International Journal of Economics, Commerce and Management
United Kingdom ISSN 2348 0386 Vol. VII, Issue 5, May 2019

http://ijecm.co.uk/

POPULATION, FOOD SECURITY AND ECONOMIC GROWTH IN NIGERIA

Bright Enakhe Onime
Doctoral Candidate, Department of Economics,
University of Port Harcourt, Nigeria
brighto80@yahoo.com

Abstract

Population growth and its interaction with food security and economic growth is the crux of the matter in this study. It has been documented that Nigeria is experiencing very high population growth rate due to aggravating high birth rate and plummeting death rate. The extent to which population growths affect food security and economic growth was therefore examined. Using time series data pooled from 1981 to 2016, tested for stationarity, co-integrated and corrected for error, the study observed a positive and significant relationship between government expenditure on social overheads and economic growth but a negative relationship between food security, population and economic growth. Especially an increase in population growth was observed to worsen food security and economic growth. Further, it increases government expenditure on social overheads and this relationship was very significant. Clearly, policies to check the bulging population rate therefore must target food production, food prices, social overheads, the extremely poor and fertility rates to be effective.

Keywords: Population, Food Security, Economic Growth, Government expenditure, Insecurity

INTRODUCTION

Nigeria is plagued by population bulge. The population is currently over 186 million persons (NBS, 2016) and this is estimated to grow at the rate of 3.1% per annum. This population growth brings with it the problems of food insufficiency, poverty, migration, urbanization, unemployment, malnutrition and environmental degradation. According to Iyoha (2002), the

primary cause of this rising population is a matter of demographic transition. Death rates have declined dramatically but birth rates are yet to decline to levels consistent with death rate.

The implications of this population explosion are grave. Outside the social problem that comes with it, there is the likelihood that the country may not be able to produce enough food to feed all its inhabitants. Meanwhile, the international community through the Sustainable Development Goals (SDGs) commits to end poverty and achieve zero hunger by 2030. However, the extent to which that is achievable in Nigeria judging by the fact that this is just twelve (12) years away is a matter for further research. This is obvious because of the rapid growth in population, subsistence farming, rudimentary technologies in agriculture and production and massive urbanization putting intense pressure on food supply.

This study is apt because rapid population growth especially in countries with poorly developed agricultural sector results in food shortages, food price inflation, and causes income strain by increasing government recurrent and social expenditure as substantial resources have to be devoted to provide basic food and other needs for the populace with little or nothing earmarked for capital development. It puts pressure on existing infrastructure such as schools, hospitals, roads, etc., migration surfaces, urbanization blossoms, environmental degradation worsens and overall economic growth is retarded.

The aim of this study therefore is to examine the effect of rapid population growth on food security and economic growth by proffering remedies to curb the menace or manage the situation. To achieve this, the remaining section of this paper shall be organized as follows. The other part of section one examines trends and determinants of population growth in Nigeria. Section two deals with some conceptual issues while section three reviews existing literature. Section four presents' data sources and estimation methods and section five shows study findings, recommendation and conclusions

TRENDS AND DETERMINANTS OF POPULATION GROWTH IN NIGERIA

The population of Nigeria is among the fastest growing in the world. The population bulge epitomized by skyrocketing population growth is a problem that has eluded solution. Clearly, as Iyoha (2002) puts it, rapid population growth exacerbates the problem of poverty, food crises, malnutrition, unemployment, urban degradation, and environmental deterioration.

According to the National Bureau of Statistics (2016), Nigeria had a population of approximately 122 million people in 2000, which increased to 159 million in 2010. The population had been growing at the rate of 2.8% per annum in the decade preceding year 2000 and beyond before increasing to 3.2% in 2008 to 2012 and then falling marginally to the current levels of 3.1%.

Table 1: Population and Growth rate, 2011 – 2016

Year	Population (Millions)	Growth Rate (%)
2010	158,578,261	3.2
2011	162,877,076	3.2
2012	162,297,284	2.3
2013	171,829,303	3.1
2014	176,460,502	3.1
2015	181,181,744	3.1
2016	185,989,640	3.1

Source: National Bureau of Statistics, 2016.

Rising population growth puts intense pressure on resources of a Nation. It affects national income as government has to devote substantial resources to feed the growing population. It affects food supply, depletes the environment, results to urbanization, migration, unemployment and scarcity of several other resources. According to Lipsey R.G., et.al (1993), the race between population and Gross Domestic Product has been a dominant feature of many less developed countries. Where population is growing rapidly, there are only two possible ways for a country to win the race: “The first way is to achieve an income growth rate that is well in excess of the population growth rate. And, the second is to control population growth’’.

However, in Nigeria, income growth has refused to catch up with the population growth. For instance, GDP growth rate was 5.3% in 2011, only increasing marginally to 5.5% in 2013 before nose-diving to 2.8% in 2015. Further, efforts at curtailing the population growth rate have not yielded good results. According to the National Bureau of Statistics, the percentage number of women not using any contraceptives in the urban areas in 2011 stood at 75% while the figure for the rural areas was 86.1%. In 2013, only 3.6% of the population aged 15 to 19 years admitted to the use of contraceptives while only about 24.6% of the population aged 20 to 49 years used contraceptives. Little wonder HIV/AIDS prevalence rate in the country is on the increase. According to NACA (2012), over three (3) million people in the country are leaving with HIV/AIDS.

One determinant of the growing population is the number of refugees and persons seeking asylum in the country. Available statistics shows that in 2014 alone, total number of asylum seekers in the country was 941 persons comprising of 587 males and 354 females. When this figure is added to the number of refugees in the country, we get a whooping number of 2620 persons. When this number is added to the population figure, it can only keep rising.

Table 2 - Asylum Seekers & Refugees in Nigeria - 2014

	Male	Female	Total
Asylum seekers	587	354	941
Refugees	960	719	1679

Source: NBS, Annual Abstract of Statistics, 2016

In addition to refugees and asylum seekers, a number of other factors continue to determine population growth in Nigeria, including birth rate, death rate, infant mortality rate, fertility rate, migration and life expectancy at birth. Birth rate has remained high. In 2017, birth rate was 38.4 per 1000 people falling gradually from 42.5 per 1000 people in 2005 to 38.9 per 1000 people in 2016. Death rate has been on the decrease. Death rate fell gradually from 16.3 per 1000 people in 2005 to 12.5 in 2016 before peaking at 12.16 per 1000 people in 2017. Infant mortality rate fell gradually from 96.5 deaths per 1000 live birth in 2005 to 66.9 deaths per 1000 live births in 2016. By 2017, it was 74.5 death per 1000 live births for male and 64.8 for females. (CIA Factbook, 2018).

Further, total fertility rate has been falling only marginally. It was 5.46 births per woman in 2017, falling gradually from 6.0 in 2005 to 5.5 births per woman in 2016. In 2017, life expectancy at birth for Nigeria was 53.88. This increased from 55.99 years in 2015 to 53.88 years in 2017 growing at an average annual rate of 0.84%. Migration rate for Nigeria was -0.35 migrants per 1000 population in 2015. Though this figure has continued to fluctuate, it peaked at -0.2 migrants per 1000 population in 2017 (CIA factbook, 2018). This figure includes the difference between the number of persons entering and leaving a country during the year per 1000 persons.

Clearly, lower death rate and infant mortality rate is synonymous with higher population growth. Conversely, the higher the fertility rate, birth rate, migration rate and life expectancy at birth, the higher the population growth.

Measures to address food sufficiency in Nigeria therefore must focus on the need to enhance the income generating capacity of government so as to be in a good standing to provide food and other basic infrastructure for the populace in addition to checking the rapid population explosion.

FOOD SECURITY AND AGRICULTURE IN NIGERIA

The concept of food security defines access at all times to enough, good and affordable food for an active and healthy life. According to Stringer (2000), availability and access to food are the two most common measures of food security. Food availability is measured in calories available per person per day in the country. Maxwell and Wiebe (1998) suggested that a complete definition of food

security must possess three vital components of access to food, including having sufficient food to meet every individual's needs; the ability to generate sufficient food without sacrificing the individual's endowment; and the need for societies to protect individuals from shocks, i.e. loss of job, disasters, financial crisis, etc. Anything short of this amounts to food insecurity.

The causes of such food insecurity include inadequate domestic production of food and variability in food prices but the consequences of such food insecurity can be very disturbing, including very low per-capita consumption levels, burden on the poorest members of the population and impacts on scarce foreign exchange and capital resources.

Agriculture plays a pivotal function as regards food security and economic growth. Agriculture was Nigeria's mainstay prior to and shortly after independence contributing over 80% to its GDP and providing employment to 70% of its population. However, following the discovery of oil, the nation's agricultural sector was neglected. The techniques of production are archaic and rudimentary. Production is subsistence and according to World Bank (2000), it is grossly undercapitalized, characterized by low productivity and lack of competitiveness. Apart from Northern Nigeria, agriculture and crop production is still predominantly rain-dependent in other parts of the country.

Till date, the country is still not self-sufficient in food production hence it lacks food security. Outside the insufficient production of food for the populace, farmlands and crops are being destroyed on a daily basis due to farmers and herdsmen clashes in various parts of the country. For instance, in Benue, Enugu, Edo, Kogi and Ondo States, there have been recorded pockets of clashes between farmers in those States and herdsmen resulting to massive destruction of farm lands, farm produce and human lives.

To meet the nation's food requirement and the gap in food production, the country engages in heavy food importation. To import, the nation budgets huge resources and scarce foreign exchange for that purpose thus depriving other sectors of needed foreign exchange which continues to impede rapid growth. Clearly, value of imported food items continued on an upward surge increasing from 15.8bilion in 1993 to 117bilion in 1997, rising again by 60% to 291.3billion in 2005 before it hits an all-time high of 2998billion in 2011. According to Iyoha (2002), food security is canvassed for many reasons including economic, political and strategic reasons. Economically, a country that heavily imports food items continually set aside huge and scarce foreign exchange for the purpose. Politically, a country that cannot feed itself is politically dependent as it remains under the whims and caprices of other food sufficient nations.

To boost food security and increase agricultural production therefore, there is the need to design and strengthen structural, economic and agricultural reforms, increase on-farm investment, boost rural infrastructure and raise the productivity of land and labour in the country.

FACTORS AND IMPLICATIONS OF POPULATION GROWTH ON FOOD SECURITY

The major factors swelling the population are mainly demographic in nature and include high fertility rate, high birth rate and declining death rate. Others include improved access to good education, migration, increase number of asylum seekers and refugees.

The implications of a rising population growth rate are diverse. Rapid population growth increases unemployment. According to Jhingan (1997), it necessitates massive investments in social infrastructure and diverts resources from education, health, housing and other vital sectors of the economy. It causes overcrowding resulting in urbanization and environmental degradation. On a global comparison, rapid population growth increased the income disparities and gaps between the developing nation and the developed countries, it also increases international migration.

In respect of availability and access to food, Stringer (2000) and Onime (2018) attributes the following factors to food insecurity; Population growth, Demographic trends, Economic development, Government policies, Income levels, Health, Nutrition, Gender, Environmental degradation, Natural disasters, Insecurity and Civil conflicts, growing number of Refugees, Migration and Diseases. Policies and Strategies to deal with food insecurity therefore must deal with these factors to be successful.

FOOD SECURITY, RURAL POVERTY AND AGRICULTURAL PRODUCTION

Food security implies availability and affordability. Due to increasing population, subsistence agriculture, rudimentary farming methods, poverty and inflation, food items and prices are now beyond the reach of the ordinary Nigerians.

The incidence of poverty is high and food unavailability is worse among the extremely poor. According to NBS (2010), in 2010, an estimated 74.1% of the population in rural areas was living in poverty while 25.9% of the urban population is poor.

Table 3: Poor proportion share to Total poor (%), 2010.

Areas	Total Population	Food Poor	Extreme Poor
Rural	63.8	65.5	74.1
Urban	36.2	34.6	25.9
National	100	100	100

Source: NBS, 2010.

Food crises increase poverty. According to Babatunde and Ajayi (2010), the higher the price of food, the more people are pushed into the poverty trap. The percentage of rural population below the poverty line was 38.8% in 2010 when compared to 32.8% for the urban population (NBS, 2010) while the severity of poverty was worse in the rural areas than it was in the urban area.

Table 4: Food poverty trends, 2009/2010.

Area	Head count	Poverty gap	Severity of poverty
Rural	77.7	38.8	23.8
Urban	72.2	32.8	19
National	75.7	36.6	22.1

Source: NBS, 2009/2010

According to FAO (2008), due to food difficulties, nearly 100 million people will not get enough to eat and over 400 million are chronically malnourished. This position has not changed much till date. This is because yearly, eleven (11) million children under the age of five die from hunger and hunger related diseases.

Clearly, food security, self-sufficiency, affordability and availability are desirable policies. However, the menace of burgeoning population and low agricultural productivity has contributed to undermine food supply efforts. The result following from this is escalating prices of food. Food prices rose from 9.3% in 2013 to 10.6 in 2015 representing an increase of 13% when compared with the figure in 2013. It was 17.4 in 2016 and rose sharply to 19.4% in 2017.

In terms of agricultural production, the major agricultural products can be grouped into foods, fuels, and raw materials. Specific foods include cereals, (grains), vegetables, fruits, oils, meats and spices. The table below shows the estimate of households growing various crops and the areas cultivated in hectares.

Table 5: Estimate of Area and Production of 10 Top Major Crops, 2015

Crop Type	% of Farming households growing crop	Areas in Hectares
Cassava	41.6	0.2
Maize	48.3	0.3
Sorghum	39	0.4
Cowpeas	30.6	0.3

Yam	28.7	0.2
Millet	24.9	0.4
Groundnut	13.7	0.3
Rice	10.6	0.4
Cocoyam	9.2	0
Sesame/Beniseed	6.5	0.5

Table 5...

Source: NBS, 2015

As shown, only a dismal 0.2 hectares of farm land was cultivated for yam production in the year 2015 by 28.7 farming households, 0.3 hectares for maize and none was cultivated for cocoyam in that year.

Table 6: Growth in Major Crop Production (%)

Crops	**2014**	**2015**	**2016**	**2017**
Wheat	2.6	2.5	5.5	3.4
Sorghum	4.4	1.6	2.1	2.9
Rice	4.3	4	3.7	18.7
Maize	2.6	1.4	5.0	2.6
Millet	2.0	0.8	0.6	2.7
Soya Bean	7.5	3.2	3.2	0.8
Beans	3.1	3.0	2.2	4.2
Plantain	2.1	2.4	21.5	8.3
Potatoes	3.8	0.9	3.2	4.1
Yam	1.0	3.8	1.6	3.3
Cassava	4.9	3.6	3.7	3.3
Rubber	6.3	3.8	21.4	7.0
Palm Oil	3.4	3.4	3.8	4.3
Cocoa	7.1	4.1	3.2	4.4

Source: CBN, Annual Report, 2015 & 2017

Growth rate in most of the crops were not impressive. Wheat grew to 2.6% in 2014, falling marginally to 2.5% in 2015, increased substantially in 2016 to 5.5% before falling sharply to 3.4% in 2017. Apart from Rice and Yam whose growth rate recorded tremendous jump in 2017 compared to their positions in 2016, all other crops either recorded sharp decline or a marginal increase.

The implication of these lean production and growth in major crops is insufficiency and inadequate supply of food to meet growing demands. It has been hypothesized that in the low-income countries where people spend a high proportion of their income on food, even a small food price increases can be detrimental to the financial well-being of the urban and rural poor.

GOVERNMENT EXPENDITURE ON OVERHEADS AND POLICY DIRECTION

It has been documented that rapid population growth makes the achievement of economic development difficult. It creates a very young population that increases the dependency ratio which accelerates government expenditures on economic and social overheads such as education, food, agriculture, health, housing, etc.

Table 7: Expenditure on Social Overheads, 2009-2016

Year	Education	Health	Agriculture
2009	137.12	90.2	22.44
2010	170.80	99.1	28.22
2011	335.80	231.80	41.2
2012	348.40	197.9	33.3
2013	390.42	179.99	39.43
2014	343.75	195.98	36.70
2015	325.19	257.72	41.27
2016	341.88	202.36	36.58

Source: CBN statistical bulletin, 2016

Over the years, owing to increases in population, governments at all levels continue to devote substantial portion of revenue to meet increasing social overheads. At the federal level, these expenditures have continued to grow. In education, this increased from 137.12 in 2009 to 341.88 by 2016. It was 90.2 for the health sector in 2009, rising and reaching an all-time high of 202.36 in 2016.

The agricultural sector in Nigeria was the dominant sector before the advent of oil, contributing 82.3% to GDP. However, following the discovery of oil, the sector has been relegated to the background contributing only about 0.95% to growth in 2016.

Table 8: Sectoral Growth Rates of GDP in Agriculture Sector

Activity Sector	2013	2014	2015	2016	2017
Agriculture	2.9	4.3	3.7	4.1	3.45
Crop Production	2.5	4.1	3.5	4.3	3.64
Livestock	6.0	5.4	6.0	2.9	1.61
Forestry	5.6	4.6	3.7	2.6	3.31
Fishing	9.0	6.7	5.9	-0.7	1.34

Source: CBN, Annual Report, 2017

As shown in table 8, sectoral growth rate of GDP in agriculture was 3.45% in 2017 compared to 4.11% recorded in 2016. Within the sector, crop production shown the most prominent growth recording 3.64% increase in 2017, followed by forestry, livestock and fishing which grew by 3.31%, 1.61% and 1.34% in 2017 respectively.

In terms of Agricultural Policy, the government introduced and continued the implementation of the Agricultural Promotion Policy framework. The objective of this policy is to diversify the economy away from oil into agriculture, ensure food security and reduce the level of poverty. As a result, according to CBN (2015), N26.0 billion was released for the 2015 annual dry season farming programme, while six million rice farmers, drawn from 19 states across the country received improved rice seed varieties. Further, the Federal Government introduced the 10-year agricultural sector food security and nutrition strategy. The overall objective of this is to provide a roadmap for the federal ministry of Agriculture and to guarantee good nutrition and food security in the country.

EMPIRICAL LITERATURE

Different theories have attempted to model the effect of rising population on food supply. Whereas some theories raised alarm about population bulge and food supply, others documented the revolution required in agriculture and food production to enable sufficient food supply to feed the ever rising population. Three of such theories are germane to this study, including the Malthusian, Conservation and High Pay-Off Input model.

It was Thomas Malthus that first drew the attention of the world to the implications of growing population on food availability. Malthus (1798) in his famous essay on Population observed that whereas food production only grows arithmetically, population grows geometrically and if the growth in population was not checked, population may outrun food supply. He therefore recommended preventive checks in the form of moral restraints, late marriages and contraceptive use and positive checks in the form of conflicts, misery, disasters,

famine, war etc. as a way of driving the population growth down. Clearly, Malthus theory is apropos and applicable to the Nigeria case where food production is not catching up with population growth. Hence, some of Malthusian recommended checks must be adopted with restraints to achieve results.

The Conservation model popularized by Malthus, David Richardo and John Stuart Mill during the 18th century evolved following experiences in low land productivity and poor land use which causes the marginal productivity of land and labour to decline. It proposed paying high priority to maintaining soil productivity and advocates for the production and use of organic manures and labour intensive capital formation. This is especially important in Nigeria where subsistence farming, continuous cropping and shifting cultivation has made land to lose its nutrients and results in low crop production.

Conversely, the High Pay-Off Input model associated with Theodore Schultz (1964) opined that the key to transforming a traditional agricultural sector into a productive source of economic growth is investment in modern high-pay off inputs such as seeds, fertilizers and technologies and making them available to farmers in poor countries. The model suggested the creation of the requisite capacities to generate a sufficiently high rate of agricultural growth so as to promote economic development and food sufficiency for the ever increasing population.

Empirically, literature on population, food security and economic growth is shallow. Babatunde and Ajayi (2010) studied the relationship between food crop production and population growth and observed a strong inverse relationship between the growth in population and a number of identified food crops studied. The correlation according to them indicated that food output does not cope with population growth. Abdulrahaman (2013) used simple regression technique to examine the effect of population growth on food security in Nigeria and concluded that population growth has an inverse relationship with agricultural output. Peters (2015) examined the relationship among population dynamics, savings and agricultural output in Nigeria. He found that population dynamics affects savings negatively, and this affects investment in the agricultural sector, leading to low agricultural output. In cross-country regressions Ahlburg (1996) found no relationship between population growth and poverty. Other similar studies found that the major variables explaining cross-country variation in poverty were the rate of economic growth and the degree of income inequality. In contrast, Eastwood and Lipton (2001) did found a considerable effect of population on poverty:

Mapfumo (2012) investigated how government expenditure on agriculture affects economic growth and poverty reduction in Zimbabwe from 1980-2009, using a log linear growth regression model. The results from this study suggested that spending more on agricultural research and development can improve economic growth and ultimately reduce poverty.

Adofu, Abula and Agama (2012) employed the Ordinary Least Square regression technique to examine the effects of government budgetary allocation on agricultural output in Nigeria. Their results revealed that government budgetary allocation to agricultural sector has a strong, positive and significant impact on agricultural production in Nigeria.

Udoh (2011), on his part investigated the relationship between public expenditure, private investment and agricultural output growth in Nigeria over the period 1970-2008. The error correction model adopted revealed that increase in public expenditure has a positive influence on the growth of the agricultural output. Similarly, Zakare Saheed (2014) examined the effectiveness of government expenditure in improving domestic food supply in Nigeria. Using the Ordinary Least Square technique, he found that government expenditure on agriculture had a negligible and insignificant effect on domestic food supply.

Clearly, this study is an addition to the existing body of knowledge on the current subject matter.

CORRELATES BETWEEN POPULATION, FOOD SECURITY AND ECONOMIC GROWTH

The question to ask is what is the relationship between Population, Food Security and Economic growth? The answer is ambiguous but clearly negative. Rapid population growth creates pressure and crowds out resources. It increases government social overhead expenditure and deplete expenditure on capital formation. This results in inability of government to have adequate resources to create the enabling environment for investment to strive. Investment drops, unemployment escalates, there is trade imbalance, especially bogus imports and hence overall economic growth deteriorates.

I posit that population bulge puts pressure on available resources and increases the demand for food. Rising demand exacerbates inflation which worsens the living condition of the populace and by implication economic growth. Therefore, we expect a negative relationship between population growth and food security. An increase in population will consequently increase food demand. Increase in demand which is not counterbalanced by an increase in production will result to demand outstripping supply which results to food insecurity.

Due to this population explosion, a number of scholars have called for the doubling of food production to meet up with the escalating population. FAO (2009); Rijsberman (2012); Conway (2012), Nwanze, Graziano da Silva et al. (2012). FAO (2009) advocated for the doubling of food production by 2050 to feed the teeming population because according to Rijsberman (2012), one billion people are already going to bed hungry every day. Nwanze, Graziano da Silva et al. (2012) calls for an improvement in people's access to food, an increase in production of food by 60per cent by 2050, drastically reducing huge losses and wastages

associated with food and managing natural resources sustainably for it to flourish for future generations.

RESEARCH METHODOLOGY

Annual data for the period 1981 to 2016 was utilized in this study. The data were obtained from various sources including CBN annual report and statistical bulletin (2016), National Bureau of Statistics (2016) and the food and Agricultural organization, FAO data bank (2016). Reliance were placed on data from these agencies because of their method of data collection and the integrity of the data. The choice of data is informed by their true representation of the variables been studied. Further, the data scope ranging from 1981 to 2016 representing a period of thirty-five (35) years is believed to be enough to adequately capture the effect of the dependent variable on the various explanatory variables of the study.

The general form of the model to be estimated is as expressed below;

RGDP = f(POPt, VAFs, GEXPt).

The variables used in the model are population, value added in agriculture, forestry and fishing (proxy for food security), real government expenditure and real gross domestic product (proxy for economic growth) in Nigeria. In the model, real gross domestic product is a function of population, food security and real government expenditures.

A linear estimation of the model by adding an intercept and a stochastic error term results to the following transformation;

RGDP = B0 + B1POPt +B2VAFs + B3GEXPt + Ut.

B1, B2, B3 < 0.

Where:

RGDP = Real Gross Domestic Product (proxy for economic growth)

POPt = Population

VAFs = Value added in agriculture, forestry and fishing (proxy for food security)

GEXPt = Real Government expenditure

Ut = stochastic error term.

A-priori, the relationship between economic growth, population, food security and government expenditure is expected to be negative. Unprecedented increase in population pressurizes food supply which increases the demand for food. An increase in food demand without a corresponding increase in production will result in food insecurity. To cushion the food crisis, government is forced to make provision to increase its expenditure on overheads in the areas of

agriculture and food production. This crowds-out resources away from capital and key infrastructural development. The overall effect is to worsen economic growth.

To estimate the above model, first, I ran the OLS regression using Eviews 8.1 software but typical of time series data, the results obtained though satisfactory in terms of its diagnostic abilities, it was spurious showing very high RS statistic and indicative of the presence of serial correlation. Thus, I subjected the series to unit root test using the Augmented Dickey Fuller test at both levels and first difference, before estimating the error correction model.

FINDINGS

Clearly, the results of the unit root test revealed that three of the series are stationary at levels with only one achieving stationarity at first difference. The results are presented in the table below.

Table 9: Unit Root Test results for Levels & First Difference

Variables	ADF Lag	ADF test stat.	95% critical	Remarks
LRGDP	1	0.7094	2.951	Stationary
LPOPT	1	1.3309	2.951	Stationary
LVAFS	1	7.2112	2.948	Non-Stationary
LGEXPT	1	1.57069	2.948	Stationary
∆RGDP	1	1.9584	2.951	Stationary
∆POPT	1	0.2794	2.954	Stationary
∆VAFS	1	2.09558	2.951	Stationary
∆GEXPT	1	2.4608	2.954	Stationary

Source: Author's Computations using Eviews 8.

The results suggest that all variables including RGDP, POPT and GEXPT were all stationary at both levels and first difference except VAFS that was non-stationary at levels but achieved stationarity at first difference. Consequently, the hypothesis of non-stationarity cannot be rejected for all the variables at first difference.

Next, we test for co-integration between the variables LPOPT, LVAFS, LGEXPT, and LRGDP. To achieve this, we run an OLS regression of the series and test its residuals for stationarity using the ADF to test for the unit roots. The result of the unit root tests on the OLS residuals is reported below.

Table 2: OLS regression output

Null Hypothesis: RGDPRESDIUAL1 has a unit root

Exogenous: None

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.745638	0.0075
Test critical values:	1% level	-2.632688	
	5% level	-1.950687	
	10% level	-1.611059	

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

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(RGDPRESDIUAL1)

Method: Least Squares

Date: 01/11/19 Time: 01:39

Sample (adjusted): 1982 2016

Included observations: 35 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RGDPRESDIUAL1(-1)	-0.487688	0.177623	-2.745638	0.0096

R-squared	0.170894	Mean dependent var	-143.3110
Adjusted R-squared	0.170894	S.D. dependent var	1278.398
S.E. of regression	1164.049	Akaike info criterion	16.98535
Sum squared resid	46070314	Schwarz criterion	17.02979
Log likelihood	-296.2436	Hannan-Quinn criter.	17.00069
Durbin-Watson stat	1.296097		

Source: Author's results using Eviews 8.1

Following the existence of long term equilibrium relationship among the non-stationary variable which precludes spurious regression, the series were examined in their levels for estimation purposes. The estimated error correction model is presented below.

Table 3: Error correction model estimation

Dependent Variable: D(RGDP) Method: Least Squares

Date: 01/11/19 Time: 02:05

Sample (adjusted): 1987 2016

Included observations: 30 after adjustments

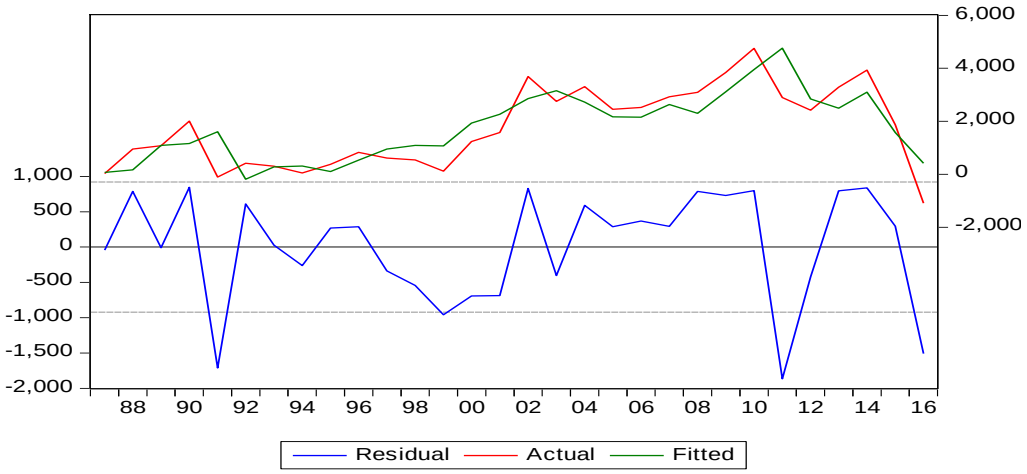
Variable	Coefficient	Std. Error	t-Statistic	Prob.
RGDP(-1)	-0.365754	0.237528	-1.539835	* 0.1385
POPT(-1)	-3.40E-05	0.000142	-0.238774	0.8136
GEXPT(-1)	2.045405	0.807431	2.533227	* 0.0193
VAFS(-1)	-0.000109	0.000427	-0.256173	0.8003
C	-2374.431	4391.086	-0.540739	0.5944
D(RGDP(-1))	0.946624	0.216477	4.372867	** 0.0003
D(POPT(-3))	0.005223	0.008463	0.617161	0.5438
D(GEXPT(-4))	-1.071705	1.140067	-0.940038	0.3579
D(VAFS(-5))	0.000587	0.000471	1.247178	* 0.2261

R-squared	0.724965	Mean dependent var	1756.442
Adjusted R-squared	0.620190	S.D. dependent var	1493.226
S.E. of regression	920.2557	Akaike info criterion	16.73051
Sum squared resid	17784281	Schwarz criterion	17.15086
Log likelihood	-241.9576	Hannan-Quinn criter.	16.86498
F-statistic	6.919253	Durbin-Watson stat	1.952885
Prob(F-statistic)	0.000177		

*Significant t-ratio at 5% level. **Significant t-ration at 10% level.

Source: Authors results using Eview 8.1

Figure 1: Actual, fitted and Residual Graph



An examination of the econometric results shows that the overall fit is satisfactory with an R-squared of 0.72. Thus 72% of the systematic variation in economic growth is explained by the ECM. The F-statistic of 6.919 is significant at the 5% level. The coefficient of the ECM term (RGDP) is significant and correctly signed. Clearly, the estimated parsimonious regression results presented above indicates that two of the explanatory variables, GEXPt and VAFS are statistically significant at the 5% and 10% level of significance respectively. Two of the variables (POPt & VAFs) were correctly and negatively signed implying a negative relationship between economic growth and these variables during the period. The implication here is that economic growth worsens with increases in population and food insecurity.

A positive but significant relationship was observed between economic growth and government expenditure. Clearly, focused increases in government expenditures to improve infrastructure and other social overheads results in an improvement in the economy.

Food Security (VAFS)

The estimated coefficient of food security (proxied by VAFS, value added forestry/fishing) was statistically insignificant but correctly signed. This implies that economic growth worsens with food insecurity.

Population (POPt)

The result of the coefficient of population was observed to be negatively related to economic growth but this relationship was not significant. Population bulge puts pressure on social infrastructure, it increases government expenditure, causes congestion and urbanization and worsens economic growth.

Government Expenditure (GEXPT)

The coefficient of government expenditure is correctly signed and significant at the 5% level. In increase in government expenditure by 10% will improve economic growth by 205%.

RECOMMENDATIONS

Based on the above findings, the study makes the following recommendations;

i. Doubling of food production through large scale agricultural production, mechanized and technologically induced crop production to guarantee food sufficiency.
ii. Massive investment in the country's abundant human resources to adequately prepare them to take up challenges in increasing the nation's productive capacities and enhance economic development.

iii. The need to check food price inflation to improve affordability for the core poor in the rural and urban areas.

iv. Consistent improvements in policies, institutions, public and private partnership with a view to accelerate agricultural and rural growth to levels that will reduce rural poverty.

v. Improvement in the income generating capacities of government and the citizenry to be able to sustain expenditure in social overheads.

CONCLUSION

So far, the study examined the effect of rapid growth in population on food security and economic growth in Nigeria. The study found some stylized fact suggesting a positive and significant relationship between government expenditure and economic growth but a negative relationship between food security, population and economic growth. Policies to curtain population growth and food security must aim at eliminating poverty, reducing income inequalities, and increasing educational and job opportunities for the populace.

It must also ensure the expansion of existing health and medical institutions to build their capacities to curb maternal and child related diseases, and ensure the equitable provision and access to social services. To be successful, such policy must be participatory and gender sensitive.

SCOPE FOR FURTHER STUDIES

This study examined the effect of an aspect of insecurity (food Security) on population and economic growth. It would be very interesting to conduct another study within the same area of research, with the incorporation of all aspects of human security (especially as defined by UNDP) and including Economic, Health, Environmental, Personal, Community and Political security, which will give more integrated result to the topic and better utility to the consultants, researchers and policy makers.

REFERENCES

Abdulrahaman, S. (2013): Population Growth and Food Security in Nigeria. Arabian Journal of Business and Management Review, 1(3):41-5

Adofu I., Abula M., and Agama J. E. (2012): The Effects of Government Budgetary Allocation to Agricultural Output in Nigeria. Sky Journal of Agricultural Research. Vol.1p.1 – 5

Alberto Valdes (1981). Food Security for Developing Countries. A Westview Special Study. Westview Press, Colorado. Page 9-11, 25.

Alexandratos, Nikos and Jelle Bruinsma (2012): World Agriculture towards 2030/2050: The 2012 Revision. ESA Working Paper. Rome, Food and Agriculture Organization.

Ahlburg, D.A. (1996): Population Growth and Poverty, in D.A. Ahlburg, A.C. Kelley and K.O.Mason (eds.), the Impact of Population Growth on Well-being in Developing Countries, Berlin: Springer-Verlag, pp. 219–58.

Babatunde, B. O. and Ajayi, S. O. (2010): Food crisis and Population growth in Nigeria. Leadership, Mentoring, Coaching and Motivation. No. 11

Christiaensen, L., and Demery, L., and Kuhl, J. (2010): The (Evolving) Role of Agriculture in Poverty Reduction: An Empirical Perspective; WIDER Working Paper 2010/36. http://www.wider.unu.edu/publications/working-papers/2010/en_GB/wp2010-36/

CIA Fact Book (2018): Africa:Nigeria. Central Intelligence Agency, USA. Available online at https://www.cia.gov/library/publications/the-world-factbook/geos/ni.html. Accessed on 15/10/2018.

Conway, Gordon (2012): One Billion Hungry: Can We Feed the World? New York, Cornell University Press.

Eastwood, R. and M. Lipton (2001): Demographic Transition and Poverty: Effects Via Economic Growth, Distribution and Conversion, in N. Birdsall, C. Kelley and S.W. Sinding (eds.), Population Matters: Demographic Change, Economic Growth and Poverty in the Developing World, Oxford: Oxford University Press, pp. 213–59

FAO (2009): How to Feed the World in 2050. Rome, Italy, Food and Agriculture Organization

Jhingan, M. L. (1997): The Economics of Development and Planning. Vrinda Publications Limited, Mayur Vihar, Phase 1, Delhi, India. Page 377-386

Lester R. Brown (1995): Who Will Feed China? Wake up Call for a Small Planet; World Watch Institute; W. W. Norton & Co.,

Lipsey R. G. etal, (1993): Economics, Tenth Edition. Harper Collins College Publishers, United Kingdom. Page 871.

Lois Simonds Hungale & Ralph Sherman (1979): Food and Economics. Avi Publishers. Page 2.

Mapfumo, A. (2012): Agricultural Expenditure for Economic Growth and Poverty Reduction in Zimbabwe. Unpublished Thesis, University of Fort Hare, Zimbabwe.

Malthus, Thomas (1798): An Essay on the Principle of Population, Oxford World's Classic report. Page 39-45.

Maxwell D. and K. Wiebe, (1998): Land Tenure and Food Security: A Review of Concepts, Evidence, and Methods, Land Tenure Center Research Paper No. 129, Madison: LTC.

Milton Iyoha (2002), Macroeconomics: Theory and Practice, Mareh Publishers, Benin. Pg. 42, 221

National Bureau of Statistics (2016), Annual Abstract of Statistics, Office of the Statistician General of the federation, Abuja, Volume 1, July.

Nwanze, Kanayo F., José Graziano da Silva, Ertharin Cousin and Emile Frison. (2012): Opinion: Food Security Must Be On The Table At Rio. Retrieved 10/07/18 online from http://www.wfp.org/news/news-release/food-securitymust-be-table-rio20.

Onime, Bright Enakhe (2017): Insecurity and Economic Growth in Nigeria: A Diagnostic Review. European Scientific Journal, Vol. 14, No. 4 (2018), February, 377-391.

Organization of Petroleum Exporting Countries (2016): Annual Statistical Bulletin, Helferstorferstrasse 17, A-1010, Vienna, Austria.

Peters, N. (2015). Population Dynamics, Savings and Agricultural Output in Nigeria. Social Science Journal, 8(2):98-107

Rijsberman, Frank. (2012): CGIAR: A Global Research Partnership for a Food Secure Future. Retrieved 10/7/18 online from http://www.cgiar.org/consortiumnews/cgiar-global-research-partnership-for-a-food-secure-future.

Stringer Randy (2000): Food Security in Developing Countries, Centre for International Economic Studies, Policy Discussion Paper 0011, Adelaide, Australia, March.

Theodore Schultz (1964): Transforming Traditional Agriculture (New Haven, Conn., 1964).

Timothy A. Wise (2013): Can We Feed the World in 2050? A Scoping Paper to Assess the Evidence, Global Development and Environment Institute. Working Paper No. 13-04, September.

Udemezue, J.C. and Osegbue, E. G. (2018), Theories and Models of Agricultural Development. Annals of Reviews and Research, Volume 1, Issue 5, April.

Udoh, E., (2011). An examination of Public Expenditure, Private investment and Agricultural Sector Growth in Nigeria: Bounds Testing Approach. International Journal of Business and Social Sciences, vol. 2, No.13, p.285-292

World Bank, (2000). Can Africa Claim the 21st Century? Washington D.C; World Bank.

Zakaree Saheed (2014). Domestic Food Supply in Nigeria: Effectiveness of Government Spending. JORIND, 12 (2), December. ISSN 1596-8308.