IJSSPP

INTERNATIONAL JOURNAL OF SOCIAL SCIENCE AND PUBLIC POLICY

ISSN 1119-0795

Volume 3 Number 2, September, 2000

Published by International Social Science and Public Policy Research Association

IMPACT OF GOVERNMENT AGRICULTURAL PRICE POLICY ON HYBRID OIL PALM CULTIVATION IN THE SOUTH SOUTH ZONE OF NIGERIA: 1975 - 1996.

BY

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Abstract

The study analysed the influence of product and input prices on hybrid oil palm hectarage by small - holders in Southern Nigeria between 1975 and 1996 using Akwa Ibom State as a case study. Data were obtained from the Ministry of Agriculture and Natural Resources and the Ministry of Finance and Economic Planning in the then Cross River State and the present Akwa Ibom State. A single equation, multiple regression involving the use of Ordinary Least Square (OLS) estimating technique was used in the analysis. The coefficients of price of garri (being proxy for price of cassava; an alternative crop) and price of seedlings (Ps_t) carried negative signs and were significant at the 5 per cent level. The dummy (D_t - indicating impact of government policy before and after the Structural Adjustment Programme (SAP) and the Trend (T) variables also carried negative signs and were significant at the 5 per cent level. The negative signs of these variables (D_t and T) implied a retrogressive impact of government agricultural policy on smallholder oil palm plantation development in the area. However, the real price of palm oil (Po_t) was not significant at the 5 per cent level. The short run elasticities with respect to real prices of palm oil (Po_t), garri (Pg_{t-1}) and seedlings (Ps_t) were 0.661, - 0.569 and -0.288 respectively. While the long run elasticities were 1.55, -1.33 and 0.67 with respect to prices of palm oil, garri and seedlings respectively. Implication on policy is that, agricultural policy instruments aimed at engendering increased cultivation of hybrid oil palm by small-holders should also be geared towards reduction in investment cost which must include subsidy on inputs amongst others. The provision of input subsidy (especially on seedlings) and the consistency of government's agricultural policies were therefore recommended. ***(International Journal of Social Science and Public Policy 2000:3(2) pp 209-220).***

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INTRODUCTION

The Nigerian government has been quite concerned about the dwindling fortunes of the oil palm industry which hitherto was a major foreign exchange earner for the country before the discovery of crude oil in the late 1950's. This industry had generated the much needed funds for the financing of development projects in the then Eastern Nigeria in general and South-Eastern State in particular through the Commodity Boards' marketing activities. Production was mostly from semi wild oil palm groves which were exploited by millions of small-scale farmers who made little or no effort to rehabilitate them due to inadequate capital (Olomola, 1991).

Semi-wild palm groves are low yielding and coupled with their excessive heights and the depleting labour force as a consequence of rural-urban migration, the maintenance and harvesting of these palms became rather costly.

To bring about a turn around in the fortunes of the industry, government had to initiate oil palm development projects amongst other tree crops aimed at encouraging the planting of hybrid oil palm (improved and high yielding varieties) by small-holders along plantation lines. This made for the provision of seedlings and fertilizer free or at subsidized rates.

In the then Cross River State's (Akwa Ibom State inclusive) Oil Palm Development Scheme (ODS), apart from the provision of free seedlings and fertilizer, cash subsidies were also given to the participants. The Nigerian Palm Produce Board (NPPB) established in 1977 provided farmers with free seedlings and fertilizer, but the low producer prices offered farmers made them unenthusiastic in expanding their hectarage given that, there existed alternative uses of land in arable crop production like cassava, yams etc. and the land tenure problems in the State. Similar findings were reported by Zeven (1967) on why the second oil palm estate rehabilitation and improvement scheme in the then Eastern region of Nigeria failed.

The abolition of the NPPB in 1986, and the introduction of the Structural Adjustment Programme (SAP)based on market forces determining the prices of agricultural inputs and products domestically consumed and exported was to motivate farmers to expand their area of most cash crops including oil palm. The ban on importation of vegetable oils in 1986 was expected also to result in increase

domestic prices of edible vegetable oil and oil seeds and consequently lead to increased cultivation of hybrid oil palm, coconut, soya bean, beniseed etc.

In view of the dominating economic importance of oil palm in the State in particular and oil palm producing States in general, it was government's expectation that the State would have increased the planting of hybrid oil palm seedlings since it is the one of the most important oil palm producing States in the country (Udom, 1986).

However, Udom (1988) reported a declining trend in the planting of improved hybrid oil palm during the 1975 to 1986 period in the then Cross River State Oil Palm Development Scheme (ODS) in spite of the rising domestic and world prices for oil palm products (palm oil and kernel). He also reported that between 1986 and 1996 prices of oil palm seedlings have been on the increase and tends to discourage farmers from cultivating hybrid oil palm. Other causes of the decline included land tenure complications and inappropriate line of agricultural extension work.

There have been very few studies carried out to ascertain which government agricultural policy instruments can be effective in bringing about the increase in hectarage cultivated with any tree crop in Nigeria generally and oil palm in Akwa Ibom State in particular in spite of the increasing demand for oil palm products in the country.

The study was carried out to ascertain the influence of agricultural price policy on hectarage expansion by small-holder oil palm growers who form the bulk of the producers in the State.

Several factors often influence the decision of farmers to either increase or maintain their cultivated hectarage of crops especially tree crops. These include, product and input prices, institutional factors, profitability of competing enterprises, weather, etc. (Tomek and Robinson, 1978).

Most studies carried out in countries like Ghana, Uganda and even Nigeria have shown that some economic factors especially product price influence the investment decision (hectarage expansion) of crops, Dittoh and Ogunfowora (1978), Saylor (1974); Frederick (1965) and Stern (1965).

The provision of inputs such as fertilizers and new strains of seeds by government to farmers at little or no cost (subsidies) to them will go a long way in making them expand their cropped area, (Whetham, 1972; Onuk, 1979 and Agiobenebo, 1995). Agiobenebo (1995) had also reported that the increase in the

price of a competing crop will result in a bias in the allocation of new land and even the use of existing land against oil palm cultivation, especially where the land is suitable for growing arable crops such as cassava, yams, maize etc. In Akwa Ibom State, cassava appears to be the most important crop after oil palm that competes for land.

Weather is a very important variable often considered in supply response studies especially for arable crops. However, it does not have significant effect on hectarage response of oil palm but can be very important in crop output.

Nerlove (1956) developed a dynamic supply model for crops (arable). His study initiated the use of both output and hectarage response functions. Over time researchers have adapted and modified this model in their different hectarage response studies for both arable and perennial crops.

Dittoh and Ogunfowora (1978) used the Nerlovian Adjustment model in their study on cotton in Northern Ghana and found out that cotton price influenced the hectarage cultivated with the crop especially in Region 3. Frederick (1965) had earlier on adapted the Nerlovian supply model and developed a planting function of lagged coffee prices, lagged coffee hectarage and a trend variable. The results also indicated a significant positive response to product price. Saylor (1965) had also adapted and modified the Nerlovian model in his study of coffee in Brazil, he expressed planted area as a function of real producer prices averaged over three years preceding harvest, a trend variable and coffee acreage lagged one year as well as a dummy to account for the rapid changes in supply during a six year government programme aimed at reducing output. The model's explanatory power was improved with the inclusion of the lagged acreage in the model. He obtained significant results.

For perennial crops, supply response studies carried out in Nigeria and some developing countries have been mostly on output response as against hectarage: Olayide (1972), Olayide and Oni (1972).

The few hectarage response studies carried out on perennial crops in developing countries include that of Stern (1965) who formulated a planting model for cocoa in West Africa with new planting expressed as a linear function of real cocoa prices (in terms of moving five year averages) and obtained very significant parameter estimates. Bateman (1965) in a study on cocoa and coffee used the same model and found out that price expectation could be used to study supply response when sufficient time series data were available.

However, scholars are yet to agree on the price variable that farmers respond to in their resource allocation decisions. And the difficulty in model construction has been their inability to define the prices and costs to which farmers respond. Price variables often used include pre-sowing and past-harvesting prices, real prices, lagged prices and proxy for present year expected prices, price ratio, and moving averages.

Farmers expected prices obtained by use of distributed lags are often based on the gestation period of the crop. For arable crops, one year lag is often used while for perennial crops, it will vary between 3 and 5 years for oil palm and upward of 4 to 8 years for rubber and cocoa (Nerlove; 1956; Helleiner, 1977; Madhaven, 1972; Abang, 1984).

MODEL

A Nerlovian model portraying the structural relationship of hectarage response used by Stern (1965) and Saylor (1974) which was modified and adapted to determine hectarage response to agricultural price policy in the zone over the study period was specified thus;

$$Ho_t^* - Ho_{t-1} + L(Ho_t^* - Ho_{t-1}) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (1)$$

$$Ho_t = f(Po_t^*, Ps_t, Pg_{t-1}^*, T, D, U_t) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (1.2)$$

Ho_t^* = expected hectarage cultivated with hybrid oil palm in year t

Ho_{t-1} actual hectarage cultivated with hybrid oil palm in year t-1

Po_t^* = expected real producer price of palm oil in year t, (this was taken as past five years moving average price).

Pg_{t-1}^* expected real price of garri in year t. (proxy for price of cassava being an alternative crop).

Ps_t = price of hybrid oil palm seedlings in year t. (This is the most important input in small holder oil palm production after land).

T = Trend (indicating time)

L = Coefficient of hectarage adjustment

D = Dummy, indicating impact of government policy during the two periods from 1975 - 1985 = 0
1986 - 1996 = 1

U_t = Error term

To arrive at the real producer price of palm oil used in the analysis, real prices lagged three and five years were tried, but the past five years moving average prices appeared satisfactory.

By substituting the linear functional form of equation (1.2) into equation (1.1) and assuming a one year lag as expected price of garri (proxy for price of cassava being an annual crop) and a past five years moving average price for palm oil, the estimating equation in reduced form using the linear and log linear forms were obtained as follows in order to obtain the lead equation

$$Ho_t = b0 + b1Po_t + b2Ho_{t-1} + b3Ps_t + b4Pg_{t-1} + b5T + b6D + e_t \quad \ldots \quad (1.3)$$

$$\ln Ho_t = \ln b0 + b1 \ln Po_t + b2 \ln Ho_{t-1} + b3 \ln Ps_t + b4 \ln Pg_{t-1} + b5 \ln T + b6 \ln D + e_t \quad \ldots \ldots \quad (1.4)$$

SOURCES OF DATA

Oil palm hectarage and seedling prices data were obtained from the records of the Tree Crop Unit of the Ministry of Agriculture and Natural Resources in both Cross River and Akwa Ibom States. Prices of garri and palm oil were obtained from the Economic Planning Unit of the Ministry of Finance and Economic Planning in the two States.

METHOD OF ANALYSIS

The analytical tool used for the study was the single equation, involving the use of Ordinary Least Square (OLS) multiple regression technique. This was preferred to other methods because it has less computational complexities (Olayemi et al, 1987). To take care of the problems of multicollinearity, autocorrelation etc. that may result in the inability of assessing the reliability of parameter estimates, the following econometric and statistical tests were carried out. The Durbin - Watson test was adjusted to h-statistic as a result of inclusion of lagged endogenous variable - (Durbin 1970; Dittoh and Ogunfowora, 1978). The F-test, Student-t test, coefficient of determination (R^2) and adjusted coefficient of determination (adj.R).

RESULTS AND DISCUSSION

Linear Functional Form Estimates

$$Ho_t = 1675.40 - 0.20Ho_{t-1} + 0.210Po_t + 30.33Ps_t - 31.52Pg_{t-1} - 86.44T - 191.01D_t \quad \ldots\ldots(1.5)$$
(924.40) (0.242) (46.82) (30.40) (19.35) (59.75) (383.15)

$R^2 = 0.76$, adjR = 0.61

F-ratio = 5.16, D.W = 1.78, h = 1.77

Double Logarithmic Functional Form Estimates

$$Ho_t = 11.35 - 0.573Ho_{t-1}^{**} + 0.661Po_t - 0.288Ps_t^{**} - 0.569Pg_{t-1}^{**} - 0.65T^{**} - 1.19D_t^{*} \quad \ldots\ldots(1.6)$$
(2.41) (0.24) (0.59) (0.12) (0.19) (0.22) (0.32)

$R^2 = 0.95$, adjR = 0.92

F-ratio = 32.15 D.W = 1.87, h = 1.86

Standard Errors in parentheses

** Significant at the 1 per cent level

* Significant at the 5 per cent level

Equations (1.5) and (1.6) show the estimates of the two functional forms used in the analysis. The results of the double logarithmic function produced better estimates and hence, was chosen as the lead equation.

The coefficients of the real producer price of palm oil (Po_t) and price of seedlings (Ps_t) carried the expected positive and negative signs respectively. The real price of garri lagged one year (Pg_{t-1}), Dummy (D) and Trend (T) variables carried negative signs. The coefficient of determination (R^2) was 0.95 indicating that the variables explained about ninety five per cent of the variability in the dependent variable. The inclusion of the lagged hectarage (Ho_{t-1}) improved the goodness of fit as was obtained by Saylor (1974). The F-ratio (32.25) indicated the overall significance of the equation. The Durbin-Watson statistic which was modified to h - statistic as a result of the inclusion of a lagged endogenous variable indicated no problem of serial correlation (h = 1.86).

The correlation between the price of palm oil trend variable (r = 0.57) indicated a slight case of multicollinearity. However this was not a serious problem

The coefficients of price of seedlings (Ps_t) and real price of garri (Pg_{t-1}) carried negative signs and were significant at the 5 per cent level. By implication, the increase in price of hybrid oil palm seedlings as a result of the removal of subsidy must have discouraged the expansion of oil

palm hectarage by small-holders. While the higher prices of garri and the shorter gestation period of cassava, must have engendered the devotion of the limited land-holdings to cassava production by the farmers. This may be expected since, soils in the oil palm belt are also suitable for cultivation of arable crops such as cassava, yam etc (Agiobenebo, 1995). The negative sign of the coefficient also indicate that cassava is in competition for land with oil palm in the area.

The dummy variable was significant and carried a negative sign indicating that government policy during and after SAP had a negative impact on oil palm planation development by small-holders. It will be recalled that, during the 1975 to 1985 period, government provided free seedlings and cash subsidies, but with the withdrawal of this subsidy in the 1986, to 1996 period and the concomittant increase in the prices of inputs, farmers may not have been able to pay for the required inputs. The Trend variable (T) also carried a negative sign and was significant at the 5 per cent level. This confirmed Udom (1988) assertion that there had been a declining trend in the hectarage of cultivated hybrid oil palm in the State. The coefficient of the real price of palm oil was not significant at the 5 percent level. This implied that, small holder oil palm growers in the state had not been quite responsive to the increase in the real price of palm oil over time. This may indicate that, product price alone may not be the only economic incentive to encourage investment in hybrid oil palm plantation development but cost reduction via input subsidy can be a complementary option in the short run that could engender hectarage expansion by the small holders.

Table 1 shows the shortrun (SR) and longrun (LR) hectarage elasticities with respect to the important explanatory variables at their mean values. The coefficient of the explanatory variables are their elasticities in the logarithmic functional form in the short run. The result indicate that hectarage elasticity with respect to palm oil price is 0.661. This implies that a unit increase in real price of palm oil will lead to 0.661 per cent increase in hectarage cultivated. While a unit increase in the price of garri will lead to a 0.569 per cent decrease in hectarage cultivated with hybrid oil palm. Also in the short run, a unit increase in

TABLE 1: SHORT RUN AND LONG RUN HECTARAGE ELASTICITIES

EXPLANATORY VARIABLE	SHORTRUN	LONG RUN
PO_{t-5}	0.66	1.55
Pg_{t-1}	-0.57	-1.33
Ps_t	-0.288	-0.67
Coefficient of adjustment $(1 - b_2)$	0.427	

Source: Computed from equation (1.6).

the price of hybrid oil palm seedlings will lead to a 0.288 per cent decrease in hectarage cultivated with hybrid oil palm in the state.

The long run elasticities were obtained by dividing the short run values by the coefficient of adjustment $(1 - b_2)$; where b_2 is the coefficient of the lagged hectarage. The long run elasticity with respect to real price of palm oil was 1.55, implying that a unit increase in real price of palm oil will lead to 1.55 per cent increase in hectarage cultivated. While a unit increase in price of seedlings and garri will lead to a 0.67 per cent and 1.33 per cent decrease respectively in hybrid oil palm hectarage in the long run.

CONCLUSION AND POLICY IMPLICATIONS

The study arrived at the conclusion that oil palm subsidy (especially on seedlings) to farmers in the area enhanced the cultivation of hybrid oil palm. Cultivated oil palm hectarage will increase with decrease in oil palm seedlings and garri prices.

The analysis of the results of the study suggest that, government's agricultural policy instruments designed to encourage hectarage expansion by small holder oil palm growers in the area in spite of seeking increase of product prices should also consider production cost reduction through provision of input subsidy. This stems from the fact that small-holder oil palm growers appear not to be encouraged to expand hectarage by increasing product price alone but may also consider the opportunity cost of land.

In view of these findings, it is recommended as follows:

Firstly, specific strategies of subsidy on oil palm cultivation (e.g. on seedlings, finance, fertilizer etc) should be provided by government. This will go a long way in reducing the cost of production and hence engender small-holder oil palm development (planting and rehabilitation) in the State.

Secondly, the problem of instability in government agricultural policies over time should be properly addressed particularly where tree crop development is concerned since it involves long term investment.

Thirdly, the take-off of the commodity exchange planned by the Federal Government need not be delayed further. This will not only bring about stability and transfer of risk by farmers, but will also become a channel for the collection of prevailing prices of agricultural export commodities in general and oil palm products in particular.

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