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Research Article

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ABSTRACT

Palm oil is a major food and non-food ingredient consumed by virtually everyone in Nigeria through the use of palm oil related products. This study investigates the feasibility of small-scale palm oil processing in Nigeria, using Elele, Rivers State as case study. Information was elicited through interviews and physical observations. Manual processing and screw hand press methods were adopted for palm oil extraction from fresh fruit bunch. Data were analyzed using descriptive statistics (mode, frequencies and corresponding percentages and gross margin model) and profitability techniques (i.e Gross ratio, Expense Structure Ratio, rate of return and Benefit-Cost Ratio). The findings show that the average cost of procuring equipment and its installations for a small-scale palm oil processing mill were estimated at ₦623,650.00. The gross margin return from this study was ₦44,000.00 while net return was ₦14,000.00. The gross ratio reveals that for every ₦1.00 return to the mill 68.00 kobo was spent on the production processes. The small-scale palm oil venture is dominated by elderly people from 50 years and above (30%). About 34% and 32% of the processors have WASC and Primary School Leaving Certificates respectively as the educational qualification. About 50% of the processors have 16-20 years experience in oil palm processing. The study concludes that small-scale oil palm processing is profitable and can also be a source of employment.

Keywords: feasibility, Nigeria, Palm oil, processing equipment, profitability, small scale palm oil processing.

1 INTRODUCTION

Palm oil has been an important ingredient in the diet of many Nigerians. Palm oil is the world's largest source of edible oil, accounting for 38.5 million tonnes or 25% of the global edible oil and fat production (MPOC, 2007). Palm oil is a product extracted from the fleshy mesocarp of the palm fruit (*Elaeis guineensis*). The global demand for palm oil is growing thus, the crop cultivation serves as a means of livelihood for many rural families, and indeed it is in the farming culture of millions of people in the country. Hence, oil palm is often referred to as a crop of multiple values, which underscores its economic importance (Akangbe *et al.*, 2011). The demand for domestic and industrial application of palm oil have continued to increase (Omereji, 2005). It is estimated that for every Nigerian household of five, about two liters of palm oil are consumed weekly for cooking (Ekine and Onu, 2008). However, palm oil is an essential multipurpose raw material for both food and non-food industries (Armstrong, 1998). Palm oil is used in the manufacturing of margarine, soap candle, base for lipstick, waxes and polish bases in a condense form, confectionary (Embrandiri *et al.*, 2011; Aghalino, 2000; Armstrong, 1998), pharmaceuticals (Helleiner, 1966), tin

plating, lubricant, biodiesel (Pleanjai *et al.*, 2007; Armstrong, 1998), fat spread, ice cream, coffee whiteners, whipping creams, fatty acids free formulation, palm based cheese, micro-encapsulated, filled milk, mayonnaise and sealed dressings, red oil/olefin (Basiron and Weng, 2004).

Before 1965, Nigeria is the world's leading producer and exporter of palm oil, and has since 1974 ceased to contribute to the export trade in the commodity, largely due to increased domestic demand/consumption that have not kept pace with the production (Omoti, 2004). During the past decade, Nigeria has become a net importer of palm oil (Olagunju, 2008). While in the early 1960's, Nigeria's palm oil production accounted for 43% of the world's production, currently, the country accounts for about 1.7% of the global palm oil production. Also, Nigeria is now ranked fifth in the global crude palm oil production in the world (Nnorom, 2012), an enterprise that Nigeria once dominated. Vogel (2002) reports that Nigeria is now an importer, and it is possible that the size of this demand may be currently supplied by foreign imports. In 2009, some Nigeria citizens are mounting pressure on the federal government to lift the 35% tariff on crude palm oil importation. Presently, cheap crude palm oil is being imported from Malaysia and Indonesia (Nnorom, 2012). Hartley (1988) reports that Nigeria lost her foremost place in oil export to Zaire and regained it only temporarily in 1964 – 1965. Nigeria lost to Malaysia and Indonesia, as the largest oil palm producer in the world today because of her poor commitment to oil palm production (Teoh, 2002; Nnorom, 2012). The drop in ranking is caused by the neglect of agriculture sector for petroleum products. There is a serious need for the encouragement of small-scale oil palm production in Nigeria to increase the domestic demand of palm oil since it has the ability of creating jobs for the teaming unemployed in the country.

Commercial large-scale oil palm plantation farming is a relatively new phenomenon in West African where oil palm cultivation is basically subsistent and small-scale covering less than 7.5 hectares (FAO, 2005). In Nigeria, 80% of production comes from dispersed smallholders who harvest semi-wild plants and use manual processing techniques (Carrere, 2001; Olagunju, 2008). According to Carrere (2001) and Olagunju (2008), several million smallholders are spread over an estimated area of 1.67 million hectares in the southern part of the country. Among the small-scale producers, traditional or semi-mechanized methods are used for oil extraction from the fresh fruit bunch (Omereji, 2005; Olagunju, 2008). In addition, during processing, outdated equipment is mostly used. This method of oil palm processing is arduous, time consuming and oil yield is usually low. Often, about 25% - 75% of potential palm oil is lost during processing (Ekin and Onu, 2008). Elevated cost of procuring equipment is a serious problem in Nigeria (Orewa, 1998). High equipment costs have discouraged intending processors from establishing and investing in oil palm venture. Consequently, significant proportion of the processors resort to hiring of processing equipment and this had resulted to delay in processing of the palm fruits (Ekin and Onu, 2008). Oil palm cultivation originated in West Africa (Poku, 2002). Some 5,000 years ago, it was said to have been domesticated in Nigeria (Sridhar and Ade-Oluwa, 2009). Production was for subsistence within the region. Currently, Nigeria oil palm sector is under reactivation after it collapsed during the discovery of crude oil. The other factors that led to the decline of Nigeria oil palm industry include civil war (1967 – 1970), lack of modern farm mechanization, over dependency on smallholder/traditional processors, land tenure problem, inadequate infrastructure, poor funding, campaign by environmentalist for environmental protection etc. Also, Kei *et al.* (1997) highlights that the stagnation in the oil palm sector in Nigeria is influenced by the overall agricultural policies. They also observed in their study that because of the increasing demand of oil palm products resulting from an increase in population and income growth, relative to the low productivity from the oil palm sector, Nigeria has become a net importer of palm oil. According to United State Department of Agriculture, the crude palm oil production in Nigeria is 920,000 metric tonnes (MT) (2012), which is far below 1,315 MMT domestic demand in 2012, within the period a deficit of 470,000 were imported the same year to supplement the domestic production. However, Soyebó *et al.* (2005) reports that land is the major factor limiting oil palm cultivation. Their report recognized that majority of the farmers in Nigeria (81%) are confronted with land problem, 34.2% with fund problem while 53.2% complained of inadequate information and cultivation knowledge about oil palm. The authors also enumerated the way forward towards palm oil self sufficiency in Nigeria by suggesting that the planting materials should be improved and that government should support the processors with

funds. So for Nigeria to compete with countries like Malaysia, Indonesia, Columbia and Thailand, the country must return to agriculture.

In assessing the profitability and economic stability of a business like smallholder palm oil processing, a feasibility study need to be considered. A feasibility study helps identify the long term basis, financial implications of the oil palm enterprise through analysis. Feasibility study determines whether the business plan has the necessary resources for it to be practicable (Marino, 2012), so that the entrepreneur will not invest more to correct flaws, remove limitations (Lohrey, 2014) than to make profit. A feasibility study of oil palm processing brings to knowledge the possibilities, opportunities that abound in oil palm processing. Oil palm processing requires economic, technological/operational and financial feasibility. The economic feasibility studies of oil smallholder oil palm processing could be geared to employment generation and use to solve the current unemployment situation currently demoralizing Nigeria in the recent years. The operational feasibility shows that no special skill is required before venturing into smallholder oil palm processing. On the other hand, the financial feasibility shows that profit is the key gauge of feasibility of any business. In oil palm economics, profitability determinants model such as Gross Margin (GR), Benefit-Cost Ratio (BCR) and Expense Structure Ratio (ESR) (Olagunju, 2008) level is determined by cost of palm fruits, cost of hiring/purchase of equipment, transportation of the palm bunches, availability of labor, price of palm oil among others (Ekine and Onu, 2008). This model level determinant is essential for the continuity of the smallholder oil palm processing enterprise. Therefore, this study investigates the feasibility studies of small-scale palm oil production in Nigeria.

2 MATERIALS AND METHODS

2.1 Field visit/survey

A preliminary survey was conducted randomly in 2011 to ascertain the communities that process oil palm in large quantity using manual/rudimentary equipment. The survey result shows that Elele, Rivers State has several smallholder palm oil mills with numerous customers majorly from the Northern Nigeria. Observations indicates that the palm oil mills is located in all part of the community and odor of oil palm was perceived even at increased distance which is not so in other oil palm processing communities. Though odor from oil palm processing is difficult to quantify. Hence, this feasibility study on small-scale palm oil processing were conducted in Elele, Rivers State, Nigeria from 13th – 22nd April, 2012. Ten oil palm processing mills were visited and data were elicited through interviews and observation. The mill owners (10 respondents) provided the information such as cost of setting up small-scale palm oil processing business due to their knowledge on the equipment procurement and overall management of the palm oil mills. While the socioeconomics characteristics were provided by the mill workers and owners (100 respondents). The information from the respondents served as a basis for comparison, for the purpose of triangulation.

2.2 Data analysis

The profitability determinants such as cost of palm fruits, cost of hiring/purchase of equipment, transportation of the palm bunches, availability of labor, price of palm oil etc is vital for the continuity of the oil palm enterprise (Ekine and Onu, 2008). The data were analyzed using descriptive statistics (mode, frequencies and corresponding percentages and gross margin model) and profitability techniques (i.e Gross ratio, Expense Structure Ratio, rate of return and Benefit-Cost Ratio).

The model specification is as follows (Ekin and Onu, 2008; Olagunju, 2008);

Net income in Naira (₦) = Total Revenue (TR) – Total cost (TC) of processing of oil palm

Where:

Total revenue in Naira (₦) = sales of palm oil + sales of cracked palm Kernel + sales of cracked kernel shell.

Total cost = cost of Fresh Fruit Bunch (FFB) + cost of hiring or purchase of equipment + cost of transportation + cost of labor + depreciation on equipment + building.

Total variable cost = cost of labor + FFB + transportation + fuel + water.

Fixed cost = cost of building + equipment.

Gross margin = Total sales – Total variable cost (TVC).

Profitability determinant model (Olagunju, 2008)

Benefit-Cost Ratio (BCR) = TR/TC.

Expense Structure Ratio (ESR) = Fixed cost (FC)/Total cost (TC).

Gross ratio (GR) = TC/TR.

Rate of return = Net Return / TC

3 RESULTS AND DISCUSSION

Table 1 presents the cost for the procurement of small-scale palm oil mill equipment. Mills that do not include kernel cracking in their process did not purchase kernel cracking equipment such mills include B, C, H and J. The total cost of procurement of the different equipment listed ranged from ₦ 94,400 - ₦ 341,400.00. But in mill C the total cost is ₦54, 400.00. This is because most of the equipment were hired, hence their prices were not stated. However, the cost of hiring the equipment represents 5 – 10% the cost of procuring the equipment. This translates to ₦ 1,550 - ₦3,100 for both presser and digester and ₦ 500 - ₦1000 for lister engine. The low price in mills B, H, and J is due to the fact that they do not crack kernel, hence they do not have the cracker and the cracker engine. Also, in mill C, H and J they do not use shaker. Lack of this equipment may reduce the quality of crude palm oil processed. On the average, the sum of ₦156, 655.00 can be used for the procurement of equipment in a typical small- scale processing mill. The price differences in each of the equipment procured in the various mills is associated with the year, place of purchase, model and the bargaining power of the purchaser. Generally, the cost of lister engine is significantly higher than the price the respondents stated. This is attributed to other uses of the engine in Nigeria including electricity generation when connected to alternator, garri production among others in Nigeria presently.

Table1: Cost (₦) for the procurement of palm oil mill Equipment for small-scale processing

Site	Presser	Digester	Lister Engine	Cracker Engine	Cracker	Separating knife	Shacker	Boiler (Drum)	Boiler (Tank)	Filter	Total (₦)
A	50,000	50,000	10,000	37,000	45,000	400	1,500	10,000	50,000 - 60,000	1,000	254,900 - 264,900
B	35,000	35,000	15,000	—	—	400	1,500	10,000-12,000	50,000-55,000	1,000	147,900 - 154,900
C	Hired	Hired	Hired	—	—	400	—	8,000-10,000	45,000	1,000	54,400 -56,400
D	25,000-30,000	25,000-30,000	10,000	35,000	40,000	400	1,500	9,000	40,000	1,000	186,900 - 196,900
E	40,000	40,000	95,000	35,000	35,000	500	1,500	43,000	50,000	1,000	341,000
F	10,000	10,000	12,000	35,000	35,000	400	1,200	8,000	35,000 - 50,000	1,000	147,600 - 149,100
G	15,000	15,000	10,000	37,000	40,000	400	1,500	10,000	45,000	1,000	174,900
H	12,000	12,000	14,000	—	—	400	—	10,000	45,000	1,000	94,400
I	12,000	12,000	15,000	35,000	40,000	400	1,500	12,000	55,000	1,000	183,900
J	40,000-50,000	50,000	150,000	-	-	400-600		10,000	50,000	1,000	301,400 - 311,400

Table 2 presents the average cost of procuring the different equipment required in setting up a small-scale palm oil processing mill. ₦ 623,650.00 is required to procure and produce palm oil from one hectare of land. The low price of land and building is associated with the rural settings of the study area. In urban settings, it may be significantly higher.

Table 3 provides job description in a small- scale palm oil processing mill and their wages for the production of 100 bunches of FFB. It is observed that the highest cost were obtained from offloading of FFB from trucks (₦5,000.00), followed by kernel cracking (₦1200.00), while the least rates is recorded for boiling (₦ 200.00). The high cost of labor was likely due to the obsolete manual machines which require a lot of human effort and the short supply of manpower.

Table 2: Average cost of procurement/setting up of a small-scale palm oil processing mill

S/N	Equipment	Quantity	Average cost (₦)
1	Presser	1	27,500.00
2	Digester	1	36,500.00
3	Lister engine	1	37,000.00
4	Cracker engine	1	36,000.00
5	Cracker	1	40,000.00
6	Separating knife	1	400.00
7	Shackers	1	1,500.00
8	Boiler drum	1	13,200.00
9	Boiler tank/barrel	1	48,750.00
10.	Filter	1	1000.00
11	Head pan	1	500.00
12	Wheel barrow	1	3,000.00
13	Hand glove	5	1,000.00
14	Bucket	6	1500.00
15	Shovel	2	1,600.00
16	Cutlass	3	4,200.00
	SUB-TOTAL		253,650.00
	Others		
17	Land and building	1 hectare	350,000.00
18	Miscellaneous expenses		20,000.00
	TOTAL COST		623,650.00

Table 3: Job descriptions in a small-scale palm oil mill and their wages

S/N	Job description	Rates in Naira (₦)	Cost of production for 100 bunches (₦)
I	Offloading from truck	50 per bunch	5000
II	Slicing	10 per bunch	1000
III	Threshing	7 per bunch	700
IV	Filtration/sieving	10 per bunch	1000
V	Boiling	200 for small tank	200
VI	Digestion/Pressing	120 per press	840
VII	Separation of fiber	100 per press	700
VIII	Repressing/re-milling	120 per press	840
IX	Kernel cracking	1200 per motor	1200
	TOTAL		10,400

The total cost of processing 100 FFB and its returns is presented in Table 4. The money realized from sales of the palm oil gotten from the 100 FFB is N32, 000.00, the palm kernel (cracked) is ₦7,000.00, while the cracked palm kernel shell is ₦5, 000.00. The cost of processing 100 FFB into palm oil is ₦30, 000.00. Out of which ₦15,000.00 (50%), is used to purchase palm fruit, ₦10, 400.00 (34.6%) is spent on labor, while ₦2,000.00 representing 6.7% were spent on transportation, water and energy. Ekine and Onu (2008) reports a higher value, stating that 65.7% and 13.8% are cost of FFB and labour respectively during oil palm processing. The total fixed cost which was ₦2,600.00 representing 8.7% and the total variable cost which is ₦27,400.00 representing 91.3% of total cost. Olagunju (2008) reports that total fixed cost and total variable cost represent 42.3% and 57.7% respectively. The variable cost such as energy is high because the processing mills are not connected to nation grid. Therefore, the mill uses fossil powered generator to supply on the electrical/mechanical energy requirement. The roads leading to the mills from plantation are deployable and in bad condition leading to wear and tear of transportation system parts. Water is also a major challenge because mills buy water from commercial water distributors.

The high cost of palm fruit bunches is an indication of insufficient oil palm plantation in the study area despite being a major oil palm producing province in Nigeria. Though, most of the palm oil processors do not have their own oil palm plantation. However, the gross margin return is ₦44,000.00 while net return is ₦14,000.00 representing 32% return per naira. This finding is slightly higher than Olagunju (2008) reports presenting 29.4% returns per naira. According to Ibitoye and Onje (2013) a positive gross margin show that oil palm processing is profitable and the business can recover its variables cost in the short run. The profitability analysis of small-scale oil palm oil is presented in Table 5. The rate of return (net return/TC) is 0.32. This value is slightly higher than previous report. Olagunju (2008) reports a rate of return of 0.29 in oil palm processing in southern Nigeria. From the value of gross ratio ($GR=TC/TR$), it shows clearly that for every N1.00 return from the mill, 68.00kobo is spent. Chukwu *et al.* (2011) shows the profitability of oil palm processing enterprise by stating that for every N 1.00 invested in processing of one tonne of FFB has N 1.10 in return. The net return varies in palm oil processing (revenue and cost) due to maintenance of equipment and depreciation of assets which is causal factor in cost (Simeh, 2002).

Table 4: Cost and returns in palm oil processing for 100 fresh fruit palm bunch

Items to total cost	Value (₦)	Percentage contribution
Returns		
Palm oil	32,000.00	
Palm kernel (cracked)	7,000.00	
Cracked Palm kernel shell	5,000.00	
Total Gross Return	44,000.00	
Variable Cost		
Palm Fruits	15,000.00	50%
Labor cost	10,400	34.6%
Other expenses (transport, water, energy)	2,000.00	6.7%
Total variable cost	27,400.00	91.3%
Fixed Cost		
Depreciation on assets	1,700.00	5.7%
Depreciation on building	900	3%
Total fixed Cost	2,600.00	8.7%
Total Cost (TVC+TFC)	30,000.00	100%
Net Return	14,000.00	
Return per Naira	32%	

Source: Field Survey, 2012

Table 5: Profitability of Palm Oil Processing

Model	Computation	Ratios
Benefit Cost Ratio	TR/TC	1.47
Rate of return	Net Return /TC	0.32
Gross Ratio	TC/TR	0.68
Expenses Structure Ratio	FC/TC	0.087

Source: Field Survey, 2012

However, the Benefit-Cost Ratio ($BCR = TR/TC$) is high (1.47). This study findings is higher than Olagunju (2008) report that shows a benefit cost of 1.29. But lower Ibitoye and Onje (2013) findings that shows that for every ₦1 spent in oil palm processing ₦4.16 is generated in return. This shows an increase in returns indicating that the venture is profitable and feasible. However, the BCR can be boosted by increased capital, improved technology (sophisticated equipment and method of processing) and skilled labor (Olagunju, 2008). The profit margin of a processing mill is dependent on the processing toll (Simeh, 2002; Oladipo, 2008; Orewa *et al.*, 2009), the type of bunch being processed (Orewa *et al.*, 2009) and the ripeness of the FFB at the time of harvest and processing (Ilechie *et al.*, 1986). Expense Structure Ratio ($ESR = FC/TC$) is 0.087 representing 8.7 % of the total cost of production, which

comprises of fixed cost components (i.e depreciation of assets and buildings). The ESR is far lesser than previous report. Olagunju (2008) reports that expense structure ratio is 0.423 representing 42.3% of total cost of production including cost of plantation rentage (25.6%), interest on borrowed capital (9.2%) and assets depreciation (1.62%). The low expense structure ratio in this study is attributable to no cost of plantation maintenance and or rentage of oil palm estate. We also assumed that the initial capital that will be used to start the business were not borrowed. Hence no interest will be paid which can increase the cost of production. Generally, when the source of FFB have to be paid for, the expense structure ratio can increase to 0.30 – 0.45 representing 30 – 45% of total cost of production. The expense structure ratio shows that palm oil business is a profitable enterprise and it worth investing..

Table 6 presents the social economics characteristics of oil palm processors in the study area. The results show that 31-40 age bracket representing 31% dominated the palm oil processing mill, while 21-30, 41-50 and 50 years and above representing 14, 25 and 30% respectively are involved in palm oil production in the study area. This results agree with Ekine and Onu (2008) that presented 14.4, 31.3, 29.9 and 31.3%, which fell within the age brackets of 21-30, 31-40, 41-50 and 50 years and above respectively in Ikwerre Local Government Area of Rivers State. Ajayi and Solomon (2010) presents that 33, 20, 23, and 24% of oil palm processors fell within the age brackets of <30, 31-40, 41-50 and 50 years and above respectively. Also, Obinne and Anyanwu (1991) reports that the mean age of males and females in their study area was 45 and 40 respectively. Akangbe *et al.* (2011) indicate that (46.9%) the palm oil extractors were 60 and above years of age, while 16.9% fell within the agile youthful age bracket of between 20-40 years. From the mean result of the different age brackets, it shows that palm oil is processed by matured and responsible adults.

The educational qualification shows that a significant proportion of palm oil processor had WASC (34%), while 18%, 32%, 7% and 9% had educational qualification of below primary six (i.e. no formal education), primary six, Diploma and Tertiary degree respectively. The findings is in consonance with that of Ekine and Onu (2008) shows that presented 20.0%, 11.1%, 51.1%, 0% and 17.6% had educational qualification of below primary six, primary six, WASC, diploma and tertiary degree respectively in Etche Local Government Area of Rivers State. Akangbe *et al.* (2011) shows that 55.0% of oil palm extractors had no formal education and only 21.3% had at least the basic primary school education while 11.2% had post primary education. Olagunju (2008) study reveals that 50%, 44%, 1% and 4% had primary, secondary, tertiary, and no education respectively. The results also show that 84% of the processors had WASC and below primary six, which indicates that the processors level of education is quite low (Ajayi and Solomon, 2010). This shows that educational qualification may have affected the method the venture is being managed in the study area of the venture. Though, the proportion of the processors having tertiary degree is low, but it shows that the small- scale oil palm industry is actually a promising venture, not just for the peasant farmers or the typical uneducated village adults, but also for graduates. Education plays an important role in palm oil processing operations since it will facilitate the adoption of innovations that will improve palm oil processing (Olagunju, 2008).

In terms of gender, 73% of the processors are males, while 27% are females. The finding is in consonance with Ajayi and Solomon (2010), shows that 74% and 26% males and females respectively are involved in oil palm processing. Also, Ekine and Onu (2008) reports that 62.5% and 37.5% males and females respectively in Ikwerre Local Government Area, and 68.9% and 31.1% males and females respectively in Etche Local Government Area of Rivers State are involved in oil palm processing.

Results also showed that 10%, 18%, 14%, 50% and 8% had the following years of experience in oil palm processing; 1-5, 6-10, 11-15, 16-20 and 21-25 years respectively. Ajayi and Solomon (2010) reports that 8%, 15%, 11% and 66% have experience for <5, 6-10, 11-15 and 16 and above years. Akangbe *et al.* (2011) reports that 30%, 52.5% and 17.5% have experience for 1-25, 26 – 50 and 51-75 years respectively. The high experience level of 11-15 years shows that palm oil processing is the major occupation of residents at the study area.

Table 6: Social economics characteristics of smallholder palm oil processors in Nigeria

Age	Mills, frequency											
	A	B	C	D	E	F	G	H	I	J	Average	%
21-30	1	1	2	2	2	2	1	1	1	1	14	14
31-40	4	3	1	0	4	6	4	2	3	4	31	31
41-50	1	3	0	4	2	5	2	2	3	3	25	25
50 & above	3	4	1	2	4	6	3	0	3	4	30	30
Educational Qualification												
Below primary six	2	3	2	2	0	0	2	1	4	2	18	18
Primary six	3	3	1	3	5	6	3	2	2	4	32	32
WASC	3	3	1	3	4	7	4	2	4	3	34	34
Diploma	1	1	0	0	1	2	0	0	0	2	7	7
Tertiary degree	0	1	0	0	2	4	1	0	0	1	9	9
Gender												
Male	7	8	3	6	10	16	8	3	6	9	73	73
Female	2	3	1	2	2	3	2	2	4	3	27	
Years of oil palm processing experience/individual												
1-5	2	0	1	1	1	2	1	1	0	1	10	10
6-10	2	3	0	1	3	4	2	0	2	1	18	18
11-15	0	0	1	2	2	2	1	2	1	3	14	14
16-20	5	4	2	4	6	10	5	2	5	7	50	50
21-25	0	2	0	0	0	1	1	0	2	0	8	8
Size of household												
1-5	4	5	2	3	6	11	5	1	4	4	45	45
6-10	4	5	1	4	4	8	5	1	4	7	43	43
11-15	0	1	1	1	1	0	0	1	2	1	7	7
16-20	1	0	0	0	1	0	0	2	0	1	5	5
Association Membership												
Member of mill owners association	9	11	4	8	12	19	10	5	10	12	100	100
Member of mill workers Association	0	0	0	0	0	0	0	0	0	0	0	0

Source: *Field survey 2012.*

In terms of household size of the processors, our study revealed that 45%, 43%, 7% and 5% have a household size of 1-5, 6-10, 11-15 and 16-20 persons respectively. Ekine and Onu (2008) reports that 35.4%, 58.3%, 2.1% and 4.2% had a household size of 1-5, 6-10, 11-15 and 16-20 persons respectively at Ikwerre Local Government Area, and 46.7%, 42.2%, 6.7% and 4.4% had 0-5, 6-10, 11-15 and 16-20 persons respectively at Etche Local Government Area of Rivers State. Similarly, Ajayi and Solomon (2010) reports that 41%, 45% and 14% had a household size of

1-5, 6-10 and >10 persons respectively. This findings show that majority of palm oil processors have household of 1-10 persons.

Only the mill owners belong to associations, while the workers in the mill do not belong to any association. The worker inability to form association like the mill owner is attributed to the seasonality of oil palm. During oil palm peak period the workers could be high and less during off peak period. Basically, in attempt to make profit the mill owners were unable to hold the workers if there is no major processing, thereby reducing cost of labour. Therefore having a mill can be a better means of generating profit than working fluctuating period (i.e peak and off peak). From Table 6 the age of the processors, educational background, household size, net farm income, net income size and mechanization level are the critical determinants of profit efficiency in oil palm venture (Kadurumba and Ume, 2011).

4 CONCLUSION

This study revealed that small-scale palm oil processing is a profitable venture while factors such as land and building, cost of FFB, educational background and mechanization level were the most critical factors influencing profitability of the venture. On the average, about ₦623, 650.00 are required to establish a small-scale palm oil processing mill. The cost of production could be higher or lower depending on the location of the enterprise which can be largely influenced by the price or cost of fixed assets such as land and other processing equipment and labour. However, the future of palm oil processing and supply is dependent on yield and rate of expansion of oil palm plantations. Due to profitability of the oil palm enterprise, the sector if adequately managed could be a source of relief to the unemployment challenges that the country is currently facing. The sector could employ several people depending on the size of the enterprise. In order to speed up the net return of palm oil processing in Nigeria, the government should sensitize her populace on the profitability of the business while providing loans to individual that are interested in the enterprise. Due to the locality of the mills, the government should also improve the condition of feeder roads which will ease transportation problems. Social amenities like electricity should be regularly supplied while pipe borne water should be provided in areas where oil is processed to facilitate palm oil production.

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