Econometric Assessment of the Trend in Cocoyam Production in Nigeria, 1960/61-2003/2006

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ABSTRACT

Stakeholders in agricultural development in Nigeria are currently confronted with the onerous task of feeding over hundred million people in the nation. The paper attempts to examine the trends in the production, area and productivity of cocoyam in Nigeria from 1960/61 to 2003/06 in two periods and highlights the relative contributions of area and productivity to the observed growth. Results reveal that output, area and productivity of cocoyam exhibited negative trends in Period I, (Pre-SAP, 1960/61-1984/85) whereas output and area of cocoyam showed positive trend in Period II (Post-SAP, 1985/86-2003/06). Increases in cocoyam production were due principally to the expansion of area under cultivation. Measures aimed at improving the yield and efficiency of resource utilization will enhance the prospect of cocoyam.

INTRODUCTION

Countries in the African continent face an ever-increasing food crisis as the effective demand for food in these countries continue to outpace demand. It is estimated that Nigeria has a land area of about 98.3million hectares out of which about 71.2million hectares or 70 percent are cultivable while only about 34million hectares or roughly one third of the country's total land area is under cultivation (FMED, 1975). Self-sufficiency in food has remained elusive in spite of the high potential for increasing food production in the country by expanding the area under cultivation and improving productivity from existing cropped area. Over the years, Nigeria has had to resort to massive food importation evidenced by the rising food import bill. This is because, the level of food production no longer keeps pace with demand.

Cocoyam ranks third in importance after cassava and yam among the root and tuber crops cultivated and consumed in Nigeria. Available statistics show that Nigeria is the world's leading producer of cocoyam (taro) which accounted for 3.5million metric tonnes during the 2003 cropping season (FAO,2006). Despite this, the objective of sustainability in food production has remained a mirage as its cultivation has been shown to be declining (Onyenweaku and Ezeh, 1987; Zuhair and Hunter, 2003).

Given that cocoyam is an important staple food in Nigeria, any attempt to improve its productivity would be a right step towards the resolution of the food crisis. This study is further justified by the need to having a better understanding of the performance of the crop sub-sector as this is an issue of concern to both government and individual planners. To this end therefore, this study attempts to examine the trends in the production, area cultivated and productivity of cocoyam in Nigeria from 1960/61 to

2003/2006 and highlights the relative contributions of area and productivity to the observed growth.

METHODOLOGY

a) The Data:

Secondary data sourced from various issues of Central Bank of Nigeria (CBN) Statistical Bulletin and Federal Office of Statistics (FOS) on area, output and productivity (yield) of cocoyam in Nigeria from 1960-2006 were used for the analysis.

b) The Model and Analysis of Data:

The growth rates were computed by fitting exponential function in time to the data following Onyenweaku and Ezeh (1987). The lead equation was chosen for further analysis based on the normal economic, econometric and statistical criteria. The fitted function is specified as follows:

Exponential: $Y = b_0 e^{bt}$ ……..… (1)

When linearized in logarithms, equation (1) becomes:

$InY = b_0 + b_1 t$ ……..… (2)

Y= production, area or productivity

t = time trend variable

b_0, b_1, = regression parameters to be estimated

The growth rate (r) is given by

$r = b \times 100/1$ …… … (3)

Where:

This measure has proven to be more realistic in computing growth rates as it takes into account the entire observations. Alternative methods of computing compound growth rates exist. One of these is to use data at the beginning and at the end of a period which has been shown to ignore vital information.

Data were fitted to the above function in estimating production, area and productivity for two periods, namely: Pre-SAP (Structural Adjustment Programme)-(1960/61-1984/85) called Period I and Post-SAP (1985/86-2003/06) Period II.

RESULTS AND DISCUSSION

a) Growth of Production, Area and Productivity.

Results of the estimated log linear function in time variable for cocoyam output, area and productivity for the two periods which is used for further analysis are presented in Table 1. Output, Area and Productivity of cocoyam exhibited negative trends in Period I. In this Period, the coefficient of the trend variable is significantly different from zero at 1% for output, area and productivity of cocoyam. In Period II however, output and area of cocoyam showed positive trends. The productivity coefficient also depicted a positive trend in Period II. The coefficient of the time trend is highly significant at 1% for area and production except productivity whereby the coefficient is significant at 5%. This is an indication that the Structural Adjustment Programme (SAP) stimulated investment in especially cocoyam production in Nigeria. The study thus validates empirically that the Structural Adjustment Programme (SAP) which ushered in the era of deregulation is an important step in stimulating and sustaining food production in Nigeria. Overall, the data shows a positive trend relationship between time and cocoyam production in Nigeria.

Attainment of aggregate growth in the production of cocoyam in Nigeria is feasible under exchange rate deregulation. The administrative fixation which was the practice before 1986 was not a good policy. The attainment of food security in Nigeria requires that government policies on those factors which best explain staple food crop production such as technology, agricultural input subsidy and exchange rate etc.

(b) Growth Rates of Production, Area and Productivity of Cocoyam in Nigeria, 1960/61-2003/06 (%)

Compound growth rates of production, area and productivity of cocoyam for the two Periods were computed and presented in Table 2. The growth rates of production, area and productivity of cocoyam were all found to be significantly different statistically for the two periods. The output of cocoyam declined in the first period by 10.80 percent per annum but increased by 14.30 percent per annum in period II, suggesting that SAP positively influenced the production of cocoyam by increasing the level of investments. A similar trend was observed in the growth rates of area allocated to cocoyam. In Period I, the area under cocoyam declined by 6.90 percent per annum but increased by 12.60 percent per annum in Period II. The growth rates of productivity of cocoyam also declined in the Pre-SAP era (Period I) by 0.80 percent. The productivity of cocoyam however increased to a compound rate of 1.70 percent per annum during the Post-SAP era. The era of negative growth rates in cocoyam output and area appears to have commenced in 1960/61 that is the beginning of the first period. The findings suggest that increases in cocoyam output in Nigeria between Periods I and II were due mainly to expansion of area under cultivation and not the productivity/yield (output/hectare).

CONCLUSION

The estimated functions suggested positive trends in the production, area and productivity of cocoyam between periods I (1960/61-1984/85) and II (1985/86-2003/06). Increases in cocoyam production were due principally to the expansion of area under cultivation and increased investment. The findings show that growth in staple food crop production in Nigeria especially cocoyam is possible especially in the era of guided deregulation. Appropriate policy on agricultural input supply, research and extension will provide the required sector-specific incentive for enhanced productivity. Measures aimed at improving the yield and efficiency of resource utilization will enhance the prospects of cocoyam.

REFERENCES

Food and Agricultural Organisation (FAO) (2006). “Food Crop and Storage”, Corporate Document REPOSITORY and Databases.

Federal Ministry of Economic Development (FMED) (1975). The Third National Development Plan, 1975-1980, Lagos.

Onyenweaku, C.E. and N.O.A.Ezeh (1987). “Trend in Production, Area and Productivity in cocoyam in Nigeria 1960/61-1981/84”, Paper Presented at the Conference organized by the National Root Crop Research Institute, Umudike.

Onyenweaku, C.E. and Okoye B.C (2005). “Trends in Cassava Output, Area and Productivity in Nigeria, 1960/61-2003/04”, Paper presented at the Proceedings of the 39th Conference of the Agricultural Society of Nigeria, Benin 2005.

Zuhair, M. and D.G. Hunter (2000). Taro cultivation and use in the Maldives. IPGRI session. 12th symposium of ISTRC; Tsukuba Japan: 97.

Table 1. Estimated Functions for Production, Area and Productivity of Cocoyam in Nigeria, 1960/61-2003/04.

I) PRODUCTION	Estimated Coefficient(s)			
	Constant (b_0)	b_1	R^2	F value
a) Period I (1960/61-1984/85)	7.864 (47.500)***	-0.108 (-9.720)***	0.80	94.556***
b) Period II (1985/86-2003/04)	5.838 (49.234)***	0.143 (13.798)***	0.92	190.072***
II) AREA				
a) Period I (1960/61-1984/85)	6.028 (26.891)***	-0.069 (-4.557)***	0.47	20.681***
b) Period II (1985/86-2003/04)	4.333 (54.038)***	0.126 (17.983)***	0.95	323.290***
	4.326 (32.560)***	0.129 (4.207)***	0.95	152.180***
III) PRODUCTIVITY				
a) Period I (1960/61-1984/85)	1.558 (15.882)***	-0.008 (-1.56)	0.10	2.431
b) Period II (1985/86-2003/04)	1.505 (24.057)***	0.017 (3.058)**	0.35	9.293**

Note: Figures in parentheses are the respective t-ratios; ***, ** and * implies significance at 1%, 5% and 10% levels respectively.

Table 2. Computed Growth rates of Production, Area and Productivity of Cocoyam in Nigeria, 1960/61-2003/04 (%).

Period	Production	Area	Productivity
1. Period I (1960/61-1984/85)	-10.236**	-6.667**	-5.256**
2. Period II (1985/86-2003/04)	21.650**	13.427**	6.929**

** Significant at 5 percent