

Economic Analysis of Palm Oil Processing in Ikwerre and Etche Local Government Areas of Rivers State, Nigeria

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ABSTRACT

Nigeria has the reputation of being the leading producer of palm oil, but, also a significant importer of palm oil. This suggests a greater demand than is locally produced. In times past, it had contributed reasonably to the economy of the nation; this has however declined in recent times. The study was conducted in Ikwerre and Etche local government Areas of Rivers State. Palm oil processing in Rivers state is largely a rural based enterprise and the species processed varied from the wild species to the hybrid forms. However, most processors processed both simultaneously. This study focused primarily on palm oil processing cottage industries. Data collection was through multistage random sampling method. Structured questionnaire and personal interviews were used to collect data from palm oil processors. Gross margin and regression analyses were used to capture the objectives of the study. Gross margin and mark-up of these enterprises were moderate but outputs were inelastic to the inputs of labour and capital. This implies that returns to investment are lower than it should be. Low returns to investment of labour and capital suggest production process is technically inefficient. Improved oil extraction technology from fresh fruit bunches (FFB) is suggested to revise elasticity of oil in terms of FFB use and revenue generated. Improved labour productivity is also advocated.

Key words: Economic analysis, oil palm, processing, gross margin, elasticity

INTRODUCTION

The economics of palm oil processing will consider the interaction of economic variables employed in the venture (economic analysis). Economic analysis in palm oil processing will consider the various ways in which variables and other related factors react to changing economic forces in terms of how productivity could be affected by changing prices, output maximizing input levels, profit maximizing input levels, the interaction between outputs, inputs and revenue level, the effect of technological changes on the various aspects of economic endeavours. It involves the application of simple economic concepts in the study of the interactions between economic variables. According to Field (2001), economic analysis will examine the basic structure and the cause-and-effect relationships in economic activities.

The African Oil palm (*Elaeis guinensis*) is recognized as the most efficient oil producing cultivated plant (Edwards *et al.*, 1990). Nigeria was reputed as the world's largest producer of oil palm, accounting for about 43% of global production (Ayodele and Eshalomi, 2010). However, Nigeria today imports palm oil and other derivatives of the oil palm despite her global standing as a significant producer. That Nigeria imports palm oil and other oil palm

derivative is evidence that production is not keeping pace with demand. This could have resulted from many economic reasons.

Ayodele and Eshalomi (2010) submitted that Nigeria accounts for a significant proportion of global production. The advent of crude oil exploration to a great extent distracted the attention of the government from palm oil production and processing which for a time in the history of Nigeria was a veritable economic resource and contributor to our GDP. This led to a reasonable decline in the output of palm oil and other oil palm derivatives. The economy of individuals in these areas whose livelihood depended on it was also impacted. Also, inadequate factor pricing may have also been contributory and consequently impacted profit and revenue prospects of the processing individuals. Technically, in palm oil processing, it will be expected that the quantity of palm oil produced will depend on the species of the palm, efficiency of labour and technology model. However, building a model for a description of a functional relationship between outputs and inputs in the palm oil industry in Rivers state, will be difficult because one has to isolate enterprises with respect to the species processed (most processed a mixture of both

the hybrid and native wild specie simultaneously), assess labour efficiency based on their quality (the educational qualification and their ages also varied significantly) and processing technology (some used traditional methods or other hybrid-trado-modern methods). Also, the response of palm oil to the input of labour and capital investment has not yet been adequately presented in contemporary literature in Rivers State. The prospect of oil palm processing enterprises getting the most they can from the use of scarce resources has not yet been significantly articulated in the state. Furthermore, the efficient scale of output that will minimize average cost is yet to be adequately factored in government policies.

In any production activity, the most fundamental aspect is to examine the various inputs required and the relationship of different levels of each input with the output. Without such information, the business planners would not be able to rationally allocate resources for production (Lekhi and Singh, 2011). This work is to examine the relationship between labour, capital and the output of palm oil and critically study the policy implications of such a relationship and how it may affect the economy of Rivers State. This knowledge is very necessary because, according to Lekhi and Singh (2011), factor-product relationship is a basic production relationship between the input and output. It guides the producer in deciding as to how much to produce. The goal of this relationship is the optimization of resources.

Achieving good profit and revenue even in cases of impaired technical efficiency as events suggest in the oil palm processing industry in Rivers States, will depend on information on input/output prices. In primary economics, it is taught that profit is maximized where there is equality between marginal cost and marginal revenue. Koutsoyannis (2003) pointed out that in average cost theories of pricing, profit is not maximized in the long run by equality in both marginal cost and marginal revenue. Instead, the long run profit maximization is attained by equating price to the average cost of the firm.

In many production environments, attention in most cases, is placed on technical efficiency, this alone does not also guarantee good profit without a good knowledge of allocative efficiency. Allocative (or price) efficiency is achieved when the cost of producing a given output is minimized, as evidenced by the ratio of the marginal products of inputs to the inputs price ratio (Sharada, 1999). This study in line with the conceptual thoughts focused on the evaluation of the functional relationships between inputs and outputs and the profit and revenue prospects of oil palm processing cottage industries in Ikwerre and Etche Local Government Area of Rivers State, Nigeria. These are geared towards determining the allocative efficiencies of palm oil processing in Etche and Ikwerre local government areas. Allocative efficiency and technical efficiency are all components of economic

efficiency (the ratio of value of output to value of input) and economic efficiency is by implication an expression of profit per unit of input.

MATERIALS AND METHODS

The study was carried out in Etche and Ikwerre Local Government Areas of Rivers State, Nigeria. These Local Government Areas are among the prominent areas in oil palm production and processing (though not an evenly distributed activity in all the towns in the study area) and houses the Rivers State Oil Palm Estate (RISONPALM). A multistage approach was adopted in sampling. First, the two Local Government Areas were studied individually and from each Area three towns noted for their industry in palm oil processing were randomly selected and ten palm oil processors randomly were sampled from each town, making thirty (30) oil palm processing cottage enterprises from each of the two local government areas. The total number of respondents thus selected for the study was sixty (60).

Structured questionnaire that captured the levels of labour and capital investments and amount of outputs (palm oil) was used in data collection. Gross margin and ordinary regression analysis were used to analyse the data. Gross margin was employed to assess the level of profit of the enterprise (in gross profit and mark-up determination). Mark-up is gross profit expressed as a percentage of cost price. Gross profit is easy to calculate but does not however give an accurate picture of a business fortune (Eyiwere, 2004).

$$\text{Mark-up} = \frac{\text{Gross profit} \times 100}{\text{Cost price}} \quad 1$$

Gross profit margin represents the expenses related to the acquisition of factors of production and overhead in production deducted from a firm's net sales or revenues which results in a company's first level of profit or gross profit. The gross profit margin is used to analyze how efficiently a firm is using its factors of production to generate profit. A higher margin indicates good profit.

$$\text{Gross Margin} = \text{TR} - \text{TVC} \text{ and Net Returns} = \text{TR} - \text{TC}$$

Where:

TR = Total Revenues

TVC = Total Variable Cost

TC = Total Cost

Response of output to input use was analyzed using multiple regression analysis where $Y = f(X)$

$$Y = f(X_1, X_2, X_3, e) \text{ where}$$

Y = Total Output

X_1 = Cost of FFB

X_2 = Cost of labour

X_3 = cost of transport

e = Stochastic error term (assumed to have zero mean and constant variables). The linear form of model specification is

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + e$$

RESULTS AND DISCUSSION

In Table 1, monthly profit marginal analysis of oil palm processing by cottage firms is presented. Regarding the quantity of investment, ₦184,034 margin representing 73.6% of the total investment is appealing (this excludes net income though). This is in agreement with the findings of Emokaro and Ugbekile (2014) in Edo State which indicated that the enterprise is profitable. Onoja and Ogali also obtained similar results in a study conducted in Kogi State. However, an average output of 2,050 litre a month (about 68.33 litres/day) in the study area is low and may have impacted revenue generated which stood at ₦14,465 (gross sales per day) and a gross margin of ₦6,134.50 per day. Ohimain *et al.* (2014) suggest an increase in returns and indicates the venture is profitable and feasible. However, the Benefit/Cost Ratio can be boosted by increasing capital investment, better technology in processing and skilled labour. Field observation revealed the use of a largely trade-modern processing method with reasonable amounts of drudgery. The stock of equipment

and structures that are used to produce goods and services impacts productivity (Mankiw and Taylor, 2009). From the study, 60.59% of cost of production taken up by fresh fruit bunches (FFB) may be eating up profit. Adult labour and transport cost may not be prohibitive, nevertheless, any move to reduce further their cost is welcome as this will positively impact profit margin. This can only come through increased mechanization which on its own may attract another form of cost.

Results from table 2 further shows that there is a general inelastic response of output to increases in cost of input acquisition. This agrees with the findings of Olagunju (2008) who reported that the coefficient of cost of labour and other inputs were negative and the use of other inputs significant at 10% showed indirect relationship with processors net returns. According to (Olagunju, 2008), those costs have decreasing impact on net return. Any coefficient value (marginal increases in output) less than one implies inelastic response as cost of input acquisition increases. In a nutshell, there is a general inefficiency in factor use. An economy is productively inefficient if it is producing less than the maximum output with given resources and technology. It must be noted that the growth rate of a nation's productivity determines the growth rate of its average income (Taylor and Mankiw, 2009). Little wonder the low income of the processors.

Table 1: Monthly profit marginal analysis of commercial oil palm processors in Ikwerre and Etche Local Government Areas

Variable cost	Average cost per enterprise (Naira)	Average sales per enterprise		Gross sales (Naira)	Gross margin (Naira)	Mark-up
		Average quantity (Litres)	Price per unit (Naira)			
Adult labour	55,000 (22.01)	2,050	211.68	433,950	184,034 (73.4)	74
Transport	43,488 (17.40)					
FFB	151,428 (60.59)					
Total	249,916					

*FFB = fresh fruit bunches. Values in parenthesis represent percentages

Table 2: The effect of variable cost factors on the profitability of oil palm processing in Etche and Ikwerre Local Government Areas

Variables	Stdcoef	R-Square	Adjusted R-Square	F-statistic	t-statistic
Cost of FFB	0.433				5.586
	0.000				
Cost of labour	0.139	0.946	0.962	372.762	0.995
	(0.000)0				
Cost of transport	0.008				0.133
	0.000				

Oil extraction technology must be improved on to increase the elasticity of oil output to FFB used. This may require more investment in extraction technology. Increase in labour efficiency/productivity should be considered. A host of factors will lead to increased labour productivity including a more educated labour force, a large stock of capital goods and technological advancements (Arnold, 2005).

CONCLUSION

Palm oil processing or extraction has been an age old trade in Rivers State; however, much improvement has not been recorded in terms of processing technology and output. There is a general inelastic respond of outputs to input application and consequent profit is low however, it has been a source of employment to many despite been a rural based enterprise. The introduction and wide use of the hybrid species that have higher oil output and use of better and modern production methods will increase output and profit margin and make the trade more attractive and rewarding.

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