Population Dynamics and Food Security in Nigeria

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Abstract

Millions of people in the world today are food especially in the third world countries. This sad state has been of a great concern to the United Nations, as captured in the United Nations Millennium development goal 1, sub-target A, B, and C to fight hunger, poverty and starvation globally and ensure environmental sustainability. This paper examines population dynamics and food security in Nigeria, by decomposing population into the following strata 0-14years (p1), 15-64years (p2) and 65 and above (p3). The paper also decomposes food production into (fishery, crops, livestock and). Time series data were obtained from various sources and subjected to series of econometric analysis. The empirical results show that the dependent populations 0 to 14 years and 65 years and above have negative and significant effect on fishery, livestock, and crops. This implies the food crisis experience in the country can partly be explained by the dynamic nature of the country population composition. To checkmate this ugly trend the paper recommends population control and aggressive revolution in the agricultural sector.

Keywords: *Population, Population Dynamics, and Food Security.*

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Background to the Study

There seems to be a lot of literature on food security especially in the third world countries. Babatunde, Omotesho and Sholotan (2007), Fayeye and Ola (2007), Onola (2009) are among a few of the literature that examined food security in third world countries. Nigeria a major food exporter, now metamorphosed into a major food imparter. In 2014 Nigeria spend the sum of N218 billion on food impartation. What gave birth to this has been a subject of heated debate among scholars. Some attributed it the rapid growth of the country's population (3.1%) ala Malthusian. Others attributed it to "Dutch disease" and poor policies of government. Adulranhaman (2013) attributed the problem to poor allocation given the brain child of British Amalgamation in 1914, to the sector. Iwuchuku and Igbokwe (2011) stated the problem emanates from the poor agricultural policies and programmes of the government. To Amen (2015), the problem emanates from theuncontrolled population explosion in the country. The list is unending, but for constrain of space we examine but a few scholars.

This paper in contributing to the heated debate x-rays the problem from the angle of population growth. However, the uniqueness of this study lies in its ability to decomposed population into different strata (0 to 14 years, 15 years to 64 years and 65 years and above). It also decomposes the agricultural output into three components (crop production, livestock and fish production). The justification for the above is that, they constitute the major source of food in the country.

Thus, the objective of this study is to assess the effect of these population strata on the various components of agricultural produce, as to ascertain which age bracket is actually a threat to food security in Nigeria. Following the introduction, the rest of the paper is divided into the following sub-sections; section two dwells on conceptual clarification. Section three x-ray the various literature related to the study and section four is the theoretical framework **in** which thestudy is anchored. Section five is the method of study, while section six, present and discuss the result. Section seven concludes the study, with some policy recommendations

Review of Literature

The key concepts, **population, population dynamics** and **food security** are defined in this section. Oxford Advanced Learner's Dictionary defined population as "all the people who live in a particular area, city or country".

Population dynamics is the change in the population structure or size as a result of the interaction among birth rate, death rate and net migration in country. Food security is defined by FAO (2003) as when all people, at all times, have physical and economic access to sufficient, safe and nutritious food for a healthy and active life.The above definition put forth by FAO (2003) is anchored on four conditions as pointed out in the World Food Summit Plan to Action, paragraph 1. (1) adequacy of food supply (ii) stability of food supply without fluctuations or shortages from season to season or from year to year, (iii) accessibility and affordability of food and lastly quality and safety of food. To Adetiloye (2012) food security means access to enough food by people at all times, that make them healthy, active at a low cost.

For Nana-Sikam (1995) a country and people are food secured when their food system operates in such a way as to remove that fear that there will not be enough food to eat. Parikh (2000) cited in Igbuzor (2012) defined food security as a state in which all people have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. A careful examination of the above definition shows that food sufficiency is a prerequisite for food security.

Abdulrahaman (2013) in his study, population growth and food security in Nigeria, using simple regression analysis technique, concludes that population growth affects negative agricultural output in Nigeria. Thus, given rise the food insecurity. Peters (2015) examines 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. It is this poor yield in agricultural produced, emanating from the dynamic nature of the population that resulted into food insecurity that characterized the Nigerian economy. This partly explained the rise in food import bill in the country.

Akpan (2009) investigates oil resource management and good insecurity in Nigeria. He uses the unrestricted Vector Autoregressive (VAR) model and found that over dependence oil resulted in the neglect of the agricultural sector, hence the decline in food production for the teeming population in Nigeria. This is an archetype of Dutch disease, because before the advent of oil exploitation and exploration agriculture was the mainstay of the Nigerian economy.

Fayeye and Ola (2007) examine strategies for food security and health improvement in the sub-Saharan Africa. They established that sub-Saharan Africa is plaque by poverty and severe malnutrition, with 30 to 45 countries plumage into food crisis. Smith (2007) investigates food security in Sudan. He states that Sudan's poor domestic policy affected farmer negatively, given rise to persistent hunger and malnutrition. He pointed out that the civil unrest put peasant farmers and the entire population at a great disadvantage. Swaminathan (2001) in his study food security and sustainable development in India, states that, the capacity to achieve a balance between the population of the people and the production of food grains and other agricultural products was marked by a sense of despair.

Cliver (2003) investigates food security in sub-Saharan Africa. He found that about 840 billion people globally are malnourished and the most **affect** in the African continent. He contends that efforts to address food security have provenabortive and food insecurity becomes the order of the day. Babtunde, Omotesho and Sholotan (2007) examine the socio-economic characteristics and food security status of farming households in Kwara State, North central. They used three-stage random sampling technique to obtain a sample of 94 respondents. The result shows that 36 percent of the respondent households were food secure, while 64 percent of respondent households are food insecure. This result gives credence to the prevalent of food insecurity in the country.

Wilson and Wilson (2010) examined population growth and food security in Nigeria using the cointegration approach. Their finding indicate that population has adverse effect on food security. They assert that food security is necessary for the following reasons: First, many countries, especially the developing countries have had tortuous uprising, resulting to instability and overthrowing of governments. Such revolt according to Moro and Igben (1999) had their root causes insufficient supply of the major staple food stuffs and the attendant high prices. If such instabilities are to be checkmate then adequate attention must be devoted to ensuring food, self-sufficiency and security because an hungry man is an angry man.

Second, attainment of food security leads to a positive balance of trade in food products as it reduces dependence on food imports and conserves the much needed foreign exchange. The conserved foreign exchange can be used to import productive capitals such as machines; new technologies and expertise which is capable of increase our frontier of knowledge and the rate of socioeconomic transformation.

Third, food security reduces fear especially among the downtrodden, about what to **eat**, and thus reduces tension in the polity.

Fourth, self-sufficiency in food production and the attendant food security imply that the country is capable of developing indigenous technology that can boost the production of food and other commodities required for growth and development.

Fifth, food security entails that majority of the people will have access to a reasonable high level of food items and hence enjoy an acceptable and adequate standard of nutrition. When this occurs, it is expected that expenses incurred in curative medicine arising from ill-health caused by poor nutrition will be reduced and more fund will be available for execution of other development projects.

Sixth, Moro and Igben (1999) pointed out that attainment of food self-sufficiency and extension food security are associated with certain complementary and beneficial outcomes. According to them, one of such complementary fallout is the fact that food self-sufficiency incorporates an inbuilt programme which ensures the existence of a buffer stock; that is quantity of food items which is far in excess of the immediate requirements of the people and which is stored to take care of the people in time of scarcity and poor harvest.

Finally, the attainment of food self-sufficiency and food security is an instrument required to achieve the inward looking strategy of self-reliance, currently being pursued by many developing nations. Such policy instrument according to Moro and Igben (1999) is expected to build up trust and confidence I the domestic economy. Such confidence encourages unfettered inflow of foreign investment and domestic reinvestment which are capable of improving the rate of socio-economic growth and development.

World food summit organized the FAO in 2002 concludes that "the goal of halving the number of hungry requires that the most food insecure and impoverished countries promote the alleviation of rural poverty, especially through sustained growth of agricultural production particularly in sub-Saharan Africa (FAO, 2002). It can be inferred from this statement that agricultural development is imperative for increasing food supply and also a means of generating the much needed income required to ensure access to food by food-insecure people. This informs the New Partnership for African Development (NEPAD) supported by Johannesburg summit on sustainable development in 2002, to place emphasis on agricultural development (Boussard, Daviran, Gerard and Volturiez, 2006).

FAO/INFP (2010) stated that "in 2010 925 million people could not afford enough food for sufficient diet and thus, where undernourished. The recent world food crises pushed many people to hunger and different ailment, putting food security once again at the top of the development agenda (FAO, 2008). Efforts to remedy this food insecurity, situation did not yield the much expected result because of the complex nature of the problem. Boussard, Davirin, Gerard and Volturiez (2006) captured the situation thus:

> *The natural resources needed to produce sufficient food are under pressure. Conversion of remaining forest areas into agricultural land, with its concomitant biodiversity loss; increasing demand for water for irrigation and exhaustion of fertile land, all represent possible limitations to the ability to feed addition 2 billion people.*

The mind boggling question is what is the hope of the future generation given the so insurmountable limitations? And the lack of political will on the part of the government in addressing these thorny and lives threaten issue.

Efforts at Attaining Food Security
Given the prime place of food security in sustainable development issue, and its role in eliminating malnutrition, which erode human capacity and reduces labour productivity, the government quickly swims into action by embarking on programmes, which will help to alleviate hunger and poverty. Some of these programmes according to Abu (2012) cited in Wilson (2013) includes: Operation Feed the Nation (OFN) which try to sensitive on food production with the slogan "If you feed yourself you feed the nation", (ii) River Basin Development Authority geared towards improving fish production and control of flood water pollution and erosion that has made life unbearable for our Eastern brothers, (iii) Agricultural Development Project (ADP) geared towards improving the technical and economic efficiencies of small-scale farmers, (iv) Green Revolution code name modernization of hunger, (v)The National Special Food Security Programme, with the aim of extending the application of innovative low cost approaches to agriculture to the door step of the farmers at minimal cost, (vi) The National Fadama Development Project (Fadama I, II and III) aimed at ameliorating the plights of the farmer to enable tem realized the full potential benefit of agriculture production activities.

All these programmes were out in lace to savage food insecurity and a quantum leap to development. Despite the laudable objectives of these programmes, it fall short of expectation because of the Nigerian factor (corruption) and the latter end of it, is even worse than the former, oh! What a melancholy.

Theoretical Framework

The work centres on the theoretical underpinning of Malthus (1766-1834) ala Malthus population theory. Two remarkable things Propel his work in this area: the rapid growth in population of Britain as at the time of his first publication and the fixed nature of land that gave rise to the law of diminishing return experienced in the agricultural sector of the British economy. He captured the scenario thus:

> *The best lands are taken up first, then next best, the next best, then the inferior, at last the worst; at each stage the amount of food produced is less than before. If existing cultivated land were farmed intensively the same inexorable law will operate and again there will be diminishing return. Consequently, it would be impossible to maintain expansion of food production to keep pace with increase population.*

The fundamental assumption underlying Malthus population theory, is that the desire for sex is strong in man and hence his ability to procreate without control because of the instinct and urge. Hence, unless man is checked, the population will grow at a faster rate than can better be imagined within a few years (Weeks, 2002). In a nut shell, the theory postulates that population increases at geometric rate, while food production increases at arithmetic rate. He concluded by saying given the above scenario, if population is left unchecked, a time will come when population will outgrow food supply. To averse this ugly trend he recommended both positive and preventive checks on population.

Malthus was seen as a prophet of doom in the western economy because, his predictions falls short of expectation. However, in sub-Saharan African countries, the realities of his predictions cannot be faulted. Although population in Nigeria has not grown at geometric rate as postulated by Malthus, overtime population growth has been tremendous (Ewugi, 2012). The vice envisaged by Malthus's theory in evident in the Nigerian economy and continue to hunt us, hence the violent and unrest experience in the country, which have left scores death. Domestic food production continued to lag behind the food needs of the population in Nigeria, and this has resulted to massive food importation which is detrimental to our balance of payment. The above assertion is buttressed by the report of the study group set-up by military administration in 1985 to examine the food situation of the country. Their report shows that there was hardly a single food commodity in which the country can claim to be self-sufficient (GLWI, 2002). This sad fact is a mirror of the present Nigeria situation after about 26 years.

Method

The empirical analysis focuses on the effect of population dynamics on food production. We examined the correlation and direction of casualty among the different strata of the population and food production. The model specification is stated as follows:

$$C_p \quad = \quad f(P_1, P_2, P_3)$$
$$F_p \quad = \quad f(P_1, P_2, P_3)$$
$$L_p \quad = \quad f(P_1, P_2, P_3)$$

Where:

C_p	=	Crop production
F_p	=	Fish production
L_p	=	Livestock production
P1	=	Population within (0-14 years)
P2	=	Population within (15-65 years)
P3	=	Population within (66 and above)

The data for the above variables are obtained from Central Bank Statistical Bulletin and National Bureau of Statistics various issues.

Results
Correlation Result
The result of the correlational analysis shows that a negative relationship exists among the dependent population P_1 and P_3 and crop production, fish production and livestock production. This result gives credence to Malthus population theory, buttressing the fact that population dynamic affect food supply. P_2 which is the working population has positive correlation with crop production and fish production, but only has a negative correlation with livestock production. This shows that the composition of population is a significant factor in explaining food insecurity or crises in Nigeria. Having establishing the above relationship, it is worthwhile for us to determine the direction of causality.

Table 1: Correlational Test Result

	CP	FP	LP	P1	P2	P3
CP	1.000000	0.511305	0.941675	-0.132321	0.171888	-0.584710
FP	0.511305	1.000000	0.527410	-0.410638	0.465882	-0.915279
LP	0.941675	0.527410	1.000000	- 0.070208	-0.022280	-0.607416
P1	-0.132321	-0.410638	- 0.070208	1.000000	-0.997712	0.431097
P2	0.171888	0.465882	-0.022280	-0.997712	1.000000	-0.490682
P3	-0.584710	-0.915279	-0.607416	0.431097	-0.490682	1.000000

Source: Research Computation, 2016.

The Granger Causality Test Result
This is depicted in table 2, the result shows that P_1 granger cause C_p, P_2 granger C_p and P_3 also granger cause C_p. P_1, P_2 and P_3 also Granger cause F_p. However, P_1, P_2 and P_3 does not granger cause L_p. Therefore the null hypothesis that population does not granger cause food insecurity is rejected and the alternative or research hypothesis accepted.

Table 2: Granger Causality Test Result

P1 does not Granger Cause CP	44	6.59139	0.0034
CP does not Granger Cause P1		0.71651	0.4948
P2 does not Granger Cause CP	44	6.84622	0.0028
CP does not Granger Cause P2		0.99390	0.3793
P3 does not Granger Cause CP	44	3.59336	0.0370
CP does not Granger Cause P3		2.62391	0.0853
P1 does not Granger Cause FP	44	3.55616	0.0381
FP does not Granger Cause P1		0.73982	0.4838
P2 does not Granger Cause FP	44	3.68657	0.0342
FP does not Granger Cause P2		0.82845	0.4443
P3 does not Granger Cause FP	44	5.88595	0.0058
FP does not Granger Cause P3		2.60342	0.0868
P2 does not Granger Cause P1	44	4.84485	0.0132
P1 does not Granger Cause P2		5.64282	0.0070
P3 does not Granger Cause P1	44	10.6400	0.0002
P1 does not Granger Cause P3		5.84058	0.0060
P3 does not Granger Cause P2	44	10.5756	0.0002
P2 does not Granger Cause P3		6.13824	0.0048

Conclusion

The main aim of this paper is to examine the relationship between population dynamics and food security. The empirical result indicates that population dynamics affect food production negatively, giving credence to Malthus theory. There is poverty, food crisis and malnutrition in Nigeria, all the social ills that constitute what Malthus refers to as misery or vices that will claim lives of many as a result of the uncheck population growth are present in Nigeria.Given these findings the paper recommends population control through the use of contraceptives and legislation on the maximum of two wards per couple in Nigeria, and also aggressive agricultural revolution.

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APPENDIX

Pairwise Granger Causality Tests
Date: 11/23/16 Time: 14:18
Sample: 1 48
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
FP does not Granger Cause CP	44	2.36288	0.1075
CP does not Granger Cause FP		2.28600	0.1151
LP does not Granger Cause CP	44	1.81564	0.1762
CP does not Granger Cause LP		1.67336	0.2008
P1 does not Granger Cause CP	44	6.59139	0.0034
CP does not Granger Cause P1		0.71651	0.4948
P2 does not Granger Cause CP	44	6.84622	0.0028
CP does not Granger Cause P2		0.99390	0.3793
P3 does not Granger Cause CP	44	3.59336	0.0370
CP does not Granger Cause P3		2.62391	0.0853
LP does not Granger Cause FP	44	1.13349	0.3323
FP does not Granger Cause LP		0.57362	0.5682
P1 does not Granger Cause FP	44	3.55616	0.0381
FP does not Granger Cause P1		0.73982	0.4838
P2 does not Granger Cause FP	44	3.68657	0.0342
FP does not Granger Cause P2		0.82845	0.4443
P3 does not Granger Cause FP	44	5.88595	0.0058
FP does not Granger Cause P3		2.60342	0.0868
P1 does not Granger Cause LP	44	0.57080	0.5697
LP does not Granger Cause P1		0.56920	0.5706
P2 does not Granger Cause LP	44	0.53287	0.5911
LP does not Granger Cause P2		0.60422	0.5515
P3 does not Granger Cause LP	44	0.18040	0.8356
LP does not Granger Cause P3		0.61082	0.5480
P2 does not Granger Cause P1	44	4.84485	0.0132
P1 does not Granger Cause P2		5.64282	0.0070
P3 does not Granger Cause P1	44	10.6400	0.0002
P1 does not Granger Cause P3		5.84058	0.0060
P3 does not Granger Cause P2	44	10.5756	0.0002
P2 does not Granger Cause P3		6.13824	0.0048