

Full length Research paper

# Analysis of palm oil value chain in Ondo state, Nigeria.

Aina OS<sup>1\*</sup>, Odegade OO<sup>2</sup>, Yakubu SA<sup>1</sup>, Dada OA<sup>3</sup> and Sangodare AO<sup>1</sup>

<sup>1</sup>Department of Cooperative Economics, Federal College of Horticulture, Dadin-Kowa.P.M.B. 108, Gombe State, Nigeria.

<sup>2</sup>Department of Agricultural Economics and Extension, Ambrose Ali University, Ekpoma, Edo State.

<sup>3</sup>Economics and Extension Department, Cocoa Research Institute of Nigeria (CRIN), P.M.B 5244, Ibadan, Oyo State, Nigeria.

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The study analyzed the palm oil value chain in Ondo State, Nigeria. The specific objective of the study were to investigate the activities of all the actors in the palm oil value chain and the value added at each stage of the value chain, evaluate the cost and returns associated with palm oil along the value chain and identify the constraints encountered by actors in the palm oil value chain. Multistage sampling procedure was adopted in the study. 96 respondents were selected in the two Local Government Area of the State and structured questionnaire was used for data collection. The data collected were analyzed using gross margin analysis. The result of the gross margin analysis indicated that palm oil business is a viable and profitable business in the study area with a gross margin of ₦171,000 per month and net returns of ₦117,000. The gross ratio was 0.85. Also the gross margin for the marketers was ₦138,000 and the gross ratio was 0.89. The major constraints encountered in the processing activities were poor water supply while the marketers complained about high cost of transportation and irregular supply of palm oil. It was therefore, recommended that government should assist in the provision of portable water to the mill and upgrading of road network in palm oil processing area.

**Keywords:** Analysis, Palm oil, Value chain, Profitability, Ondo State, Nigeria.

## INTRODUCTION

Oil palm (*Elaeisguineensis*) is one of the most important economic oil crops in Nigeria. Cultivation of oil palm serves as a mean of livelihood for many rural families and indeed the farming culture of millions of people in the country. The reference to oil palm as a crop of multiple value underscores its economic importance. Oil palm is made of essential components, namely; the fronds, the leaves, the trunk and the roots which are used for several purposes ranging from palm oil, palm kernel oil, palm wine, broom, and palm kernel cake (Matthew, 2017).

As of early 2000, Nigeria was producing part of the palm oil sold in the world market and it was considered a dominant source of foreign exchange. Up until the 2015, Nigeria was the world's largest producer of palm

oil accounting for 45% of global palm oil production. Over-reliance on traditional production methods, excessive tapping of palm trees for palm wine, kidnapping, banditry and insurgency, were factors that contributed to Nigeria's inability to meet up with the global rise in demand for palm oil (Ayodele, 2019).

Oil palm was initiated in the West Africa tropical rain forest region. Oil palm is a communal cash crop cultivated by Nigerian farmers, the crop is vital because it has been demonstrated that it could serve as a livelihood resources for several families in the rural areas (Poku, 2002). Olagunju, (2008) established that the production of the cash crop in the country is largely dominated by smallholders farmers. Despite the level of production in Nigeria, oil palm processing in small scale is predominantly by traditional approaches (Ayobami, 2019). Kehinde, (2020) lauded palm oil as a valuable contributor to poverty alleviation and food independence in Oyo State, Nigeria. In another research Oluwatomiwa (2020), established that palm oil

\*Corresponding Author's email: [ainaosunday@hotmail.com](mailto:ainaosunday@hotmail.com)

production and marketing is an efficient and lucrative business in Ondo State of Nigeria. Omonona, Agbaje, (2018) stressed the significance of the oil palm in creating direct employment to an average of 4 million people in Nigeria. Aside the palm oil, palm kernel oil and palm kernel, which are the key products of the oil palm tree, the waste generated from the fruits in term of fibers when it is processed also have many significant uses. For instance, according to Tiku, Bullem, (2015), the slurry is utilized in the production of soap and fertilizer and palm kernel cake is used as feeds in livestock and aquaculture industry and for fertilizer as well. In addition to this, most of the part of the oil palm tree like the trunk, leaves and fiber is broadly used. The bunches refuse and the oil processing byproducts can be utilized in the mills fuel for substitution for wood fuel, (Partnership Initiative in Niger Delta PIND, 2011). The process of producing palm oil from oil palm tree to its consumption involves value chain process where there is value addition at different stages.

The term 'value chain' indicates the tool that enables the exploration of business operations relative to new values, adding more opportunities in relation to prevailing values in respect of sourcing of input factors, the production, the processing and the delivery of the end product (Energy Market Economic EME, 2018). Analysis based on value chain commences from the end market perception to define the products they desire and how the utmost value can be shared along the chain as the actors work to produce those products. Omonona, Agbaje (2018) established that oil palm value chain consists of the farming, processing and marketing of oil palm. The oil palm value chain actors, in this sense includes; the oil palm grower, producer, processors, marketers and consumers.

The study analyzed the palm oil value chain in Ondo State, Nigeria; specifically, the study evaluate the cost and returns associated with palm oil along the value chain and identify the constraints encountered by the actors in the palm oil value chain.

## METHODOLOGY

### Study Area

This study was carried out in Ondo State, Nigeria. Ondo State generally referred to as Sunshine State, was created from defunct Western Region on 3<sup>rd</sup> February, 1976. Before the creation, the State existed as the Ondo Province of the Western Region. The state covers a land area of 14,793 square kilometers with its administrative capital at Akure.

The State has 18 Local Government Area with a population of 3,460,877 and is blessed with a rich ethnic composition largely from the Yoruba sub-group of the Akoko, Akure, Ikale, Ilaje, Ondo and Owo people. Ijaw minority (such as Apoi and Arogbo) and Ilaje population inhabit the coastal area of the State.

OndoState is located in the South-Western geopolitical zone of Nigeria.

The State lies between latitude 5<sup>o</sup>45<sup>1</sup> and 8<sup>o</sup>15<sup>1</sup> and longitude 4<sup>o</sup>45<sup>1</sup> and 6<sup>o</sup> East, this means that the state lies entirely in the tropics. The State is bounded in the North by Ekiti and Kogi States, in the East by Edo State, in the West by Osun and Ogun States and in the South by the Atlantic Ocean. The tropical climate of the State is broadly of two seasons: rainy season (April - October) and dry season (November - March). The temperature throughout the year ranges from 21<sup>o</sup>c to 29<sup>o</sup>c and the humidity is relatively high. The annual rainfall varies from 2000mm in the Southern areas to 1150mm in the Northern areas. The State enjoys luxuriant vegetation with high forest zone (rain forest) in the South and Sub-Savannah forest in the Northern fringe. There are some rivers present in the State, with some creeks and lakes in and around Ondo State with some popular ones like Owena, Ala, Oni, Awura, Ogbese and Ose. Generally, the land rises from the coastal part of Ilaje, Ese-odo and Okitipupa area to highlands and steep down at the Northern part of the State.

### Sampling Technique

The respondents for the study were various actors in the palm oil value chain. Multi-stage sampling procedure was used to select respondents in study area. The first stage involved the purposive selection of two out of 18 Local Government Area (LGAs) in Ondo State (Okitipupa and Odigbo) because of the predominance of local palm oil processors and marketers in the area. In second stage, three communities were randomly selected from each local government area making a total of 6 communities. In the last stage, twelve palm oil processors were also randomly selected from each community making a total sample size of 72. Also 2 major agricultural produce markets where palm oil products are sold were identified and 12 marketers were randomly selected, making a total of 24 marketers and in all, giving a total sample size of 96.

### Method of Data Collection and Source of Data

Primary data were used for this study. Data were collected with the aid of well structured questionnaire from the actors of the chain.

### Method of Data Analysis

The tools that were employed in the analysis include, descriptive statistics, such as percentages, frequency distribution tables and gross margin analysis for profitability analysis and ranking for constraint measurement.

### Value Addition

Value addition in palm oil production which entails increasing the economic value of palm oil products in different stages can be defined mathematically (Ayobami, 2019) as:

$$VA = Y - II$$

Where:

VA = Value Added (₦)

Y = Economic value of the output (₦)

II = Economic value of inputs used (₦)

The value added to the entire chain is calculated as:

$$VA_{Chain} = Y_{Chain} - II_{Chain}$$

Where:

$VA_{Chain}$  = Value added throughout the chain;

$Y_{Chain}$  = Value of the output in the chain and

$II_{Chain}$  = Value of the intermediate inputs used in the entire value chain.

Value added is additive, thus the value added by each of the stakeholders or actors of the value chain can be added algebraically as presented:

$$VA_{Chain} = \sum VA_{Actors}$$

Where:

$VA_{Chain}$  = Value added throughout the chain (₦)

$\Sigma$  = Summation; and

$VA_{Agents}$  = Value added by each actor (₦)

The above formulae makes it possible to identify which stage contributes to the highest share of the value addition, which stage has the lowest, and if there is an overall positive value added.

### Gross Profit in Value Chain Analysis

Gross profit is the difference between total revenue and total variable cost.

$$GP = TR - TVC$$

Where:

GP = Gross Profit

TR = Total Revenue

TVC = Total Variable Cost

### Net Profit

A theoretical value must be attributed as a cost to production corresponding to the use of the investment, a value known as depreciation. Depreciation is an element in the value of Y, but it is not a financial flow in the year being analyzed. When depreciation is subtracted from the Gross Profit, the balance is termed the Net Profit (NP).

$$NP = GP - D$$

Where :

NP = Net Profit

Gp = Gross Profit

D = Depreciation

### Gross Ratio

The gross ratio shows the proportion of profit generated by the sales of a product or service, when total cost is divided by total revenue, the value obtained is the gross ratio. It is calculated as:

$$\text{Gross Ratio} = \frac{TC}{TR} \times 100$$

Where:

TC = Total Cost

TR = Total Revenue

## RESULTS AND DISCUSSION

### Cost and Return incurred in Palm oil Processing

Table 1: Cost and return incurred in Palm oil Processing

Average Processing Cost/Month	Amount (₦)	Percentage of Cost (%)
<b>A. Variable Cost</b>		
Palm fruit Cost	150,000	25.25
Labour Cost	180,000	30.30
Fuel Wood	61,500	10.35
Kegs (25 liters)	108,000	18.18
Transport Cost	22,500	3.79
Grinding Cost	42,000	7.07
Water Cost	30,000	5.05
<b>Total Variable Cost (TVC)</b>	<b>594,000</b>	
<b>B. Fixed Cost (Depreciation)</b>		
Washing Tub	45,000	
Containers	3,000	
Sieves and Baskets	6,000	
<b>Total Fixed Cost (TFC)</b>	<b>54,000</b>	
<b>Total Cost (TC)</b>	<b>648,000</b>	
<b>Average Processing Return/month</b>		
Price per 25liters of Palm Oil	8,500	
Quantity (25liters of keg)	90	
Total Revenue	765,000	
Gross Margin	171,000	
Net Returns	117,000	
Gross Ratio	0.85	

Source: Computed from field Survey 2020

Table 1 shows the cost and return incurred in palm oil processing. It shows the total variable cost and the total fixed cost incurred in palm processing. Labour cost has the highest percentage (30.3%) of variable cost signifying that palm oil processors incurred more cost on labour.

This is an indication that palm oil processing is Labour intensive, while palm fruit cost is the next (25.25%), follow by the cost of 25liters kegs (18.18%). Fuel wood cost was 10.35%, grinding cost was 7.07%, transport cost was 3.79% and water cost was 5.05%. The table also shows the average total variable cost in a month as ₦594,000 while the average total fixed cost was ₦54,000, the total cost incurred in the palm oil processing in a month was ₦648,000, signifying that the

processors requires huge capital in their processing activities.

The table also shows the return associated with palm oil processing, the average price of a 25liters keg of palm oil is ₦8,500, the processors process at least 3 kegs of palm oil/day, making a total of 90kegs/month. The total revenue of palm oil processing per month was ₦765,000 and gross margin ₦171,000. Which signifies that they have a fairly good revenue from the processing activity, also the net profit was ₦117,000, given gross ratio of 0.85, which means that for every ₦1 spent on processing of palm oil, the processor gains 85kobo as profit, thus it can be concluded that palm oil processing enterprise is profitable. The value added of the palm oil processing is ₦117,000.

**Table 2: Cost and Return incurred in Palm Oil Marketing**

Average Marketing Cost/month	Amount(₦)	Percentage (%)
<b>Variable Cost</b>		
Quantity	120kegs	
Price per 25liters	8,500	
Palm Oil Purchase	1,020,000	96.05
Transportation	24,000	2.26
Tax	6,000	0.56
Loading and off loading	12,000	1.13
<b>Total Cost (TC)</b>	<b>1,062,000</b>	<b>100</b>
<b>Average Market Return/month</b>		
Price per 25liters of Palm Oil	10,000	
Quantity (25liters of keg)	90	
<b>Total Revenue (TR)</b>	<b>1,200,000</b>	
<b>Gross Margin</b>	<b>138,000</b>	
<b>Gross Ratio</b>	<b>0.89</b>	

Source: Computed from field Survey Data, 2020

Table 2 shows the cost incurred in palm oil marketing. It shows the total cost incurred in palm oil marketing. The marketers bought an average of 120kegs (25liters) per month at the rate of 8,500 from the processors. It shows the total purchasing cost incurred in the palm oil marketing in a month as 1,020,000 (96.05% of the total cost incurred) signifying that the marketing requires huge capital. The table also reveals that transportation cost was about 2.26% while loading and off loading of

kegs of palm oil was 1.13% and tax paid was 0.56%. The table also shows the returns associated with palm oil marketing. The total revenue of palm oil marketing per month was 1,200,000 and the gross margin was 138,000 which signify that the marketers have fairly good revenue. Given the gross ratio of 0.89, it can be concluded that palm oil marketing enterprise is profitable in the study area. The value added of the palm oil marketing is ₦138,000.

**Table 3: Constraints Encountered by Palm Oil Processors**

Constraints	Frequency	Percentage(%)	Rank
Poor Market for palm oil	82	18.2	2 <sup>nd</sup>
High Cost of Transportation	78	17.3	3 <sup>rd</sup>
Poor Water Supply	86	19.1	1 <sup>st</sup>
Poor Finance and Lack of Credit Facilities	34	7.6	6 <sup>th</sup>
Unavailability of Milling Machine	42	9.3	5 <sup>th</sup>
Poor Quality of Palm Fruit	58	12.9	4 <sup>th</sup>
Poor Road Network	28	6.2	8 <sup>th</sup>
Duration of Processing is too long	30	6.7	7 <sup>th</sup>
High Labour Cost	12	2.7	9 <sup>th</sup>

Multiple Responses.

Source: Computed from Field Survey Data, 2020

Table 3 shows the major constraints faced by the palm oil processors in the study area, ranked in order of the most reported to the least. The processors were faced with challenges ranging from poor water supply (19.1%), poor market for palm oil (18.2%), high cost of transportation (17.3%), poor quality of palm fruit (12.9%), unavailability of milling machine (9.3%), poor financing and lack of credit facilities (7.6%), poor road network (6.2%), and the least ranked was long duration of processing (6.7%) and high cost of labour (2.7%). There is poor water supply as they use water mainly for processing. Water is not readily available for them to use so most of them go to stream and rivers to get water which is not very convenient for them. The processors also complained of high cost of transportation. These respondents asserted that most of the farms where the palm fruits are obtained are not

accessible for vehicles. Beside most drivers often object to carrying palm fruit bunches because they complained that the oil from the fruit get their vehicle stained and dirty. Respondents further asserted that bad road leads to high transportation fare, and this increase processors hardship and cut down on their profit margin. However, if the feeder roads are accessible to motorist, then the processors will likely pay less and earn more profit in the processing enterprise. The higher transportation cost, the lower the profit made from processing activities.

Poor quality of the palm fruit was also the 4<sup>th</sup> ranked constraints encountered by the processors. They complained that most of the fresh palm fruit available for the processors are not from the improved yield and thus reduces the quality of the palm oil available for the marketing activity.

**Table 4: Constraints Encountered by Palm Oil Marketers**

Constraints	Frequency	Percentage (%)	Rank
Fluctuation of selling Prices	22	7.9	5 <sup>th</sup>
High Cost of Transportation	90	32.1	1 <sup>st</sup>
Poor Financing and Lack of Credit Facilities	42	22.1	3 <sup>rd</sup>
Irregular Supplies	75	26.8	2 <sup>nd</sup>
Poor Road Network	31	11.1	4 <sup>th</sup>

Multiple Responses.

Source: Computed from field Survey Data, 2020.

Table 4 shows the major constraints encountered by the palm oil marketers in the study area in ranked order of the most reported to the least. The marketers were faced with challenges ranging from high cost of transportation (32.1%), irregular supplies (26.8%) as a results of the duration of processing, poor financing and lack of credit facilities (22.1%), poor road network (11.1%) and fluctuation of selling prices (7.9%). The marketers complained about poor road network and high cost of transportation. This was in line with Ekene, Onu (2008), in their findings that transportation ranked first as the major constraint in palm oil marketing, in their paper on economics of small-scale palm oil processing in Ikwerre and Etche Local Government Area of Rivers State, Nigeria. Since a larger proportion of the respondents hire vehicles to convey their products, this might affect the income obtained from the sales of the palm oil, the higher the transportation cost, the higher the price of palm oil thereby increasing the marketing cost. Some marketers also complained that they lack adequate access to credit facilities and that their major source of finance is their personal saving which has been limiting their marketing activities.

## CONCLUSION AND RECOMMENDATION

Considering the empirical results from the study, it can be concluded that palm oil business is a profitable and viable business in the study area. Poor water supply

and poor market for palm oil were identified as major constraints facing the palm oil processors while high cost of transportation and irregular supplies were the main problems encountered by the palm oil marketers in the study area. Based on the findings from the study, the following recommendations were made: Government should assist in the provision of portable water to the mill thereby ensuring that water is readily available for their processing activity. Government should also ensure adequate upgrading of road networks in palm oil processing areas, which will ease products movement and also lessen cost of transportation. The processors should make use of the improved seedling of palm fruit as to improve on the market value of the palm oil for better marketing of the produce and to also increase the supply of palm oil, processors should employ the use of modern processing techniques which is more efficient thereby increasing their productivity.

## REFERENCES

- Ayobami AA (2019). Economic Analysis of Oil Palm and Food Crop Enterprises in Ondo State, Nigeria. *Management Network Journal*, 4(8):58 – 65.
- Ayodele T (2019). African Case Study; Palm oil and Economic Development in Nigeria and Ghana; Recommendations for the World Bank's 2019 Palm Oil Strategy. *Initiative for Public Analysis, Lagos*,

- Nigeria. Retrieved on October 25<sup>th</sup>, 2020 from <http://www.ippanigeria.org>. 1 – 15.
- Ekiine DI, Onu ME (2008). Economics of Small-scale Palm oil Processing in Ikwerre and Etche Local Government Area of Rivers State, Nigeria. *Journal of Agriculture and Social Research*. 8(2):1 – 9.
- EME, (Energy Market Economy), (2018). Identifying Growth Pole Value Chain for Cross River, Kaduna, Kano and Lagos States Department for International Development (DFID) and World Banking, UK.
- Kehinde OA (2020). Structure and Performance of Palm Oil Marketing in Oyo State, Nigeria. *Journal of Food and Agriculture*. 6(2):114 – 122.
- Matthew OE (2017). Vegetable and Edible Oil Section of Manufacturer Association of Nigeria, Nigeria Palm Oil Today, and Future Outlook, Paper Presented at the Nigerian Institute for Oil Palm Research Workshop, January, 2017.
- Olagunju FI (2008). Economics of Palm Oil Processing in South-Western Nigeria. *International Journal of Agricultural Economics and Rural Development*, 1(2):69 – 77.
- Oluwatomiwa TA (2020). The Performance of Oil Palm and Different Food Combination in a 5years Sequential Intercropping in Ondo State.
- Omonona BT, Agbaje IA (2018). Growth in Oil – Palm Value Chain under Microenterprises in Delta State, Nigeria. *International Journal of Research in Management, Economics and Commerce*. 3:5.
- PIND (2011). Foundation for Partnership Initiatives in the Niger Delta (PIND). A Report on Palm Oil Value Chain Analysis in the Niger Delta, 2011.
- Poku K (2002). *Small – Scale Palm Oil Processing in Africa*. (Vol. 148). Food and Agriculture Organization.
- Tiku NE, Bullem FA (2015). Oil Palm Marketing, Nigeria-lessons to learn from Malaysia Experiences and foreign direct investment in Cross River State. *Journal of Development and Agricultural Economics*, 7(7), 243 – 252.