ECONOMIC ANALYSIS OF PALM FRUIT PROCESSING IN OHAOZARA LOCAL GOVERNMENT AREA OF EBONYI STATE, NIGERIA.

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ABSTRACT:
The study investigated the Economic analysis of palm fruit processing in Ohaozara L.G.A of Ebonyi State; Data for the study were collected using structured questionnaire and interview schedule administered to the respondents.A multi-stage sampling technique was used to select one hundred and twenty (120) palm-fruit processors in the study area. Data collected were analyzed using descriptive and inferential statistics. Analysis of the socio-economic variables revealed that both men and women were involved in palm fruit processing, but with (58.3%) of the processors being female; while (41.7%) of them were male. It also showed that majority (89%) of the respondents were within the active reproductive age-brackets of 31-60 years, and also that (88.34%) of them were married, while (79%) of them had one form of formal education or the other. The Palm Fruit processors have household sizes between 4-16 members; but with a mean of 10 members. In addition, greater number (81%) of them had long years of experience in palm fruit processing for about 5-20 years; and it also showed that (51.7%) of the respondents used local varieties; while (60.8%) of them used traditional processing techniques. Palm fruit processing in the study area is economically viable, as the return per Naira invested was 4.38. The multiple regression analysis showed that the coefficients for processing experience, cost of labour and annual farm income had direct relationship with the output of palm oil; while the coefficients for processing technique, source of labour, cost of water and cost of firewood had inverse relationship with the output of palm oil.The major constraints identified include: technological change, inadequate infrastructural facilities, shortage and high cost of labour, poor access to improved seedlings, poor extension services, high cost of processing equipment, inadequate finance; among others. It is recommended that the government in power should come to the aid of these palm fruit processors in the area as a way of encouraging them to remain in the business and make a living.
KEYWORDS: *Economic analysis, Palm fruit processing, Ohaozara LGA, Ebonyi State, Nigeria.*

INTRODUCTION:

The Oil Palm (Elgesis guinensisJaq) is a perennial crop that originated from the tropical rain-forest of West Africa. It spread to South America in the 16th Century and to Asia in the 19th Century. Nigeria at Independence was an Agragrian country with agriculture engaging over 85% of its almost 60 million people and contributed 70% of the Nigeria's export earnings. The oil palm (Elaesis guinensis) was recognized as the most efficient of all the oil producing plants (Bassey, 2016); and whose major product is oil palm ;which invariably accounts for 63% of annual produce from vegetable oil exports in the world (Udoh and Essien, 2015).

Nigeria was reputed as the World's largest producer of Palm oil; accounting for about 43% of the global production (Ayodele and Eshalomi 2010). Nigeria today imports palm oil and other derivatives of oil palm, despite her global standing as a significant producer. This could have resulted from many economic reasons.

Ayodele and Eshalomi (2010) also reported that the advent of crude oil exploration to a greater extent distracted the attention of the government from palm oil production and processing which for a time in the history of Nigeria was a veritable economic resources and contributed to Nigeria's Gross Domestic Product (GDP). This led to a reasonable decline in the output of palm oil and its derivatives. The economy of individuals in these areas whose livelihood depends on it was also impacted. Inadequate factor pricing may have also been contributory factor and consequently, impacted on the profit and revenue prospects of the processing individuals.

Nigeria's Palm oil sector has since witnessed a downward trend with contribution to global market share reducing to 1.4% as at 2018. This trend could be attributed to the fact that palm oil production methods mostly characterized by small holdings, low productivity, low resource base resulting to low yield per hectare and low income, as well as the country's focus on crude oil exploration and export. This culminated into the country's becoming a net importer of the commodity in the 1980's as rising domestic demand exceeds supply with average deficit of 393,000 million tonnes in the last ten years (USDA, 2018).

At present, palm oil consumption in Nigeria is increasing at an average annual rate of 11% with 3% of

the increase attributable to population growth (Akpokodje et al, 2001). However, efforts to increase palm oil production have not yielded the desired results as the percentage supply is far below the rising annual demand; hence a market shortage has persisted. To bridge this gap between domestic demand and supply; palm oil has to be imported. It is to be noted that palm oil importation has been on the increase; thus increasing from 110,700 metric tonnes in the year 2000 to 160,000 metric tonnes in the year 2003 (FAO, 2003). Presently, Nigeria produces 1.3 million metric tonnes of vegetable oil as against the national demand of 1.6 million metric tonnes. The deficit of 0.3 million metric tonnes is met through import where the nation annually expands an average of $500 million.

The rise in the importation of the product (mostly from Asian countries where the unit cost of production is lower) has on the other hand, forced down local price of palm oil; thus making it less profitable for the local farmers to continue production. For the local oil markets, the importation impose even more serious consequences as the product is not often immediately disposed off after purchase due to the lag in effective demand.

Importance Of Oil Palm In Nigerian Economy

Palm oil is a vegetable oil derived from the fruit of the palm tree and it is used for both as food and non-food consumption. The total global production of palm oil is estimated at over 45 million metric tonnes, with Indonesia and Malaysia being the major world producers and exporters. The palm oil industry has experienced rapid growth in recent times, and has become a significant contributor to the world market for vegetable oils (World Growth, 2011). Nevertheless, the importance of oil palm to the National economy cannot be over-emphasized, and it ranges from food production for human consumption, provision of employment to the farmers and the citizens and to the provision of raw materials for industries.

Palm oil has been a major source of foreign exchange earner to Nigeria, as well as a source of revenue to the rural populace of the south-east, Nigeria (Onoh, 2012). It also provides one of the leading vegetable oil produced globallyby accounting for a quarter of global consumption and approximately 60% of International trade in vegetable oil (World Bank 2010). Palm oil from the oil palm (Eleasis guinensis) has become the World's most important vegetable oil in recent years in terms of quality produced (Udo and Essien, 2015)

Palm oil is used in various products such as margarine, baked goods and sweets, detergents and cosmetics (UNESCO 2007).

In addition, an estimated 74% of global palm oil usage is for food products; while 24% is for industrial purposes (USDA, 2012). The oil palm is regarded as a stabilizing crop to global food security; especially in developing countries and has become an increasing important driver of economic growth and poverty reduction in the major producing countries. This is due mainly to the fact that oil palm is by far the most productive of all the vegetable oil crops; and yields more than any other oil seed crops; such as rape seed, sunflower, soybeans, peanut or cotton seed. (Chukwuma, 2010). Furthermore, Nigeria was the worlds largest producer of palm oil before the crude oil boom era, and now Malaysia has taken over the leading position (Onwubuya, 2012).

For decades now, oil palm cultivation has expanded world wide by around 43%, as a result of demand from India, China and the European Union (RSPO, 2011). Oil palm is among the most productive and profitable of all the tropical crops for bio-fuel production. The high-yielding oil palm varieties developed by breeding programmes can produce over 20 tonnes of fresh fruit bunches per hectare, per year under good managements; which is equivalent to 5 tonnes of oil per hectare, per year (excluding the Palm Kernel Oil FAO, 2010).

In Nigeria, the oil palm tree is useful crop that is relevant in all aspects of live with socio-economic and socio-cultural values. Ibitoye et al, (2011) reported that oil palm is a versatile crop with almost all parts having economic values and useful for everyday livelihood. The different parts of oil palm include: the fronds, leaves, trunk and the roots. These parts give a wide range of products which are of benefit to mankind. The most important product of oil palm is the palm fruit; which is processed to obtain three commercial products. These include palm oil, palm kernel oil and palm kernel cake.

The palm oil is rich in carotene and contains vitamin A. It is also used in the manufacture of soaps and other detergents (Agwu, 2006).

The palm kernel oil is used for the manufacture of margarine, cooking fats, lubricants, pomade and also a source of glycerin (Ajieh, 2013). The residues obtained after the extraction of oil is called Palm kernel cake; which is used in livestock feed production (Soyebo et al 2005). The sludge from palm oil processing is used for making traditional soap and fertilizer. The empty bunch, fibre and shell that remain after oil extraction can be used for mulching, manure and source of fuel. The leaves of oil palm can be used for making brooms and roofing materials. The thicker leaf stalks are used for walls of village huts. The bark of the palm frond is peeled and woven into baskets; while the trunk can be splitted and used as supporting frames in buildings. The popular palm wine has socio-economic importance is obtained from the male inflorescence and is a rich source of yeast. The palm wine can be allowed to ferment and then distilled into a local gin (NIFOR, 2009). The leaflet of the oil palm are used for making thatch for roofing

houses, while the rachises are used for fencing, reinforcing buildings and basket making. The mid-ribs of the leaflet are used in making brooms; while the cabbage soft tissue around the apical buds, serves as delicacy for eating. The fibre residue left after the oil had been extracted from the fruit provides fuel; while the shell from the cracked palm nuts provides not only fuel; but also serve as an aggregate for flooring houses (NIFOR, 2009).

Furthermore, since independence in 1960, Nigeria's agricultural sector has experienced slow output growth that has not kept pace with population increases. This has resulted in declining agricultural exports and domestic food supplies and continous reliance on imported food. Nigeria has been particularly fortunate in having vast oil palm reserves, but it has been plagued by economic chaos and political instability over the past four decades, while the decline in the agricultural sector can be partly explained by drought and serious pests and diseases infestation (Udoh and Essien 2015). This is added to the rapid devaluation of the Naira, combined with high transportation costs. Thus, Nigeria's first goal is to meet the domestic demand and then if possible, back to become competitive in export markets (Nnabuife, 2013).

Technically, palm oil processing in Ohaozara LGA is largely a rural base enterprise and it is expected that the quantity of palm oil produced will depend on the species of oil palm, efficiency of labour and the technological model.

Conventionally, the response of palm oil to the input of labour and capital investment has not been adequately presented in the contemporary literature in Ebonyi State and Ohaozara LGA in particular. In addition, the prospects of palm oit processing enterprise getting the most they can from the use of scarce resources has not yet been significantly articulated in the State. In the same vein, the efficient scale of output that will minimize average cost of input is yet to be adequately factored in government policies. Therefore, in any production activity, the most fundamental aspect is to examine the various inputs required and the relationship of different levels of each inputs with the output, without such information, the business plan or the enterprenuer would not be able to rationally allocate resources for production. Hence, this study fills the gap. The broad objective of the study was to examine the economic analysis of palm fruit processing in Ohaozara Local Government Area of Ebonyi State. The specific objectives were to:

- describe the socio-economic characteristics of palm oil processors.
- identify palm fruit processing methods employed by the processors;
- estimate the costs and returns of palm fruit processing
- determine the factors affecting palm fruit processing; and
- identify the constraints to palm fruit processing in the area.

METHODOLOGY:

Ohaozara Local Government Area lies between latitudes $5^{o}40^{/}$ and $6^{o}45^{/}$ North of the equator and longitudes $7^{o}30^{/}$and $8^{o}30^{/}$ East of the Greenwich Meridian. It has its quarters in Obiaozara-Uburu and a population of 148,826 (NPC, 2006). The annual rainfall ranges between 1500-2,000mm and with a temperature range of $21^{o}C$ – $29^{o}C$. The local government area also witnesses two distinct seasons; which are the dry and the rainy seasons. The dry season lasts from November to March; while the rainy season lasts from April to October; however with a short dry spell at August; otherwise known as August break. The average wind speed in the area is at an estimated 9km per hour.

The occupation of the people is mainly farming; which is also a critical economic engagement of the dwellers. The main crops grown in the area include; yam, cassava, rice, maize, groundnut, banana, plantain and oil palm; all on a small scale basis. Among the animals reared include goats, sheep, poultry, pigs etc. They also engage in other economic activities such as petty trading, civil service jobs, tailoring hair dressing and hunting.

Sampling Procedure:

Multi-stage sampling technique was used in the collection of data using structural questionnaire. Firstly, four (4) communities were randomly selected outof the five (5) communities that make up the local government area. These communities include; Uburu, Onicha, Ugwulangwu and Okposi. Secondly, five (5) villages were also randomly chosen from each of the four (4) communities already selected in stage I; thereby bringing the number to twenty (20) villages. Thirdly, six (6) palm fruit processors were randomly selected from each of the 20 villages already selected in Stage II. This gave the total sample size of one hundred and twenty (120) processors that were used for the study.

Analytical Techniques:

Data collected were analyzed using descriptive statistics and relevant inferential statistics in order to achieve the desired objectives.

Model Specification:

Descriptive Statistics:

These were used to analyze the socio-economic data using frequency distribution tables, means and percentages. They were used to describe the socio-economic variables of the respondents, identified palm fruit processing methods and also identified the problems associated with palm fruit processing in the study area.

Budgetary Technique Using Gross Margin Analysis:

This was employed to estimate the profitability of palm fruit processing. Gross margin is the difference between gross farm income (GFI) and the total variable costs (TVC). It is a useful planning tool in situations where fixed capital is negligible of farming enterprises; and especially in the case of small scale subsistence farming (Olukosi and Erhabor, 2005). The model is expressed as thus:

$\pi = TVP - TVC = TFC$.....equation (1)

$\pi = €P_1Q_1 - €P_1X_1 =$

$€PKCK$.....equation (2)

where:

π – Net Farm Profit
TVP – Total Value of Production
TVC – Total Variable Cost
TFC – Total Fixed Cost
Q_j– Quantity of J^{th} output
P_j – Unit price of j^{th} output
P_i – Unit price of i^{th}variable input
X_i – Quantity of i^{th} variable input
n – number of inputs used in production
m – number of enterprises
CK – quantity of k^{th} fixed input
PK – unit price of k^{th} fixed input
r – number of fixed inputs
€ - summation

Multiple Regression Model:

This was used to express the technical relationship between inputs and outputs of the processing cycle. Linear, semi-log, doubl-log and exponential functional forms were employed, fitted and tried; and on the basis of economic theory, statistical and econometric criteria; linear functional form was chosen as the lead equation. The explicit form of the model is presented below.

Where:

Y – output of palm oil (litres/ha)
X_1 – age of the processors (years)
X_2 – gender (dummy: male =1; female = 0)
X_3- marital status (married = 1; otherwise = 0)
X_4 – quantity of fresh fruit bunches (kg)
X_5 – variety of palm fruits
X_6 – level of education
X_7 – household size (number)
X_8 – cost of fresh fruit bunches (₦)
X_9 – cost of firewood (₦)
X_{10} – Cost of Labour (₦)
$X_{1!}$ – cost of water (₦)
X_{12} – processing technique
X_{13} – palm fruit processing experience (years)
X_{14} – cooperative membership (member – 1; non-member – 0)
X_{15}- annual farm income
b_o– constant term
b_1 - b_{15} – coefficients to be estimated
e_i – error term

Processing of Palm Fruits:

Ugwumba (2013) opined that there are two broad methods of palm fruit processing. These include the traditional or manual method; commonly referred to as "low technology" and the mechanized or modern method of processing; which is basically the same in principles as the present industrial method. However, the difference is the equipment and technology being employed; in addition to the quality of each method. It is a well known fact that the use of machine enhances high productivity.

Adah and Obinne (2015) stated that palm fruit can be processed by using the traditional method or more sophisticated method. After harvesting, the fruits in groves or plantation (i.e. the fruit bunches) are moved to the mill. Here, the fresh fruit bunches are weighed and then quartered before they are transferred to the sterilization until where they are cooked. After sterilization, the next step is stripping and threshing to separate the fruit from the husks. The husks are then discarded and later used as fuel firing furnaces that power the sterilizer. The separated fruits are then transferred to the digester where the cooked fruits are mashed into a pulp. The mash is then transferred to the presser, from where the palm oil will be squeezed out and transferred into a clarifier for sedimentation. The traditional methods are usually employed by peasant women and small processors using mortars. Palm fruit has always been processed by traditional, primitive-rural techniques of cooking the palm fruits in a wooden mortar. The mash is then squeezed either by hand or any other method which will squeeze the palm oil out of the mash. Oke (2002) reiterated that majority of palm fruit processors adopt traditional technique of processing.

RESULTS AND DISCUSSION

Analysis of the socio-economic variables of the residents (Table 1) revealed that both men and women were involved in palm fruit processing but with (58.3%) of the processors being females while (41.7%) of then where male. This implies that most of the palm fruit processors in the area are females. This therefore agrees with the findings of Owutuamor et al, (2009) who opined that female play an active role in palm fruit processing. They also posited that females have requisite skills; especially where it comes to traditional palm fruit processing.

The same table discloses that majority (89%) of the processors were within the productive age-bracket of 31-60 years. This means that most of them are still in their active productive years, which could portend increase in productivity for the processors. It is however, not in tandem with the findings of FAO (2012) which

reported that agricultural age in Africa is between the ages of 31-40 yrs, which was seen as the period processors are still strong enough to carry out their farming activities. Nevertheless, Nwaru (2007) reported that young farmers are more likely to take risks by adopting better agricultural practices than the older farmers who are more conservative to modern agricultural practice.

The table equally shows that (88.34%) of those who engaged in palm fruit processing in the area were married. This implies that the greater population of the respondents in the study area were married. This agrees with the study of Garei et al (2008) who posited that married processors tend to be more dedicated; thereby having positive impetus for higher productivity so as to meet the family needs for food, income; among others.

The table also revealed that most (79%) of them had one form of formal education or the other. Amaechina and Eboh (2017) reported on the ease with which educated farmers do have access to information, which could assist in enhancing their innovativeness and good use of the improved technological package.

In the same vein, palm fruit processors have household sizes of between 4-16 members, but with a mean of 10 members. However, under the peasant agriculture, much reliance is often placed on the strength of the household to supply the much needed farm labour in the absence of mechanized equipment. Thus, the larger the household size, the greater the supply of family labour. This is in agreement with the findings of Ezeh and Nwachukwu (2010), who reported that family size has major implications on the provisions of labour for farm work. Similarly, Ozor and Cynthia (2010) opined that a fairly large family size implies more labour available for the household farm activities which will increase output.

The table equally showed that greater number (81%) of the respondents in the area had long years of experience in palm fruit processing for about 5-20 years. This implies that most of the palm fruit processors in the area are well experienced in palm fruit processing.

The same table also revealed that (60.8%) of the respondents used traditional processing techniques; while only (39.2%) used modern method. This implies that majority of the respondents in the area use traditional method. FAO (2012) had reported that palm fruit processing using traditional method is inefficient; as a lot of oil is trapped in the mixture as an emulsion.

The results further showed that majority (51.7%) of the palm fruit processors used local varieties, while (48.3%) used improve varieties. This implies that the respondents in the study area prefer local varieties because they are more common which also result to the reduction in oil production. This is in agreement with the findings of Ekong (2003) who also had the same view.

Labour is very critical in all agricultural activities; especially among the peasant farmers in developing countries. Nwaru (2006) postulated that married couples who have children in the homes, invariably use them as a source of family labour in the farm operations; thereby reducing the cost of production to the bearest minimum. Hence, the use of family labour is a sort of cash saving device which would add to both the output and profitability of palm fruit processing.

Cooperative membership lends credence to the a priori expectations because membership of farmer groups has many advantages in terms of reduction of risks and uncertainties, and to have cheaper source of credit and other important inputs needed in the production process as recorded by Babatunde et al, (2008). Hence, cooperative membership creates access to networks and opportunities to diversify income through boosting of output which will eventually lead to the profitability of the farm business enterprise. This was also corroborated by Ekong (2003) who observed that membership of cooperative society gives higher advantage of accessibility to micro-credit inputs and also creates avenue in cross breeding of ideal information.

Table I. also depicts that the respondents have different sums of money accrued to them from palm fruit processing. However, FAO(2018) reported that credit ;helps farmers in payment of labour, and procurement of farm inputs in order to boost their productivity. Nevertheless, it could be deduced from the result that the processors did not earn enough money, possibly for the fact that they were engaged in small scale palm fruit processing.

The result on Table 2 showed that majority (58.33%) of the respondents used traditional method; while (25%) used modern method and (16.67%) used a combination of the two above. This implies that majority of the palm fruit processors used traditional method in preference to the other two. This is because of the easiness and familiarities of it, which made palm fruit processors chose that very method in the study area.

Table 3 illustrates the costs and returns analysis of palm fruit processing in the study area. However, a closer look at the table revealed that the total revenue (TR) was ₦1,105,000.00; while the total cost was ₦205,500.00. The net farm income (NFI) was ₦899,500.00; with the benefit cost ratio (BCR) of 5.38. The return per naira invested was 4.38; which shows that for every naira invested in palm fruit processing in the study area; a profit of ₦4.38; is made . Thus , it could be concluded that palm fruit processing in the study area though on a small scale is economically viable.

The multiple regressing analysis results are presented in Table 4; and it shows that the linear

functional form emerged as the lead equation based on the economic, statistical and econometric criteria. The coefficients for processing experience, cost of labourand the annual farm income had direct relationship with the output of palm oil. While the coefficients for processing technique, source of labour, cost of labour, cost of firewood and cost of water had inverse relationship with the output of palm oil.

The coefficient of processing experience was positive and statistically significant at 5% level of probability. This implies that as the number of years of experience a processor has increases the quantity of palm oil produced also increased.

Cost of labour has positive coefficient and statistically significantly at 1% level of probability. This implies that as the cost of labour for processing increases, the quantity of palm fruit also increased.

The coefficient of annual farm income was positive and statistically significant at 1% level of probability. This implies that as the cost of labour for processing increases, the quantity of palm fruit processed also increased.

This is in line with the report of Soyebo et al (2005) who posited that processors with higher income produce larger quantity of palm oil than those with lower income.

The coefficient of processing techniques were negative and statistically significant at 5% level of probability. This implies that as the processors continued with the crude method of processing, the quantity of palm oil produced decreases. This is in line with the findings of Olajide et al, (2020) who reported that the use of crude/traditional method led to decrease in the quantity of palm oil produced.

Sources of labour has negative coefficient, but was statistically significant at 1% level of probability. This implies that as the processors continued with the use of family labour, the quantity of palm oil produced will decrease to certain degree.

The coefficient for cost of firewood and cost of water were both negative, but were statistically significant at 1% and 5% level of probability respectively. This implies that the increase in cost of firewood and cost of water do not increase the quantity of palm oil produced. This is in agreement with the findings of Ekine and Onu (2008) who reported that the cost of inputs used resulted to decrease in the quantity of palm oil produced.

Table 5 depicts the mean score analysis of the constraints faced by the palm fruit processors in the study area. The result showed that the most predominant constraints to palm fruit processing in the area include; technological change (4-63), inadequate infrastructural facilities (4-48), inadequate storage facilities (4-45), shortage and high cost of labour (4-40), poor access to improved seedlings (4-39), inadequate use of modern inputs (4-30), poor extension services (4-20), high cost of processing equipment (4-13), inadequate finance (4.04), scarcity of water (3.81), shortage of firewood (3.68), unavailability of land (3.61); among others. However, a close look at the table above, one observes that technological change is one of the most debilitating constraints faced by palm fruit processors in the area, which equally cuts across all facets of agricultural processing.

Nevertheless, if the required machinery for processing can be procured for them by the government; it will go a long way in helping the processors to produce large quantity and high quality palm oil in a year. This will not only increase their turnover; but will equally encourage and motivate young people to venture into palm fruit processing in the study area. This agrees with the findings of Nwandu et al (2021) who posited that technological change, infrastructural facilities, inadequate storage facilities; are among the factors influencing palm fruit processing. Inadequate finance is not left here. On this, Mgbenka and Mbah (2015) affirmed that finance is one of the major tools in agricultural production and its insufficiency results to poor output. It is to be noted that financial resource is one of the major tools in agricultural production and it's insufficiency results to poor output. Hence, as farmers are poor, they suffer from limited access to credit facilities; thereby hindering higher productivity and output (Izekor and Olumese, 2010).

On shortage and high cost of labour, Okoye et al 2010; FAO 2014; Kadiriet al, 2015 and Ume et al, 2018 reported that it is common in most countries in sub-saharan Africa. However, Nigerian situation could be linked to among other things, economic recession as labourers charge exorbitantly to survive and as well as rural-urban migration of able-bodied youths in search of greener pastures; thereby leaving farming to the feeble aged parents and their little children.

CONCLUSION:

Oil palm which is commonly called Elaesis guinensis is the principal source of palm oil over the world. It originated from west Africa and was taken to Malaysia from Eastern Nigeria in 1961. Nigeria was the major producer of palm oil in the world, but has since relinquished its number one position to Indonesia and Malaysia due to Petroleum boom. However, analysis of the socio-economic variable revealed that majority (89%) of the respondents are still in their active productive years (31-60). The table also revealed that both men and women were involved in palm fruit processing; but with 58.3% of the processors being female; while (41.7%) of them were male. In addition, 88.34% of those engaged in palm fruit processing were married. The table also showed that most (79%) of

them has one form of formal education or the other. The same Table 1 depicts that greater number (81%) of them had long years of experience in palm fruit processing. The table also revealed that (60.8%) of them used traditional processing techniques; while only (39.2%) used modern technique. In the same vein, (51.7%) of the respondents used local varieties of oil palm; while (48.3%) used improved varieties.

Table 2**:** showed that majority (58.33%) of the respondents used traditional method; while (41.67%) chose other methods. Table 3**:** illustrates costs and returns analysis of palm fruit processing where it was found that for every naira invested in palm fruit processing in the study area brings a profit of N4.38. This implies that palm fruit processing is a very rewarding and profitable venture in the study area.

Coefficients for processing experience, cost of labour and annual farm income have direct relationship with the output of palm oil; while processing techniques, source of labour, cost of firewood and cost of water have inverse relationship with the output of palm oil.

All of them were however, significant at varied probability levels.

The major constraints encountered by these palm fruits producers in the study area include: technological change, inadequate infrastructural facilities, poor extension services, inadequate use of modern inputs, poor access to improved seedlings, high cost of processing equipment ,inadequate finance, scarcity of water, shortage of firewood, unavailability of land, among others. It is recommended that these major constraints limiting the respondents from attaining their goals in palm fruit processing be addressed by the Government in power as a means of encouraging them to increase palm oil production in the study area.

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Table 5: Constraints Faced By The Palm Fruit Processors.

Constraints	Mean scores (x)	Decision point
Inadequate use of modern inputs	4.30	Accepted
Poor extension services	4.20	Accepted
Inadequate provision of market information	1.90	Rejected
Poor quality control measures	1.60	Rejected
Poor quality palm oil	1.70	Rejected
Shortage and high cost of labour	4.40	Accepted
Bad road network	1.52	Rejected
Poor access to credit	3.39	Accepted
Inadequate infrastructural facilities	4.48	Accepted
High cost of transportation	1.60	Rejected
Inadequate storage facilities	4.45	Accepted
Inadequate finance	4.05	Accepted
Unavailability of land	3.61	Accepted
High maintenance cost	1.79	Rejected
High cost of processing equipment	4.13	Accepted
Scarcity of water	3.81	Accepted
Low product price	2.09	Rejected
Shortage of firewood	3.68	Accepted
Poor market infrastructure	1.69	Rejected
Poor access to improved seedlings	4.39	Accepted
Technological changes	4.63	Accepted

Source: Field survey data, 2021

Table I: Socio-economic characteristics of the respondents:

Gender	Frequency	Percentage (%)
Male	50	41.70
Female	70	58.30
Total	**120**	**100.00**
Age(Years):		
1 – 30	13	10.84
31 – 40	43	35.83
41 – 50	36	30.00
51 – 60	28	23.33
Total	**120**	**100.00**
Marital Status:		
Single	14	11.66
Married	59	49.17
Widow (er)	26	21.67
Divorced (separated)	21	17.50
Total	**120**	**100.00**
Educational level (years):		
No formal education	21	17.50
Primary Education	42	35.00
Secondary education	33	27.50
Tertiary Education	24	20.00
Total	**120**	**100.00**
Household Size (NO)		
1 – 4 Persons	34	28.33
5 – 8 persons	56	46.67
9-12 persons	18	15.00
13 – 16 persons	12	10.00
Total	**120**	**100.00**
Processing Experience (Years):		
1 – 5	36	30.00

6 – 10	38	31.67
11 – 15	24	20.00
16 – 20	22	18.33
Total	**120**	**100.00**
Varieties of oil palm:		
Local Varieties	62	51.70
Improved varieties	58	48.30
Total	**120**	**100.00**
Sources of Labour:		
Family labour	40	33.33
Hired labour	60	50.00
Communal labour	20	16.67
Total	**120**	**100.00**
Processing Techniques:		
Traditional method	73	60.80
Modern method	47	39.20
Total	**120**	**100.00**
Membership of Co-operatives:		
Member	59	49.17
Non-member	61	50.83
Total	**120**	**100.00**
Annual Farm Income (N)		
210,000 – 300,000	48	40.00
310,000 – 400,000	40	33.33
410,000 – 500,000	20	16.67
510,000 – 600,000	12	10.00
Total	**120**	**100.00**

Source: Computed From The Field Survey Data, 2021

Table 2: Palm Fruit Processing Methods Employed By The Processors.

Methods used	**Frequency**	**Percentage (%)**
Traditional method (a)	70	58.33
Modern method (b)	30	25.00
Combination of (a) and (b)	20	16.67
Total	**120**	**100.00**

Source; Computed From The Field Survey Data, 2021

Table 3: Costs And Returns Of Palm Fruit Processing In The Study Area.

Budget items	Unit	Quantity	Unit cost (₦)	Total amount (₦)
Revenue:				
Fresh palm oil	Litres	1000	1,070.00	1,070,000.00
Palm kernel cake	Kg	70	500.00	35,000.00
Total				**1,105,000.00**
Variable Cost:				
Fresh fruit	Kg	1.5	30,000	45,000.00
Water	Litres	-	4,000	4,000.00
Labour	Man/days	10	3,500	35,000.00
Transportation	-	-	8,000	8,000.00
Total				**92,000.00**
Fixed Cost:				
Land				
Drums used	No	5	10,000	50,000.00
Basins used	No	5	5,000	25,000.00
Jerry can used	Litres	15	1,500	22,500
Baskets	No	20	800	16,000.00
Depreciation (using straight line method)				11,350.00
Total				**124,850.00**

Total Cost: (TVC + TFC)

92,000 + 124,850 - *216.850.00*

Gross Margin: (TR – TVC)

1,105,000 – 92,000 - *1,013,000.00*

Net Farm Income: (GM – TFC)

1,013,000 – 124,850.00 - *888,150.00*

Benefit – Cost – Ratio: (TR/TC)

1,105,000 / 216,850.00 - *5.096*

Therefore, Return on Naira invested = (NFI/TC)

888,150 / 216,850 - *4,096*

Source: Computed From The Field Survey Data, 2021

Table 4: Result Of Multiple Regression Analysis Of The Effects Of The Socio-Economic Characteristics On The Ouput Of Palm Oil.

Variables	+Linear	Semi-Log	Double-log	Exponential
Constants	13.56366	3.575079	2.824478	4.86e + 33
	(0.20)	(4.31)***	(3.00)***	(1.23)
Gender	4.02345	0.0308383	-0.0799305	-1.61e + 33
	(0.39)	(0.24)	-(0.55)	-(1.40)
Age	2.421001	0.0301599	0.0651557	4.87e + 30
	(0.45)	(0.46)	(0.42)	(0.09)
Marital status	8.010686	0.0816457	0.2832325	1.21e + 32
	(1.27)	(1.06)	(1.54)	(1.97)*
Educational level	3.319632	-0.0018808	0.0180763	-4.69e + 31
	(0.63)	-(0.03)	(0.12)	-(0.85)
Household size	1.326329	0.0410693	0.0135799	3.79e + 31
	(0.20)	(0.50)	(0.08)	-(0.51)
Palm fruit	4.759065	0.0177004	-0.1929598	-2.16e + 31
varieties	(0.91)	(0.28)	-(1.15)	-(0.89)
Sources of labour	-10.21572	-0.1013633	-0.3152007	-2.20e + 29
	-(3.11)***	-(2.52)**	-(1.51)	-(0.50)
Processing	14.49846	0.1262685	0.3851096	-1.58e + 31
experience	(2.42)**	(1.72)*	(1.60)	
Membership of	-6.846584	-0.0472207	-0.1046647	-6.71e + 30
Co-operatives	-(1.52)	-(0.86)	(0.67)	-(0.65)
Cost of labour	34.96204	0.3772457	1.351466	-6.62e + 31
	(4.87)***	(4.28)***	(5.28)***	-(0.35)
Methods used	-4.885943	-0.0815347	-0.2819789	-3.55e + 29
	-(1.25)	-(1.71)*	(1.34)	-(0.35)
Cost of firewood	-15.50721	-0.1718599	-0.5072897	-8.65e + 30
	-(3.06)***	-(2.77)***	-(2.77)***	-(0.95)
Cost of water	-9.477629	-0.1020015	-0.2245828	3.04e + 30
	-(2.40)**	-(2.11)**	-(1.52)	(0.45)
Annual farm	10.87256	0.1923138	1.160132	3.88e + 29
income	(5.02)***	(3.96)***	(4.29)***	(0.39)
R -square	0.5930	0.5273	0.5318	0.1582
F –ratio	10.10***	7.73***	7.78***	0.63

***, ** and * shows the significance of 1%, 5% and 10% levels respectively.
Figures in bracket represent the T-values.