

POPULATION GROWTH AND FOOD SECURITY IN NIGERIA: IS THERE A LINK?

**BRIGHT O. OHWOFASA (PHD),
DEPARTMENT OF SOCIAL SCIENCE (ECONOMIC UNIT), DELTA STATE POLYTECHNICS,
OTEFE-OGHARA, NIGERIA.**

**MOSES EKARUWE (PHD)
DEPARTMENT OF ACCOUNTANCY, DELTA STATE POLYTECHNIC,
OTEFE-OGHARA, NIGERIA.**

Abstract

The average agriculture output growth between 2011-2020 which stood at 3.5% against the backdrop of over 2.6% population growth rate accounts for the present food insecurity, hunger and malnutrition in Nigeria. The study examined the impact of population growth on food security in Nigeria with data covering 1986-2020. The study employed two models in which agriculture output was made as a function of population growth rate while in the second model, the impact of population growth and agriculture productivity on economic growth was examined. The Cocharane Orcutt iterative method on an ordinary least squared (OLS) was employed. Accordingly, the study found that population growth had significant negative impact on agriculture output. However, the study further found that economic growth is significant and positively responsive to changes in agriculture output and population growth rate in Nigeria. Among other things, the study recommended that government may consider increase in budget allocation to the agriculture sector so as to boost food output. Finally, government may also consider introduction of policy that will encourage small family thereby reducing the country's population growth rate.

Keyword: Food insecurity, Population growth, Economic growth rate, OLS Nigeria.

Introduction

The issue of food insecurity and constantly growing population has been of greater concern in developing countries most especially in sub-Sahara Africa (SSA) economies. This is particularly observable in Nigeria with a population growth rate of about 2.7% of mostly young people who are largely unemployed (Iwu, 2020). In most cases, the agriculture sector has been abandoned to the rural poor for reason ragging from lack of social amenities in the rural communities to total loss of interest in agricultural engagement by the youth. The result is declining food production leading to high prices of agriculture products and food insecurity. Available statistic indicates that about 14 million people including children are malnourished in Nigeria (Owoo, 2021). Iwu (2020) submitted that on the average, about 21.4% of population in

Nigeria suffered hunger between 2018 and 2020. This is why in the last one decade, there has been prevalence of severe food insecurity in Nigeria which has continue to increase whilst the demand for food rises amidst a very fast-growing population. Otaha (2013) averred that man's ability to undertake economic activities is predicated on availability of food security and food production. He further argued that the level of food insecurity in Nigeria during the last four decades has been on the increase due to neglect of agriculture sector occasioned by the discovery and export of crude oil in the early 1970s as well as neo-liberal economic policies which was adopted by the government. The policy led to devaluation of the naira, trade liberalization as well as privatization and commercialization of government owned enterprises. The result is that cases of under

nutrition and malnutrition are daily reoccurrence thereby leading to decline below accepted international standard in food intake requirements of most Nigerians (Otaha, 2013).

The worry in Nigeria today is that the rapidly growing population is capable of making the country unable to feed its citizens amidst vast unutilized land mass and other natural resources, a situation which has been described as bewildering paradox. For instance, the 1991 census estimated the country population at 87.5 million which grew to over 140 million in 2006 and by 2020 has been estimated at 206.1 million (World Bank, 2020). According to the statistics, Nigeria's population is growing at an average growth rate of 2.6% between, 2000-2020. When compare to some West African countries such as Ghana with a population of 31.1 million and a population growth rate of 2.4%, Benin Republic, 12.1 million and a population growth rate of 2.8% and Niger with a population of 24.2 million with a population growth rate of 3.8% in the same period, it will be understood while the West African neighbours have increasing population growth rate than Nigeria. However, the worry is that the increasing population growth rate has not kept pace with food productivity which account for massive food imports that had gulped substantial amount of import bills over the last few decades. According to Iwu (2020), a total of ₦334.3 billion was spent on importations comprising mainly food stuffs, beverages, tobacco, spirits and alcohol between January and June 2019 representing a total increase of 47% over the preceding year 2018. In order to boost agriculture productivity and ensure food security, successive governments in Nigeria had

embarked on different policies and programmes aimed at accelerating productivity in the agriculture sector. These included Operation Feed the Nation of 1976-1980 by the regime of General Olusegun Obasanjo, Green Revolution of 1980 introduced by Alhaji Shehu Shagari as well as Directorate for Food, Road and Rural Infrastructure in 1985/86 during the Gen Babangida administration (Abdulrahman, 2013). In 1986, the Structural Adjustment Programme (SAP) policy was introduced with the purpose of ensuring market-oriented policies in agriculture activities thereby stirring increase private sector participation in food production and export.

Also, there were past effort by the government geared towards improving food supply through agricultural production but yielded very little results. These efforts include The National Grains Production Company, National Root Crops Production Companies, North-east, Western and National Livestock Production Companies, The Nigerian National Shrimp Company and The Nigerian National Fish Company. The government set up these companies in 1989 with the purpose of involving them in direct food production. The major crops targeted includes maize, rice, millet, wheat, sorghum and cassava. There were also the establishment of eleven River Basin Development Authorities meant to develop river basins for meaningful agricultural production that should make Nigeria self-sufficient in food production. However, rather than addressed the problem of food insecurity the programmes only helped to alienate the peasant farmers who were the major producers of food in Nigeria. This made the programmes to be more in favour of capital intensive and large scale commercial farmers who corruptly enriched

Journal of African Contemporary Research. themselves at the expense of poor peasant farmers (Otaha, 2013; Matemilola & Elegbede, 2017).

There were also a number of agriculture policies introduced in 1999 following the advent of democratically elected government which were meant to enhance food production in which the National Economic Empowerment and Development Strategy (NEEDS) was relatively more pronounced (Iwu, 2020). The government hoped that the emergence of NEEDS would help to diversify the economy away from oil to market-oriented and private sector-driven economy with strong emphasis on agriculture. The current regime of President Buhari administration launched the Anchor Borrowers Programme (ABP) on 17th November, 2015, being spearheaded by the Central Bank of Nigeria (CBN). It was the intention of the government to create a synergy between anchor companies involved in the processing and smallholder farmers (SHFs) of the required key agricultural commodities. In this regards, the ABP provides farm inputs in kind and cash (for farm labour) to smallholder farmers to boost production of these commodities. At harvest, the SHF supplies the produce to the Agro-processor (Anchor) who pays the cash equivalent to the farmer's account.

Despite the array of policy initiatives introduced by the government very little achievement has been recorded in terms of increase food productivity. This is evidenced by the annual increase in the country's import bills. Consequently, the country's economic performance is affected as indicated by the gross domestic product (GDP) growth rate. For instance, the GDP growth rate which stood at 15.3% in 2002

declined to 4.2% in 2012 and further to 0.8% in 2017 before entering a negative territory of -1.9% in 2020 occasioned by the advent of the covid-19 pandemic. Although, there is no conflict of interest as to the importance of agriculture productivity in ensuring food security with regards to the population, empirical probe of the issue has been scarcely pursued in the literature. It is against this backdrop that the study is germane. The objective of the study therefore is to examine to what extent increasing population growth affected food security using agriculture output as a proxy. The rest of the paper is organized as follows. In section two, a brief review of related literature is undertaken. In what follows, section three contains the method of study while section four presents and discusses the results. Finally, in section five the paper is concluded with policy recommendations based on findings.

The Literature

The concept of food security emerge in the literature some few decades ago following the high population growth rate in most SSA countries with declining food production index. According to Adebayo (2010), the idea came up in 1974 during the world food conference which emphasized adequate food at the national level. Accordingly, food security has been defined in various ways by different authors. In the view of Adetiloye (2012), he sees food security as a situation that affords the citizens access to adequate food and at affordable costs at all times thereby making them active and living a healthy life style. The author stressed the importance of availability of food with all essential nutrients that will ensure safe and consistent living without resorting to stealing, scavenging and other short cuts in

order to make a living. Adeniyi, Abdulraheed and Bello (2009) cited in Abdulrahman (2013) defined food security as the ease of making available food produced domestically to the majority of the population at a price that is affordable to all. Therefore, if food security is ability of country to readily make food available to its citizens at affordable prices, then food insecurity encompasses the inability of a country to provide and secure high quantity and quality of food to its people as a result of high demand, shortages in the supply of agricultural commodities and low purchasing power (Abdulrahman, 2013).

Bremner (2012) opined that food security presupposes a situation where everyone has access to sufficient food in both physical and economic dimensions so as to meet the dietary needs for a healthy lifestyle thereby boosting productivity. The access to food in this regards implies affordability of food to individuals and households. This idea brings to the fore the need to have access to nutritious, sufficient and safe food by individuals and households in a country that can keep the body and soul together for a healthy living. Gueye, Abdelkarim and Diop-Ly (2013) submitted that food security is a necessary condition for human capacity development that is required for well-nourished people that will enable them to be better educated to use new technology and thus spur them to engage the community new ideas and impetus. Food security can be referred to as the access to availability of food. Therefore, there can be said to be food security for household when members of the households do not live in hunger or fear of starvation (FAO 2001 cited in Otaha, 2013). According to Idachaba (2006) cited in Otaha (2013), food security encompasses a

situation where all people have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life at all times. Food security for a household means access by all members at all times to enough food for an active, healthy life. World Bank (2006) defined food security as access by all people at all times to enough food for an active healthy life. In view of Economic commission for Africa (2009), food security involves not only food availability through storage, and trade but also more importantly food access through domestic or home production. This is why FAO (2010) submitted that for a country to have sustainable food security, food supplies must keep pace with increase population and urbanization. FAO therefore opined that addressing agriculture and population growth is vital to achieving food security.

On the other hand, population has been defined as the total number of people living in particular area over a period of time. According to Gee (1999), population growth referred to the change that occurred in the size of population when the difference between birth and death measured in both absolute and relative terms are taken into account. This is why the Mundi Index (2012) classified population growth as the average annual percentage change in population that affects the birth and death rate as well as the total difference in emigrates and immigrates within a specified period of time in a country. In the view of some people, increasing population is good for a country. Johari (2015) argued that a large population is an asset for a country in several respects but failed to realize that an increasing population of a state might also be a source

of anxiety. What is meant by this postulation is that the increase in population becomes a source of anxiety and worry when the level of food supply cannot keep pace with the increase in food demand.

From the domain of empirical literature, few studies exist that have assessed the relationship between food security and population growth rate. Thus, Babtunde, Omotesho and Sholotan (2007) conducted study on the socio-economic impact of food security on farming households in Kwara State. A sample of 94 respondents were collected for the study. The study found evidence of food security for about 36% of household members in the sample while 64% were food insecure. Fayeye and Ola (2007) evaluated the relationship between food security and improvement in health of people in SSA. It was observed by the study that about 30 to 45 countries in SSA suffered acute malnutrition and abject poverty occasioned by severe food crisis. Akpan (2009) examined the impact of oil resource management on food insecurity in Nigeria. Utilizing the vector autoregressive (VAR) model, the study found evidence of neglect of agriculture sector occasioned by over dependence of oil export with the result that decline in food outputs were being experienced. Wilson and Wilson (2013) employed co-integration to assess the impact of population growth on food security in Nigeria. It was discovered by the study that population growth had significant negative impact on food security. Abdulrahman. (2013) assessed the impact of population growth on food security in Nigeria for a data period of 2000-2012. Using an ordinary least square (OLS) on a linear regress model, the study found that

population growth had significant positive impact on food security in Nigeria.

In his study on food insecurity. Peters (2015) assessed how population growth and savings impacted on agricultural food output in Nigeria. The study observed that investment in agriculture is negatively affected by population thereby affecting agricultural output with its concomitant impact in food import bills. Osu (2017) examined the extent at which population growth affected food security in Nigeria. The study disaggregated food production into crop, fishery and livestock productions. Using correlation and granger causality techniques, the study found that a significant proportion of the population accounted for the presence of food crisis in Nigeria. Oguntegbe, Okoruwa, Obi-Egbedi and Olagunju (2018) scrutinized the relationship between index of food production and the growth rate of the population in Nigeria for a data period of 1980-2011. The granger causality approach, OLS and two stage least square (2SLS) methodologies were employed for the analysis. Accordingly, findings indicated that population growth rate had significant positive impact on index of food production contrary to negative relationship from 2SLS model. The study suggested against further increase in the country's population. Iwu (2020) averred that an excessive population growth rate has been a major cause of food insecurity in SSA. He carried out his study on population and food security using Ekiti and Ondo States with emphasis on yam, fruit and cassava farmers. Employing an array of descriptive approaches, the study identified bad road, high transportation cost, inadequate market and weather as the major factors militating against food

security in Nigeria. The study however failed to test the impact of population growth, a key variable in the study, on food security. Owoo (2021) documented a recent study on how demographic considerations affected food security of households in Nigeria. Fixed effects regression was employed by the study and findings indicated that larger households faced more problems of food insecurity in Nigeria. Therefore, a review of the literature therefore suggest that empirical studies on the relationship between population growth and food security particularly in the Nigeria’s case are being scarcely pursued. This informs the reason for the study.

Research Methodology

A linear regression using the ordinary least square is employed in analyzing the relationship between population growth and food security on the one hand and how these two variables affected economic growth in Nigeria on the other hand. The data of agriculture output and GDP were culled from the Statistical Bulletin of the Central Bank of Nigeria (2021) while the data on population was sourced from the World Bank data bases covering the period, 1986-2020. Accordingly, the study developed two models as follows:

Model 1

$AGO = f(POP)$(1)

In log stochastic term, equation (1) becomes:

$lnAGO_t = \alpha + \beta lnPOP_t + \varepsilon_t$(2)

Model 2

$GDP = f(AGO, POP)$(3)

$lnGDP_t = \beta_0 + \beta_1 lnAGO_t + \beta_2 lnPOP_t + \varepsilon_t$(4)

Where: AGO = output of the agriculture sector (a proxy for food security), POP = Nigeria’s population while GDP = gross domestic product at 2010 constant prices. On the other hand, α & $\beta =$ constant, $\beta_i =$ parameters to be estimated and $\varepsilon =$ white noise error term.

Unit Root Test

To ensure that a non-stationary series is not included in the model, the Augmented Dickey Fuller (ADF) test was employed to ascertain the level of stationarity of the variables. The purpose of a unit root test is to avoid spurious regression or nonsense correlation. Accordingly, the ADF test is estimated as:

$\Delta Y_t = C_i + \omega Y_{t-1} + C_{2t} + \sum_{i=1}^p di\Delta Y_{t-1} + \varepsilon_t$(5)

Where $y_t =$ relevant time series; $\Delta =$ first difference operator; $t =$ a linear trend and $\varepsilon_t =$ error term. The null hypothesis of the existence of a unit root is $H_0: \omega=0$. Failure to reject the null hypothesis leads to conducting the test on further differences of the series until stationarity is reached and the null hypothesis is rejected.

Data and Discussion

The structure and behavioural trend of food security and the population growth rate in Nigeria is presented with relation to the growth performance of the Nigerian economy. This can be seen in Table 1 where the output of the agriculture sector was consistently less than double digit except 2001-2005 which recorded an increase output of 16.0% in the sector. The output of agriculture from 2011 to 2020 hovered between 2.2% and 6.7% with the

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 highest growth recorded in 2012 and the
 lowest in 2020. There is no doubt that the
 covid-19 pandemic affected every sector of

the economy including the agriculture
 sector.

Table 1: Structure of Food Security and Population Growth in Nigeria (%)

Year	Agriculture Output	Nigerian Population Growth Rate	GDP at 2010 constant price
1986-1990	5.0	2.6	4.8
1991-1995	2.8	2.5	0.2
1996-2000	4.0	2.5	3.1
2001-2005	16.0	2.6	8.8
2006-2010	6.1	2.7	7.3
2011	2.9	2.7	5.3
2012	6.7	-0.4	4.2
2013	2.9	5.9	5.5
2014	4.3	2.7	6.2
2015	3.7	2,7	2.8
2016	4.1	2.7	-1.6
2017	3.4	2.6	0.8
2018	2.1	2.6	1.9
2019	2.4	5.5	2.3
2020	2.2	0.0	-1.9
2021	2.3	2.4	3.3
2022	2.1	2.8	3.4

Sources: CBN Statistical Bulletin (2022) and World Bank Data Bases

Evidently, this suggests low productivity in the agriculture sector when compared to the averaged population growth of about 2.6% in the period under review. Similarly, it can also be seen from Table 1 that as a result of the poor performance of agriculture sector amidst increasing population, economic growth does not perform very well. For instance, the economy recorded a near zero growth rate between 1991-1995 while the best period for the Nigerian economic since the present democratic dispensation occurred in the period, 2001-2005 which saw all-time

high growth rate of 8.8%. The moderate performance of the economy in this period was occasioned by the rising price of crude oil at the global market which continued on a progressive trajectory up to 2014 when 6.2% growth rate was recorded for the economy. The growth of the economy declined in 2015 and finally went into a recession in 2016 for which the economy had not fully recovered before the advent of the corona virus pandemic in December, 2019 that disrupted the world economy. This behavioural trend of the variables is depicted in Fig 1

Fig 1: Trend of Food Security and Population Growth in Nigeria

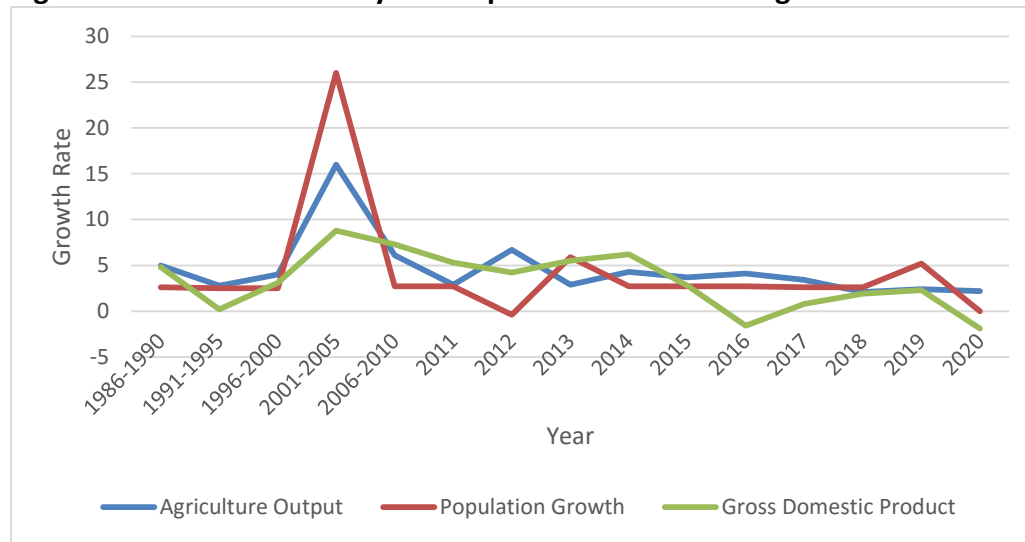


Table 2: Results of unit root test

Augmented Dickey Fuller (ADF) Test				Phillips-Peron (PP) Test		
Variable	Level	First Diff	Order	Level	First Diff	Order
LAGP	-1.85	-3.64	1	-1.82	-5.58	1
LPOP	-1.15	-5.67	1	-2.85	-9.47	1
LGDP	-1.53	-4.38	2	-1.73	-3.84	1
C.V = 5%	-3.55	-3.56		-3.55	-3.56	

Source: Author’s computation using Eview 9.0

Table 2 shows that the series are non-stationary at level as the ADF indicates first order stationarity for agriculture output and population while GDP was only stationary at

integration of order 2. On the other hand, the PP test indicates stationarity for all three variables at integration of order one at 5% level of significance.

Table: Model 1

Regression estimation

Method: Least Square

Dependent variable: AGP

Variable	Coefficient	Std error	t-statistics	Probability
Constant	-1.71	2.29	-0.75	0.46
LPOP	-2.17	0.45	-4.78	0.00
AR(1)	0.87	0.10	8.38	0.00
$R^2 = 0.98$, DW = 1.92, F stat = 11.65				

Source: Extracted from Eview 9.0

Table 4: Model 2**Regression estimation****Method: Least Square****Dependent variable: GDP**

Variable	Coefficient	Std error	t-statistics	Probability
Constant	2.35	0.94	2.50	0.01
LAGP	0.34	0.07	4.58	0.00
LPOP	1.02	0.24	4.25	0.00
AR(1)	0.89	0.08	27.25	0.00
R ² = 0.99, DW = 1.87, F stat = 8.67				

Source: Extracted from Eview 9.0

In conducting the study in both models, certain exception was observed namely the presence of autocorrelation and as a result the Coharane Orcutt iterative method through the AR(1) process was employed to correct the serial correlation problem. Thus, the R² and F statistics in both models are robustly satisfactory even as the DW statistics indicates absence of serial correlation. Therefore, in model 1 shown in Table 3, population had significant negative impact on agriculture output. Also, the constant is significantly negative. This implies that in the absence of population productivity in the agriculture sector is negative as labour is required to work on every sector including the agriculture sector. The negative impact of population growth on agriculture output is a suggestive of food insecurity in Nigeria as earlier envisaged by prior studies (see for instance, Fayeye & Ola, 2007; Akpan, 2009, Wilson & Wilson, 2013; Peters, 2015; Oguntegbe et al, 2018; Owoo, 2021). In the case of model 2, the study ascertained to what extent agriculture productivity and population growth affected economic growth in Nigeria. It was observed in Table 4 that agriculture output and population growth had significant positive impact on economic growth in Nigeria. These findings are very important in that the need to have

population growth that will keep pace with food productivity have been stressed.

For instance in the last few years in Nigeria, the level of hunger has increased as many families cannot feed themselves as a result of hike in food prices. There were several factors responsible for the increase in prices but notably two of these factors were relatively more pronounced. These included scarcity of food produced occasioned by rising insecurity that scared away farmers as well as the fact that most of the foods consumed in Nigeria were imported at exorbitant prices thereby making them to be above the reach of the common man. The result is hunger and malnutrition. In the northeast and north west for example, the fear of Boko Haram Terrorists (BHTs) and banditry has become the beginning of wisdom. There had been high levels of conflict across the regions which is driving limited engagement in agricultural activities, declines in humanitarian access and displacement with many populations being displaced multiple times. This, coupled with the significantly above-average staple food prices, constrains household purchasing power and food access. As a result, crisis and emergency outcomes were widespread across much of the Northeast and Northwest.

Also, as humanitarian access declined in recent time with increased conflict and continued displacement, many households in hard-to-reach areas are experiencing large food consumption gaps indicative of high levels of acute malnutrition and excess mortality. As these populations face severe difficulty meeting their food needs, the risk of famine had continue to persist. According to available statistics, over 690,000 people have been displaced in the Northwest and North-Central areas of the country thereby disrupting household engagement in typical livelihood activities (FAO, 2021). The increase in the level of insecurity has been responsible for disruption in agricultural farming seasons in Nigeria as most farmers are prevented from being engaged in land preparation, planting, weeding and harvesting. Added to insecurity problem is high input costs for items such as improved seeds, herbicides and fertilizers which constrained the level of crop cultivation that at present is below average.

Likewise, as a result of insurgency in the north east most displaced families relied on vulnerable host communities for basic needs, including food. This had further impoverished host communities leading to increased exposure to food insecurity and malnutrition. Lootings and fear of attacks have prevented many farmers from working in their fields, leading to loss of harvests, productive assets and extremely reduced purchasing power. According to FAO's statistics, at least 9.2 million people in Nigeria faced a crisis or worse levels of food insecurity between March and May 2020 amidst armed conflicts, COVID-19's effects and climate change (FAO, 2021). Out of these numbers, about 3.2 million people are in Adamawa, Borno and Yobe states.

FAO pointed out that between June and August 2021 the figure was expected to increase to over 12.8 million people, of whom 4.4 million would be in the three northeastern states unless resilience-focused and humanitarian actions were taken.

Conclusion and Recommendation

Over the last few years, the issue of food insecurity has taken a center stage in national discourse as cases of hunger and malnutrition abound in Nigeria especially in the northern part of the country. In order to avert the impending problem of food insecurity people began to agitate for the need to check the fast growing population which according to the World Bank statistics is over 2.6%. Therefore, the study examined the extent at which population growth affected the level of food security in Nigeria with data spanning 1986-2020. The study employed descriptive and econometric analyses. It was observed by the study that the level of population growth had debilitating impact on food security in Nigeria. However, the study found evidence to suggest that population and food security are key determinants of economic growth in Nigeria. The major conclusion that can be drawn from the study therefore is that increasing population might be good or bad depending on the ability to keep pace with increase in food productivity in an economy. Therefore, it is recommended that government may consider increase in budget allocation in the agriculture sector so as to boost food output. Also, rewarding incentives should be given to all those willing to take up career in agriculture particularly the youths thereby fast-tracking the current diversification drive of the government. Finally, government may consider

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introduction of policy that will encourage small family which will lend to decline in the country's population growth rate.

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