from deceased some plants or animals. Other problems associated with the environmental emissions in Nigeria are increased in urban population which include conservational issues like CO₂ emission, escalate abnormal heat, global warming and even pollution. The convergence of population explosion in urban cities it may lead sprawl problems and conservational changes has raise questions concerning environmental sanitation and health care, this has the prospective of producing environmental and humanitarian hitches (Auber and Tamer, 2013; Hampwaye et al., 2013; Peters, 2010; Bakare, 2011).

Carbon dioxide emissions (CO₂) in Nigeria majority comes from human activities such as burning oil through transportation, gasoline, coal and use of wood as a sources of energy (firewood) and left-over materials from manufacturing courses such as cement production. Hence, carbon dioxide emissions (CO₂) attentiveness an average emissions rate of a given waste product on a given basis relative to the strength of a precise bustle. A consequence of fossil fuel burning and biomass combustion, it is also emitted from land use vicissitudes and other industrial courses. The trends of carbon dioxide emissions in Nigeria as per shown in figure 1.10 below:

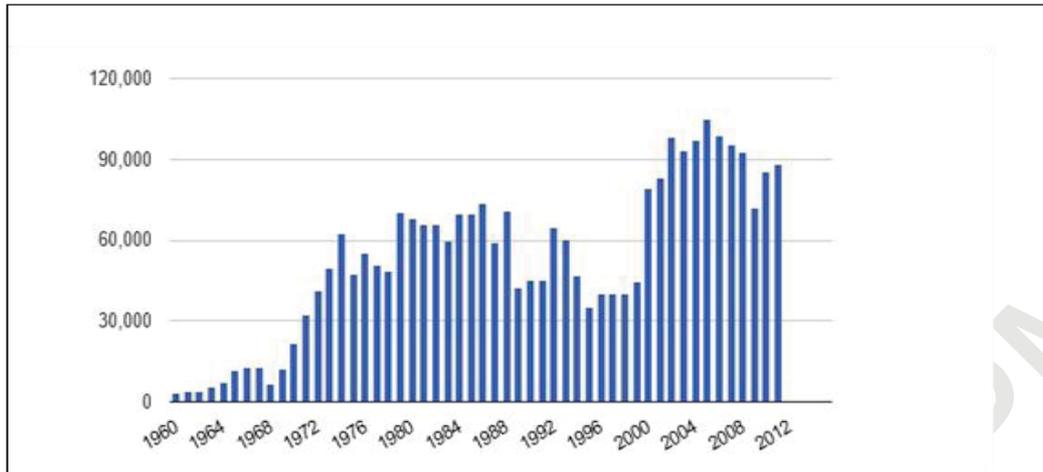


Figure 1.10 : Nigeria carbon dioxide emissions (CO₂)
 (Source: World Bank (2015))

Nigeria as a nation's from 1960's to 2011, the average value of carbon dioxide emissions for Nigeria during the period was 52970 kt with a minimum of 3,406.643 kt in 1960 and reached maximum rate of 104689.183 kt in 2005. It can be seen from figure 1.11, that carbon dioxide emissions from the transportation sectors is the one of the largest contributors to CO₂ emissions in Nigeria over years. The CO₂ emissions from transport sector was augmented from 50 percent in 1970 to 57 percent in 1980, slightly decreased over the period 1990's and this had fallen to 39 percent in 2013.



Figure 1.11 : Nigeria Carbon Dioxide Emissions (CO₂) Transport
 (Source: World Bank (2015))

Carbon dioxide emissions from transportation sectors comprises emissions from the burning of fossil and liquid fuel for all transport activity, nevertheless of the transport sector, This includes internal aviation or flight, national steering, roads, railway and pipeline for petroleum product.

Despite the fact that most of the environmental issues are negative but some above issues contribute to an increase in economic growth. Urbanization in Nigeria has played a quantitatively significant positive role in complete poverty decline, by providing new chances to rural out-migrants (about of whom seepage poverty) and through the second-round effect of urbanization on the improvement of living standards of those who remain in rural areas Potts Deborah (2009). Urbanization also stimulate economic growth is possible to be contingent on how favorable the infrastructure facilities and institutional settings are. Therefore, the remarkable improvement through provided that environmental sanitation, enhancements in air excellence in foremost municipalities and genius at the persistent progresses in the human ailment made conceivable by industrial improvement.

1.2.4 Relationship between the Population and Environment

An ecosystem is a component of living and non-living organisms interacting through exchange materials and energy. Without a population, there can be no ecosystem. Different kinds of plants and animals require different sets of Condition, and materials to go on living. The sum total of these conditions and materials is called environment. All organisms exist within layer of air, soil and water known as biosphere. Within the biosphere, we can isolate a number of ecosystems-communities of living things interacting with the physical environment. Any environment without a population is simply a barren environment. The population manipulates the ecosystem through resource exploitation, modification and building. Also, there can be no population without environment. Therefore, a population in a favorable environment is an ecosystem and can be studied as the science of ecology. Ecology is about living plants and animals, including man in environments that are suitable for life see figure 1.12 below.

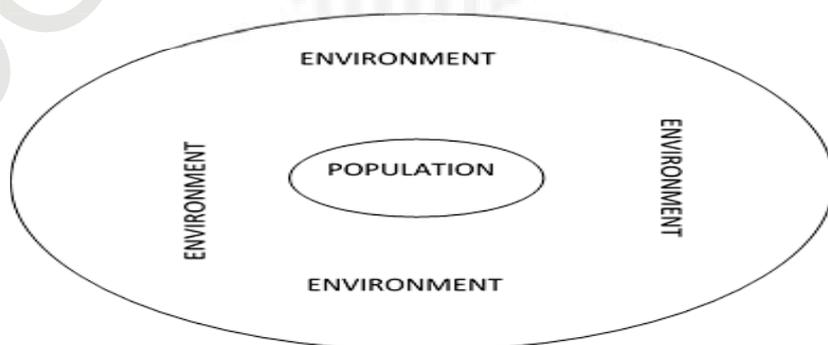


Figure 1.12 : Interaction between population growth and environment
(Source: Author's construction based on literature)

A place where specie flourishes can assume to provide all the conditions and materials needed by the specie, whether it is plant or animal such a place would be an optimum environment. The concept of optimum environment is basic to the idea of ecosystem. Environment has played the major role in populating the earth with its present complement of plants and animal.

1.3 Problem Statements

One of the issues addressed in this study related to the heterogeneous effect population growth and environment. It is generally agreed that population growth will eventually cause an environmental catastrophe. However, the problem is bigger and more complex than just counting bodies. Theorist of the population has argued that population growth is positively related to land degradation more individuals demand more resources and emit more CO₂ emissions and forest loss. Therefore, Nigerian population persistently augmented from 88.9 million people in 1991 to 140 million in 2006 censuses (NPC, 2007) to 178.5 million people in 2014 estimation (NBS, 2015). Thus this clearly shown that an escalation of 57.4 percent of the total population in just 15years only. Nigeria population is keeping growing rapidly in 1991 census; the country's population was increased from 88.9 million people with 37 percent of the populace living in the urban cities while 63 percent living in rural areas (NPC, 1997).

By the year, 2000, almost 43 percent of the inhabitants were in the urban areas, then as of 2011 rises to 46.9 percent of the country's population was living in the urban metropolises, and almost 50 percent of Nigeria's population is in the urban municipalities by the year, 2014 and them appraisal the population growth rate at 2.7 to 3.0 percent between the periods of 2010 to 2014 (NBS, 2015). As increase in urban population which includes conservational issues like CO₂ emissions, escalate abnormal heat, global warming, and even pollution. The convergence of population explosion in urban cities it may lead sprawl problems and conservational changes has raised questions concerning environmental sanitation and health care, this has the perspective of producing environmental emissions and humanitarian hitches (see, Bakare, 2011 and Hampwaye et al., 2013).

Numerous thrust and pull causes stand apparently to running near suffering out movement from rural-urban migration which leads to population pressure in urban cities. This strength in line for the deteriorating resource accessibility per head and decline economic prospects in rural areas, while urban cities there are availabilities of economic opportunities, health and educational facilities (See, Defries et.al 2010 and Aluko, 2013). Therefore, Nigeria like others developing countries of the world has the high level of fertility rate shows per woman in Nigeria with an average of 5.7 children. Thus, the average number of children per woman is 4.7 children in urban areas while, 6.3 children in rural areas (2003, NDHS).

The second issue pertains to the environment and economic growth while Nigeria's economy struggles to operate leverage the country's very large wealth in oil and gas but still country's poverty figure roughly 33% or more so, of its people (Sanusi, 2010). It is generally argued that an increases in energy consumption have an adverse effect on environment, i.e. energy used have some impact to our ecosystem, fossil and liquid fuel consumption do substantially harm than more other of forms energy sources by most measures, comprising pollution i.e. airborne and rainwater, hurt to public health, flora and fauna and environmental damage and global heating Meanwhile in Nigeria also energy consumption has positive contribution to the growth and gradually supportable power supply and liquid fuel to millions of households, businesses and companies throughout the country (see, Onakoya et al., 2013 and Ali et.al., 2016).

Production externalities arise after the creation of certain goods and services has a negative effect in another aspect to the environment. The deleterious effects might be touched by other firms or by consumers. However, one of the most common examples of adverse production externalities includes air and water pollution, carbon dioxide emissions or even deforestation as a result of the economic activities i.e. industrialization, the pollution also removes some species or flora and fauna and environmental emissions. Therefore, trade induces effect, dominates the economic growth-environment relationship, the trade influence on the composition of the nation's production, and increases the scale of economic activities. (See, Grossman and Krueger 1995; Antweiler et al., 2001; Cole & Elliott 2003; and Frankel 2009).

However, oil exploration and others manufacturing activities have been on-going, it ought to calamitous effects on the environment and also it has adversely affected to the ecosystem (Kadafa, 2012a). Thus, the oil-producing areas be made up of miscellaneous ecosystems of freshwater swamps, rainforest and mangrove swamps, Nigeria presently has the largest wetland in Africa and among the tenth greatest imperative wetland and maritime biotas in the world (UNEP, 2011). Then as a result of water pollution, the region is now described by unhygienic watercourses, streams, rivers and biodiversity loss in general, the region is a conservation wilderness (Kadafa, 2012a). However, these issues affect the source of revenue of the government or even inhabitant whose depend on the environment for survival then leading to augmented poverty and dislocation of people (NBS, 2015). The oil industry sited inside this area has contributed enormously to the land degradation which is a datum that cannot be doubtful but unmaintainable oil exploration events has concentrated on the oil-producing area is one of the five (5) greatest severely petroleum spoiled ecosystems in the world (UNEP, 2011). Researchers have revealed that the amount of oil spilled over 50 years was a minimum 9-13 million barrels for the periods (see, Kadafa, 2012b).

Though, despite the enormous government efforts in environmental and natural resources protection, the incidence of CO₂ emissions and pollution has continued to grow (UNEP, 2011). Therefore, the poor environment in Nigeria is a serious concern due to some reasons: the economic growth in Nigeria is mainly driver by agricultural

sector is highly labor intensive, the literature indicated that poor environment may lead to low economic growth.

1.4 Research Questions

- i. Does population growth have any effect on environment in Nigeria?
- ii. Does environment have any impact on economic growth?
- iii. Does population have any impact on economic growth?

1.5 Objectives of the study

The broad objective of this research work is to investigate the impact of population growth and economic growth on environmental emissions in Nigeria.

The specific objectives of the research work include;

- i. To examine the effect of population growth on environmental emissions in Nigeria.
- ii. To examine the impact of environmental emissions on economic growth in Nigeria.

1.6 Significance of the study

This thesis contributes to the existing stock of knowledge in two different ways but interconnected issues, First distinct the prior studies that focus on aggregated effect of population growth on environment in Nigeria, this study extends beyond the previous work by considering the regulatory or comparative the impact of humans on the environment although Ehrlich and Holdren in the early 1970s have introduced the so called IPAT equation which is suitable to address the strength of the environmental regulatory effect and the effect of the population growth on environmental affluence, there are very limited studies that evaluate these effects only a few in Nigeria as nation's were included in the sample of the available studies.

Evaluating the effect of population growth on the environment in the Nigeria is vital because the country have been sluggish to develop effective conservational or ecological laws (ADB, 2012) very few studies in Nigeria, for example, Theodore, 2006; Omofonmwan, 2008 and more recently Nwasu, 2014 have claimed to provide supportive evidence for effect of population growth. But they are limited because they ignored to evaluate further the potential effect of relative rapid population growth rate on related environmental emissions in Nigeria. Henceforth, limited empirical studies, particularly in Nigeria also meant the nations could not take advantage practical evidence for the evaluation of population controlled measures and ecological policy.

Thus, the present study sheds light on how decision makers can make right choices that can help the country to benefit from population growth without compromising environmental sustainability with the reduction of CO₂ emissions (Habiyaemye and socte, 2010).

In an effort to fill the gap, this present study distinguishes from the previous studies by differentiate between the effect of population growth on environmental emissions and consequently, is better able to decompose the scale, composition and the measures of controlling population growth as well as the actions for the reduction of the environmental emissions (Antweiler et al.2001). Thus when the population growth related as one of the determinants of environmental emissions in Nigeria by consuming more fossil fuel consumption are notable from each other, policymakers will have appropriate information in determining the upcoming course of action interventions in Nigeria as nations that are in awful essential of the future development and a healthier environment.

Additionally, it should be noted that renowned model IPAT equation is a somewhat more general model as it was designed to include different countries and continents. Rather than focus on the effect of population growth on a single country's alone the present study extends IPAT equation to examine further effects of population growth on the environment due to diverse in relative environmental severity in Nigeria.

The second objective of this study is to contribute to the existing literature by providing a comprehensive account of the impact of environment on economic growth. This study improves on previous studies by using energy consumption as one of the independent variables (see, Odemba, 2011; Rafin dadi, 2016) available empirical evidence in Nigeria as a country. Hence, mostly focused on the role of energy consumption as an important factor for economic growth. However, the previous studies are limited because they only consider the role of energy consumption on economic growth without further examining the impact of fossil fuel consumption in particular as one of the determinant growth rates in Nigeria. Another, contribution to the stock of knowledge is that previous studies have not considered the differences between energy consumption and fossil fuel consumption as a two separate variables. Therefore, this present study has been disaggregated into fossil fuel and energy consumption as well this study used these two variables as an independent separately.

In general, the outcomes of this study will, therefore provide convincing evidence that can be useful for evaluation of conservational or environmental policy options in Nigeria. Policies that cannot only unveil the need for intervention, measures that can minimize public exposure to carbon dioxide emissions (CO₂) but also identify vital issues for environmental health researchers and those responsible for public policy.

1.7 Scope and Limitation of the Study

This study was based on the rapid population growth rate in Nigeria as a case study. Similarly, to achieve the objective which assesses the effect of population growth on the environment in Nigeria, and also were used to achieve the objective which to examine the impact of environment on economic growth in Nigeria.

Similar to other studies, this study is as well constrained by data inadequacy particularly on the two main variables population growth rate and environmental issues. This limit the scope of the study to cover a reasonably long period of time.

1.8 Thesis Organization

This study is separated into five chapters. Chapter one (1) presents the introduction of the study. This chapter is divided into sub sections. The first section is the study overview, general background population growth and projection and population trends in Nigeria, An overview of the Nigerian economy and Environmental issues in Nigeria. The second section discusses the Problem Statements of the study. The third section presents the research questions of the study. The fourth section describes the objectives of the study. The fifth section is concerned with the Significance of the study, and the sixth section discussed the scope and the limitation of the study and final section provides an outline of the organization of the study.

The second chapter was devoted to literature review which provided an overview of both theoretical and empirical literature on population growth and environmental issues in Nigeria. Similarly, theoretical as well as empirical literature on environment and economic growth in Nigeria was also discussed under the second chapter. Lastly methodological review was discussed in this chapter as well.

Chapter three centered on the methodology adopted for the study. Specifically, the chapter provided mathematical derivation as well as discussion on the theoretical framework which underpinned the estimation of models in relation to the two objectives. In addition the model specification was presented in relation to the entire objectives of the study. Similarly, expected signs base on theory and literature were presented in this chapter in relation to each objective as well. Furthermore, this chapter discussed data analysis method used to achieve each objective as well as the data source used in conducting the research study. Lastly, variable description in relation to the two objectives set out was discussed.

Chapter four covered the detail empirical results and discussion in relation to the two laid down objectives. Finding of the research was discussed under this chapter based on the regression analysis in relation to each of the objectives. Chapter five, provided summary of the research findings, which was subsequently followed by summary of

the major findings of the research based on individual objective. Limitations of the study and future research direction were also discussed in this chapter. Similarly, policy recommendations of the study were discussed here.



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