FOOD PRODUCTION TREND IN NIGERIA AND MALTHUS THEORY OF POPULATION: EMPIRICAL EVIDENCE FROM RICE PRODUCTION

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ABSTRACT

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This paper empirically examined the trend of rice production and importation parameters in Nigeria from 1960-2015 vis-à-vis postulation of Malthus theory. Malthus's core argument was that while human population increased exponentially, food production increased more slowly, in a linear or arithmetic series. Data for the study were sourced from secondary data on Nigerian rice production and importation, its deficit and estimated demand andself-sufficiency ratio of rice consumption/demand from 1960 to 2015. Descriptive statistics, correlation analysis and analysis of variane (ANOVA) were used to find out the relationship among the rice variables considered. Both rice imported and rice demand increased from average of 39,350 thousand and 300,569 thousand metric tonnes in 1960-1969 to 2,678,900 thousand and 3,399,000 metric tonnes in 2010-2015 respectively. The result revealed that Nigerian population increased exponentially while rice production increased in arithmetric projection which was in line with postulate of Malthus basic theory of population. Although the expected local rice production (LRP) fluctuated both upward and downward from 1960 to 1980, estimated demand (ESD) rose rapidly and linearly since 1980 to 2015. The trend of self-sufficiency in rice demand from 1960-2015 with time exhibited inverse relationship which implied that food production increase in Nigeria did not commiserate with population increase. If the potential of agriculture resources is harnessed, the observed estimated demand (ESD) could be overwhelmly realized. This implies that rice production would significantly influence agricultural GDP and therefore have influence on economic growth (ECG) in Nigeria. Budgetary allocations to the agricultural sector in Nigeria should followed stipulated 25% FAO standard or at least 10% Maputo agreement by Africa leaders (African Malabo Declaration, 2014) for the crop sub sector to support inclusive economic and human development of the Nigerian government at all levels.

INTRODUCTION
The problem of population and population growth has worried economists and other social scientists for a very long time. The question has always been what the population of a country is likely to be in the future and the economic and social consequence of a change in population, whether upwards or downwards. Malthus, (1798) argued that the world population is growing geometrically while food production is only increasing arithmetically, and unless the population is checked at a time, the population could doubled their numbers in every quarter of a century (Malthus, 1798; 1803). The consequence of these two principles is that eventually, population will exceed the capacity of agriculture to support the new population and it would rise until a limit to growth is reached. According to Malthus, (1803) population could not continue unchecked and classified two different types of checks: positive check factors increasing mortality such as war, famine and disease which would increase the death rate or preventive check otherwise known as negative checks: postponement of marriage, increased cost of food, factors decreasing fertility such as moral restraint, contraception and abortion. The full title of first Malthus' work was an essay on the principle of population as it affects the future improvement of the society, with remarks on the speculations of Mr. William Godwin, the Marquis de Condorcet and other writers. Malthus upheld that their schemes to create a perfect society came up against insurmountable demographic and resource constraints. This constraint placed severe limits on human productive behaviour and undermined the view that a completely free or perfect society was possible (Rashid, 1987, Pullen, 1987, 1998, Ashraf and Galor, 2007).

In the olden days, hunting and fruit gathering was the principal occupation, and the only mode of acquiring food, the means of subsistence being scattered over a large expanse of territory. Human population was low. The history of dramatic growth in Nigeria population began when hunting and gathering was abandoned for farming, animal husbandry, increase in permanent settlement and eventually formation of cities (Ewugi and Illiyasu, 2012). In Nigeria and more commonly in most developing countries, the demand for food products has outstriped supply creating a huge deficit. Although importation of food products was used partially to fill the growing deficits in the past, and presently, its continuation constitutes avoidable drain on Nigeria's scarce foreign earnings, especially during this period of economic instability and dwindling oil prices (Oladimeji *et al*., 2013). Nigerian population has increased from about 60 million in 1963 to 88.5 million in 1991 (National Population Census, 1963 and 1991) with about 48% increase during that period. The population has increase from 88.5 million to a recent estimated figure of over 184 million in 2016 (NPC, 2016). This scenario, 1991-2016) increase in population, shows that population has double in 25 years with about 107% increase which has raised fundamental question: Is the misery or vice envisaged by Malthus manifested in Nigerian economy?. Therefore, the objective of this study was to

examine the trend of rice production and consumption in Nigeria vis-à-vis Malthusian population theory and remarks on long run possible effects of continuous importation of rice to the Nigeeria economy which the country has comparative advantages.

MATERIALS AND METHODS
Study areas
The study was conducted in Nigeria; the country is situated on the Gulf of Guinea, in sub-Saharan Africa. Nigeria lies between Longitudes 2° 49' E and 14° 37' E and Latitudes 4° 16'N and 13° 52' N. It has a total land area of 923,768, 622 km^2 and an estimated population of over 160 million as of 2016 (NPC, 2016). The climate is tropical, characterized by high temperatures and humidity with marked wet and dry seasons, though there are variations between the South and North. Total rainfall decreases from the coast northwards. The South, below Latitude 8° N has an annual rainfall ranging between 1,500 and 4,000 mm and the extreme North between 500 and 1000 mm. Food production in Nigeria is virtually rainfed. For example, Nigeria's irrigated area as a share of total cultivated area is estimated at about 2 percent (Svendsen *et al.,* 2009, Oladimeji and Abdulsalam, 2014), which is lower than average of only 6% for Africa, and 37% for Asia and 14% for Latin America (Oladimeji and Abdulsalam, 2014).

Data sources
Data for the study include secondary data on Nigerian rice production and importation, its deficit and estimated demand, and self-sufficiency ratio of rice consumption/demand from 1960 to 2015. The data were sourced from the publications of Central Bank of Nigeria (CBN) statistical bulletins, Food and Agriculture Organization (FAO); Federal Office of Statistics (FOS)/National Bureau of Statistics (NBS), Federal Ministry of Agriculture and Rural Development (FMARD) and other national and international relevant sources. Graphs and charts related to Malthus theory were adapted from literatures to support or against the empirical findings. Three types of aggregate rice production data were used included total Local Rice Production (LRP), Total Rice Imported (TRI) and Total Estimated Demand (ESD) of the country throughout the sample period expressed in million metric tons. Data covered the period 1960 to 2015.

Analytical techniques
Descriptive statistics: ranges, graphs, correlation analysis and, inferential statistics such as paired sample Z-test, were used to find out the relationship among the rice variables considered.

RESULTS AND DISCUSSION
Descriptive analysis of rice production parameters
The descriptive statistics for Local Rice Production (LRP), Total Rice Imported (TRI) and Estimated Demand (ESD) used in the analyses is shown in Table 1. The average LRP per annum from 1960-2015 was about 1,373,820 thousand metric tonnes while that of TRI, 1,059,967 thousand metric tonnes and about 5,455 million metric tonnes for ESD. Also, the coefficient of variability for LRP, TRI and ESD stood at 0.70, 1.20 and 0.97 respectively. This implies that TRI rose drastically from 201,200 tons (1970-79) 1,762 metric tons (2010-2015) compare to local rice production that rose slightly from 267,640 tons to only 613,300 tons during the same period. This implies that variation in rice imported had a rapid increased compared with local rice production and estimated demand that could be assumed to had a slow rise.

Table 1: Summary statistic of variables used in trend analysis (1960-2015)

Years	LRP. 000` tons	TRI. 000` tons	ESD. 000` tons	ΔLRP	ΔTRI	ΔESD	SSR
1960-69	268,840	39,350	300,569	-	-	-	91.1
1970-79	536,480	240,550	892,227	267,640	201,200	591,658	63.5
1980-89	869,500	551,600	2,437,340	333,020	311050	1,545,113	34.5
1990-99	1,823,600	492,800	5,401,600	954,100	-58800	2,964,261	35.0
2000-09	2,065,600	1,636,500	1.14E+07	242,000	1,143,700	6,018,429	18.6
2010-15	2,678,900	3,399,000	1.23E+07	613,300	1,762,500	879,971	16.9
Total	8,242,920	6,359,800	32,731,736	2,410,060	3,359,650	11,999,432	259.6
Mean	1,373,820	1,059,967	5,455,289	482,012	671,930	2,399,886	43.3
Median	1,346,550	522,200	3,919,470	333,020	311,050	1,545,113	34.75
Stdev	955,045	1,272,532	5,266,749	302,433	757,908	2,220,520	28.8
Min.	268,840	39,350	300,569	242,000	-58,800	591,658	16.9
Max.	2,678,900	3,399,000	12,300,000	954,100	1,762,500	6,018,429	91.1
Cov.	0.70	1.20	0.97	0.53	1.13	0.93	0.67
Skewness	0.1998	1.610	0.5571	1.2124	0.8236	1.4276	1.0446
Kurtosis	-1.8596	2.2254	-2.0048	0.3508	-1.1233	1.6718	0.1292

In addition, local rice production in Nigeria varied from a maximum of 2,678,900 thousand metric tons (2010-2015) to a minimum of 268,840 thousand metric tonnes (1960-1969) with a standard deviation of 955, 045 thousand metric tonnes. Both rice imported and rice demanded increased from average of 39,350 thousand and 300,569 thousand metric tonnes in 1960-1969 to 2,678,900 thousand and 3,399,000 metric tonnes in 2010-2015 respectively. The result shows that average increase in ΔLRP, ΔTRI and ΔESD in 1960-2015 were 482,012, 671,930 and 2, 399,886 respectively. Both the skewness and kurtoss of the TRI shows that the values tends to be asymmetric (1.6) and heavy tails (2.2) which implies there was wide difference among the mean from 1960-69 to 2010-2015. However, the skewness and kurtosis values for LRP tends toward symmetric (0.1998) and light tails (-1.8596). This suggests that change in total rice imported and estimated demand had a wider gap and grow faster while change in LRP tends to have close gap and slower than change in local rice production which was manifested in Fig. 2.

The results support the problem envisaged by malthus population theory as Nigerian food production is inversely proportional to rapid population growth rate which manifested in misery and vices anticipated by Malthus, which include food insecurity, epidemics and diseases, ethnic and religious conflict, chronic or transitory poverty, which depends on how long poverty is expressed by an individual or a community and other forms of vices and misery. It suffices to note that subsequent development in agricultural and industrial production in Britain where the problem was envisaged and many developed countries proved the theory wrong to a large extent.

Rice production and self-sufficiency in Nigeria

The result contains the trend of self-sufficiency in rice demand from 1960-2015 illustrated in Fig. 1. Ironically, the graphical representation shows that there was fluctuating and inverse relationship between self-sufficiency in rice production and time. The findings from Food and Agricultural Organisation (FAO) and Central Bank of Nigeria (CBN) records show that Nigeria's self- sufficiency ratio in rice production was as high as 98.8% in 1960s but fell to an average of 50% in 1990s, dwindled to between 43% and 25% in 2007 and 2014 with an annual average of about 31% and standard deviation of 11.7 (Fig. 1). This also implies that food production in Nigeria increase does not commiserate with population increase. This is in tandem with Malthus posulation who argues that as the world population grow geometrically, a large gap between resources and population occurs.

It suffices to note that Nigeria has about 79 million ha of arable land, 214 billion m^3 of surface water and 87 km^3 groundwater both of which can partly be used for both rainfed crop and irrigation (FAO, 2013). However, Nigeria's abundant agricultural resources notwithstanding, the country is still largely a food deficit nation. But the rapid increase in population of Nigeria has resulted in a huge increase in the demand for rice which is consumed virtually by both rural and urban households in Nigeria.
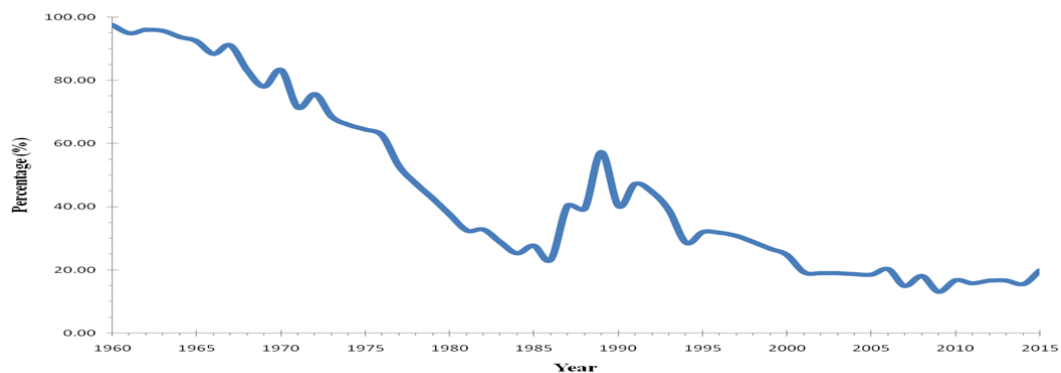

Fig. 1: Trend in self-sufficiency in rice production in Nigeria (1960-2015)
Source: Computation and graph by Author; Data source: C.B.N. and N.P.C. records

Statistical surveys have shown that the demand for rice in Nigeria as at 2007 was estimated at 13.5 million tons against the current production level of 3.2 million tons (Ugwu and Kanu, 2012), thus creating a gap of about 10.3 million tons. In the last ten years, Nigeria has become one of the largest importers of rice, second to Indonesia. Its import bill of rice has increased from US$1 million in 1970s to as high as over US$1 billion in 2014 (FAO, 2015). Available records from Oladimeji and Ajao, (2014) computed from FAO data base statistics found that the total domestic rice production in Nigeria for about 2 decades period (1990-2008) averaged about 3.2 million tons per annum and ranged from 2.5 million tons in 1990 to 4.2 million tons in 2008 with a standard deviation of 429, 600 tons during the 1990 to 2008 decades. But the estimated demand for rice consumption ranged from 3.8 million tons to 14.5 million tons during the same decades with annual average of approximately 8.0 million tons and standard deviation of 3.3 million tons. Although, apart from remedy from importation of rice from the developed countries, Boserup, (1965) criticized Malthus view, arguing that as the population approaches the limits of the

food supply, the supply increases as new technology improves yields. She opined that as population approaches crisis such as what is experienced in Fig. 1, the world would respond with assistance spawning economic growth and new technologies. In contrast to Malthus view, instead of too many mouths to feed, Boserup emphasized positive aspects of a large population. In simple terms, Boserup suggested that the more people there are, the more hands there are to work; She argued that as population increases, more pressure is placed on the existing agricultural system, which stimulates invention and increases production.

Trend analyses of rice production, importation and estimated demand (1960-2015)
The trend analysis for the Nigerian population, resources and food importation is graphically presented in Fig. 2. The figure indicates that the population increases exponentially while resources increase in arithmetic projection which is in line with postulate of Malthus basic theory of population. Malthus envisaged that there could be misery or vices when population outstrips production which he tagged point of misery and this coincided with point of crisis in Nigeria as shown in Fig. 2. Therefore, in the absence of consistent checks on population growth in Nigeria, Malthus prediction that in a short period of time scarce resources will have to be shared among an increasing number of individuals could come to past. However, Malthus failed to anticipate that some developed countries could come to the aids of food deficit countries such as Nigeria through programmes such as grant, aids and relieves, and more importantly food importation. Nigeria's importation of rice like other food products, has grown astronomically as observed in Fig. 2, which consumed a huge amount of our earning and if unchecked will lead to more trade deficit.
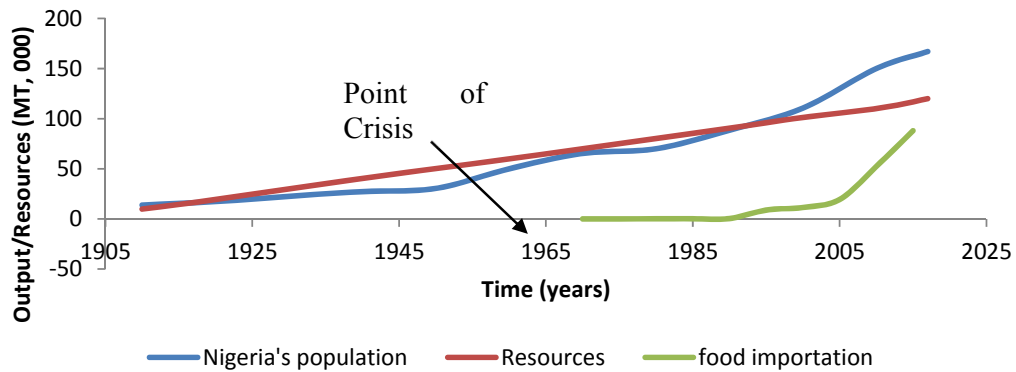

Fig. 2: Nigeria population, Resources and Food Imprtation
Source: Computation and graph by Author; Data source: C.B.N. and N.P.C. records

Figure 3 also indicates the relationship between local rice production and estimated demand. Although the expected local rice production (LRP) fluctuates both upward and downward from 1960 to 1980, estimated demand (ESD) rose sporadically and linearly since the 1980s to date. This connotes that rice demanded increases at increasing rate in the period 1960 to 2015 which was in consonant with the studies of Ayanwale and Amusan, (2012), FAO, (2013), Oladimeji and Abdulsalam, (2014) that affirmed increase in rice demand in Nigeria grow between 7.3% and 10.3%.
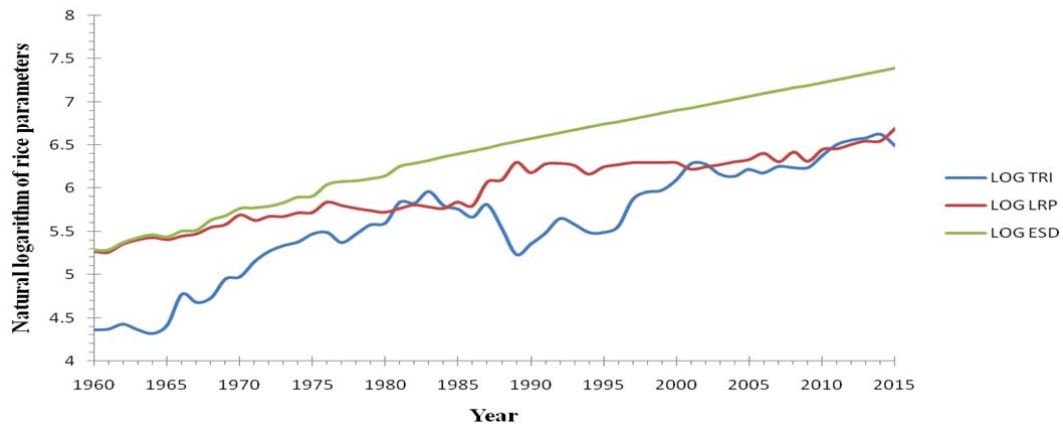

Fig. 3: Trend analyses in LRP, TRI and ESD Production in Nigeria (1960 - 2015)
Source: Computation and graph by Author; Data source: C.B.N. and N.P.C. records

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The result is also in agreement with Malthus view who opposed the Say's Law which state that supply creates its own demand. Malthus rejected versions of the Say's Law that proposes that the demand for commodities would alone and automatically provide a motive for sufficient investment and production to satisfy such demand, or that investment and production would alone and automatically lead to an adequate demand to absorb supply. He argued that production and consumption were impelled by very different motives. Demand adjusted slowly, according to 'habit and tastes' and hence if productivity increases significantly, demand would not necessarily match supply and gluts of commodities might result. Hence, advances in demand would not necessarily follow advances in production. Malthus (1803) noted that one way of restoring 'effectual demand' in such circumstances was to redistribute some income from the richer to the poorer consumers. He also noted that 'effectual demand' was maintained by 'unproductive consumers' such as clergymen, who contributed nothing to the supply of goods. On the contrary, the growth rate in LRP is slower and most time dwindles, hence creating a rice demand-supply gap deficit. Local rice production in Figure 3 has a slow, fluctuating increase which does not commiserate with increasing demand and sometimes exhibit a downward slope. This leads to yearly rice importation which exhibits continuous increase particularly in recent years. Ironically, TRI slopes upward more gradually than increase in LRP.

In addition, Ewugi and Illiyasu, (2012) opined that Malthus' suggestion on population checks, perceived pestilence as part of positive checks is partly relevant when compared to today's Human Immune Deficiency Virus/Acquired Immune Deficiency Syndrome (HIV/AIDS) epidemic worldwide. It suffices to note that the preventive checks by Malthus, which emphasis voluntary reduction of population growth, must be encouraged. These include rational thinking by individuals before getting married and building a family and, make rational decisions based on the income they expect to earn and the quality of life they anticipate to maintain in the future for themselves and their families. However, the positive check to population is a direct consequence of the lack of a preventive check. When a society does not limit her population growth voluntarily, diseases, famines and wars reduce population size and establish the necessary balance with resources.

Rice production parameters and economic growth

The result of the correlation matrix of the log function in ECG (Agric. GDP) and rice production parameters (1960-2015) is shown in Table 2. The result shows that there is a strong positive correlation between the Economic Growth (EC) and Estimated Demand (ESD) which was statistically significant at 1%. One way ANOVA was used to confirmed statistical interaction among three rice production parameters. The result of the ANOVA to test significant difference in LRP, TRI and ESD is presented in Table 3. Since p-value was less than 0.001 (1.52e-04) and F calculated (27.5) was greater than F critical (3.05), the null hypothesis was rejected. This implies that increase in estimated or potential production (ESD) using available resources could lead to increase in the economic growth. The correlation between ECG and LRP was statistically significant at 10%.

Table 2: Pearson correlation matrix of ECG and rice production parameters (1960 - 2015)

Pearson correlation	ECG	LRP	TRI	ESD
ECG	1.00			
LRP	0.563*	1.00		
TRI	-0.532	-0.467	1.00	
ESD	0.891***	0.751*	0.472	1.00

Source: Data analysis, ***, * denote significant at 1% & 10% respectively

Table 3: One way ANOVA showing variations of rice production variables

Groups	Count	Sum	Average	Variance	P-value	Fcrit
LRP	56	50002000	892892.9	1.11E+12		
TRI	56	76556200	1367073	1.12E+12		
ESD	56	3.28E+08	5853274	4.36E+13		
(Sos) Between grp	8.39E+14 (ss)	2 (df)	4.2E+14(ms)	27.5 (F)	1.52e-04	3.05
(ii) Within groups	2.5E+15	165	1.53E+13			
(iii) Total	3.36E+15	167				

Source: Data analysis, Sos denote Source of variance, ss= sum of square, df = degree of freedom, mean square and F= F value

Though a higher positive correlation was expected between ECG and LRP, the slight significance between the duo could be as result of under utilization or non-optimal use of available resources for rice production. However, there was negative correlation between ECG and TRI, an indication that there was an inverse relationship between these two variables. These are the *a priori* expectations which are consistent with the postulates of economic theory, that an increase in production of each of these parameters (LRP and ESD) and simultaneous decrease in total rice imported (TRI) would bring about economic growth, *ceteris paribus*. The result above presumes that the arithmetical food production pattern versus geometrical population growth aspect of the Malthusian theory could be said to be applicable to some degree. However, its predictions of misery would be said to have failed due to

balance of food deficit in Nigeria by massive food importation including rice mostly from other developed countries. Furthermore, Boserup, (1965), Simon, (1977, 2000) argued that as population increases, more pressure is placed on the existing agricultural system, which stimulates invention, the changes in technology allow for improved crop strains or yields and enhanced increased food production at geometric ratio.

Implications of trend analysis of rice parameters on Malthus theory

Malthus laws turned out to be tendencies in Britain and most developed nations but the result of rice production trend in Nigeria indicates that the theory holds to some degree and could not be suspended. Food crop production increases have not kept pace with population growth, resulting in rising food imports and declining levels of national food self-sufficiency. Like Adam Smith, Thomas Malthus in his period did experienced a world with apparently finite resources of energy, not anticipating the industrial revolution in Britain would occur. Nigeria is endowed with abundant land and human resources to produce enough rice not only for domestic consumption but also for export. If the potential of agriculture resources is harnessed and all institutional frame works are in order, the observed estimated demand (ESD) could be overwhelmly realized. This implies that rice production would significantly influence agricultural GDP and therefore have influence on economic growth (ECG) in Nigeria. As a follow up to Boserup ideology, Nigerian should take advantage of abundant resources annexed her population and improve her existing agricultural system. This will stimulates invention and increases production.

CONCLUSION AND RECOMMENDATIONS

The trend analysis for the Nigerian population, rice production and importation shows that the population increased exponentially while resources increased in arithmetic projection which is in line the with postulate of Malthus basic theory of population. Although expected local rice production (LRP) fluctuated both upward and downward from 1960 to 1980, estimated demand (ESD) rose sporadically and linearly since 1980s to 2015. Nigeria's importation of rice like other food products is also growing astronomically. The study also revealed that an increase in production of LRP to meet estimated demand could bring about reduction in total rice imported. Hence, improve economic growth, *ceteris paribus.* Therefore, if Nigerian agricultural resources are managed sustainably and transparently and if capital budgetary allocations to the agricultural sector which was put at an average of 3% followed stipulated 25% FAO standard or at least 10% Maputo agreement by Africa leaders (African Malabo Declaration, 2014), the crop sub sector particularly, rice will support inclusive economic and human development of the Nigerian government at all levels.

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REFERENCE

Ashraf, Q., and Galor, O. 2007. Cultural Assimilation, Cultural Di¤usion and the Origin of the Wealth of Nations,"Working Paper, Brown University. Brown University and CEPR, 50pp.

Boserup, E. 1965. The Conditions of Agricultural Growth: The Economics of Agrarian Change under Population Pressure. Allen & Unwin, London, UK.

Ewugi, M. S. and Illiyasu, Y. 2012. Malthusian Population theory and the Nigerian Economy: A Political Economy Approach. *International Journal of Human Resource Studies,* (2)4:197-206.

Food and Agriculture Organization FAO, 2013. *FAO Country Programming Framework (CPF)* Federal Republic of Nigeria, Fiat Panis, Pp 1-41.

Food and Agriculture Organization, FAO, 2015. Food and Agricultural Organization of the United Nations, Statistics Division, Rome.

Malthus, T. R. 1798. An Essay on the Principle of Population, as it Affects the Future Improvement of Society, with Remarks on the Speculations of Mr. Godwin, M. Condorcet, and other Writers, 1st edn. London: Johnson.

Malthus, T. R., 1803. An Essay on the Principles of Population, 2nd edition,1803, Everyman edn.,

National Population Commission, NPC. 2006, 1991. Population Census of the Federal Republic of Nigeria. *Analytical Report* at the National Population Commission, Abuja,Nigeria.

National Population Commission (NPC). 2016. Population Estimate of the Federal Republic of Nigeria, Abuja, Nigeria.

Oladimeji, Y. U., Abdulsalam, Z, and Damisa, M.A. (2013). Socio-economic characteristics and returns to rural artisanal fishery households in Asa and Patigi LGAs of Kwara State, Nigeria.International Journal of Science and Nature, 4(3): 445-455.

Oladimeji, Y. U. and Abdulsalam, Z. (2014). An Economic Analysis of Dry Season Irrigated Farming in Asa River, Kwara State, Nigeria: Implications for Poverty Reduction. *Journal of Sustainable Development in Africa*, 16(7): 1-15.

Oladimeji, Y. U. and Ajao, A.M. 2014. Structure and determinants of profit efficiency among small scale rice farmers in Kwara State, Nigeria. *International Journal of Applied Research and Technology.* 3(11): 27 – 33.

Oyinbo, O., Omolehin, R. A. and Abdulsalam, Z. Analysis of the Demand for Rice in Kaduna State, Nigeria. *Agris on-line Papers in Economics and Informatics*, V(3): 45-52.

Pullen, J. M. 1987. Malthus, Thomas Robert', in Eatwell, John, Milgate, Murray and Newman, Peter (eds) (1987). *The New Palgrave Dictionary of Economics,* (London: Macmillan), 3:280-285.

Pullen, J. M. 1998. The Last Sixty-Five Years of Malthus Scholarship', History of Political Economy, 30(2): 343-52.

Rashid, S. 1987. Malthus and Classical Economics', in Eatwell, John, Milgate, Murray and Newman, Peter (eds) (1987) The New Palgrave Dictionary of Economics, (London: Macmillan), (3): 285-90.

Simon, J. L. 1977. The Economics of Population Growth. New Jersey, 1977. Priceton University Press, 455pp.

Simon, J. L. 2000. The Great Breakthrough and Its Cause. Ann Arbor, Edited by Timur Kuran. University of Michigan press

Svendsen, S., Ewing, M. and Msangi, S. 2009. Measuring irrigation performance in Africa.IFPRI Discussion Paper 894. Washington, D.C.

Ugwu, D.S. and O. Kanu, I.O. 2012. Effects of agricultural reforms on the agricultural sector in Nigeria. *Journal of African Studies and Development,* 4(2): 51-59.