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Profitability of Oil Palm Production and Processing in Edo State, Nigeria

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ABSTRACT

This work presents a comprehensive literature and studies conducted on the economic point of oil palm cultivation and processing and the factors that influences profitability of the sector as well as its contribution to the socioeconomic development of the farmers in Edo state. The study highlights the importance of oil palm production and processing in Edo, a major oil palm producing state in Nigeria. It looked at the economic indicators and the cost structure that are linked to oil palm production and processing. The study used primary data collected from oil palm farmers and processors using multistage sampling procedure. Questionnaire was distributed to 365 respondents and the questions tried to ascertain those that are farmers alone, farmers and processors and processors alone. Descriptive statistics was used to describe the socioeconomic characteristics of the respondents, while budgetary analysis was used to determine the profitability of the subsector. Findings showed that the mean age of the respondents was 52 years. Majority (53.9%) of the farmers, farmer/processors (61.8%) in Edo obtained seedlings from the Nigerian Institute for Oil Palm Research. Majority (71.8%) of the farmers, processors (89.5%) and farmers/processors (97.6%) had no access to extension services. Majority (100.0%) of the farmers, processors (92.1%), farmers/processors (97.6%) had no access to credit. Furthermore, majority of the farmers (51.3%) and farmers/processors (89.4%) had less than 1,500 palm trees. Gross profit margin ratio of the farmers, processors, farmers/processors were 0.37; 0.39; and 0.43 in respectively. This shows that oil palm production and processing is a profitable venture, however, it shows that those involved in both farming and processing made more profit than those involved in only one enterprise. The study recommended that there should be investment in oil palm production and processing due to its viability, the farmers and processors should be encouraged to join cooperatives to enable them have easy access to loans from financial institutions, there should be more access to extension services to ensure that the farmers are better informed about better and improved agricultural practices that will further increase their profits.

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Introduction

Oil palm production is a major agricultural sub sector in Nigeria having Edo state as one of the major producers of palm oil. Oil palm has been confirmed by various studies as a profitable venture, this is evidenced in its versatile use in the production of palm oil, vegetable oil, cosmetics, biofuels, bio-fertilizer amongst others, culminating into its great demand globally [1].

The profitability and the need to increase oil palm production and the demand for the product has led to the call for regional collaboration by the Edo state government to drive investment in sustainable oil palm production. Furthermore, to boost production in the oil palm industry in Edo State, the State government has allocated 57000 hectares of land to Oil palm investors and also initiated so many programs like Edo State Oil Palm Program (ESOPP) to promote oil palm production in the state [2].

The State is poised to fill in the demand supply gap in the country by at least 20%. Oil palm is a very profitable venture with the net profit estimated to be about N3 million per hectare (NIFOR).

Economically, the sector has created so many job opportunities and a source of income for both the farmers and the millers in the State. In addition, the federal government of Nigeria has set a target of 40 million metric tons of oil palm production by 2023, this move will further boost the profitability in the sector [1,2].

Considering the profitability of this sub sector in Edo state, there is need for more entrants/ investment in the sector, policies that will encourage more investment is paramount so as to meet both local and international demand and eventually enhance economic growth and development.

Overview of Oil Palm Production

Oil palm tree is the most productive crop in the world today with the fruit been used to produce crude palm oil for cooking and for industrial use, the nut can be converted to food, the cake into animal feeds and fertilizer and other areas as biofuels [3].

Palm oil production plays a very important role in the economy of Nigeria. In the 50's and 60's Nigeria was the largest producer of palm oil world - wide, commanding over 40% of the world palm oil industry and employing about 60%- 70% of the total work force. Presently, Nigeria is lagging behind as number five

(5) after countries like Malaysia and Indonesia who were once sent to Nigeria to learn the production method and also secure seedlings. According to in 1980-2015 Nigeria was recorded as the net importer of palm oil [3,4].

Palm oil is currently grown in 24 states of the federation with over 3 million hectares being cultivated. The capacity of palm oil producers has expanded beyond the traditional methods mainly due to research in inputs and growing more in the wild grooves and small holder plantations. Despite the increase in the number of states involved in palm oil production, with research in seed varieties and expanse of land being cultivated, Nigeria's share of the global palm oil market has reduced drastically from 40% to 2 % [3].

In the Nigerian palm oil industry, 80% of the plantations are owned by small holder farmers who are scattered over the 24 states with only 5% being owned by large estate holders. This is a far cry from what is obtainable in countries like Malaysia and Columbia where over 50% of their plantation are owned by large estate owners. With the recent development in the industry, the Central Bank of Nigeria (CBN) decided to take up the lead and thus included palm oil and palm kernel product and vegetable oil among the 41 enlisted products that are not qualified for foreign exchange.

The decision of the Central Bank of Nigeria to resuscitate the palm oil industry has to some extent increased the level of production. Figures quoted by the Central Bank of Nigeria shows that about 1.4MT constitute the local consumption while current production ranges from 800,000MT to 930,000MT, there is thus a demand supply gap of 400,000MT to 600,000MT. With demand surpassing supply, the gap is met by imports. This difference in the demand and supply can be attributed to increase in the raw material needs of the local industries, there is therefore a great need to increase production so as to bridge this gap. This can be achieved by conscious and committed establishment of more estates and also coming together of small holder farmers to form cooperatives. These cooperatives will give them better and easier way to secure credits which are available in the ACGCFS as well as the anchor borrower program [5].

Problem Statement

The palm oil sector in Edo state is faced with some challenges irrespective of its viability. One of the challenges is the fact that 80% of the participant in this industry are small scale producers. This is the bane of its low level of production. The average yield of oil palm in the state is below average. According to, the profitability of the oil palm sector depends on the yield per hectare and they found out that the average yield in Edo state was below the national average and this will inadvertently affect their profitability. These challenges need to be addressed in order to increase production that will culminate to bridge the demand supply gap and also increase revenue and profit [6].

Lack of access to credit is one major problem faced by the farmers in Edo. The lack of credit access from banks and other financial institutions has made most of the oil palm farmers to depend on local informal sources for loans that attracts high interest. This challenge inhibits the farmers ability to increase their farm land, purchase more inputs, this invariably will reduce their output and subsequently their profits [7].

Another challenge farmers in Edo state are faced with is the high cost of agricultural inputs like pesticides, herbicides, fertilizer.

Due to the cost of modern technology the farmers are limited to the use of local technology. This affects their productivity and their level of profit [8,9].

Furthermore, climate change which is a global problem also affects the profitability of the farmers. Other environmental issues like deforestation, land acidification can affect the sustainability of the sector. Also lack of access to extension workers in Edo state that are meant to educate, guide the small-scale farmers on the use of agricultural inputs can also affect their production efficiency and eventually their profit.

Addressing these various challenges farmers and processors in Edo state are faced with will be a major step in the right direction to help boost the sector, increase production, enhance food security, increase their profits and sustain the industry.

Objective of the Study

The main objective of this study is to assess the profitability of oil palm production and processing in south west Nigeria –Case study Edo state.

The primary objectives are

1. Describe the socioeconomic characteristics of oil palm farmers and processors in the study area
2. Investigate the profitability of oil palm production and processing in Edo state

The study is very relevant at this period when there is need for increased production of palm oil to meet the widening demand and supply gap. The study brought to limelight the profitability of the oil palm sub sector. This will further encourage more investment in the sector, more employment of youths in the sector will be achieved. The study made some recommendations that help to address the various challenges the farmers are facing and at the same improve on the factors that will help to increase their profit.

Method

Budgetary Analysis

This is an analysis of the profitability of an organization's output. It measures the amount of profit earned due to the efficiency of any operation in a business. Profitability analysis helps in analyzing available information to evaluate and improve the profits in an organization [10].

Profitability analysis measures cost and revenue of a firm which determines whether or not a firm is profiting. There are several ways of measuring how well a business is doing. These are profitability ratio, Return on Investment (ROI). Under profitability ratios we have gross profit margin ratio, net profit margin ratio and operating profit margin ratio. Each of this can be used to measure the profitability of a business. Gross margin ratio was used in this study.

Gross margin shows the profitability of a business. It is what is left after the cost of goods sold has been subtracted from net sales:

$$\text{Gross margin} = \text{TR} - \text{TVC} \dots\dots\dots 1$$

$$\begin{aligned} \text{Gross profit margin ratio} \\ = \frac{\text{TR} - \text{TVC}}{\text{TR}} \times 100 \dots\dots\dots 2 \end{aligned}$$

Return on investment (ROI) assesses an organization's efficiency in allocating capital under its control to profitable investment. It simply measures the return on owner's investment

Data Sources and Collection

Both primary and secondary data were used. The primary data was sourced using structured questionnaire from oil palm farmers and processors in Edo state. Secondary data was obtained from journals, research reports, internet, ministry of Agriculture and ADP in the state and NIFOR. In the sampling technique, multistage sampling technique was used to select the respondents. In the first stage, out of the 3 zones in the state, one zone (Edo south) was purposefully selected due to the predominance of oil palm farmers and processors in the zone. In the second stage, 7 local government areas were selected purposefully. In the third stage 5 villages was selected randomly from each of the selected L.G.A. Finally, 10 oil palm farmers were randomly selected from the five villages. A total of 350 Oil palm farmers made up the sample size.

Analytical Tools

The data for this study was analyzed using descriptive statistics and budgetary analysis.

To describe the socioeconomic characteristics of oil palm farmers and processors in Edo and Ondo states, descriptive statistics was used in two forms:

- i. Categorical variables were assessed using measures of relative distribution such as frequencies, proportion and percentage distributions
- ii. Quantitative variables were assessed using measures of central tendency and data dispersal.

The parameters that were used are, age, sex, marital status, religion, family size, educational level, production experience, tribe, source of sprouted seeds (NIFOR, ADP, Private), labour used, cooperative society, extension service, farmers group, farm size, fresh fruit bunch yield, palm oil price, price of inputs (Fertilizer, pesticides, diesel), quantity of inputs used (fertilizer, pesticides, diesel), labour cost, credit access, source of credit.

Investigate the Profitability of Oil Palm Production and Processing in Edo

The profitability of oil palm production was calculated using gross margin analysis. The formula for calculating the gross margin is:

$$GM = TR - TVC$$

$$P = GM - TFC$$

Where P = Net income

GM = Gross margin

TFC = Total fixed cost

TR = Total revenue

TVC = Total variable cost

The variables that make up the total variable cost are: Cost of fertilizer, Cost of pesticides, Labor cost, Land rent/lease, Transport cost

The variables that make up the total fixed cost are: (Hoes, Cutlass, Shovels) Depreciated values

Profitability of Palm Oil Mills

For the profitability of oil mills, cost of the palm fruits, cost of hiring/ purchase of equipment, transportation of the fresh fruit bunches (FFB), labor cost, price of palm oil are very important [10] The model specification is:

Gross margin = TR - TVC (total variable cost of processing palm oil)

$$\text{Profit} = GM - TFC$$

Total Revenue TR include:

Sales from palm oil, sales of cracked palm kernel, sales of cracked kernel shells.

Total Variable Cost (TVC) of processing palm oil includes:

Cost of fresh fruit bunch (FFB), cost of hiring or purchase of equipment, cost of transportation, labor cost, fuel (Firewood,

Kerosene), water, diesel to run the equipment

Fixed cost includes: Depreciation on equipment, depreciation on building.

Result and Discussion

The result of the socioeconomic characteristics of the oil palm farmers and processors is presented in Table 1 and 2 below: The majority (84.62%, 80.26% and 81.3%) of the oil palm farmers, processors and those engaged in farming and processing were males. The results implies that male dominated oil palm production and processing in the state, this may be because oil palm production and processing is like every other farming activity which is energy consuming and tedious, and male are able to provide the energy required.

The majority (87.18%, 94.08% and 95.93%) of the oil palm farmers, processors and those engaged in both farming and processing were married. The implication is that married individuals dominate oil palm production and processing in the state.

Most (42.31%) of the oil palm farmers in Edo state had household size of 4-6 persons while the majority (60.53% and 57.72%) of oil palm processors and those engaged in both farming and processing had household size of 4-6 persons respectively. This shows that the majority of the oil palm farmers in the state had a fairly large household size and their household members can assist them in oil palm farming and processing on their farms.

The majority (53.85%) of the oil palm farmers were within 51-60 years, most (38.82% and 32.52%) of the oil palm processors and those engaged in both farming and processing were within 41-50years and 51-60years respectively. This shows that the majority of the oil palm farmers and processors are middle aged and their productivity might have started declining and this may affect their profit level.

Most (47.43%) of the oil palm farmers had tertiary education, the majority (54.61% and 51.22%) of the oil palm processors and those engaged in both farming and processing had tertiary education. This implies that the majority of the oil palm farmers and processors are well educated and this may influence their level of productivity as well as their profit level. This is because education will expose the oil palm farmers and processors to innovation in oil palm production and processing.

The majority (71.79% and 57.24%) of oil palm farmers and processors had 11-20years experience in palm oil production and processing respectively while larger proportions (84.55%) of those engaged in both farming and processing had 1-10years experience. The result implies that the majority of the oil palm value chain actors are well-experienced and this may have a positive effect on their level of profitability and efficiency.

The Majority (53.85%) of oil palm farmers in the state got their oil palm seeds from NIFOR while larger percent (61.79%) of those engaged in both farming and processing got their oil palm seeds from the open market. The implication is that the majority of the farmers and processors got their oil palm seeds from credible sources, which implies that the oil palm seeds are more likely to be improved cultivars which will increase the efficiency and profitability level of the oil palm farmers and processors.

The majority (80.77% and 56.58%) of the oil palm farmers and processors used both hired and family labor on their farms and processing plants respectively, while more than half (51.22%)

of the those engaged in both farming and processing used only hired laborers. The implication of the result is that hired and family laborers were mostly used by the oil palm farmers and processors during farming and processing respectively.

The majority (71.79%, 89.47% and 97.56%) of the oil palm farmers, processors and those engaged in both farming and processing did not have access to extension services. The implication of the result is that their failure to extension service may have a negative effect on their efficiency as well as their level of productivity.

The majority of the oil palm farmers have less than 1,500 stands of tree, 26.92% have between 1500-7500 stands of trees, while the majority of the respondents practicing both farming and processing had less than 1,500 stands of palm tree. This implies that the oil palm farmers are mostly small-scale farmers.

All (100%) of the oil palm farmers, almost all (92.11% and 97.56%) of the oil palm processors and those engaged in both farming and processing had no access to credit facilities. The implication of the result is that larger chunk of the oil palm value chain actors did not use credit facilities and this may limit their scale of production and efficiency which will at the long run affect their profitability level.

The majority 53.85% of the oil palm farmers have less than 100 acres of land for oil palm production, 23.08% has between 100-500 acres of land, while the majority (85.37%) of those engaged in both farming and processing had less than 100 acres of farmland for oil palm production. The result shows that the majority of the oil palm value chain actors are small scale farmers.

Table 1: Socioeconomic Characteristics of Oil Palm Farmer and Processors in Edo State

Variables	Farmers		Processors		Farmers and processors	
	frequency	percentage	frequency	Percentage	Frequency	percentage
Sex						
Female	12	15.38	30	19.74	23	18.7
Male	66	84.62	122	80.26	100	81.3
Total	78	100	152	100	123	100
Marital status						
Single						
Married	68	87.18	3	1.97	3	2.46
Divorced	10	12.82	143	94.08	118	95.93
Widowed			6	3.95	1	1.62
Total	78	100	152	100	123	100
Household size (number of persons)						
1-3	1	1.28	19	12.5	13	10.57
4-6	33	42.31	92	60.53	71	57.72
7-9	39	50	37	24.34	33	26.83
10-12					6	4.88
>12	5	6.41	4	2.63		
Total	78	100	152	100	123	100
Age (years)						
≤30	3	3.85	2	1.32	2	1.63
31-40	11	14.1	24	15.79	34	27.64
41-50	22	28.21	59	38.82	32	26.02
51-60	42	53.85	38	25	40	32.52
>60			29	19.08	15	12.2
Total	78	100	152	100	123	100
Level of education						
Non-formal	6	7.69	14	9.21	11	8.94
Primary	16	20.51	25	16.45	23	18.7
Secondary	19	24.36	30	19.74	26	21.14
Tertiary	36	47.43	83	54.61	63	51.22
Adult education						
Total	78	100	152	100	123	100
Experience (years)						

1-10	17	21.79	54	35.53	104	84.55
11-20	56	71.79	87	57.24	15	12.2
21-30	5	6.41	11	7.24	4	3.25
Total	78	100	152	100	123	100
Source of seed						
NIFOR	42	53.85	92	60.52	37	30.08
Ministry of Agriculture	14	17.95	16	10.53	10	8.13
Open market	22	28.21	44	28.95	76	61.79
Total	78	100	152	100	123	100

Source: Field survey

Table 2: Socioeconomic Characteristics of Oil Palm Farmers and Processors in Edo State

Labour utilized						
Hired	12	15.38	64	42.1	63	51.22
Family	3	3.85	2	1.32	7	5.69
Both	63	80.77	86	56.58	53	43.09
Total	78	100	152	100	123	100
Extension contact						
No	56	71.79	136	89.47	120	97.56
Yes	22	28.21	16	10.53	3	2.44
Total	78	100	152	100	123	100
Number of oil palm/hectars (trees)						
<1500	40	51.28	-	-	110	89.43
1500-7500	21	26.92	-	-	7	5.69
>7500	17	21.79	-	-	6	4.88
Total	78	100	-	-	123	100
Credit access						
No	78	100	140	92.11	120	97.56
Yes			12	7.89	3	2.44
Total	78	100	152	100	123	100
farm size (acres)						
<100	42	53.85	-	-	105	85.37
100-500	18	23.08	-	-	8	6.5
>500	18	23.08			8	6.5
Total	78	100		-	123	100

Source: Field survey

Profitability of Oil Palm Farming and Processing in Edo State

The result of the profitability of oil palm farmers and processors is shown in Table 3. The table shows the cost and return structure of the oil palm farmers and processors. The result shows that the total revenue realized by oil palm farmers, processors and respondents engaging in oil palm farming and processing was ₦1,735,164.67, ₦1,474,678.50 and ₦1,410,041 respectively. The result shows that oil palm farmers realized the highest revenue. The total variable cost incurred by the oil palm farmers, processors, and respondents engaging in oil palm farming and processing were ₦1,038,408.85, ₦800,321.14 and ₦690,950.13. The result shows that farmers incurred the highest variable cost. The total fixed cost incurred by the oil palm farmers, processors, and respondents engaging in both oil palm farming and processing was ₦46,649.49, ₦105,730.20 and ₦110,014.74. The result shows that respondents engaged in both oil palm farming and processing incurred the highest fixed cost.

The total production cost incurred by the oil palm farmers, processors, and respondents engaged in both oil palm farming and processing was ₦1,085,058.34, ₦906,051.34 and ₦800,964.87 respectively. The result shows oil palm farmers incurred the highest production cost. The gross or raw profit obtained by the oil palm farmers, processors, and respondents engaging in oil palm farming and processing in Ondo state were ₦696,755.82, ₦674,357.36 and ₦719,090.87 was the gross or raw profit obtained by oil palm farmers, processors and individuals engaged in both production and processing respectively. The result shows that respondents engaged

in both oil palm farming and processing have the highest gross revenue. The positive gross margin shows that oil palm production and processing is a profitable and bankable enterprises.

The net profit obtained by the oil palm farmers, processors, and respondents engaging in both oil palm farming and processing were ₦650,106.33, ₦568,627.16 and ₦609,076.13 respectively. The result shows that respondents engaged in both oil palm farming and processing have the highest net profit. The positive net profit shows that oil palm production and processing is a profitable and bankable enterprises. The profitability index of 0.37, 0.39 and 0.43 was obtained by the oil palm farmers, processor and respondents engaged in both oil palm production and processing respectively. The profitability shows that 37%, 39% and 43% of the earned revenue from oil palm production, processing and for those engaged in both oil palm production and processing constituted the net revenue. The implication of the results is that oil palm value chain is a profitable and bankable enterprise in Edo state.

Table 3: Profitability of Oil Palm Production and Processing in Edo State

	Edo Farmers	Processors	Farmers & processors
Variable	Mean (₦)	Mean (₦)	Mean (₦)
Revenue			
FFB/oil	2,602,747.00	557,549.00	1,410,041.00
Kernel		28,419.92	
Shell		3,902.44	
Total revenue	1,735,164.67	1,474,678.50	1,410,041.00
Variable cost			
Fertilizer	91,460.26	0	8,201.43
Pesticide	74,773.08	0	
Herbicide	122,668.50	0	
Hired labour	199,447.40		
Family labour	326,025.60	0	
Manure	6,504.36		
Transportation	13,468.75	199.19	
Fresh fruit bunch	204,060.90	800,121.95	682,748.70
Total variable cost	1,038,408.85	800,321.14	690,950.13
Fixed cost			
Tractor		70,116.27	25,278.64
Cutlass	185.42		
Knapsack	394.44		
Truck	27,017.60		
Borehole	11,439.85		10,357.20
Generator	7,612.18		7,598.65
Farmhouse			56,535.00
Pumping machine		8,700.00	649.87
Motor			3,519.00
Selector		1,582.46	1,736.11
Pressing machine		8,549.25	
Fiber		461.81	
Boiler		1,462.35	1,944.44
Cracker		1,771.10	2,395.83
Digester		1,651.66	
Filter		698.19	
Milling machine		3,781.39	
Thresher		2,037.20	
Nut separator		1,307.42	
Sterilizer		3,611.11	
Total fixed cost	46,649.49	105,730.20	110,014.74
Total Cost	1,085,058.34	906,051.34	800,964.87

Gross Margin	696,755.82	674,357.36	719,090.87
Profit	650,106.33	568,627.16	609,076.13
Profitability index	0.37	0.39	0.43

Source: Field survey

Summary and Conclusion

Education plays an essential role in improving the production and processing of oil palm. It has been shown that a high level of education enhances a better understanding and eventual improvement of agricultural practices as regards to oil palm production, in addition to the use of modern technologies [11].

Male participation in the oil palm sector is one factor that influences oil palm production, their use of alternative strategies and their resilience and being able to adapt to changes in circumstances around them. The years of experience plays a vital role in improving the level of production. Highly experienced farmers tend to be more productive because of the experience gained over the years.

Source of seedlings is another factor that can influence production. Getting seedlings from credible source like Nigerian Institute for Oil Palm Research (NIFOR) which are likely to be improved cultivars that will eventually increase their level of efficiency and productivity. Availability of credit facility plays a major role in influencing production and processing of oil palm. It helps to enhance the scale of production and efficiency which will eventually culminate to increase in profitability of farmers and processors. The services of extension workers helps to improve productivity, considering the fact that the extension workers introduce to the farmers the latest agricultural practices that will boost their level of production.

The oil palm industry in Edo state is a male-dominated sector of which most are married with fairly large household sizes of between 4-6 and 7-9 persons. They are mostly middle aged with most of them having tertiary education. The sector is made up of mostly small-scale farmers and processors who mostly have no access to credit facilities and extension services, which invariably affects their level of production. Oil palm production and processing is a profitable venture as revealed in studies carried out by. This therefore, calls for more participation in this sector, more investment and more of government involvement in order to enhance production, and consequently bridge the demand and supply gap [10,12,13].

Based on the findings of this research the following recommendations are being preferred:

One major constraint the players in this industry face is lack of access to credit facilities. The farmers and millers should be encouraged by making credit facilities available to them. This will enhance their level of production by enabling them access better and improved technologies that will further improve their farm practices, increase production and profits.

To further increase the sectors profitability there should be favorable government policies and programs such as tax incentives, subsidies, and infrastructural development that will enhance the growth of the oil palm industry. There should also be an established partnership with governmental and non-governmental institutions and research institutes to enhance exchange and sharing of knowledge, technology and best agricultural practices in the sector. Stringent quality control measures should be put in place to ensure

that the palm oil and other products produced meet international standards, and thereby increasing the sectors competitiveness. Oil palm farmers should be encouraged to expand their production and processing operations to enable them take advantage of economies of scale, which will ultimately lower costs and increase profits [14-22].

In conclusion, Nigeria can still attain the level she was as a major palm oil producing nation of the world because the resources are available (both natural and human resources). What Nigeria needs is more investments in the sector, and deliberate encouragement of the youths to venture into the sector by way of incentives. More entrants into this sector will create more employment, increase production and eventually bridge the demand supply gap of the sector.

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