

Original Article

Profitability and Factor Influencing Palm Oil Production in Edo State, Nigeria

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Abstract - The study focused on profitability and factor influencing palm oil production in Edo State, Nigeria. Data used in the study were collected from 110 palm oil producers with the aid of a well-structured questionnaire using a multi-stage sampling technique. Descriptive statistics, budgeting analysis, and ordinary least squares (OLS) were used in analyzing the data. Results revealed that the majority of the respondents were male (86.4 %), having a mean age of 49.7, and married (90%). The average household size was seven persons. Most of the respondents (60%) relied on fresh fruit bunch gotten from rented oil palm plantations. Palm oil production was shown to be profitable in the study area, with net revenue of ₦100 860. The return to scale (RTS) of 0.188 indicated a positive decreasing return to scale, and that palm oil production in the study area was in stage II of the production function. Palm oil production as an enterprise is a profitable venture.

Keywords - Profitability, Palm oil, Production, Factor, Edo State

I. INTRODUCTION

The gap between demand and supply of food has continued to increase over the years and also for agricultural products [1]. Palm oil is an important ingredient in the diet of a lot of people. Palm oil also constitutes the largest source of edible oil, accounting for 38.5 million tonnes or 25% of the global edible oil and fat production [2]. Palm oil is a product extracted from the fleshy mesocarp of the palm fruit (*Elaeis guineensis*). The global demand for palm oil is growing. Thus, crop cultivation serves as a means of livelihood for many rural families, and the demands for domestic and industrial applications of palm oil have continued to increase [3]. It is estimated that for every Nigerian household of five, about two liters of palm oil are consumed weekly for cooking [4]. Palm oil is an essential multipurpose raw material for both food and non-food industries [5].

Palm oil processing, whether at a small scale or industrial level, constitutes a major source of income and employment to a large proportion of the poor rural population in Nigeria, most importantly in the southwestern part of the country [6]. Previous studies

conducted in some parts of Nigeria have shown the economic contribution and indispensability of palm oil production both to the rural and urban dwellers. Palm oil has been a major source of foreign exchange to Nigeria as well as a source of revenue. Besides, palm oil in this area is viable and employs people in the active economic age group. Thus, palm oil is highly integrated, profitable, and viable [7], and worth sustaining for economic growth.

Palm oil production in Nigeria constitutes a major vocation in many communities because of the income it provides for many farmers and their households. The fact that it also serves as one of the modest revenue sources to some state and local governments infers that an efficient, effective, sustained, and strong palm oil sector in Nigeria will accord the poor to be involved in the solution to poverty challenge through the provision of gainful employment as well as a means of livelihood [8].

II. METHODS

A. Study Area

The research was carried out in Edo State, Nigeria. The State is located in the South-South geopolitical zone of Nigeria and was created in 1991. It is bounded in the North and East by Kogi State, in the South by Delta State, and in the West by Ondo State. It lies approximately between Latitude 05°44.N and 07°34.N of the Equator and between Longitude 06°04.E and 06°43.E of the Greenwich Meridian. The annual rainfall averages are 250 cm near the coastal areas and 150 cm in the extreme northern part of the state. The temperature ranges from 22°C to 36°C. The soil type in the state is generally the reddish-yellow kind of ferrasols. This varies from area to area in the state. The vegetation also varies from the rain forest type in the Benin low lands to Savanna in the Akoko-Edo uplands [9]. Agriculture is the predominant occupation of the people in this state. The major cash crops cultivated are rubber, cocoa, and oil palm. In addition, the state produces crops such as yams, cassava, rice, plantain, guinea-corn, and various types of fruits and vegetables.

B. Sampling technique and data

A multi-stage sampling technique was used in the selection of 120 respondents in the study area. The



first stage involved a purposive selection of five (5) Local Government Areas based on predominance in palm oil production in the state, which include Ovia North East, Ikpoba-Okha, Ovia South-West, Orhionmwon, and Egor. The second stage involved the use of a simple random sampling technique to select three (3) villages from each LGA. Lastly, eight (8) palm oil producers were selected through a simple random sampling technique from each village. This gave a total sample size of 120 palm oil producers. However, only 110 respondents completed their copies of the questionnaire and valid for the analysis of this study.

C. Analytical technique

The profitability of palm oil producers in the study area was estimated using budgetary analysis to estimate the Net Revenue (NR). The Net Revenue is represented by:

$$NR=TR - TC \dots\dots\dots (1)$$

$$TC=TVC+TFC\dots\dots\dots(2)$$

Where,

TVC=Total variable cost

TFC=Total fixed cost

TC = Total cost

TR = Total revenue

NR = Net revenue

D. Profit Function Analysis

The factors affecting the profitability of palm oil production were determined using the production function analysis. The Ordinary Least Square multiple regression analysis was used to estimate the parameters of the production function model. The data were fitted using the linear, semi-log, and double log functional forms. The linear functional forms fitted were selected based on the level of significance of the independent variables, the number of significant variables, and the value of the coefficient of multiple determination (R²).

Model specification: The production function postulated for palm oil production in the study area is implicitly represented by equation (1).

$$Y= f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9,ei)\dots\dots\dots (3)$$

Where; Y= profit (₦)

X₁=Total FFB processed per annum (mt)

X₂= Depreciation on asset (₦)

X₃= Water (litres)

X₄= Age of respondents (years)

X₅= Educational level of respondents (years)

X₆= Initial capital on business (₦)

X₇= Transportation cost (₦)

X₈= Diesel cost (₦)

X₉= labour cost (₦)

III. RESULT AND DISCUSSION

Table 1 revealed that the majority (86.4%) of the respondents were males, which shows that small-scale palm oil production is dominated by males. This may be due to the fact that the enterprise is labor-intensive and also requires a relatively high cost of investment which the male gender is better poised to access. Evidence from the field revealed that most repairs on equipment are done by the male handler operator; that is, for someone to be efficient in the palm oil enterprise, knowledge, strength, and skill to handle milling equipment is required, and this is more at the disposal of the male gender.

As shown, 47.3% of the respondents are between the ages of 30 and 49. This implies that owners of palm oil processing establishments in the study area are still in their active age and are expected to be productive. 52.8% of the palm oil producers are between the ages of 50 to 60 years. This may be because most civil servants like establishing processing mills after retirement. In the study area, the youngest age is 31years, and the eldest is 68 years. The average age in the study area is 50 years, which implies that more production is being handled by people who are approaching the climax of their productive age. However, they are expected to have acquired relevant business management techniques.

The majority of the respondents are married (90%), while the remaining (10%) are single, divorced, or widowed. It is expected that processors will engage in a more thorough decision-making process given their responsibilities at home. This may be due to the fact that the marital status of respondents is believed to have an effect on their decision-making ability. While married processors have a spouse, they can discuss with, and more reason to be careful with investment decisions, processors who are single have reduced latitude of consultation in decision making and risk management, thereby increasing oil production. This implies that the majority of the palm oil producers would be more relatively stable in their processing enterprise than their single counterparts. The stability of processors in their business can enhance palm oil production.

The Table revealed that 44.6% of the respondents have a minimum of secondary school education, while 34.5% completed only primary school education. This shows that the majority of the respondents are literate, while about 21% have no formal education. Education is believed to have a positive effect on decision-making ability and resource utilization in business management.

About 36% of the respondents processed fresh fruit bunches (ffb) from their own oil palm plantation, while only 3.6% of the respondents rely solely on the purchase of. Most of the respondents (49.1%) rely on ffb gotten from rented oil palm plantations. This could be a cost reduction strategy since they would only incur maintenance costs and rent. The implication of this is that vertical integration is not encouraged of personal ownership of oil palm

plantations. Moreover, a field survey revealed that the source of ffb has a significant influence on the price of purchase as well as the quantity that can be processed at a point in time.

Table 1. Distribution of Respondents by Gender

Gender	Frequency	Percentage (%)
Female	15	13.6
Male	95	86.4
Total	110	100.0
Marital Status		
Single	6	5.5
Married	99	90.0
Divorced/widowed	5	4.5
Total	110	100.0
Level of education		
No formal education	23	20.9
Primary education	38	34.5
Secondary education	19	17.3
Tertiary education	30	27.3
Total	110	100.0
Sources		
Personal plantation	40	36.4
Purchase	4	3.6
Rented plantation	54	49.1
Rented and personal plantation	10	9.1
Rented plantation and purchase	2	1.8
Total	110	100.0
Age		
	Frequency	Percentage (%)
30 – 39	11	10.0
40 – 49	41	37.3
50 – 59	50	45.5
≥60	8	7.3
Total	110	100.0
Source of capital		
Cooperative society	4	3.4
Friends	1	0.9
Money Lender	5	4.5
Personal savings	100	90.5

Source: Field Survey, 2016. Mean age = 49.7, Minimum age = 31.0, Maximum = 68.0, SD = 7.82

A. Net Returns Analysis of Palm Oil Production

Table 2 presents net revenue per metric ton of palm oil produced in the study area. The cost elements in the variable cost include transportation cost, cost of water, diesel cost, labor cost, the amount spent on FFB, and other operating expenses, while the fixed cost was calculated as the addition of land rent and depreciation cost. As shown in the Table, the cost of both FFB and labor accounted for the major production cost of palm oil, ₦127,130 and ₦21,114, respectively. Total revenue represents returns from sales of palm oil and palm kernel. The average total revenue obtained was ₦278,610 per metric ton, with a standard deviation of ₦24,028.17. The average net revenue per metric ton of palm oil produced was ₦100,860. However, the gross return was ₦116,611, while the return per naira from the enterprise was 57%, implying that on every naira invested, a profit of 57 kobo was realized. This finding suggests that

palm oil production in the area surveyed was profitable. Thus, palm oil producers were able to recover their operating cost per metric ton of palm oil produced.

Table 2. Net Revenue Analysis of Palm Oil Producers

Variables	Mean (₦)	Std. Deviation (₦)
A.) Total Variable Cost/mt	161,999	43,956.46
Transportation/mt	12,555	9,485.52
FFB Cost/mt	127,130	31,274.12
Labour Cost/mt	21,114	13,966.41
Cost of water/mt	263	201.49
Diesel Cost/mt	937	465.12
B.) Fixed Cost	15,751	12,741
Depreciation on fixed asset/mt	14,027	10,669.02
Rent on land	1,724	1,311.28
C.) Total Cost/mt	177,750	48,159.79
D.) Gross Margin	116,611	29,157.21
E.) Total Revenue/mt	278,610	24,028.17
F.) Net Revenue/mt	100,860	47,972.39

Source: Field survey, 2016

As shown in Table 3, the Benefit-Cost Ratio (BCR=TR/TC) is high (1.57); this shows an increase in returns. It indicates that the enterprise is profitable. The value of the Expense Structure Ratio (ESR=FC/TC) was 0.089, which implies that about 8.9% of the total cost of production is made up of fixed cost components, that is, depreciation of assets and rent on land. The ESR is lesser than the previous study [6], which was 0.423, representing 42.3% of the total cost of production. The low expense structure ratio in this study could be attributed to no initial cost of plantation maintenance since the majority either purchased the ffb or rented the plantation (54.5%). It is also assumed that the initial capital that was used to start the business was not borrowed. Hence, no interest will be paid, which can increase the cost of production. The ESR shows that the business is worthwhile to invest in. The Gross Ratio (GR) was 0.64; this implies that for every N1.00 return to the firm, 64.00k is being spent.

Table 3. Profitability of Palm Oil

Benefit-Cost ratio	1.57
Rate of Return	0.57
Gross Ratio	0.64
Expense Structure Ratio	0.89

Source: Field Survey, 2016

B. Factors affecting the profitability of palm oil production

Table 4, revealed that for a naira increase (or additional cost of equipment used) in depreciation per metric tons of palm oil produced, net revenue decreased by 93 kobo. A liter increase in the quantity of water used per metric ton of palm oil produced reduces net revenue by ₦36. This may be due to the

additional cost of water that was incurred. The net revenue is expected to increase by ₦7,183 as the farmer grows older, which may be as a result of the accumulation of years of experience.

Furthermore, the table revealed that the acquisition of more academic qualifications would lead to a ₦6,316 increase in net revenue per metric ton of palm oil produced. This implies that those who are more educated are expected to have more skill and technical know-how that will bring about an increase in their net revenue. If the initial capital on business increases, the net revenue decreases by ₦4,049. An increase in transportation cost per metric tons of fresh fruit bunches decreases the net revenue by ₦1.50K. Also, if the cost of diesel used per metric ton to process palm oil increases, the net revenue decreases by ₦27. This may be due to the fact that the more be processed, the more cost is being incurred. Hence this reduces revenue. This is because processors are expected to incur more costs in production as the quantity of ffb processed increases. As the labor cost used per metric ton to process palm oil increases, the net revenue decreases by 90K.

Table 4. Factor Affecting Profitability

Variables	Coefficient	Standard error
Constant	-162637.812	16106.684
Total FFB Processed(mt)	-2.438	15.911
Depreciation(mt)	-0.926***	0.309
Water(mt)	-35.796**	-17.454
Age	7183.274	3996.789
Educational level	6315.997**	2888.453
Initial capital	-4049.127	2049.349
Transport cost	-1.448***	0.343
Diesel cost	-27.042***	7.345
Labor cost	-0.897***	0.258
R ²	0.631	
Adj R ²	0.597	
F	18.964	

Source: Field Survey, 2016. Significant at***1%, **5%

IV. CONCLUSION

The study established that palm oil production was profitable in the study area. Depreciation on capital equipment and quantity of water used exhibited a negative relationship to profitability. However, it increased with producers' age and acquisition of more academic qualifications.

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