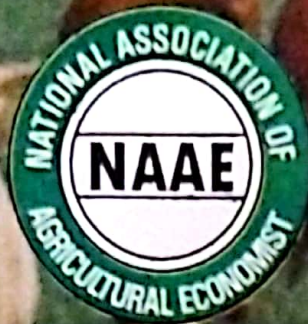




COMMERCIAL AGRICULTURE, BANKING REFORM AND ECONOMIC DOWNTURN: SETTING A NEW AGENDA FOR AGRICULTURAL DEVELOPMENT IN NIGERIA

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ABSTRACT

This study examined the trends in the output, area and productivity of rice in Nigeria from 1986-2006 and investigated the pattern of the observed growth by fitting exponential trend equations to the output, area and productivity of rice. The computed growth rates for output and area were positive and significant for the period. However, statistically significant deceleration was confirmed for output, area and productivity. Significant acceleration and or stagnation was not observed for either area, production or productivity of rice in Nigeria during the period under investigation. The study recommends the expansion of the area currently under rice cultivation in addition to agricultural extension, market liberalization, greater investments to improve the well-being and productivity of farmers through education, improving farmers' access to productive inputs, strengthening of research and networking, technology development and transfer as well as an effective and efficient input delivery system to the farmers and guaranteed output markets.

INTRODUCTION

Nigeria is the most populous country in Africa, with a population of over 140 million people (NPC, 2006). Its domestic economy is dominated by agriculture, which accounts for about 40% of the Gross Domestic Product (GDP) and two-thirds of the labour force (Akande, 2000). Agriculture supplies food, raw materials and generates household income for the majority of the people. The external sector is dominated by petroleum, which generates about 95% of Nigeria's foreign exchange earnings while agriculture contributes less than 5%. Trade imports are dominated by capital goods, raw materials and food. Nigeria is currently preoccupied with the challenge of diversifying the structure of its economy (Tunji, 2000). It is estimated that Nigeria has a land area of about 98.3 million hectares out of which about 71.2 million hectares or 70% are cultivable while only about 34 million hectares or roughly one third of the country's total land area are under cultivation (Onyenweaku, 2004).

The objective of national self-sufficiency in food production in Nigeria has continued to be a wild goose chase. The food problem, which started in the mid-1960s, has continued to deepen several years after independence. The advent of oil in the early 1970s made Nigeria highly dependent on oil revenue, with the performance of the agricultural sector being adversely affected over the years. According to Omoruyi (1987), the oil boom of the 1970s is associated with the following fundamental changes: (i) heavy dependence of the economy on crude oil exports as the main source of foreign exchange earnings, (ii) erosion of the competitiveness of the agricultural sector in the international market due to overvalued exchange rates, inadequate pricing policies, rural urban

migration and general neglect coupled with low productivity in the country's agriculture which led to heavy dependence on imported food and agro-allied industrial materials, (iii) government policies encouraged import-oriented production and consumption pattern with little incentives for non-oil exports and (iv) government became a prime mover of the economy through huge investments of oil revenue in social, physical and economic infrastructure.

Consequent upon the collapse of the world oil market in the early 1980s, a serious economic crisis erupted in Nigeria. There were sharp declines in oil exports and prices which resulted in drastic reduction in the country's foreign exchange reserves and earnings as well as in government revenue. Government deficits widened exacerbated by escalating foreign debts, thereby plunging the country into economic depression, rising prices and unemployment (Omoruyi, 1987).

Structural deregulation of the Nigerian economy became inevitable with the introduction of the Structural Adjustment Programme (SAP) in 1986 aimed at (i) restructuring and diversifying the productive base of the economy in order to reduce dependence on the oil sector and on imports, (ii) reducing the dominance of unproductive investments in the public sector, (iii) improving the efficiency of the sectors and intensifying the growth potentials of the private sector. According to Ojo, *et al* (1993), the main policy instruments for SAP included the adoption of a realistic exchange rate policy coupled with the liberalization of external trade and the adoption of appropriate pricing policies in all sectors with greater reliance

on market forces and reduction of complex administrative controls.

According to Adeoti (2002), although the growth rate in the agricultural sector in Nigeria increased from an average of about 3 percent in the 1990s to about 7 percent in mid 2000, the food security status of Nigerians had continued to decline. The dismal performance of the agricultural sector in terms of its contribution to Nigeria's yearly total revenue in the last three decades prompted the government to initiate other agricultural schemes and programs to enhance agricultural productivity in Nigeria, which include among others the following: the River Basin Development Authorities; the National Accelerated Food Production Project; the Agricultural Development Project; Operation Feed the Nation; the Green Revolution; the National Directorate of Food, Roads and Rural Infrastructure; the Agricultural Credit Guarantee Scheme Fund; the National Special Programme for Food Security; Root and Tuber Expansion Project, and the National Fadama I, II and III programs.

The need for self sufficiency in food production cannot be over emphasized, because, producing sufficient quantity and quality is an objective of agricultural development. CBN (2006) observed that a sectoral analysis in 2006 of the real GDP indicated that the agricultural sector contributed about 42 percent of the GDP compared with 41.2 percent in 2005 (CBN, 2006). The growth rate of the contribution of the agricultural sector to the GDP at 1990 constant basic prices grew from 4.2 percent in 2002 to 7.2 percent in 2006. The agricultural sector also employed over 60 percent of the total labor force in Nigeria in 1999 (Adeoti, 2002).

Rice is the third most frequently consumed crop in Nigerian households, but is the sixth most important contributor to daily per capita consumption of food. In West Africa Sub-region, rice is considered to be the source of food and income for both rural and urban dwellers in Nigeria (FAOSTAT, 2003). It is one of the crops that received priority research attention possibly due to its increasing importance as a food crop produced mostly in Northern Nigeria and consumed nationwide. The crop is therefore a security crop for farming households in meeting the consumption needs of producers as well as generating income for them to buy other food condiments. Due to its increasing importance, the government had designed a number of strategies to reduce the importation of rice in order to boost domestic production. This policy stance was informed by continuous decreasing trend in area under cultivation and productivity manifested in supply

not keeping pace with demand. This study attempts to examine the trends in the production, area and productivity of rice in Nigeria from 1986-2006 and investigated the pattern of the observed growth.

METHODOLOGY

This study was based on time series data on area, production and productivity of rice (*Oryza sativa*) collected from various issues of Abstracts of statistics published by the Federal Office of Statistics (FOS), Abuja and Food and Agricultural Organization statistics (FAOstat) for the period 1986-2006. The data are presented in Table 1.

Table 1: Area, Production and Productivity of Rice (*Oryza sativa*) in Nigeria 1986- 2006.

Period	Production ('000 tonnes)	Area ('000 hectares)	Productivity (ton per hectare)
1985/86	283	700	0.404286
1986/87	808	745	1.084564
1987/88	2081	1041	1.999039
1988/89	3303	1652	1.999395
1989/90	2500	1208	2.069536
1990/91	3226	1652	1.952785
1991/92	3260	1664	1.959135
1992/93	3065	1564	1.959719
1993/94	2427	1714	1.415986
1994/95	3203	1796	1.783408
1995/96	3122	1784.2	1.749804
1996/97	3230	2048	1.577148
1997/98	3486	2044	1.705479
1998/99	3522	2192	1.606752
1999/00	3841	2199	1.746703
2000/01	3102.9	2117	1.465706
2001/02	3231.5	2185	1.478947
2002/03	3520.3	2210	1.592896
2003/04	3713.9	2398	1.548749
2004/05	3929.4	2494	1.575541
2005/06	4168.9	2725	1.529872

Sources: Federal Office of Statistics (FOS), Abuja (various issues); FAOstat: www.fao.org

The basic statistics, namely, mean, standard deviation, variance and coefficient of variation (C.V.) were estimated to ascertain the variability in area, production and productivity of Sorghum. CV is a normalized measure of dispersion. It is the ratio of the standard deviation to the mean. The compound growth rates were also estimated. The growth rates were calculated by fitting an exponential function in time to the data as follows:

$$Y = \beta_0 \beta^t \quad \text{--- (1)}$$
 Linearising the equation, it becomes:

$$\text{Log } Y = \beta_0 + \beta_1 t \quad \text{--- (2),}$$

Where Y = Production, Area or Productivity; t = time trend variable; β_0 and β_1 's are regression parameters to be estimated. The compound growth rate (r) is given by the formula:

$$r = (e^{\beta_1} - 1) \times 100 \quad \text{--- (3), where } e = \text{Euler's constant} = 2.71828.$$

The coefficient of variability (CV) which is a normalized measure of dispersion is the ratio of standard deviation (δ) to the mean (μ).

$$\text{Algebraically, } CV = \frac{\delta}{\mu} \quad \text{--- (4)}$$

A quadratic equation in time variable was fitted to the rice output data to confirm the existence of acceleration, deceleration or stagnation during the same period following Onyenweaku (2004) as follows:

$$\text{Log } Y = \beta_0 + \beta_1 t + ct^2 \quad \text{--- (5)}$$

Where c is the regression coefficient used to depict acceleration, deceleration or stagnation. In equation (5) above, the linear and quadratic time terms gives the secular path in the dependent variable (Y). The quadratic time term (t^2) allows for the possibility of acceleration, deceleration or stagnation in rice production during the period under study (Sawant, 1981; Onyenweaku, 1993). Significant positive values of the coefficient of t^2 confirm significant acceleration in growth; significant negative values of t^2 are confirmation of significant decelerative growth; while non significance of the coefficients of t^2 implies stagnation or absence of either acceleration or deceleration in the growth process.

RESULTS AND DISCUSSION

The variability, trend and growth analysis of Rice production in Nigeria are presented in Table 2.

The estimated exponential functions in time trend variable are as follows:

$$\text{Production: } \text{Log } Y = 7.190 + 0.064t \quad (6) \\ (32.713)^{***} (3.663)^{***}$$

$$\text{Area: } \text{Log } Y = 6.869 + 0.053t \quad (7) \\ (87.990)^{***} (8.478)^{***}$$

$$\text{Productivity: } \text{Log } Y = -0.123 + 0.127t \quad (8) \\ (-0.558)^m (2.76)^{**}$$

Note: ns = Not significant.

The results in Table 2 indicated that there has been fluctuations in area, production and productivity of rice production in Nigeria with an increasing trend. The variations and extent of growth in area, production and productivity indicated that the variability in area was 29.950 percent suggesting instability in the acreage under rice. The variability in yield was observed to be relatively lower (22.836 percent). The variability in the production of the crop was more (31.812 percent). This suggests that the production of rice experienced relatively higher instability as compared to area and

productivity in the two decades considered in the study.

The growth analysis was carried out with the help of the estimated regression coefficients of the time trend variable. The results are presented in Table 2. The estimated regression coefficients for area and production were statistically significant at the 1 percent level of probability. The regression coefficient has shown a positive growth with increasing trend in area under rice. The growth analysis also indicated positive growth trends in the production of rice in Nigeria for the period 1986-2006.

Results in Table 2 indicated that the compound growth rates in percentage have shown increasing trend (5.443 percent) for area under rice in Nigeria. The compound growth rate is statistically significant suggesting sizeable increase in acreage under rice cultivation. The per annum rate of growth for production was higher (6.609 percent). The per annum growth percentages are positive indicating overall increase in both area and production of rice in Nigeria. This requires that to further boost production, the area under rice cultivation should be increased vis-à-vis intense research to evolve high yielding and short durational varieties of Rice in the country.

Results in Tables 3-5 shows the estimated quadratic equation in time trend variable for area, production and productivity of rice during the period 1986-2006. The quadratic term t^2 allows for the possibility of acceleration, deceleration or stagnation in the growth process. Results in Tables 3, 4 and 5 show that the values of the coefficients of t^2 variable are -0.003, -0.009 and -0.005 for area production and productivity being significant at the 0.01, 0.01 and 0.05 probability levels respectively. The significance of the coefficients of the t^2 variable is a confirmation of significant decelerative growth in area, production and productivity. Significant acceleration and or stagnation was not observed for either area, production or productivity of rice in Nigeria during the period under investigation. This result is an improvement over Onyenweaku (2004) earlier findings where significant stagnation in output growth was confirmed for millet, cowpea and rice for the period 1960/'61-1987/'88. This may be attributable to the observed intervention policies by the government geared at improving the area, output and productivity of rice in the country one of which was drastic reduction in importation and massive support of domestic production of rice.

Table 2: Variability, Trend and Growth Analysis of Rice production in Nigeria, 1986 - 2006.

Statistical Tool	Area	Production	Productivity
Arithmetic mean ('000 tonnes)	1815.819	3001.138	1.629
Standard deviation	543.855	954.572	0.372
Variance	295778.028	911206.866	0.138
Coefficient of variability (%)	29.950	31.812	22.836
Regression coefficient (β_1)	0.053	0.064	0.011
t-ratio	8.478***	3.663***	0.913 ^{ns}
r^2	0.791	0.414	0.042
F-statistic	71.876***	13.416***	0.833 ^{ns}
Compound Growth Rate (%)	5.443***	6.609***	1.106 ^{ns}

Source: Computed from time-series data 1985/86-2005/06.

*** and ** implies statistically significant at the 0.01 and 0.05 probability levels respectively, ns= not statistically significant.

Table 3: Estimates of Quadratic equation in Time trend Variable fitted to Area for the period 1986-2006.

Variable	Estimate	t-ratio	Status
Constant	6.585	62.273***	Deceleration
Time trend (t)	0.127	6.366***	
Time trend squared (t^2)	-0.003	-3.828***	
r^2	0.885		
F-ratio	69.083***		

Table 4: Estimates of Quadratic equation in Time trend Variable fitted to Production (Output) for the period 1986-2006.

Variable	Estimate	t-ratio	Status
Constant	6.463	22.619***	Deceleration
Time trend (t)	0.254	4.241***	
Time trend squared (t^2)	-0.009	-3.263***	
r^2	0.632		
F-ratio	15.439***		

Table 5: Estimates of Quadratic equation in Time trend Variable fitted to Productivity for the period 1986-2006.

Variable	Estimate	t-ratio	Status
Constant	-0.123	-0.558	Deceleration
Time trend (t)	0.127	2.762**	
Time trend squared (t^2)	-0.005	-2.589**	
r^2	0.302		
F-ratio	3.893**		

CONCLUSION AND RECOMMENDATIONS

The acreage under rice in Nigeria has shown large amount of variation over the two decades investigated. There were also marked fluctuations in rice production and productivity. The estimated functions in time trend variable pointed to positive trends in area and production for the period 1986-2006. The pattern of the fluctuations is linear in fashion. Increases in rice production could be attributable principally to the expansion of the area under rice in the country. The results have also confirmed significant deceleration in area, output and productivity growth. The declining trends in the outputs of rice observed since the early 1970s have been stemmed by the structural deregulation

of the economy. Measures to stimulate rice production in Nigeria would therefore include expansion of the area currently under cultivation in addition to agricultural extension, market liberalization, greater investments to improve the well-being and productivity of farmers through education, improving farmers' access to productive inputs, strengthening of research, technology development and transfer as well as an effective and efficient input delivery system to the farmers and output markets. These should be made to ride on favourable macroeconomic environment, development of rural infrastructure and the sustainability of the environment in the quest for stimulating agricultural growth.

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