

Analysis of Palm Oil Marketing in Ogbadibo Local Government Area of Benue State, Nigeria

ABSTRACT

This study examined the analysis of palm oil marketing in Ogbadibo Local Government Area of Benue State, Nigeria. Specifically, the study examined the socio-economic characteristics of the palm oil marketers in the study area; marketing channels; determined the marketing costs and return incurred by palm oil marketers in the study area; determined the factors that affect the marketing of palm oil in the area and to determine the constraints experienced by palm oil marketers in the study area. Data was collected through the administration of a questionnaire and was analyzed with the use of descriptive statistics such as frequency, and percentages and determined multiple regression. The result showed that palm oil marketing is a women-dominated business as revealed by (82.5%) of the respondents were female. The results also indicated that people from the ages of 31 – 40 are more interested in palm oil marketing as they formed the majority with about 50%. The majority (73.8%) of the marketers were married which showed that there were more married people involved in the marketing of palm oil in Ogbadibo Local Government Area of Benue State. Also, majority (45%) of the marketers have been in the palm oil business for 5 to 10 years. Furthermore, all respondents had formal education. The majority (60%) of palm oil marketers have household sizes of 2– 4 persons, with majority (42.5%) earning between ₦ 61,000 – ₦ 80,000 as monthly the income of the majority of the marketers. Also, the result showed that on the average, the total variable cost incurred was ₦26, 000 while fixed cost amounted to ₦3, 500, on the return side, the average total revenue amounted to ₦57, 600, the gross margin of the marketers was estimated to be ₦26, 100, the profit of ₦22, 600 while the net return on investment was 0.55% per gallon per day. Result of pricing efficiency ratio of 1.175 and 1.367 for wholesalers and retailers respectively, indicated that wholesalers and retailers quoted prices were under efficient implying that few of them were running the business at a loss. The major constraints affecting palm oil marketers were high cost of transportation, lack of access to credit facilities, substitution by other products among others. The study concluded that palm oil marketing was profitable and solvent with a return on investment of 0.55% and a profit of ₦22, 600 per gallon per day or (1 gallon = 3.7854 liters). The study recommends that there should be an improvement in the transportation system to reduce the high cost of palm oil transportation.

Keywords: *Marketing, constraints, palm Oil, marketing margins, Benue State*

1. INTRODUCTION

Palm oil is the major agricultural commodity export of Nigeria in terms of foreign exchange earnings. Although its contribution to the total natural exports earnings during the past two decades propped considerably due to the enormity of foreign exchange earnings of crude petroleum. The importance of palm oil production and marketing in Nigeria agricultural sector becomes clearer when one realizes its substantial contribution to the Gross Domestic Product (GDP) and its supply for both domestic and industrial uses (Rapsomanikis, *et al.*, 2004). Palm oil is extracted from the pericarp or outer beneath outer skin of the nut from the oil palm, (*Elaeisguineensis*) colored red due to high content of alpha carotene (24mg per 100g) and beta-carotene (30mg) together with about 60mg of 5-12% polyunsaturated fatty acids, and linoleic acid.

According to Ibitoye (2014), world production of palm oil has increased tremendously during the last 30 years as a result of the rapid expansion of oil palm planting in Southeast Asian countries, spearheaded by Malaysia and Indonesia. He further reiterated that it is thus, by far, the most widely produced tropical oil and constitutes thirty per cent (30%) of the total edible oil production worldwide. He also reported that in Nigeria, 80% of production comes from dispersed smallholders who harvest semi-wild plants and use manual processing techniques. Two kinds of oil are obtained from the oil palm; red palm oil extracted from the fibrous layer and palm kernel oil which is obtained from the kernel beneath the fibrous layer of the fruit. Palm oil has a special feature which is its color that varies from orange-yellow to red to a fat-soluble carotenoid which is responsible for the vitamin A content of palm oil. Processing the oil palm fruit into palm oil was done by harvesting the fruit from the bunch and then processed into palm oil by women, through a time-consuming and labor-intensive process involving repetitively boiling and filtering the fresh fruits with water, similar methods are still largely used throughout West Africa.

In most African countries including Nigeria palm oil grows naturally in the rainforest zones where annual rainfall is between 125- 660 centimeters and annual temperature ranges from 20-34°C. Palm oil is the world's second-largest major vegetable oil after soya bean it is not only used as a domestically edible oil it is also used for the production of varieties of products like soaps, margarine and several others. This indicates that there is a high demand for the products and consequently need to increase production. Palm oil marketing is concerned with all stages of operation that aid the movement of the produce from the producer to the final consumer. These include: assemblage, storage, transportation, grading and financing. Marketing of palm oil in Nigeria takes place in homes, roadsides, local/periodic market centers and stalls. These can be both wholesale and retail types in both rural and urban centers. Generally, palm oil is transported from the supply regions of Southern Nigeria to the demand regions of Northern Nigeria.

In Benue State, the marketing of palm oil takes the traditional but efficient systems. It follows in place in the home of producers, by the roadside and in the local market center. These areas serve as channels of distribution of palm oil. The local market centers are of three kinds, classified according to their functions in respect to palm oil distribution. These are the market places found in most of the villages in the producing areas. Palm oil is sold in cans, drums and retail market where palm oil is sold in bottles and tins. Palm oil is sold either in wholesale or retail markets. Transaction takes place side by side. The only justification for this classification is that a greater volume of oil is sold at wholesale than at retail. However, the seller may handle both wholesale and retail marketing. The export-orientated nature of palm oil aids many producers to become monopolies.

Several factors affect the efficient marketing of palm oil and they need to be addressed because the potential of the sector is too enormous to be overlooked. One of the functions of agricultural marketing is to bring items of trade from surplus to deficit areas (Joshua, 2015). Therefore, it is important to examine the marketing of palm oil in Ogbadibo Local Government Area, of Rivers State, the specific objectives were to: (i) examine the socio-economic characteristics of palm oil marketers in the study area, (ii) describe the marketing channels of palm oil in the study area, (iii) determine the marketing cost and return

incurred by palm oil marketers in the study area,(iv) ascertain the determinants of wholesale and retail selling prices of palm oil in the study area,(v) determine the pricing efficiency levels in palm oil marketing, and (vi) ascertain the factors that affect the marketing of Palm oil.

2. MATERIALS AND METHODS

2.1 Research Design

The study employed a public opinion survey using structured questionnaire and interview schedules to achieve the specific objectives.

2.2 The Study Area

The study was carried out in Ogbadibo Local Government Area of Benue State, Nigeria. The choice of this local government for this study stemmed from the fact that Ogbadibo is one of the local government areas that is noted for palm oil production and marketing in Benue State. The local government shares boundaries with Olamaboro Local Government Area of Kogi State to the North, on the East by Udenu Local Government Area, on the South by Isi-Uzo local government area both of Enugu State and on the West by Okpokwu local government area of Benue State.

The Local Government Area is located between latitude $6^{\circ} 20'$ and $9^{\circ} 10'N$ and longitude $6^{\circ} 40'$ and $7^{\circ} 40' E$ with estimated landmass area of 820km^2 and a projected population of three hundred and sixty-five thousand (465,102) people (NPC, 2022). The annual temperature is about $27^{\circ}C$ with an annual rainfall of 1500-1800 millimeters. The Local Government comprises three districts namely: Orokam, Otukpa and Owukpa with 13 council wards. The major crops produced in the area include rice, maize, yam, soybeans, sorghum, vegetables among others. Also, economic tree crops such as oil palm, citrus, mango, and cashew are also grown.

2.3 Sampling Procedure and Sample Size

Multistage sampling was used. In the first stage, three (3) major districts were purposively chosen from the local government based on intensity of Palm oil marketing which were Orokam, Otukpa and Owukpa. In the second stage, twenty (20) palm oil wholesalers and twenty (20) retailers were randomly chosen from each of the selected districts. In all, a total of 150 respondents formed the sample size of the study. A well-structured questionnaire as research instrument was used to elicit information from the respondents.

2.4 Analytical Techniques

Both descriptive and inferential statistics were employed in the study. Descriptive statistics such as frequency, means and percentages was used to describe socio-economic characteristics of the respondents and pricing efficiency of wholesale and retail palm oil marketing. Gross margin (GM) was used to evaluate marketing costs and return incurred by palm oil marketers. Regression model was used to ascertain the determinants of wholesale and retail selling prices. Three functional forms, linear, double-log and semi-log were tried and the equation with the best fit will be chosen as the lead equation for further analysis.

2.5 Model Specification

2.5.1 The regression model

The model was implicitly expressed as follows:

$$Q_i = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, \epsilon_i) \dots\dots\dots (1)$$

Where:

Q_i =Quantity of palm oil supplies (liters)

X_1 =Price per unit sold (Naira)

X_2 =Price of other substitutes (Naira)

X_3 =Cost of transportation (Naira)

X_4 =Equipment cost of marketing (Naira)

X_5 =Age of household head (Years)

X_6 =Educational level of household head (Years)

X_7 =Sex (male=0, female=1)

X_8 =Marital status1 (married=0, single=1)

U =Stochastic term.

Marketing channels was described based on the data to be collected from the respondents such as the wholesalers and retailers and consumers respectively to describe the marketing channels palm oil trade in the study area.

2.5.2 Marketing cost

The marketing cost was estimated using the formula:

$$MC = QM (CL + CT + RS + TX) \dots\dots\dots (6)$$

Where:

MC = Marketing cost (₦)

QM = Quantity of commodity marketed (Gallons)

CL =Rate of loading/transportation(₦)

RS = Cost of storage (₦)

TX = Tax (₦)

2.5.3 Gross margin analysis

This model is used to determine cost and returns, it is mathematically stated as:

$$GM = TR - TVC \dots\dots\dots (7)$$

Where:

GM =Gross Margin (₦)

TR =Total Revenue (₦)

TVC =Total Variable Cost (₦)

TFC = Total fixed cost.

3. RESULTS AND DISCUSSION

3.1 Socio-economic Characteristics of Palm Oil Marketers in the Study Area

The results showed that more females are invested in palm oil marketing than males. Specifically, 82% of the total respondents were females while 17.5% were males. This showed that the palm oil marketing business involves more females than males. This result agreed with that of Okidimet *et al.* (2019) who found out that the majority of palm oil marketers were females. More so, the findings of the study revealed that half (50%) of the respondents were within the ages of 31-40 years and this implies that people involving in palm oil marketing are mostly young with enough strength and capacity to meet their daily needs and household food security. The majority (73.8%) of the palm oil marketers were married with household size of 2-4 persons implying that palm oil marketing is more attractive to married people, so as to improve income, maximize resource use efficiency and also ensure their household's welfare and well-being. The implication is that, the more the household size increases, the more the quest to generate money to take care of the home through marketing of palm oil in the study area.

Results on educational level showed that all the respondents (100%) had one form of formal education or the other with majority (41.3%) attaining primary education. This is in line with the finding of Nse-Nelson *et al.* (2021) where they discovered that the majority of the palm marketers acquired formal education and this will enhance their marketing performance and efficiency. Most of the respondents had the experience of about 5- 10 years. This result implies that marketers had a good experience in palm oil marketing. This is in agreement with a study carried out by (Nse-Nelson *et al.* 2021) who stated that the experience of marketers is a major factor in the profitability of palm oil marketing. About 45.0% of the respondents have been in palm oil marketing business for more than 10 years and hence it is obvious that the respondents have enough experience that will enable them to efficiently allocate resources for optimum marketing output. The result further showed that majority (42.5%) of the respondents have ₦61, 000 – ₦80, 000 as monthly income from palm oil marketing. The implication of this result is that the income level of marketers significantly affects the number of participation in palm oil, the more the income level the more the participation. This study is in line with the recommendation of (Nse-Nelson *et al.* 2021) who recommended that palm oil marketers should form a cooperative body to take advantage of economies of scale.

Table 1: Socio-economic Characteristics of Palm Oil Marketers in the Study Area

Variables	Frequency	Percentage	Cumulative (%)
Sex			
Male	14	17.5	17.5
Female	66	82.5	100.0
Age (years)			
22-30	13	16.3	16.3
31-40	40	50.0	66.3
41-50	24	30.0	96.3
51-56	3	3.8	100.0
Marital status			
Single	5	6.3	6.3
Married	59	73.8	80.0
Divorced	7	8.8	88.8

Widowed	9	11.3	100.0
Household size			
(number)	48	60.0	60.0
2-4	31	38.8	98.8
5-7	1	1.3	100.0
8-10			
Educational level			
Primary	33	41.3	41.3
Secondary	28	35.0	76.3
Tertiary	19	23.8	100.0
Marketing experience			
(years)			
< 5	32	40.0	40.0
5-10	36	45.0	85.0
11-15	8	10.0	95.0
16-20	4	5.0	100.0
Monthly income (₦)			
20,000-40,000	5	4.2	4.2
41,000-60,000	8	6.7	10.9
61,000-80,000	51	42.5	53.4
81,000-100,000	40	33.3	86.7
121,000-140,000	13	10.8	97.5
Above 141,000	3	2.5	100.0

Source: Author's Computation, 2024.

3.2 Marketing Channels of Palm Oil Marketing in the Study Area

The channels of palm oil marketing in the survey area is depicted in chart as shown. According to the responses of the respondents, sixty per cent (71%) of marketers get palm oil from the producer side. These are wholesalers who sell to retailers and retailers sell to the consumers, while (29%) purchase from the producer and then retail to the consumer. The marketing channel used majorly by marketers is from the producer to the wholesaler to the retailer and to the final consumer. This study agreed with the observation of Bassetet *et al.* (2015) which stated that the majority use the first channel of marketing and a 4-level distribution with 3-level traders.

Table 2: Percentage Distribution of Palm Oil Marketing Channels in the Study Area (n=120)

Channels	Frequency	Percentage
Producer → Wholesaler → Retailer → Consumer	85	71
Producer → Retailer → Consumer	35	29
Total	120	100

Source: Author's Computation, 2024.

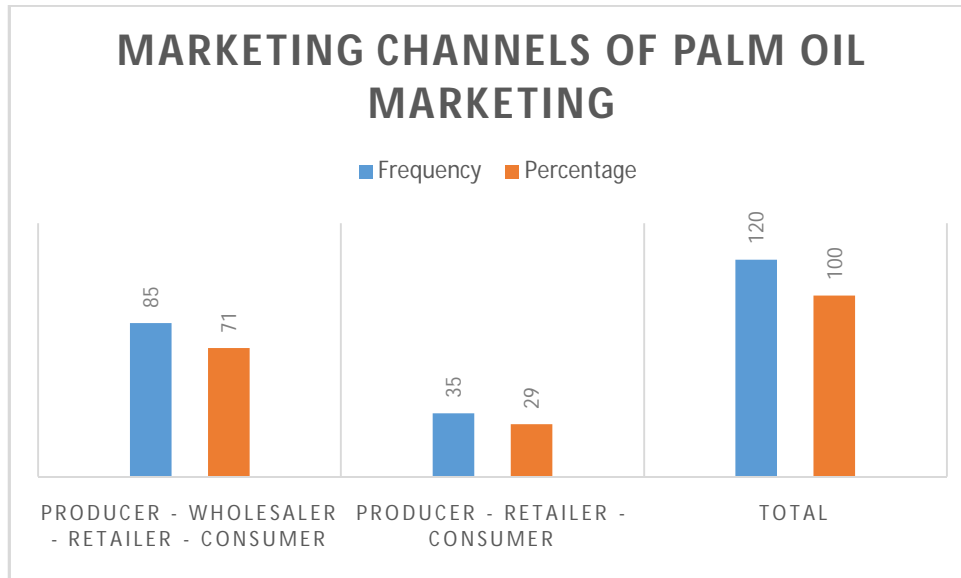


Figure 1: Marketing Channels of Palm Oil Marketing in the Study Area

3.3 Determinants of Selling Prices in Wholesale of Palm Oil in the Study Area

Table 3 shows the regression estimates for the determinants of wholesale selling prices in the study area. The estimated R^2 was 0.73 implying that 73% of the variations in wholesale selling prices were explained by the independent variables included in the model. The F-statistic (6.322) confirms the suitability of the overall regression equation. The result indicates that quantity of palm oil purchased by wholesalers was negatively related to the wholesale selling price and significant at ($P= 0.05$) while purchase price was found to be positively related to wholesale selling price and this was significant at ($P= 0.01$). The possible explanation is that the higher the quantity of palm oil purchased by wholesalers, the lesser are their selling prices and this might be attributed to the fact that bulk buying attracts discounts which invariably reduce cost per unit and therefore give the sellers the opportunity at selling at reduced price. Consequently, it facilitates high rate of turnover and more profit. On the other hand, the higher the purchasing price, the higher the wholesale selling price.

Table 3: Determinants of Wholesale Selling Price of Palm Oil in the Study Area

Variables	Coefficients	T- values
β_0 (Constant)	4.095***	8.137
X_1 (Quantity purchased)	0.040**	-2.103
X_2 (Purchase price)	0.269*	3.395
X_3 (Transportation cost)	0.026	1.438
X_4 (Storage cost)	0.014	0.129
R^2	0.73	
Adjusted R^2	0.72	

F- value

6.332**

***= Significant at 1%, **= Significant at 5%; and *= Significant at 10%

Source: Author's Computation, 2024.

3.4 Determinants of retail Selling Prices of Palm Oil in the Study Area

On determinants of retail selling price (Table 4), the analysis revealed that transportation cost and purchased price were positively correlated with the retail selling price and was significant at ($P= 0.01$). Storage cost was also positively correlated with retail selling price but was significant at ($P= 0.05$). However, the quantity purchased by retailers from wholesalers was negatively related to retail selling price but was significant at ($P= 0.01$). The explanation of the findings is that, the higher any one of these marketing factors (transportation and storage cost), the higher will be the retail selling price of palm oil while the higher the quantity purchased by the retailer, the lesser its selling price with respect to reduction in price paid to wholesalers. The regression result showed that the variables used in predicting retail selling price of palm oil in the study area accounted for 68% of the prediction with F-value statistically significant at ($P= 0.01$).

Table 4: Determinants of Retail Selling Price of Palm Oil in the Study Area

Variables	Coefficients	T- values
β_0 (Constant)	2.140**	2.268
X_1 (Quantity purchased)	0.243***	-3.369
X_2 (Purchase price)	0.531***	3.541
X_3 (Transportation cost)	0.273**	4.344
X_4 (Storage cost)	0.028	2.419
R^2	0.68	
Adjusted R^2	0.62	
F- value	16.961***	

***= Significant at 1%, **= Significant at 5%; and *= Significant at 10%

Source: Author's Computation, 2024.

3.5 Marketing Costs and Return of Palm Oil Marketing in the Study Area

Table 5 shows the marketing costs and returns in palm oil marketing. The analysis of costs and returns of palm oil marketing showed that the total variable cost incurred was ₦31, 500 while fixed cost amounted to ₦3, 500. Similarly, on the return side, the average total revenue amounted to ₦57, 600. The profit was ₦22, 600 while the net return on investment was 0.55% per gallon per day and they sell an average of 2-4 gallons per day. The return on investment of 0.55% obtained in this study is higher than that obtained by Nse-Nelson *et al.* (2021) which obtained a return on investment of 0.16. The marketing costs and revenue from the result showed that palm oil marketing is a profitable venture with a lower fixed cost. This

result agreed with Simpa and Nmadu (2015) who revealed that palm oil marketing was highly profitable having a lower fixed cost.

Table 5: Average Marketing Costs and Return Analysis of Palm Oil Marketing in Naira/Gallon /day

Item	Amount (N)
Total Revenue (TR)	57600
Buying price	25200
Cost of packaging materials	1500
Transportation cost	2000
Labor cost	1800
Tax	1000
Total Variable Cost	31500
Fixed Cost	
Rent	500
Cost of furniture	1000
Bottles/gallons/others	2000
Total Fixed Cost	3500
Total cost	35000
Profit (TR-TC)	22600
Rate of return on investment (TVC/TR)	0.55%

Note: 1 Gallon = 3.7854 Liters

Current price of 1 liter of palm oil = ₦1,700

Source: Author's Computation, 2024

3.6 Pricing Efficiency of Wholesale and Retail Palm Oil Marketing

The results in **Table 6** showed the pricing efficiency of wholesalers and retailers of palm oil marketing in the study area. It is shown in the table that the retail average selling price of palm oil per liter was ₦427.60 while its cost per liter was found to be ₦312.80 and the pricing efficiency ratio was found to be greater than 1 (i.e. 1.367). Therefore, it could be concluded that retail palm oil marketing price was under efficient as the marketers are running business at a loss. In respect to wholesale price efficiency, the average wholesale selling price per liter was ₦314.70 and palm oil cost per liter was ₦267.90. The pricing efficiency ratio was found to be greater than 1 (i.e. 1.175) which implies that wholesale palm oil marketing price was also under efficient.

Table 6: Pricing Efficiency of Palm Oil Marketing in the Study Area

Marketers	Average Price/Liter	Average Cost/Liter	Efficiency ratio
Retailers	855.20	625.60	1.367
Wholesalers	629.40	535.80	1.175

Source: Author's Computation, 2024.

3.7 Factors Affecting Palm Oil Marketing in the Study Area

Table 7 presents the result of 4-point-liket scale was used to show the problems faced by palm oil marketers in the study area. All 10 items were agreed by the respondents (having had a mean score greater than the criterion mean score which is 2.50) indicating that these items were factors facing palm oil marketing in the study area. The result showed that high transportation cost ($\bar{x} = 4.28$) ranked first in palm oil marketing. This findings is in line with (Ekineet *al.*, 2016), who reported poor transportation systems and inadequate credit facilities as the major problem of palm oil marketing. The problem of lack of access to credit facilities ($\bar{x} = 4.20$) was ranked second. Similarly, the problem of poor market information about prices ($\bar{x} = 4.18$) was ranked third while the problem of substitution with other oil ($\bar{x} = 4.08$) was ranked fourth. Other major constraints were competition ($\bar{x} = 3.81$), unfavorable government policy ($\bar{x} = 3.70$), low patronage ($\bar{x} = 3.68$), lack of standard measurement ($\bar{x} = 3.31$), and poor quality of products ($\bar{x} = 3.29$). Although, finding revealed that production cost of palm oil was also perceived as a challenge in palm oil marketing in the study area but was not considered as a major challenge.

Table 7: Factors Affecting Palm Oil Marketing in the Study area (n =120)

Factors	Weighted sum	Weighted mean	Rank	Remark
Lack of access to credit facilities	504	4.20	2 nd	PC
Transportation cost	513	4.28	1 st	PC
Unfavorable government policy	444	3.70	6 th	PC
Low patronage	442	3.68	7 th	PC
Production cost	280	2.33	10 th	NC
Substitution by other oil	490	4.08	4 th	PC
Poor market price information	501	4.18	3 rd	PC
Competition	457	3.81	5 th	PC
Poor quality of product	395	3.29	9 th	PC
Lack of standard measurement	397	3.31	8 th	PC

Source: Authors' Computation, 2024

* = Challenges with Mean score ≥ 2.50 are considered more serious

* PC= Perceived Challenge NC= Not a Challenge

4. CONCLUSION AND RECOMMENDATIONS

The study have shown that women generally invested more in palm oil marketing than the men in the study area and cooperative society played a very good and important aid in the aspect of business finances in the study area. The study showed despite the constraints encountered by the marketers, Ogbadibo Local Government Area of Benue State, the palm oil marketing in the area is a profitable venture with a rate of return on investment of 0.55% and profit of ₦22, 600 per gallon per day and arate of

return on investment of 0.55%. However, despite the viability of the business, the study found that wholesalers and retailers quoted prices were still under- efficient implying that few of them were running the business at a loss. Based on the findings of this study, the following recommendations were made:

- i. Governmental and Non-governmental Organizations should provide adequate credit facilities for palm oil marketers (retailers and wholesalers) to enhance their purchasing power and increase their supply to meet demand at affordable price
- ii. Government should provide adequate transportation for the palm oil marketers to reduce transportation cost and hence reduce cost borne by final consumers
- iii. Provision of adequate storage facilities to minimize product spoilage and quality.
- iv. More supply of palm oil should be encouraged to bridge the gap between supply and demand of the commodity thereby reducing the purchase price.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declares that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during writing or editing of this manuscript.

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