

Economic Analysis of Palm Oil Processing and Marketing in Oyo Town, Oyo State

¹Ogunjinmi, O. O., ²Oyedare O. O., ¹Durojaiye A. M.

¹Department of Agricultural Education,
Emmanuel Alayande University of Education,
Oyo, Oyo State.

²Department of Forestry Technology,
Federal College of Forest Resources Management, Maiduguri, Borno State.
olumide.oyedare89@gmail.com

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Abstract

This study examines the economic analysis of palm oil processing and marketing in Oyo Town, Oyo State. A multistage sampling technique was used to randomly select 80 palm oil processors. Data was collected with the aid of structural questionnaire. Descriptive and inferential statistics were suit for the data analysis. The results showed that majority of the palm oil processors were female with a mean age of about 50 years. Household size was 10 persons. Monthly income of palm oil processors was N51,000, total cost and total revenue were N382,001.25 and N454,925.00 respectively with gross margin was N174,237.00, net farm income was N72,923.00 and return per naira invested was 1.19 other financial measure included are operating ratio, fixed ratio and gross ratio with 0.62, 0.22 and 0.84. The study showed that majority of the respondents belongs to cooperative association. Years of experience were 15 years in the study area. The major constraints faced by the processors and marketer were transport cost, weather, unstable price, high cost of labor, poor marketing mechanism, inadequate infrastructure and poor management. It was recommended that palm oil processors should have access to credit facilities with low interest rate in order to boost palm oil production. Financial institutions especially Nigerian Bank for agriculture should be strengthened to provide soft agricultural credit and rural finance to palm oil processors and marketers at very low interest rates.

Keywords: Profitability, Budgetary Model, Marketing Mechanism, Credit Facilities, Palm Oil Processors

1. INTRODUCTION

Palm oil, derived from the fruit of the oil palm tree, is one of the most important agricultural commodities worldwide, playing a significant role in the economies of many countries, including Nigeria (Okem 2017). With its versatility and widespread usage in various industries, palm oil has been a major contributor to economic growth, providing income and employment opportunities for millions of people globally (Oladiran, 2018).

In Nigeria, palm oil production and marketing have been an integral part of the country's agricultural landscape for centuries. Nigeria is the largest producer of palm oil in Africa and the

fifth-largest globally (Adeola, 2016). The palm oil sector constitutes a significant share of Nigeria's agricultural GDP, contributing to both rural and national economies (Oladiran *et al*, 2018).

The analysis of palm oil processing involves examining the various stages of production, including cultivation, harvesting, processing, and refining. It considers the costs and efficiencies associated with each stage, analyzing factors such as land availability, labor, technology, and infrastructure. Additionally, it assesses the market dynamics and trends, including supply and demand factors, factors influencing consumer preferences and purchasing decisions, such as price, quality, and health considerations.

Several studies have contributed to the economic analysis of palm oil processing and marketing in Nigeria. Ahmed *et al.* (2017) examined the profitability and efficiency of palm oil processing mills in Southern Nigeria, highlighting the importance of technology adoption and government policies in enhancing productivity. Olaoye *et al.* (2019) conducted a value chain analysis of palm oil production in Ondo State, Nigeria, assessing the challenges and opportunities at different stages of the value chain. They emphasized the need for improved infrastructure and access to finance to enhance competitiveness in the sector.

Another relevant study by Adepoju *et al.* (2020) examined the price transmission dynamics between domestic and international palm oil markets in Nigeria. The findings revealed the influence of international market price fluctuations on domestic prices and emphasized the need for market integration and price stabilization policies. Similarly, Ogbuabor and Okoroafor (2018) analyzed the determinants of palm oil export competitiveness in Nigeria, highlighting the importance of quality standards and market access.

At present, Nigeria is experiencing supply shortages of all grades of vegetable oil, especially red oil (USDA, 2003). Palm oil is marketed in the country throughout the year and majority of the population keep demanding for it. Marketing of palm oil is encumbered with its attendant problems such as price fluctuations lack of/or inadequate transport facilities low level of marketing experience, lack of knowledge (by buyers & sellers) of type of competition operating in the palm oil market, poor storage-facilities and non-uniformity in the measures used, which is largely responsible for the poor marketing efficiency of palm oil as regards price mechanism price collusion and discrimination in the market (Ohen *et al*, 2007). It has also been observed that palm oil production has suffered serious setback due to a very low development of the sub-sector of agriculture making the country losing her leading position in palm oil production in the world. In addition to the problem of insufficient funding of the sprouted seeds and seedlings production from government and private institution, the value chain research improvement has been negatively affected.

The economic analysis of palm oil processing and marketing in Nigeria is therefore essential for identifying opportunities for growth, attracting investments, and promoting sustainable development in the sector. By understanding the factors affecting production, processing, and marketing, policymakers can implement measures to enhance productivity, strengthen value chains, and improve competitiveness. Moreover, it enables stakeholders to make informed decisions regarding investments, branding strategies, and market access, contributing to the overall development of Nigeria's palm oil industry. This study therefore aimed at analyzing the costs and returns of palm oil processing and marketing in Oyo Town. Below are the specific objectives;

- i. To determine the socio-economic characteristics of palm oil processors in Oyo Town;
- ii. To evaluate the costs and returns in palm oil processing;

- iii. To determine the effects of socio-economic characteristics of the processors on their profitability;
- iv. To identify the challenges encountered by palm oil processors in Oyo Town.

2. METHODOLOGY

Study area, Data collection and Sampling Techniques.

The research was carried out in Oyo Town, Oyo State, South Western Nigeria. Oyo town has a land mass of about 2,427km² a provisional population of about 420,798 (NPC, 2006) Oyo lies 30miles (51km) north of Ibadan. The city has four Local Government Areas. Atiba Local Government Area, headquartered at Kosobo: Oyo West Local Government Area, headquarter at Ojongbodu and Afijio Local Government Area, headquartered at Jobele. The economy of Oyo is based chiefly on agriculture and handicrafts products. The town is a traditional centre of cotton spinning, weaving and dyeing (with locally grown Indigo). It is also famous for carving calabashes (gourds) leather work (especially cushions) in goat skin and sheep skin, wood carving and mat making. Local trade is primarily in yams, corn (maize), sorghum, cassava (manioc) poultry, palm oil and skin.

The study population consists of all palm oil processors and marketers in Oyo-Town, Oyo State, Nigeria. In the four Local Government Areas; there are at least 10 processing plants and they have 8 to 15 processors in each plant. 20palm oil processors were selected from each of the Local Government Area giving a total of 80palm oil processors as respondents used for the study. Primary data was collected using well-structured questionnaire. Data was collected on socio-economic characteristics of the respondents and the costs and returns of palm oil processing.

2.1 Analytical tools

The data for this study was analyzed using both descriptive (such as simple bar charts, means distribution tables, and frequency) and inferential techniques. Gross Margin Analysis was used to evaluate the cost and returns of palm oil processing and marketing. Gross Margin (GM) is defined as the difference between total revenue and total variable cost. *Mathematically, it is usually expressed as;*

$$\mathbf{GM = TR - TVC}$$

$$\mathbf{Profitability\ ratio = GM /TC}$$

$$\mathbf{Efficiency\ ratio = TR/TC}$$

Where

GM = Gross Margin

TR = Total Revenue

TVC =Total Variable Cost

TC = Total cost

2.2 MULTIPLE REGRESSION ANALYSIS

Multiple regression analysis was used to assess the main determinants of profitability of palm oil processing and marketing in the study area.

Mathematically, it is usually expressed as;

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

a = constant

Y = Gross Margin in Naira

X₁= Age (years)

X₂= Gender

X₃= Household size

X₄= Years of Experience

X₅= Membership of Social-Organization

X₆= Type of Labour

X₇= Production Method

X₈= Source of Capital

X₉= Marketing Method

μ_i =Stochastic error term

3. Results and discussion

3.1. Socio-economic Characteristics

The study revealed that majority of the respondents (79%) who are into palm oil processing in the study area were female while 21% were male (Figure 1). Ortiz *et al.* (2019) revealed that women were actively engaged in a wide range of industries, including agriculture, manufacturing, and services, proving that women's workforce participation is not limited to specific sectors or regions. Palm oil processing and marketing have provided economic opportunities for women in rural areas, allowing them to contribute to household income and achieve a certain degree of financial independence (Khatun *et al.* 2016). 54 respondents indicating 67.5% represents of the respondents within the age group of 41 – 50years and forms the majority followed by 22 respondents within the age group of 31 – 40years (Figure 2). The mean age of about 50years implies that the producers were getting close to retirement and may find it difficult to cope with the challenges of palm oil production. This finding agrees with Chen *et al.* (2018) who examined the age demography of palm oil marketers in a Nigerian market. The study found that older marketers faced more difficulties in adapting to changing market demands and consumer preferences. This could be primarily due to a lack of exposure to marketing strategies and techniques. The study however emphasized the need for training and capacity-building programs to equip older marketers with the necessary skills and knowledge to effectively cope with production challenges.

Also, about 33.8% had a household size of 1–5persons, 53.8% had a household size of 6 – 10person, 12.5% had a household size of 11 – 15persons (Figure 3). On experience in palm oil processing, 8.8% of the respondents had 1 – 5years, 18.8% had 6 – 10 years of experience, 41.3% had 11 – 15years of experience while 31.3% had more than 15years of experience. The mean farming experience of the respondents was 11 – 15years, implying that palm oil producers has moderate years of experience in palm oil production (Figure 4). However, this is expected to enhance their production output. This finding agreed with a study by Lim *et al.* (2017) who examined the impact of experience on palm oil production in Indonesia and found a positive correlation between experience and profitability. The study suggested that experienced palm oil

producers were often better equipped to manage operational challenges, make informed decisions, and optimizes resource utilization, leading to higher profits. These findings highlight the importance of experience as a determinant of profitability in the palm oil industry.

This study also revealed that all the respondents belong to one social organization or the other. Membership of religious society was 21.3%, cooperative societies were 48.8%, and membership of age grade group was 6.3% while 23.8% belong to other societies (Figure 5). Majority of the respondents belong to any cooperative association. This could have a positive growth and expansion of their business (Udoh, 2005). Palm oil processors in the study area have different sources of capital. Cooperative societies (45%), personal savings (16.3%), loan from commercial banks (6.3%), money lenders (23.8%) while others sources accounted for 88% (Figure 6). It was revealed that all the palm oil processors adopted modern method because of ease of processing and reduction of stress (Figure 7). This modern method is mostly preferred due to it saves time, fast and efficient. The study also revealed that the marketing method adopted by palm oil processors. 61.3% were into wholesaling while 38.8% were into retailing (Figure 8).

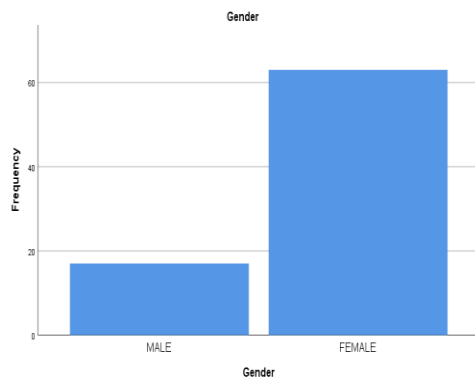


Figure 1: Gender

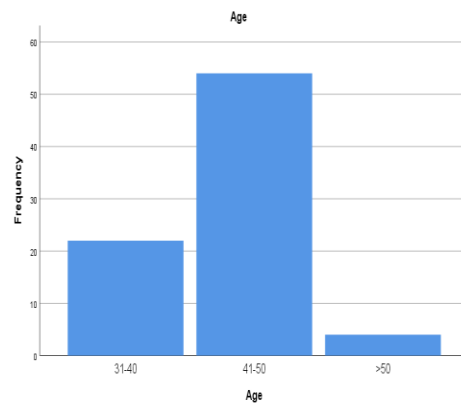


Figure 2: Age

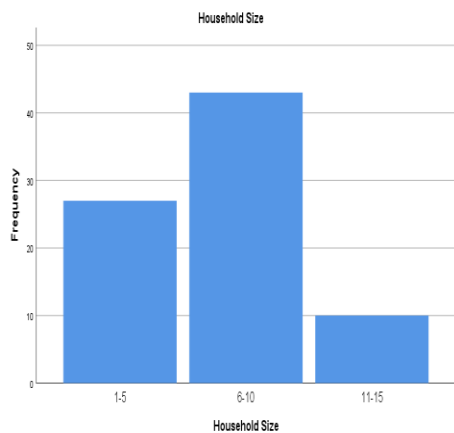


Figure 3: Household Size

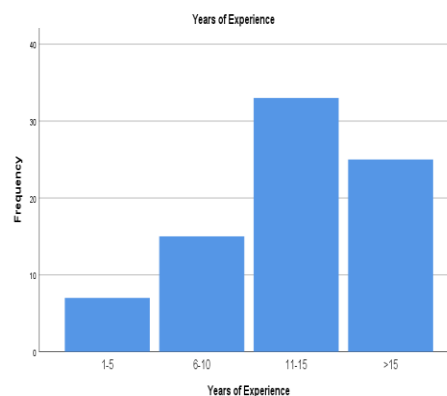


Figure 4: Years of Experience

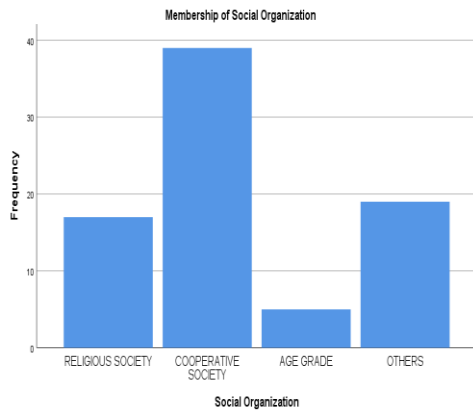


Figure 5: Membership of Social Organization

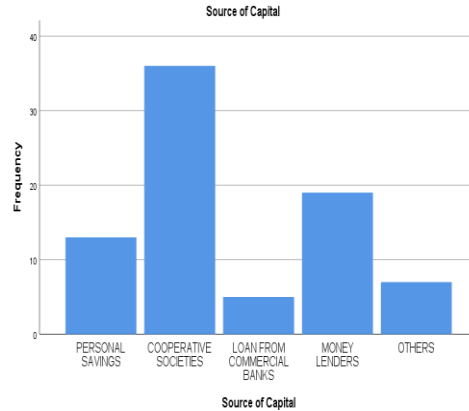


Figure 6: Source of Capital

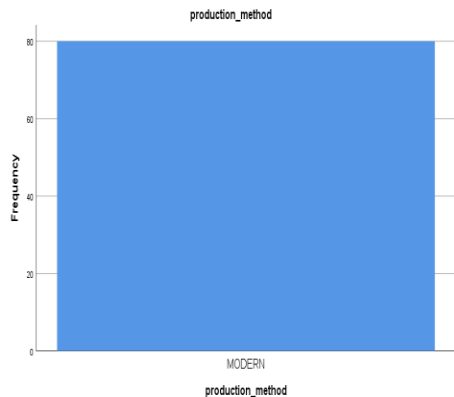


Figure 7: Production method

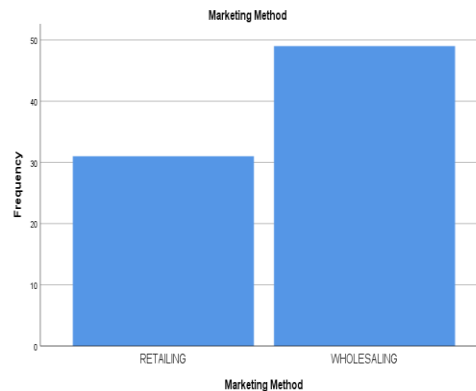


Figure 8: Marketing Method

Table 1: Cost and Return Analysis of Palm Oil Processing and Marketing

Items of Cost	Value (₦)	Percentage of T.C.
Labour	24,425.00	6.39
Firewood	55,500.00	14.53
Transport	25,125.00	6.58
Water	13,712.50	3.59
Maintenance	8,200.00	2.15
Palm Fruit	153,725.00	40.24
Total Variable Cost (TVC)	280,687.50	
Fixed Costs		
Storage Drum	57,750.00	15.12
Stem Cooker	14,093.75	3.69
Hand Press	10,256.25	2.68
Sieving Materials	9,056.25	2.37
Clarifier	8,262.50	2.16
Basket	1,895.00	0.49

Total Fixed Cost (TFC)	101,313.75	
Total Cost = (TVC + TFC)	382,001.25	100.00
Return (TR)		
i) Revenue on Palm Oil Sold	420262.50	
ii) Revenue from wastes	34662.50	
Total Revenue	454,925.00	
Gross Margin (TR – TVC)	174,237.00	
Net Income (TR – TC)	72,923.00	
Return per naira invested (TR / TC)	1.19	
Operating Ratio (OR) = TVC / TR	0.62	
Fixed Ratio (FR) = TFC / TR	0.22	
Gross Ratio (GR) = TC / TR	0.84	

Source: Field Survey Data, 2023.

Table 1 revealed that firewood cost constituted the largest part of the variable cost followed by transportation cost and labour cost. This implies that firewood, transportation and labour accounted for the largest percentage of variable Cost Total Revenue was due to sales of palm oil and its wastes. The gross margin was ₦174,237.00, net farm income was ₦72,923.00 and return per naira invested was 1.19 other financial measure included are operating ratio, fixed ratio and gross ratio with 0.62, 0.22 and 0.84 respectively. These results showed that palm oil processing and marketing is profitable despite production challenges encountered by the processors (Table 1).

Table 2: Estimate of factors that affect palm oil processors profitability.

Variables	Co-efficient	T	Sig.
Age	-0.235	-0.865	0.390
Gender	-0.085	-0.381	0.705
Household-Size	-0.239	-1.560	0.123
Years of Experience	0.315	1.850	0.068
Social-Organization	0.052	0.318	0.752
Types of labour	0.185	1.171	0.246
Production method	1.172	2.397	0.019**
Source of capital	0.120	0.705	0.483
Marketing method	-0.385	-2.112	0.038**
R ²	0.835		
Adjusted R ²	0.814		
F	39.817		

Source: Field Survey, 2023.

Table 2 estimated parameters and the relevant statistical test results obtained from the analysis are presented. It had an adjusted R² value of 0.814. This implies that about 81.4% of the variation in (Y) is accounted for by the variables (X₁ – X₉) included in the model while the remaining 18.6% is as a result of non-inclusion of other explanatory variables in the model. The F-value is positive and statistically significant. This indicates that the variables included in the model adequately explain the net income in the study area (Table 2).

Out of the nine (9) variables modeled, production and marketing methods were statistically significant (at 0.05 level of significance) in determining the profitability of palm oil in the study area. This implies that the significant variables have positive relationship with palm oil profitability. Therefore, change in production method or change in marketing method will increase the profitability of palm oil in the study area.

Table 3: Challenges Faced by Palm Oil Processors in the Study Area

Constraints	Frequency	Percentage (%)
Palm fruit affordability		
Fairly Affordable	20	25.00
Very Affordable	13	16.30
Affordable	47	58.80
Total	80	100.00
Transport – Cost		
High	75	93.80
Low	5	6.30
Total	80	100.000
Weather		
High	58	72.50
Fairly high	17	21.30
Low	5	6.30
Total	80	100.00
Finance		
Yes	80	100.00
Unstable Prices of Input		
Yes	67	83.80
No	13	16.30
Total	80	100.00
High Cost of labour		
Yes	70	87.50
No	10	12.50
Total	80	100.00
Poor Marketing – Mechanism		
Yes	77	96.30
No	3	3.80
Total	80	100.00
Inadequate – Infrastructure		
Yes	80	100.00
Poor – Management		
Yes	16	20.00
No	64	80.00
Total	80	100.00

Source: Field Survey, 2023.

Majority of the respondents (58.8%) believed that palm fruit is affordable in the study area while 25.0% believed that it is fairly affordable. This means that palm fruit affordability is not a problem in the study area (Table 3). It was also found out that majority of the respondents (93.8%) are having issue with transportation cost which is very high. Poor roads and higher transportation costs increase farmers' production cost. The movement of fresh fruit bunches from stand points to processing centre, and the transportation of finished products to the market is hindered. These findings agreed with PIND (2011). All the respondents have issues of capital. Therefore inadequate capital is one of the major challenges threatening the survival of palm oil processors and marketers in the study area. 67 respondents indicating 83.8% of the respondents have issue with unstable prices of input which always affect the profitability of palm oil. These unstable prices are caused by the unstable macro-economic policy which then leads to inflationary pressure (Oni, 2013). All these have the tendency to cause rising prices in fuel, transportation of farm inputs and therefore increase cost of production. It was also found out that high cost of labour is affecting majority of the respondents (87.5%) while 12.5% are not affected by this. Majority of the respondents have poor marketing-mechanism (96.3%). The produce from oil palm at local level did not have well defined marketing procedure. This give rise to poor products prices which in turn affects the rural producers' profit margin. This result agrees with Enkenta and Ajala, (2017). All the respondents are also faced with the problem in inadequate infrastructure. In addition, 64 respondents were not affected by the problem of poor management while 16 respondents have problem of poor management.

4. Conclusion

The study concluded that most of the respondents were female, experienced and approaching retirement age. Palm oil processing is also profitable venture while factors such as production and marketing methods were the most critical factors influencing profitability of the venture. The cost of production could be higher or lower depending on the location of the enterprise which can be largely influenced by the price or cost of fixed assets such as land, labour and other processing equipment. Marketing has been widely recognized as one of the most effective ways of increasing the productivity of agriculture. The study made a valuable addition to the knowledge required for efficient marketing of palm oil in the study area. Therefore, government should collaborate in mounting a vigorous advocacy on the benefits of the palm oil processing through coordinated extension services, seminars should be organized to broaden the understanding of processors on modern technology pertaining to palm oil production and processing, palm oil processors should have access to credit facilities with low interest rate in order to boost palm oil production in the study area and social amenities like electricity should be regularly supplied while pipe borne water should be provided in areas where palm oil is processed in order to facilitate palm oil production.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest

REFERENCES

- Adeola, O. (2016). Comparative Analysis of the Performance of the Palm Oil Sector in Malaysia and Nigeria. *International Journal of Economics, Commerce and Management*, 4(8), 173-180.
- Adepoju, A. O., Fatumo, S. A., & Fasina, O. S. (2020). Price transmission and market integration between international and domestic markets of palm oil in Nigeria. *Journal of Food Distribution Research*, 51(1), 29-47.
- Ahmed, K. Y., Anur Aiyar, S., & Ahmad, Y. M. (2017). An economic analysis of oil palm processing mills in southern Nigeria. *Journal of Tropical Agriculture, Food, Environment and Extension*, 16(2), 40-47.
- Chen, X., Yin, Y., Cai, H., & Iweala, E. E. (2018). An analysis of the demographic characteristics and marketing practices of oil palm oil retail traders in Nigeria. *Journal of Agriculture and Rural Development in the Tropics and Subtropics*, 119(2), 207-217.
- Enkenta C.M, and Ajala M.K. (2017): Abandoned Nigerian Economic Resources: the case of oil palm. *International Journal of Agricultural Extension and Rural Development Studies*, 4(2), 1-16.
- Khatun, D., Sadiq, M. M., Islam, R., & Chakraborty, S. (2016). Socioeconomic Impact of Palm Oil Processing on Rural Women Empowerment in Indonesia. *Journal of International Women's Studies*, 17(3), 224-244.
- Lim, S. Y., Dao, M. H. L. T., & Ji, Y. (2017). Palm oil production in Indonesia: The effects of experience and technical efficiency on smallholder profitability. *Food Policy*, 71, 74-84.
- NPC, 2006: National Population Census Report. National Population Commission, Abuja, 21 – 27.
- Ogbuabor, J. E., & Okoroafor, O. K. (2018). Determinants of export competitiveness of palm oil in Nigeria. *Journal of Agribusiness and Rural Development*, 48(3), 239-250.
- Ohen, 2007: Price transmission and Market Integration Vertical and Horizontal Price Linkages for live Catfish in Nigeria. *J. Agric Soc. Sci.*: 3:79 – 82.
- Okem (2017). Assessment of Palm Oil Production Among Smallholder Farmers in South-South Nigeria. *Journal of Agriculture and Veterinary Science*, 10(5), 46-52.
- Oladiran, O. J. (2018). Impact of Agricultural Export on Economic Growth in Nigeria: Evidence from Palm Oil Sector. *International Journal of Economics, Commerce and Management*, 6(12), 13-22.
- Olaoye, J. O., Babatunde, R. O., & Ibrahim, W. B. (2019). Value chain analysis of improved palm oil production in Ondo State, Nigeria. *Journal of Agriculture and Ecology Research International*, 19(4), 1-11
- Oni (2013): Challenges and Prospects of Agriculture in Nigeria. The way forward. *Journal of Economics and Sustainable Development*, Vol. 14, No. 16, 2013.

- Ortiz, I., Hersh, J. L., & Amlani, A. (2019). From labor rights to women's rights: The transformation of work in a global era. *International Feminist Journal of Politics*, 21(4), 635-653.
- PIND (2011): Palm Oil Value Chain Analysis in the Niger Delta. Foundation for Partnership Initiatives in the Niger Delta (PIND), Abuja, Nigeria.
- Udoh, (2005): Marketing of Fresh Water Clam *Galatea Parode* Born 1778 in South Eastern Nigeria. *J. Rural Economic Development* 14(2):121.
- USDA, 2003. United State Department of Agriculture, P:4. Foreign Agricultural Service and Industrial Estimates: *Nigeria Oil Seeds and products Annual, October, 2003*.