

AJGA 2006012/2101

An Analysis of Agricultural Production in Nigeria

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(Received April 29, 2006)

ABSTRACT: This study focused on the growth of the agricultural sector of the Nigerian economy. Efforts were made to highlight factors affecting domestic agricultural production. Descriptive statistics and regression analysis were the major tools of analyses in this study. The study showed that the overall agricultural production average growth rate was 5.4% and that GDP growth rate, population growth rate, and the Consumer Price Index were the main factors affecting domestic agricultural production. This study recommended the need to increase per-capita productivity through the introduction of improved technology in agricultural production.

Key Words: Nigerian Agricultural Production; Nigerian Economy; GDP Growth Rate; Population Growth Rate; Consumer Price Index.

Introduction

Nigeria, which spans an area of 924,000 square kilometers, is bordered by the Gulf of Guinea, Cameroon, Benin, Niger, and Chad. The topography ranges from mangrove swampland along the coast to tropical rain forest and savannah to the north (1). Nigeria is generously endowed with abundant natural resources. With its reserves of human and natural resources, Nigeria has the potential to build a prosperous economy and provide for the basic needs of the population. This enormous resource base if well managed could support a vibrant agricultural sector capable of ensuring the supply of raw materials for the industrial sector as well as providing gainful employment for the teeming population (2).

Nigeria's rich human and material resource endowments give it the potential to become Africa's largest economy and a major player in the global economy (1). Compared with other African and Asian countries, especially Indonesia, which is comparable to Nigeria in many respects, economic development in Nigeria has however been disappointing. With GDP of about 45 billion, 32.953 billion and 55.5 billion dollars in 2001, 2002 and 2003 respectively and per capita income of about \$300 a year, Nigeria has become one of the poorest countries in the world. Having earned about \$300 billion from oil exports between the mid-1970s and 2000, its per capita income was disappointingly 20 percent lower than that of 1975. Inability to tap much of the abundant human and material resources can therefore put the attainment of the Millennium Development Goals by 2015 in jeopardy (1,3).

The role of agriculture in economic development of most countries can hardly be overemphasised (4). The contribution of agricultural growth to overall poverty reduction has been documented (5). In view of

the importance of agricultural growth to economic growth, (6) observed that rising agricultural productivity has been most important concomitant of successful industrialization.

A retrospective look into the Nigerian economy and its development reveals that agriculture was both the main stay of the Nigerian economy and the chief foreign exchange earner (7). In the 1960s, agriculture accounted for well over 80 percent of the export earnings and employment; about 65 percent of the GDP (gross domestic product) and about 50 percent of the government revenue (8). This contribution to the Nigerian economic growth has however declined over the years. The contribution of agriculture to the GDP was about 50% in 1970 and 34% in 2003(9). At present, agriculture accounts for only 41 percent of the real sector, while crude oil accounts for 13 percent (10). Although agriculture no longer serves as the leading contributor to Nigeria's gross national product and leading foreign exchange earner due to phenomenal growth in the petroleum sector of the economy as (11) observed, agriculture is still the dominant economic activity in terms of employment and linkages with the rest of the economy (1). While accounting for one-third of the GDP, it remains the leading employment sector of the vast majority of the Nigerian population as it employs two-third of the labour force (7).

The principal constraint to the growth of the agricultural sector is the fact that the structure and method of production have remained the same since independence more than four decades ago (10). The United Nations Food and Agriculture Organization rates the productivity of Nigeria's farmland as low to medium— but with medium to good productivity if properly managed (1). To be effective, and attain higher level of productivity and growth in the agricultural sector there is a need to identify the major factors that determine its growth.

Problem Statement

Besides oil, the major strength of the Nigerian economy is its rich agricultural resource base, its human resource base and its huge market. However, these resources have to be effectively mobilised so as to diversify the economic base and reduce dependence on oil and on imports. The economy remains vulnerable to external shocks emanating from fluctuations in the world prices of crude oil and the rising prices of imports. The resulting external and internal imbalances are manifest in the adverse balance of payment position, unemployment and low capacity utilisation in virtually all sectors as well as the deteriorating purchasing power of the populace (12).

The contribution of agriculture to the Nigerian economic growth is very low compared to what it used to be in the past (8). Nigerian agriculture to a large extent still possesses the characteristics of a peasant economy that was prominent in the pre-independence period (13). In spite of the presence of two major rivers - the Niger and the Benue, the agricultural sector is still predominantly rain fed (1). Agricultural productivity has seriously declined over the past two decades and as a result, rural poverty is rampant (14). World bank data shows that more than 70% of Nigerians live below the poverty line (which is less than a dollar/ day) implying that there has been an astronomical growth in the levels of poverty of Nigerians most of whom are engaged in agriculture from independence till today (7). Farming population comprises predominantly resource-poor peasants, cultivating an average of about two hectares of land usually on scattered holdings with low and declining productivity (1).

Objectives of the study

The main objective of this study is to examine the growth of agricultural production in Nigeria.

The specific objectives are:

- to examine the growth in the various agricultural sub sectors of the Nigerian economy between 1981-2003
- to determine the factors affecting domestic agricultural production in Nigeria

Methodology

Scope of study

This study was designed to cover a period of 23 years (1981- 2003). A time series data was used for this study. Data used in this study were obtained from the Central Bank of Nigeria Statistical Bulletin, CBN Annual Report and Statement of Account, and Federal Office of Statistics.

Method of data analysis

Statistical tools, employed in this study, include; Duncan multiple range test, regression analysis, and descriptive statistics. To estimate the trends in agricultural production, the annual growth rate of the domestic agricultural production was calculated as follows:

Annual growth rate = (Change in the value of domestic agricultural output / Original value of agricultural production) x 100

Average growth rate between periods was calculated thus:

$$\text{Mean} = \sum_{i=1}^n R_{it}$$

Where n = 23 years and R_{it} is the annual growth rate of the various agricultural sub sectors of the Nigerian economy.

Regression Analysis

Regression analysis was used to highlight the factors affecting domestic agricultural production.

Regression model is specified as follows;

$$Y = f(X_1, X_2, X_3, X_4, X_5, u)$$

Where:

Y = real value of agricultural production (₦ million). This was estimated by deflating the value of agricultural production using 1985 as the base year.

X_1 = Food import values (₦ million). The apriori expectation is that food import coefficient will be negative because people may consume more of foreign food items which are likely to be relatively cheaper.

X_2 = GDP growth rate (%). It is expected that the coefficient of GDP growth rate will be positive. This is because agriculture is the major occupation of most Nigerians.

X_3 = Population Growth Rate (%). It is expected that the coefficient of the population growth should be positive because majority of the population engage in agricultural production, therefore increase in population means more labour for agriculture.

X_4 = Consumer Price Index (1985 = 100). Coefficient of consumer price index is expected to be positive because increase in price will stimulate supply of agricultural product from the producers.

X_5 = Government Expenditure on Agriculture (₦ million). For government expenditure, it is expected that the coefficient will be positive such that increase in government expenditure will cause a corresponding increase in domestic agricultural production.

u = Error Term

The following production functions were fitted to the model:

Linear function: $Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5$

Semi-Log function : $Y = b_0 + b_1\log X_1 + b_2\log X_2 + b_3\log X_3 + b_4\log X_4 + b_5\log X_5$

Double-Log function: $\log Y = b_0 + b_1\log X_1 + b_2\log X_2 + b_3\log X_3 + b_4\log X_4 + b_5\log X_5$

Exponential function: $\log Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5$

Results and Discussion

Trends in Agricultural Production (1981 – 2003)

Data obtained from the index of agricultural production by types of activity namely crops, livestock, fishery and forestry were analysed for the trends in agricultural production. This was done under the growth rate of agricultural production by types of activities as shown in Table 1.

Table 1: Average Growth Rates

Statistics	Crops (%)	Livestock (%)	Fishery (%)	Forestry (%)	Aggregate(%)
Mean	6.35	4.32	1.17	1.44	5.4
Std. Deviation	5.96	7.32	15.60	2.09	4.93

Source: Computed from CBN Data (Various edition)

Table 1 shows that between 1981– 2003, aggregate agricultural production only grew by 5.4%. This shows that all the component of the agricultural sector of the economy have not had any appreciable growth in production. From the results so far, the trend in agricultural production can be described as not impressive, and that agricultural growth has been slow and not even steady.

Results of the Regression Analysis

The regression result of the four functional forms are shown in Table 2.

Table 2: Result of the Regression Analysis

Functional Form	Constant (b ₀)	Regression Coefficients					R ²	F-value	D.W
		X ₁	X ₂	X ₃	X ₄	X ₅			
Linear (t-values) S.E	-26504.9	-7.17E-02 -1.491 0.048	286.91* 2.146 133.668	18424.73* 3.006 6129.498	8.49* 5.034 1.687	4.122E-02 0.846 0.049	0.959	79.038	0.955
Semi-Log (t-values) S.E	68062.8	-55964.68 -1.595 3739.053	1699.579 1.307 1300.061	-117977* -3.368 35032.447	18332.09* 3.312 5535.417	-852.257 -0.450 1893.879	0.962	61.169	1.20
Exponential (t-values) S.E	3.504	-1.08E-06 -1.695 0.000	3.910E-03* 2.215 0.002	0.319* 3.935 0.081	1.12E-04* 5.029 0.000	5.068E-07 0.787 0.000	0.948	62.438	1.004
Cobb-Douglas (t-values) S.E	4.634	-640E-02 -1.497 0.043	1.716E-02 10155 0.015	-0.798 -1.993 0.400	0.213* 3.369 0.063	-1.0E-02 -0.466 0.022	0.957	53.276	1.115

Source: CBN Data Analysis

Key: * = t-values significant at 5% level of significance; S.E. = standard error

The linear function was chosen as the lead equation based on the R squared, the expected signs and the significant variables.

The result of the estimated parameter can be written thus:

$$Y = -26504.9 - 0.07X_1 + 286.91 X_2 + 18424.73X_3 + 8.49X_4 + 0.04X_5$$

The negative coefficient of the value of the food imports indicates that as food import increases, domestic agricultural production decreases. This might be due to the fact that food importation exposes the local farmers to unfair competition by foreign producers who usually take advantage of economies of scale in production due to their access to better production technology.

The positive coefficient of the GDP growth rate indicates that increase in the GDP also moves domestic agricultural production in the same direction. This shows that increased domestic economic activity has the impact of increasing the domestic agricultural production. This may be due to the fact that most economic activity in the country are related to agriculture.

The result also shows that population increases has been a major contribution to domestic agricultural production in Nigeria. This may be due to the fact that majority of the populace are engaged in agriculture, meaning more hand on the farm as population increases.

The coefficient of consumer price index was positive. This shows that as consumer price increases domestic agricultural production also increases, meaning that domestic agricultural production is positively related to increase in consumer prices. This may be due to the fact that increase in price stimulates supply on the farmer's side leading to more production of food. More agro-processing activities must therefore be embarked upon in order that farmers may be able to dispose of their produce at fairly reasonable prices.

The result of the coefficient of government expenditure was positive, that is domestic agricultural production is positively related to increase in government expenditure, meaning that as government expends more on agriculture, domestic agricultural production also increases. The reason why it was not significant might be due to the fact that government has not been investing so much on agriculture over the years.

The linear function had a R^2 of 0.959 or 95.9% and an adjusted R^2 squared of 94.7% implying that 94.7% of the variation in the dependent variable (Y) is accounted for by the independent variables (X_1 , X_2 , X_3 , X_4 and X_5).

The Durbin Watson test result was 0.955, that is the computed d-value=0.955. For the tabulated d-value, we have $d_L=0.895$ and $d_U=1.920$. Therefore the calculated d-value falls or lies between the lower and the upper limit. As such, there is inconclusive evidence regarding the presence or absence of positive first-order serial correlation.

The F-test shows that all independent variables are significant in explaining domestic agricultural production.

Conclusions and Recommendations

The agricultural sector that consists of sub-sectors namely, crops, livestock, fishery and forestry has had a very slow growth. It was discovered among the sub-sectors that crop had major contribution to the agricultural sector with livestock following closely. Fishery and forestry sub-sectors have very low average growth rates. Further more, the study revealed that for domestic agricultural production to improve, a number of issues need to be addressed. These include:

- Embarking on measures that improve poultry, forestry and fishery sub sectors of the economy whose contribution to agricultural production have been very low over the years.
- Making deliberate efforts to increase small scale enterprises in Nigeria. This is because most enterprises in Nigeria are likely to agro-allied that may require raw materials from agriculture.
- Increase in per-capita productivity of the people through improved technological innovation.
- Empowering farmers to market their produce at reasonably good prices. This may require government buying excess of the farmers' produce particularly during the season at guaranteed minimum prices.

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