Appraisal of Palm Oil Production in Nigeria (1979-2014)

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Abstract

The study examined the trends and levels of production recorded in palm oil output in Nigeria bearing in mind the different research breakthroughs by the Nigerian Institute for Oil Palm Research (NIFOR). The study was therefore designed to provide an analysis on the performance of palm oil production and determine the growth rate in Nigeria from 1979-2014. Secondary data were used for the study. The data were analyzed using descriptive statistics and multiple regressions analysis. The result showed that exchanged rate of the Nigerian Naira had a significant positive relationship with world output of palm oil such that ₦1 million increase in exchange rate will result in ₦1.69 million increase in world output of the commodity. Also further findings showed that the co-efficient of producer prices was negative, implying that as the producer prices increased, palm oil production output decreased. It appears that the production and export of agricultural export commodities have been improving especially since the introduction of the Structural Adjustment Programme (SAP) in 1986, which seemed to have had a positive effect on agricultural exports. Efforts should therefore be made to promote agricultural exports with attention given to oil palm, which has potential in contributing significantly to agricultural exports from Nigeria.

Keywords: Palm oil, export, producer prices, Naira exchange rate, interest rate

Introduction

Palm oil is extracted from the mesocarp of oil palm nuts. Oil palm is a tree found in tropical rain forests. It is grown in the palm belt of Nigeria, stretching from Okitipupa in Ondo State through Edo, Delta and Imo states up to the sub-urban areas of Calabar in Cross River State.

Oil palm (*Elaeis guineensis*) originated in tropical West Africa, where it is found growing in many areas. Palm products were among the major export earners in the late 1960s and 1970s. Other agricultural products that constitute major export earners during this period are cocoa, groundnut rubber and cotton. Besides, palm produce provided over 70% of village employment in oil palm-growing areas. Evidence from the research carried out by Opeke (1997) confirmed that multiple products from oil palm are: palm oil, palm kernel oil/cake, palm wine, palm fronds

(roofing materials), soap making materials, brooms and chewing sticks. Others are fertilizers, sheabutter, baskets, and fencing and construction materials. It is because of this that palm oil may be said to be the most versatile crop among other crops planted in Nigeria.

Agricultural exports have traditionally played a prominent role in Nigeria's drive towards economic development, performing roles of providing employment for the labour force, stable food and raw materials. Domestic and export crops until recently contributed more than 83.5% of the total foreign exchange earnings of the country. The economic significance of palm produce in the domestic and international markets is visible through its contribution to the gross domestic product (GDP) and foreign exchange earnings. Afoma and Dick (2017) observed that palm oil export declined steadily in the period 1980-1988. No export was however made from 1989-1994. However, the largely subsistence basis of Nigerian agriculture had natural limitations that prevented it from taking up the challenges of a process of urbanization on the scale experienced by Nigeria since 1983. Some unfavourable policies and actions of government have also continued to condition these policies which strongly influence agricultural operations especially as regards the structure of incentives and performance, as well as changes on fertilizer subsidy, price and export policies. Moreover, land tenure laws have posed great difficulties for investors and individual farmers who have increased production. Another stumbling block has been the cultural elements of the area, if not the law against free-hold land ownership. Besides, there is non-replacement of old worn-out trees with new high-yielding varieties and absence of a comprehensive tree crop survey record of oil palm trees.

In the 1960s, the contribution of agriculture to foreign exchange earnings was about 83% from 1960-1970, while the export crops sub-sector contributed on the average 58% annually to the foreign exchange revenue (Phillip, 1996). Nigeria used to be the largest producer and exporter of palm oil, followed by the Democratic Republic of Congo. However, the supply of palm oil is yet to satisfy the demand of major consumers. The large oil revenue, coupled with the accumulation of resources in major foreign currencies, became the enabling factor in the decision to revalue the Nigerian Naira. Moreover, the domestic prices paid to export crop producers relative to the external prices received by the erstwhile commodity boards were low, virtually amounting to implicit taxation or negative protection of the farmers (Phillip, 1996). Nigeria, in recent years, has lost her role as a leading exporter of world's palm oil trade due to the decline in palm oil exported. This decline has reduced the contribution of the agricultural sector to the foreign exchange earnings in Nigeria. The importance of agricultural export to the Nigerian economy calls for a periodic review of the present and future influences of these crops on the Nigerian economy. This study will help reveal the factors that influence palm oil output. It will help policy makers to develop appropriate policies which will in turn enhance palm oil production output. Also, the output forecast will enable the government to plan and ensure that the resources are available to the farmers at the required time. The contribution of agriculture to the nation's GDP will rise and probably Nigeria may go back to being the largest producer and exporter of palm oil.

The main objective of the study was to examine the trend of Nigeria's palm oil production during the period of 1979-2014.

The specific objectives were to

i. analyze the trend of Nigeria's palm oil output.
ii. determine the growth rate
iii. determine the factors that affect palm oil output, and
iv. make suggestions and policy recommendations based on the findings.

The agricultural export sector of Nigerian economy plays an important role. The sector provides food, raw materials for industries and for export, revenue for the government use and foreign exchange earnings. The oil-rich Nigerian economy long hobbled by political instability, corruption and poor management is undergoing substantial economic reforms under the current civilian administration. Nigeria's former leaders did not diversify the economy away from over dependence on the capital-intensive oil sector, which provides 20% of GDP, 95% of foreign exchange earnings and 65% of budgetary revenues. Agricultural exports have traditionally played a prominent role in Nigeria's drive towards economic development (Olayemi and Olayide, 1975) prominent among agricultural cash crops production in Nigeria are cocoa, rubber, palm oil, groundnut and cotton which are generally destined for export Until recently, these commodities contributed more than 83.5% of the total foreign exchange earnings of the country (Anon, 1996). Presently, agriculture accounts for about 35% of the country's GDP as it has been overrun by oil exports, which now plays a major role in the GDP of the economy. The Structural Adjustment Programme (SAP) was introduced into Nigeria in July 1986. The SAP was designed to deal with the underlying imbalances in the economy. The programme had two broad components, the first of which emphasized short- to medium-term stabilization while the second focused on the elimination of imbalances in the production and expenditure structures. According to Obadan (2000) the SAP objectives of export crop development were to:

i. Increase production of exportable cash crops for the intensification of Nigeria's export based diversification.
ii. Raise rural employment generation opportunities for increased income generation and the need to halt rural-urban migration.
iii. Increase domestic supply of agricultural raw materials including natural rubber to the sector. This is to increase value added and minimize dependence on imported raw materials.

Oloidi (1992) showed that the SAP had limited ability to boost the demand for Nigerian agricultural exports. He attributed this to the fact that the SAP could only influence the current price and the previous year's average producer price. Obaseki (2000,) defined the exchange rate as a relative price that measures the worth of a domestic currency in terms of goods and services it can purchase, vis-à-vis foreign partner's currency over a given period of time.

According to Phillip (1996), the exchange rate is the amount of domestic currency required to obtain a unit of foreign currency. Obaseki (2000,) defined exchange rate policy as the framework, rules and other measures for determining and influencing the level of the exchange rate at a given point in time. He noted that exchange rate policy in Nigeria has moved in a circle, from a fixed exchange rate system between 1960 and 1986, a flexible exchange rate system from 1986-1993, a temporary halt of deregulation in 1994 when the official exchange

rate was pegged, and the reverse of policy in 1995 that re-introduced deregulation as a major policy thrust. The system has been fine-tuned by the Central Bank of Nigeria over the years, culminating in the introduction of the Interbank Foreign Exchange Market (IFEM) which was introduced in 1999. It was realized that before SAP, agricultural production was almost stagnant. It was constrained by the low producer prices and restrictions on marketing. It was observed that during the adjustment period, the real depreciation of the naira improved producer prices, while the elimination of the marketing boards and liberalization of trade had a very positive impact on a variety of cash crops. Phillip (1996) noted that exchange rate should in principle be left to the vagaries of the market forces of demand and supply. He observed however, no government really completely hands off the determination of the exchange rate. Obaseki (2000) suggested that the long run objectives of the exchange rate policy should be to achieve an equilibrium exchange rate that would guarantee both internal and external balance without undue dependence on equilibrating short term capital flows, acquisition of long term external loans and abrupt monetary policy interventions. Olayide and Olatunbosun (1972) showed that average earnings of all the agricultural export commodities, which they studied, showed a downward trend percentage. They posited that a possible explanation for the downward trend could be because agricultural export commodities were being controlled by marketing boards and therefore producers had fewer incentives to increase their production. Olowoyeye (1999) suggested that there should be an alignment of producer prices with the world prices as this would serve as incentives for farmers to produce more of export crops and thereby enhance export promotion. Obadan (2000) gave some desirable suggestions on non-oil exportation promotions relating to:

i. One-stop basis for export documentation.
ii. Adequate funding of the activities of cash crop farmers.
iii. Reaction of commercial desks oversees to assist provision of information on market potentials for Nigeria's exporters.

Methodology

Area of study

The area of study, Nigeria, lies on the southern coast of West Africa between Longitudes 2^0 and 15^0E and Latitudes 5^0 and 15^0N. Nigeria occupies a land area of about 923,769 square kilometres, and bordered by Benin to the west, Niger to the North and Chad and Cameroon to the East.

Data Collected

Data collected were on palm oil output, exchange rate of the Naira, producer prices, world prices of palm oil and inflation rate for the period 1979-2014.

Method of Data Analysis

Data collected were analyzed using descriptive statistics and multiple regression. The descriptive statistics procedure involved the use of graphs to show trends in time series data. It analyzed the trends in palm oil production output, producer prices and world prices. Growth

rate analysis was also used to show increase or decrease in the palm oil output, producer prices and world prices. The percentage growth of over a 10-year period was analyzed for producer prices and world prices .The average growth rates were also determined. The growth rate was calculated with a spreadsheet using this formula: CAGR = (End value/start value) ˆ (1/(periods-1)-1.

Multiple regression analysis was used to determine the relationship between the dependent variable and all the independent variables. The basic model of a simple regression is stated as below:

$$Y = F(x)$$

where, Y is the dependent variable.

The implicit multiple regression models is expressed as:

$$Y = F(X_1, X_2, X_3, X_4, U)$$

Where the dependent variables =

Y= Palm Oil Output

and the independent variables =

X_1 = Exchange rate
X_2 = Producer prices
X_3 = World price of palm oil
X_4 = Inflation rate
U = Error term

Regression was run for Y, which is the output of palm oil, using the independent variables above. The regression model helped us to analyse how each independent variable affected the quantity of palm oil output. Three functional forms were used based on the above implicit function as follows.

i. The linear function:
$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + U$
ii. The semi log function:
$Y = Lnb_0 + bX_1 + b_2X_2 + b_3X_3 + b_4X_4 + U$
iii. The double log function:

$$LnY = Lnb_0 + b_1L_nX_1 + b_2L_nX_2 + b_3L_nX_3 + b_4L_nX_4 + U$$

The model, which gave the best fit, was chosen. The criteria for choosing the best functional form included:

1. Economic criteria, which were based on a priori theoretical explanation of the data available
2. Statistical criterion, which determined the statistical significant of the coefficients

Results and Discussion

The trend in annual palm oil output in Nigeria from 1970-2015 is presented in Figure 1. The graph shows that palm oil trend analysis of production output between 1979 and 1990 was

increasing at a point before there was a slight drop, and continued increasing till 2010 with a very slight drop from 2011 to 2015.

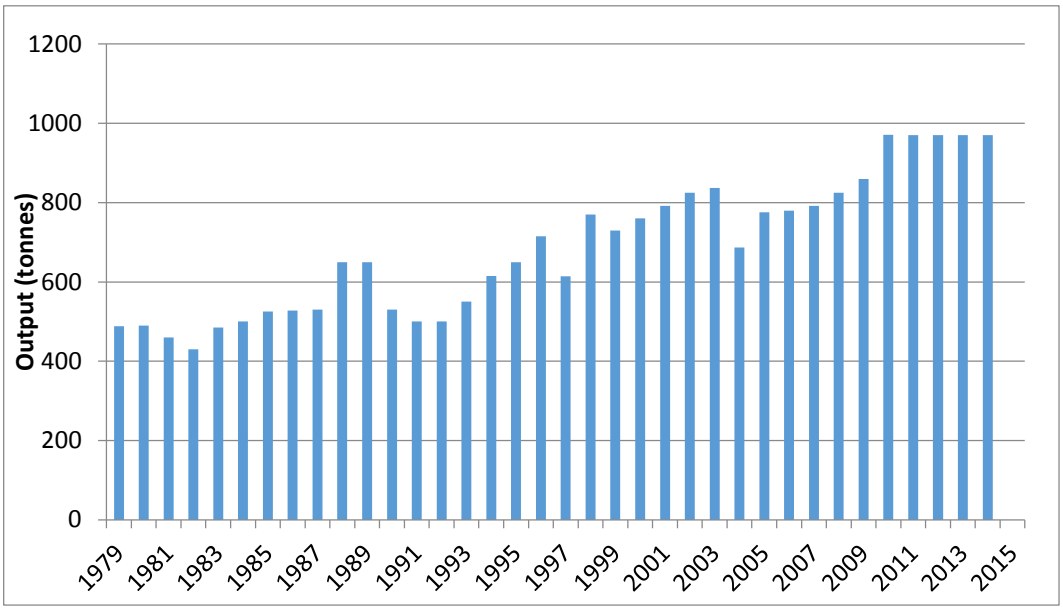

Figure1: Palm Oil Production output

Trend Analysis of World Prices of Palm Oil

The world prices of palm oil fluctuated through this study period **(**1979-2009), with 1981 recording the lowest price of ₦34 per tonne, while year 2007 recorded the highest price of ₦48,280.80 (Figure 2)

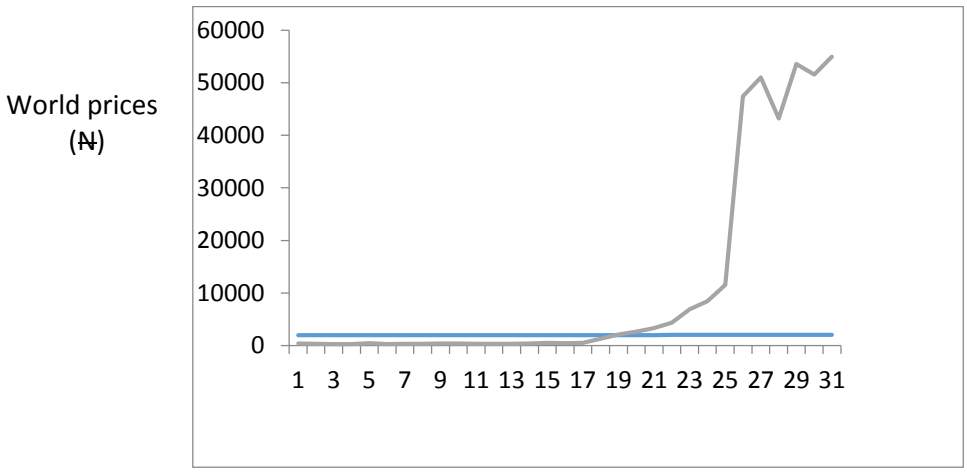

Figure 2 : Trend of world prices of palm oil

Trend Analysis of Producer Prices of Palm Oil

The producer prices of palm oil fluctuated between 1979 and 1994 with a general downward trend, which could be attributed to the high inflation in that period. However, the price spiked

up in 1995 and continued rising till 2009 when its price reached ₦55,000 per tonne (Figure 3).

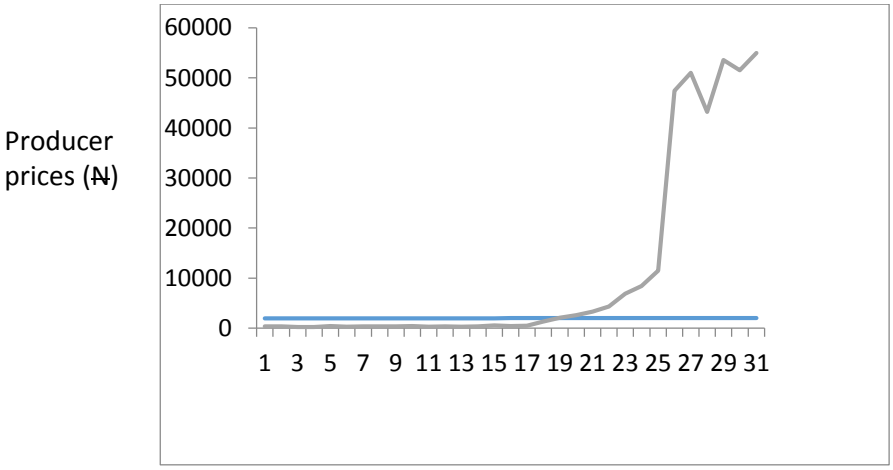

Figure 3: Trend of Palm Oil producer prices

Growth Rate

Table 1 shows the percent growth in world prices of palm oil produce at different time intervals from 1979 to 2009.

Table 1: Growth Rate of world prices of palm oil

Period	Growth rate (%)
1979 to 1989	8.40
1990 to 1999	29.98
2000 to 2009	46.04
2009 to 2014	**24.87**

Source: Extract From Computer Analysis

There was a positive growth rate of 8.40 from 1979 to 1989, 29.98 from 1990 to 1999, and 46.04 from 2000 to 2009. It was noticed that the growth rate of world price increased sharply which may be attributed to the devaluation of the naira. The constant annual growth rate formula was used using the Microsoft excel; the growth rate was calculated at 10-yearly intervals, and finally from 1979-2009.

The rate of growth in producer prices of palm oil is shown in Table 2, while Table 3 presents the rate of change of exchange rate. There was a positive growth rate in producer price of 1.09 between 1979 and 1989. Also, producer price exhibited a sharp increase in growth rate between 1990 and 1999 (32.73), which may be due to market liberalization and SAP. Also, the growth rate continued to increase as noticed in the period 1999 to 2009, at 35.53. The average growth rate in producer price of palm oil of this study period was 22.51.

Table 2: Growth rate of Rate of Producer Prices of Palm Oil

Period	Growth Rate (%)
1979 to 1989	1.09
1990 to 1999	32.73
2000 to 2009	35.53
2009 to 2014	22.51

Source: Extract from Computer Analysis

Table 3: Growth Rate of Exchange Rate

Period	Growth Rate (%)
1979 to 1989	-1.094
1990 to 1999	39.59
2000 to 2009	21.87
2009 to 2014	19.36

Source: Extract from computer Analysis

The growth rate of exchange rate was a value of – 1.094 between 1979 and 1989 (Table 3). However, there was a sharp increase in growth rate between 1990 and 1999. This may be due to the devaluation of the naira and liberation of the economy. Moreover, a decline in the growth rate (28.87) of exchange rate was noticed between 2000 and 2009. The rate of growth of exchange rate for the study period was 19.36. The general fluctuation or instability in growth rate may be due to the varying exchange policies adopted by the country thus far.

Table 4 explains the regression result which was derived from the computer analysis about the exchange rate of the Nigerian Naira, producer and world prices of palm oil, and interest rate.

Table 4: Palm Oil Output Regression Result

	Coefficients	Critical t-values	Significance
Constant	699.461	4.782	0.000
Ln Exchange rate	1.169	3.898	0.001
Ln produce price	-0.582	-0.994	0.329
Ln World price	0.313	0.677	0.505
Ln Interest rate	0.041	-0.500	0.621

Source: Extract from Computer Analysis

The regression equation was therefore:

Palm oil Output = 699.461 + 1.169Exch Rate - 0.582Produce Price + 0.313World Price + 0.041Interest Rate + Error Term

Corresponding Critical t values for the independent variables were 4.782, 3.898, -0.994, 0.677, and -0.500 for the constant, exchange rate, produce price, world price and interest rate respectively.

R2 = 0.837; Adjusted R2 = 0.839; F.S2t = 33.340
D.W2 = 1.279.

A Priori Analysis

The regression result (Table 4) shows that, exchange rate had a positive relation with the world output, such that a N1 million increase in exchange rate will result in N1.169 million increase in world output. This conforms to the *a priori* expectation. Also further finding is that the co-efficient of producer's price is negative. It has negative effects on the economy, such that as the producer price increases the palm oil production output will decrease.

The regression result also revealed that world price has an effect on the palm oil production output in Nigeria. The possibility of the world price co-efficient conforms to the economics analysis as an increase of world price by ₦1 million will increase world output by ₦0.313 million. Finally, interest rate had a positive relation with 14% output, such that a N1 million increase in interest rate will result in ₦0.04l million in World output.

***Co-Efficient and Adjusted Co-Efficient of Determination* (R^2)**

Co-efficient of determination, R^2 was 0.837 while the adjusted R-Square was 0.839. The R^2 which is the co-efficient of multiple determination shows that more than 83% variation in World output was explained by the model which was of good fit and could be used in drawing meaningful influence about the economic analysis of palm oil production output in Nigeria. That shows that explanatory variables i.e. Exchange rate, producer price world price, interest rate contributed to the 83% variation in world output.

The model which was tested at 5% level of significance with n-k degree of freedom showed that producer price, World price and interest rate were not significantly related to palm oil production output in Nigeria with the respective values being 0.994, 0.677, -0.500, less than the t-tabulated (2.04), while Exchange rate was significantly related to the world output with the value (3.898), which is greater than the value of the critical t value of 2.04.

The value of the T-statistics result above was 33.340. This is greater F-tabulated at the 5% level of significance (3.32) and it shows that the overall model was statistically significant.

Econometric Analysis

In this work, we chose to test the existence of serial- and auto-correlation in our model with Durbin-Watson (DW) statistics. Durbin-Watson value from the regression result above was 1.279, n was 31 while k was 4.

Therefore, DL the Durbin-Watson lower was 0.960, while the DU, Durbin-Watson upper, was 1.59, though our DW value from the regression result was 1.279. This means that it fell between the DL and DU i.e. 0.960 and 1.59. This indicates that our result was inconclusive, and the model was very good.

The variables, exchange rate and world price, had positive co-efficients. This implies that an increase in these variables would increase the production output of palm oil. Producer price had a negative coefficient.

Conclusion

From the study, one can conclude that production and export of agricultural export commodities have been improving especially since the introduction of the structural adjustment programme (SAP), which seemed to have had a positive effect on agricultural exports. Efforts should therefore be made to promote agricultural exports with attention given to palm oil, which has potential in contributing to agricultural exports.

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