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ECONOMIC PROFITABILITY ANALYSIS OF OIL PALM PRODUCTION AMONG COOPERATIVE WOMEN PALM OIL PROCESSORS IN IWO ZONE OF OSUN STATE, NIGERIA

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ABSTRACT

The study investigated the economic profitability analysis of oil palm processing among cooperative women palm oil processors in Iwo Zone, Osun State, Nigeria. Data were collected through a well-structured questionnaire administered to 120 cooperative women oil palm processors using a two-stage sampling technique. Both descriptive and inferential statistics were used for data analysis. The results showed that the majority (74.5%) of the oil palm cooperators were married, with an average age of 36 years. Findings further showed that 87.5% of the participants reported had enough experience on oil palm processing. Majority 83.3% of the respondents had joined cooperatives between 5 and 20 years or more. Majority of the respondents make use of their personal savings (41.7%), personal savings was the most source of finance used by the cooperators. The majority (63.3%) of the respondents engaged in manual processing. The study concludes that cooperative participation plays a vital role in improving the profitability of palm oil processing enterprises in the study area. The findings indicated that the oil palm processing is a viable, economical and profitable business. The study recommended that, government should provide financial support to cooperatives through soft loans and grants to improve palm oil processing activities. Palm oil processors should actively participate in cooperative activities such as meetings, savings programs, and etc. Modern palm oil processing equipment should be provided to oil palm processors to reduce wastage and improve processing efficiency.

Keywords: Women, Cooperative, Oil palm, Incomes, Cost and returns, Iwo Zone

INTRODUCTION

Nigeria is the largest consumer of palm oil in Africa (Obayelu *et, al.,* 2022). The exorbitant price of processing equipment has deterred prospective processors from starting and funding palm oil businesses. As a result, a sizeable fraction of processors turn to renting the processing machines causing a delay in the palm fruit processing (Nwalieji and Ojike, 2018). Today, oil palm is vital to the economies of several nations, particularly Indonesia, Malaysia, and Nigeria, from which it exports significant amounts of oil, meal, and other by-products (Murphy, 2019). In general, oil palm is currently grown in plantations in the Americas, Asia, and the wet tropics of Africa. Despite this, 85% of the world□s oil palm is produced in the South East Asian nations of Malaysia and Indonesia, where the majority of oil palm is produced (Murphy, 2015; Goggin and Murphy, 2018). The oil palm sector employs 6 million people directly and an additional 11 million indirectly annually, with an estimated yearly value of US$ 60 billion (Kadandale *et, al.,* 2019). By 2050, according to estimates from a variety of industry sources, between 93 and 156 Mt of palm oil may be needed (Harris *et, al.,* 2023; Pirker *et, al.,* 2016). Nigeria basically produces two species of oil palm: Dura and Tenera. Oil palm is currently found in three states: wild, semi-wild, and cultivated. The majority of oil palm and palm kernels come from wild palm groves that are frequently in a semi-cultivated state rather than from oil palms that are cultivated (Statista, 2020). . Nigeria now produces 1.0 million tons of palm oil a year, ranking it as the world□s fifth-largest producer (Statista, 2020). According to Foundations for Partnership Initiatives in the Niger Delta (PIND) (2019), Nigeria was the world□s top producer of palm oil until the 1960s. Due to Malaysia□s dedication to oil palm plantation cultivation, Nigeria has since lost this position as the world□s top producer of oil palm. Originating in the tropical rainforest of West Africa, oil palm (*Elaeis guineensis*), whose fruits are processed into palm oil, is an ancient perennial crop (Busari *et, al.,* 2022). The seed thrives well in humid tropical climate, giving rise to a monoecious species that alternately produces unisexual male. There are different techniques used in processing palm oil and these range from traditional methods to modern methods (hand operated press and power operated mills). However, small-scale processors prevalently utilize traditional processing methods, and it is through these processors that the majority of palm oil processed in Nigeria is produced (Nwalieji and Ojike, 2018). The modern palm oil processing mills have higher extraction rate (13.00-18.00%) compared to manually operated traditional mills, resulting in lower (8.00-10.00%) oil extraction rate (NIFOR, 2019). Several studies (Murphy *et, al.,* 2021; Obayelu *et, al.,* 2022) have focused on oil palm processing among farmers and processors using the traditional methods of production, however, empirical evidence on the returns on investment of oil palm under (power operated mills and hand operated press) methods remains varied and patchy. The oil palm, which is a monoecious crop, is botanically known as □*Elaeis guiñeensis*□, a palm species that serve as the sole source of palm oil to humans. It has the potentials to bring about economic development and food security through the activities and value addition in its production chain. Oil palm processing and its value addition have the potential to strengthen national food security and reduce rural poverty. The extra value such as vegetable oil, palm kernel oil, native soap, can

be used for commercial purposes, which serve as a source of income. Also, processing of palm kernel by small-scale producers have the ability to increase income, reduce rural unemployment, rural poverty and wastages in oil palm processing (Sarku, 2014)

Problem of the Statement

Bassey (2016) reported that Nigeria was the leading producer and distributor of palm oil until the petroleum (oil) boom of the late 1970s'. Data from Gourichon (2018), Statista (2020), Palm Oil Analytics (2017), amongst many, shows that Nigeria and other West Africa countries have generally been stagnated or subjected to critical fluctuation of palm oil production, which is a major source of income and employment to a substantial proportion of the rural populace in the southern part of the country. However, the decline in agricultural output and export, particularly with regards to oil palm processing and value addition is not conducive for the economic development of the nation. More so, that high labour costs in oil palm processing, non-availability of good roads in prospective high producing areas and dearth in the sources of credit facilities and infrastructure needed in the processing of oil palm, have also contributed immensely in a negative manner to affect value addition processes (Edem, 2017; Gourichon, 2018; Nwalieji & Ojike, 2018). With the myriad of challenges already identified. Fatunbi *et, al.,* (2019). Accomplishment of these processes requires high level of efficiency in the handling to achieve high quality commodity (Ajah, 2023). A survey on women contributions in agriculture by National Bureau of statistic (NBS, 2017) indicated that female participating in processing and value addition activities was, increase as compared to their males counter-part. Women also contribute in off-farm activities such as sales of processed packaged foods products (Ajah, 2023). The processing of oil palm fruits is both a source of income and employment to a large proportion of rural women. About 60% of world yield of oil palm fruits is processed into oil which has a multitude of domestic and industrial applications. The enterprise like many agro-processing enterprise are at micro/subsistence level of development due to inadequate of capital, seasonality of the product as well as other limitations such as drudgery, hazardous and unhygienic conditions, very little access to capital, and use of traditional processing techniques (Adisa and Okonade, 2019). In spite of their contributions, Shuaibu *et, al.,* (2025) identiėed some of the women's constraints to access timely markets and improved labor-saving devices, insufficient support services (credit, extension and inputs supply), inadequate trainings and linkages to other value chain actors, among others. Provisions of interventions focusing on these constraints are particularly effective strategies to address women needs (Adam, 2018). Ogunlela and Mukhtar (2019), opined that increasing women access to resources could improve their income and eventually contribute to enhances of social services, food and nutrition e household. Iliyasu, *et al.,* (2016) observed that if small-scale processors are assisted to rise beyond subsistence level, there might be increase in their incomes through more efficient use of resources.

Research Questions

(i) What are socio-economic characteristics of the respondents?
(ii) What are the various sources of finance of women iol palm processors?
(iii) What are various methods utilized for oil palm processing among women cooperators oil palm processors?
(iv) What are the cost of production and sales of oil palm?

Objectives of the Study

The study investigates the economic profitability analysis oil palm production among cooperative women palm oil processors in Iwo Zone, Osun State, Nigeria. Therefore, the study aims to :

(i) describe socio-economic characteristics of the respondents;
(ii) identify various sources of finance to women oil palm processors;
(iii) identify various existing methods utilized for oil palm processing among oil palm processors and,
(iv) estimate cost of production and sales of oil palm, palm kernel and oil palm waste in the study area.

Review of Related Literature

Cooperative societies have been in existence in Nigeria since the 1930s, with the first cooperative society law enacted in 1935 (Okojie *et, al.,* 2017). Since then, cooperative societies have grown in number and scope, with various types of cooperatives emerging, including consumer cooperatives, producer cooperatives, and credit cooperatives (Akintonde, 2017). Despite their growth and potential, cooperative societies in Nigeria still face numerous challenges, including inadequate funding, poor management, and lack of government support (Ogundele, 2018). The impact of cooperative societies on the livelihood of women entrepreneurs in Nigeria is a topic that has received limited attention in the literature. While there are studies on the role of cooperative societies in promoting economic development in Nigeria. People participate directly in cooperative societies and they create and increase productivity, which are the major indicators for poverty reduction and promotion of livelihoods in general. The issue of women's entrepreneurial participation in cooperative organizations in Nigeria, and its impact on their livelihoods has therefore at best received peripheral attention, showing the need to fill these gaps highlighted above. (Chikaire 2021). A cooperative society is a voluntary association of individuals, united by a shared need, who collectively contribute resources to achieve common socio-economic goals. The Nigerian Cooperative Societies Act (2004) defines it as a □voluntary association of individuals, united by common bond, who have come together to pursue their economic goals for their own benefits.□ These societies are legally recognized and empowered to own property, engage in contracts, and sue or be sued. The International Labour Organization (2018) emphasizes the cooperative model□s ability to promote inclusive growth by combining social objectives with economic operations. Cooperative principles such as democratic member control, economic

participation, autonomy, and concern for community are designed to promote equality and empowerment. Women entrepreneurship refers to women□s participation in initiating, owning, and managing businesses. It plays a critical role in reducing poverty, promoting gender equality, and improving household livelihoods. In Nigeria, women entrepreneurs are heavily involved in informal and micro-enterprises, particularly in trade, food processing, agriculture, and services (Adeyeye, 2017). Despite their contributions, women entrepreneurs face significant challenges including limited access to financial services, low levels of formal education, cultural restrictions, and legal inequalities (Lawless *et, al.,* 2016). According to the World Bank (2019), although women contribute up to 60□80% of the labor in agriculture and produce over 50% of food globally, they control significantly fewer productive resources and are often marginalized in financial systems. Livelihood refers to the means by which people secure the necessities of life, including food, shelter, and income. Chambers and Conway (2019) define livelihood as comprising □the capabilities, assets (stores, resources, claims and access), and activities required for a means of living.□ A sustainable livelihood is one that is resilient to shocks and can maintain or enhance well-being over time. A number of studies highlight the significant role of cooperative societies in promoting women□s livelihoods. For example, (Kareem *et, al.,* 2020) found that workplace cooperatives in Nigeria significantly enhance member welfare through loan facilities, group savings, and income-generating opportunities. They concluded that cooperatives play a pivotal role in poverty reduction and capital formation. Akintonde (2017), conducted a study on the role of cooperative societies in economic development in Nigeria and found that cooperative membership significantly improved access to credit and training for women. This led to increased business profitability and resilience. Wanyama *et, al., (*2018) Globally, (Wanyama *et al.,* 2018) found that cooperative organizations in 15 African countries created approximately 160,000 jobs and empowered thousands of rural women through microcredit, enterprise development, and social inclusion.

Empirical Review

Ogunjinmi, *et al., (2023)* examined 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 ₦51,000, total cost and total revenue were ₦382,001.25 and ₦454,925.00 respectively with 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. 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.

METHODOLOGY

Area of the Study

The study area is Iwo zone. Iwo, town, Osun state, southwest Nigeria, the area covers approximately 245 km^2 with a population density of about 1,015/km^2. It is one of the most populous local governments in the state, with a population of approximately 191,348 to over 248,000. Iwo is situated in Osun State. It serves as the main administrative center, with additional administrative divisions created, including Iwo East and Iwo West Local Council Development Areas (LCDAs). It lies 6 miles (10 km) north of the Iwo station on the Lagos-Kano railway and at the intersection of roads from Ibadan, Oyo, and Ogbomosho, on a low hill at the edge of savanna and forest. The Iwo Local Government Area is a major agricultural and administrative area in Osun State, Nigeria, centered around the ancient city of Iwo. Agriculture is the primary occupation, with significant cultivation of cocoa, kolanuts, and food crops such as yams, and cassava,. Iwo has a tropical wet and dry or savanna climate and is zero metres above sea level (Aw classification). The area averages a yearly temperature of 29.66 °C (85.39 °F), which is 0.2% higher than the national average for Nigeria. Iwo generally experiences 248.57 wet days (68.1% of the time) annually with average precipitation of 133.63 millimetres (5.261 in).

Ayedire Local Government Area, is one of the thirty Local Government Areas, in Osun State, Nigeria, with its headquarters located in the town of Ile-Ogbo at 7°47′00″N 4°12′00″E Ayedire Local Government Area. The local government was carved from the old Iwo local government which was in Araromi in Iwo. It shares borders with Ejigbo, Ola Oluwa, Irewole, Ayedaade, and Iwo Local Government Areas. It was situated in the western part of the state, and its covers an area of 262 km^2 and serves as primary agricultural, focusing on cultivation and trading of agricultural produce, Cocoa is a major cash crop cultivated in the area solely or in combination with other agricultural crops such as coffee, cassava, palm oil, kola nut, maize, pineapple and yam. Population size is about 75,846 (2006 census). It features two distinct seasons (dry and rainy) and experiences an average temperature of approximately Aiyedire has ten political wards namely Ileogbo i, Ileogbo ii, Ileogbo iii, Ileogbo iv, Kuta i, Kuta ii, Oke-osun, Oluponna 1, Oluponna 1i, and Oluponna 1ii. Aiyedire is a part of the famed Iwo Kingdom.

Methods and Materials of Data Collection

The data for the research was gathered from both primary and secondary sources. Primary data were acquired through the administration of structured questionnaires and oral interviews were utilized to capture pertinent information from the sampled respondents in the study area. Secondary data were sourced from published journal materials, online sources, academic texts,

and other relevant publications. Both descriptive and inferential statistics were used to analyzed collected data. Descriptive statistics such as frequency distribution tables, percentages and mean was used describe socio-economic characteristics of the respondents, identify the various sources of finance of women oil palm processors and various existing methods utilized for oil palm processing. Inferential statistics such as budgetary analysis was utilized to estimate costs of production and sales of oil palm in the study area.

Sample Size and Sampling Technique

The population for this study included all oil palm fruit processing households in Ayedire and Iwo Local Government Area, Osun-State, while the sample size was one hundred and twenty (120) respondents. A two-stage multistage sampling technique was used for this study. The first stage involved purposely selecting five (5) communities from each selected LGAs. Ayedire; (Oke-odo, Oluponna, Oke-osun, Kuta and Ile-Ogbo), Iwo namely; (Olobere, Ogburo, Amere, Feesu and Papa) and known for oil palm processing, while in the second stage, twelve (12) palm oil extracting and processing cooperative women were randomly selected from each of the communities, giving a total of one hundred and twenty(120) respondents which formed the sample size for this study

Analytical Technique

Gross Margin (GM) estimation:

This is the difference between the total revenue and total variable cost. It is expressed mathematically thus,

Model Specification;

GM = Gross Margin

Where:

GM = TR - TVC.....equ(1)

Return per Capital Invested (RPCI) = Net return or Net income divided byTotal cost

NI = TR-TC.....equ(2)

TR = Total Revenue

TVC = Total Variable Cost

Where,

P = Price of palm oil sold (₦/litre)

Q = Quantity of palm oil produced per annum (Litre/kg)

Net Income or Net Margin (л) Analysis

This is the difference between the total revenue (*TR*) and total cost (*TC*). Mathematically,

Where,

NI = Profit (₦)

TR = Total Revenue

TC = Total Cost

PI = NI/TR □□□□□□□□□□□□□□□□□□□□□□□□□□□□□.....*equ(3)*

RRI = TR-TC/TC□□□□□□□□□□□□□□□□□□□□□□□□□.....*equ(4)*

IRR ON VC = TR- FC/VC X 100...□.....□□□□□□□□.□□*...equ(5)*

ESR = TFC/TVC .....equ(6)

BCR = TR/TC.....equ(7)

RESULTS AND DISCUSSIONS

Results and Discussions

3.1 Distribution of socio-economics characteristics of Respondents.

Table 1, shown that substantial percentage 41.7% and 29.2% of the respondents had their age fell within 31□40 years and 41-50 age bracket. Also, 16.6% and 12.5% of the respondents had their age fell within 51□60 and below 31 years respectively with an average of 36 years. This implied that the respondents were in their prime working age. Implication was that females are more hard working and productive in oil palm processing section in the study area. This findings agreed with (Obayelu *et., al,* 2022), who asserted that women participating in oil processing of agricultural produce are more than men. The marital status of the respondents showed that 74.5% of the respondents were married and 17.5 were single, while 3.3% and 5.0% were divorced andseparated respectively. This confirmed that higher percentage (82.5%) of the respondents were married. Education has been found to influence the level of adoption of improved processing techniques which can lead to improved productivity. The study revealed that 29.2% of the respondents had primary school education only, 50.0% had secondary school leavers, 4.2% had been educated up to tertiary institution level while 16.6% of the respondents had no formal education. This revealed that 83.4% of the respondents possessed formal education. findings showed that most of the respondents were educated, meaning that they can write and read. This finding agreed with Shittu *et, al.,* 2025 who claimed that literate farmers adopt innovation easily due to their educational

attainment. The study revealed that majority 40.9% of the respondents practiced Christianity, 55.8% of them practiced Islam while 3.3% practiced traditional religion. The respondents are associated with one religion or another, which implied that there is no religious discrimination in their involvement in iol palm production. This result is consistent with Ogunjinmi (2023) who asserted that there is no religious barrier in oil palm processing. In terms of major Occupation. The study revealed, that majority 17.5.2% of the respondents predominantly farmers as their major occupation while 24.2% of the respondents were involved in trading, 33.3% involved in palm oil processing activities, 14.2 per cent were civil servants, artisan 16.7% and 8.3 per cent who engaged in some other activities. This indicated that the majority (66.7%) of the respondents engaged in various activities apart from oil palm processing as main occupation. It is believed that the other occupations of the respondents can determine the level of focused attention given to palm oil processing. Years of experience are expected according to a *priori expectation*, to increase productivity, the more experienced they are, *ceteris paribus,* the more efficient they would be in management because the experience acquired over the years would be brought to bear on their activities. It was revealed that 14.2% of the sampled oil palm processors had between 4 and 6 years of experience in plantain marketing, 15.0% had between 7 and 9 years of experience, 26.7% had between 10 and 12 years of experience, while 31.6% had 13 years or more of oil palm processing experience and 12.5% had less than or 3 years of experience with an average of 11 years. This finding showed that substantial percentage (87.5%) had between 4 and 13 years or more experience. This implied that oil palm processors had enough experience *priori to expectation.* This result is consistent with Ajah (2023). *M*ajority 45.0% of the respondents had between 3 and 5 people as household size while 26.7%, 12.5% and 7.5% of the respondents had between 6 and 8, 9 and 10, 11 and more people as household size. 8.3% of the respondents also had less or 3 persons as family size with 4 persons as average household size. This implied considerably moderate household size. In terms of cooperative membership, 16.7% of the respondents had stayed in cooperative in less than 5 years, 25% of the respondents had joined cooperative between 5 and 10 years, 35.0% of the respondents also had joined cooperatives for 11-15 years while 18.3% and 5.0% had also joined cooperatives between 16 and 20 years, and 21 years and above respectively. This confirmed that oil palm processors belong to one or other cooperative societies.

Table 1: Socio-Economic Characteristics of the Respondents.

Variable	Value	Frequency	Percentage	Cumulative frequency	Mean
Age (years)	≤30	15	12.5	12.5	
	31-40	50	41.7	54.2	

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	41-50	35	29.2	83.4	
	51-60	20	16.6	100.0	36 years
Marital Status	Single	21	17.5	17.5	
	Married	89	74.2	91.7	
	Divorced	4	3.3	95.0	
	Separate	6	5.0	100.0	
Educational attainment	No formal education	20	16.6	16.6	
	Primary	35	29.2	45.8	
	Secondary	60	50.0	95.8	
	Tertiary	5	4.2	100.0	
Religion	Christianity	49	40.9	40.9	
	Islam	67	55.8	96.7	
	Traditional worshipper	4	3.3	100.0	
Major Occupation	Farming	21	17.5	17.5	
	Oil palm processing	40	33.3	50.8	
	Artisans	20	16.7	67.5	
	Trading	29	24.2	91.7	
	Others	10	8.3	100.0	
	<3	15	12.5	12.5	
	4-6	17	14.2	26.7	

Business experience (years)	7-9	18	15.0	41.7	
	10-12	32	26.7	68.4	
	13 & above	38	31.6	100.0	11 years
House hold size	≤3	10	8.3	8.3	
	3-5	54	45.0	53.3	
	6-8	32	26.7	80.0	
	9-10	15	12.5	92.5	
	11 & above	9	7.5	100.0	4 persons
Cooperative Membership	< 5	20	16.7	16.7	
	5-10	30	25.0	41.7	
	11-15	42	35.0	76.7	
	16-20	22	18.3	95.0	13.5 years
	21& above	6	5.0	100.0	
Total		**120**	**100**		

Source: Field Survey, 2024

3.2 Distribution of Various Sources of Finance By the Respondents

The various sources of finance used by cooperative plantain marketers to start their business including cooperative societies, personal savings, micro finance bank and friends and relatives. Table 2 showed that the majority of the respondents 41.7% used their personal savings in starting and maintaining the business and 25.0% of the respondents sourced their finance from both cooperatives and their personal savings. Additionally, 4.2% sourced their finance from friends and

relatives while 20.7% obtained credit from cooperative, 8.4% source funds from Microfinance bank. Based on the information received by the respondent, this result indicated that majority of the respondents make use of their personal savings (41.7), personal savings was the most source of finance used by the cooperatorrs. From the information provided by the respondents it was shown that the respondents maximized their profit rather than diverting funds for unneccesary personal use.

Table 2: Sources of Finance in the Study Area.

Sources of finance	Frequency	Percentage	Cumulative
Cooperative	25	20.7	20.7
Friends and relatives	05	4.2	24.9
Micro finance bank	10	8.4	33.3
Both cooperative and personal savings	30	25.0	58.3
Personal savings	50	41.7	100
Total	**120**	**100.0**	

Source: Field Survey Data, 2024

3.3 Distribution of Various Existing Methods Utilized By Oil palm Processors

The various existing methods of utilized by cooperative palm oil processors include: manual, modern and both manual and modern methods. There is an abundance of documentary evidence on the methods of oil palm processing. According to Agbelemoge *et, al.,* (2020), there are two broad methods of oil palm production: traditional/manual and modern/mechanize. Table 3 indicated the distribution of respondents by processing method. According to the results, 63.3% used manual processing, 10.0% used modern processing, and 26.7% used both manual and modern processing. This means that the majority of oil palm processors in the study area used manual processing methods. This could be due to the high equipment production cost, low education attainment and insufficient capital for oil palm processing, which led to low income decreased the adoption of modern processing technology. Modern palm oil processing equipment should be provided to oil palm processors to reduce wastage and improve processing efficiency.

Table 3: Various Existing Methods Used for Oil Palm Processing

Methods utilized for oil palm processing.	Frequency	Percentage	Cumulative
Manual method	76	63.3	63.3

Modern method	12	10.0	73.3
Both Manual and Modern methods	32	26.7	100.0
Total	**120**	**100.0**	

Source: Field Survey Data, 2026

3.4 Distribution of Profitability of Oil Palm Processing in the Study Area

Table 1 revealed that labour cost (33.68%) constituted the largest part of the variable cost followed by transportation cost (16.53%). This implies that labour and transportation accounted for the largest percentage of variable Cost. Total Revenue was obtained from sales of palm oil, palm kernnels and its wastes. These results showed that palm oil processing and marketing is profitable despite production challenges encountered by the processors. The estimated costs and returns of oil palm processing on average in the study area. The fixed cost and variable cost estimated as ₦819,135 **and** ₦2,744,000 respectively. The variable cost took the higher percentage 77.01% while fixed cost was 22.99 % out of 100% of the total cost. Gross margin from processing on average was ₦5,459,883 and expenses structure ratio was 0.29. Tables 4, results also revealed the calculated total revenue, gross margin, profit of palm oil processing and return per capital invested as ₦8,203,883, ₦5,459,883, ₦4,640,748 and 1.30 respectively. Other financial measures included profitability ratio (PI), internal rate of return on variable cost and operating ratio with 0.57, 269.12% and 0.44 respectively. Benefit cost ratio is 2.30, meaning that on every one (₦) naira invested on palm oil processing by the palm oil processors realized 30k as profit. Since it exceeded 1 this indicated that the enterprise is profitable with high returns. These measures of performance indicated that oil palm processing business in the study area is viable and profitable.

Table 4: Profitability of Palm Oil Processing in the Study Area

Variables	**Production Cost**	**% of TC**
Revenue (₦)		
(i) Revenue from palm oil sold	5,322,057.70	
(ii) Revenue from palm kernels	2,525,819.80	

sold		
(iii) Revenue from waste	356,005.50	
Total Revenue (TR)	**8,203,883**	
Variable Cost (VC)		
Labour Cost	1,200,000	33.68
Transportation Cost	589,000	16.53
Rent	190,000	5.34
Fuel/ Fire wood (₦)	100,000	2.81
Threshing	195,000	5.48
Cost of loading /Off loading	300,000	8.41
Water	20,000	0.56
Market/LG revenue	150,000	4.20
Total Variable Cost ₦	**2,744,000**	**77.01**
Fixed Costs (FC) (₦)		
Depreciation		
Interest on Loan	45,875	1.29
Shop rent	67.880	1.91
Delivery Van	280,000	7.86
Threshing equipment	150,000	4.20
Extraction equipment	170,000	4.77
Shop rent	27,620	0.78
Market stall charges (₦)	77,760	2.18
Total Fixed Cost (₦)	**819,135**	**22.99**
Total Cost	**3,563,135**	**100**

Profit = (NR-TC of oil palm)	**4,640,748**
Return per Capital Invested (RPCI)	**1.30**
Profitability ratio % (PI)	**0.57**
Internal rate of return on variable cost (IRR on VC)	**269.12%**
Operating ratio (PR)	**0.44**
Gross Margin (GM)	**5,459,883**
Benefit cost ratio (BCR)	**2.3**
Expenses structure ratio (ESR)	**0.29**

Source: *Field Survey, 2026*

CONCLUSION AND RECOMENDATIONS

The results showed that majority (74.5%) of the oil palm cooperators were married, with an average age of 36 years. Findings further showed that 87.5% of participants reported had enough experience on oil palm processing. Majority 83.3% of the respondents had joined cooperatives between 5 and 20 years or more. Majority of the respondents make use of their personal savings (41.7%), personal savings was the most source of finance used by the cooperators. The majority (63.3%) of the respondents engaged in manual processing. The study concludes that cooperative participation plays a vital role in improving the profitability of palm oil processing enterprises in the study area. The findings indicated that the oil palm processing is a viable, economical and profitable business through access to credit, improved technologies, training, market information, and collective bargaining, cooperative societies enhance productivity and income among processors. However, the effectiveness of cooperatives depends on proper management, active member participation, and institutional support. Strengthening cooperative societies can therefore contribute greatly to rural development, poverty reduction, and increased profitability in the palm oil processing sector. This study therefore recommended that, Government should provide financial support to cooperatives through soft loans and grants to improve palm oil processing activities. Palm oil women processors should actively participate in cooperative activities such as meetings, savings programs, and training sessions to maximize benefits. Cooperative societies should improve transparency and accountability to encourage trust and active membership

participation. Modern palm oil processing equipment should be provided to cooperatives to reduce wastage and improve processing efficiency.

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