

## COMPARATIVE ANALYSIS OF THE PROFITABILITY OF SMALL AND MEDIUM SCALE CASSAVA AND PALM FRUIT PROCESSING IN ABIA STATE, NIGERIA

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### ABSTRACT

*This study was designed to comparatively examine the profitability of small and medium scale cassava and palm fruit processing in Abia State, Nigeria. Multi-stage sampling technique was adopted in selecting 50 cassava and 50 palm fruit processors to give total respondents of 100. Simple descriptive statistics such as means and percentages, cost and returns analysis and Z-test were adopted in analyzing the data. The socio-economic characteristics of the processors showed that middle aged persons between 25 and 54 accounted for majority (70% and 60%) of the respondents for cassava and palm fruit processors respectively. Also majority (60% and 64%) of the respondents were female. The majority of the respondents (60% and 54%) of the cassava and palm fruit processors had at least secondary education implying that the processing business was dominated by literates/elites. Cassava processors gained monthly net returns of ₦308,000 as against ₦227,000 realized by palm fruit processors, indicating that cassava processing is more profitable than palm fruit processing. In view of its contribution to this paper, the following are recommended: a re-establishment of active processing firms which are income-spinning ventures; on the macro-level, government should discourage the exportation of competing products which has a multiplier effect on the operations of the firms and as such protect them from harsh competitions capable of weakening their profit performances.*

**Key words:** profitability, palm fruit, cassava, processing, small scale, medium scale

### INTRODUCTION

Small and medium enterprises (SMEs) have continued to be a popular phrase in the business world (Iorun, 2014). In Nigeria, the food processing sector is dominated by small and medium enterprises. Small and medium scale agro-processing enterprises have played a very important role in the development of the economy of most developed and developing countries of the world, particularly in terms of employment generation especially in the rural areas, better income distribution, reduction of post-harvest food losses and increasing food availability, and as a training ground for entrepreneurs before they invest in large scale enterprises Uzoejinwa *et al.* (2016). The massive attention and support given to Agri-SMEs relate to the widely acclaimed fact that Agri-SMEs are major sources of employment just like the other non-agribusiness small and medium enterprises. They have a higher capacity for generating employment in Nigeria than some large scale enterprises (CBN, 1990; Taiwo *et al.*, 2012). Cassava is one of the most important food crops of Africa. Its high resilience and adaptability to a wide range of ecological conditions has sustained its production through many generations in sub-Saharan Africa since it was introduced into this region in the 16th century (Adebayo *et al.*, 2009). It

is consumed in different traditional dishes varying from country to country and across communities (Adebayo, 2009). It provides increased income for farming households; increased employment opportunities; potential to target development benefits to women; potential lower food prices for consumers; competitively priced raw materials and more convenience improved traditional products Adebayo *et al.* (2010). Ezike *et al.* (2011) posited that in Nigeria cassava supplies about 75% daily calorie intake to over 50 million Nigerians in cassava growing zones. It plays a major role in country's food security as 80% of Nigerians in the rural areas eat cassava meal at least once a week and majority eat cassava products, at least once a day. It also provides one of the highest returns in value terms to effort invested (Odemero, 2015).

Cassava processing involves the transformation of raw cassava tubers into one or more finished domestic and internationally traded products by the processor. The processing is aimed at reducing the limitation of cassava roots, increase shelf-life and reduce naturally occurring *cyanogens* and to overcome perish ability of fresh cassava roots (Ikwuakam, 2013). Cassava and palm fruits are important, not only as a food crop but even more so as a major source of income for rural households (Davies *et al.*, 2008). Nigeria used to be the world's

largest producer of palm fruit (*Elaeis guineensis*), before the crude oil boom era and now (Ibitoye *et al.*, 2011; Onwubuya *et al.*, 2012). Today, Nigeria has conceded this feat to Malaysia and Indonesia which together can boast of 83% the world’s total production of palm oil, while Nigeria can boast of only 1.7% of which is insufficient to meet its domestic consumption which stands at 2.7% (Okolo *et al.*, 2019). Ibitoye (2014) reported that in Nigeria, 80% of palm fruits production comes from dispersed small holders who harvest semi-wild plants and use manual processing technique. Processing fresh fruit bunch (FFB) to extract the oil is labour intensive and involves the following stages – threshing, picking, parboiling, digestion, extraction and separation (Nwajiuba and Akinsanmi, 2003). Palm fruit gives the highest yield of oil per unit area, compared to any other oil producing plant when processed, and it produces two distinct oils; Palm fruit and Palm Kernel Oil which are of great importance in the industrial market (FAO, 2002). There are different techniques in processing palm fruit ranging from modern to traditional methods. However, the traditional method of processing is prevalent among small and medium scale processors and these small scale processors are responsible for the bulk of agro-processing in Nigeria (Olagunju, 2008). However, due to the lack of infrastructural facilities such as good roads, processing and storage equipment as well as inadequate marketing information; huge quantities of these crops (cassava and palm fruits) waste uncontrollably. An excess of 10 million tonnes of grain equivalent of food per annum conservatively estimated at over ₦825 billion was reported to be lost to spoilage and wastage occasioned by the lack of post harvest management (NIFST, 2011). In view of the above, this study becomes expedient as it would provide the information needed to promote palm fruit and cassava processing enterprise and also could serve as a guide for investors in the venture as well as for policy makers.

This paper aimed to comparatively examine the profitability of small and medium scale cassava and palm fruit processing enterprises in Abia State while focusing exclusively on: examining the socioeconomic characteristics of the cassava and palm fruit processors; ascertaining the cost and returns associated with cassava and palm fruit processing and identifying constraints affecting the profitability of cassava and palm fruit processing business in the study area.

**MATERIALS AND METHODS**

The study was carried out in Abia State. The State lies between longitude 04° 45' and 06° 07' North and Latitude 07° 00' and 08° 10' East. It is situated in the south-east geo-political zone of Nigeria and is bounded by Imo State on the West, Ebonyi and Enugu States on the North, Cross Rivers and

Akwa-Ibom States on the East and Rivers State on the South. The State has a population density of 580 persons per square kilometer and a population of 2,833,999 persons (NPC, 2006).The climate of the State is a tropical one and usually humid all year round. The major occupation of the people is farming and the major crops grown are Maize, yam, cassava, rice, vegetable, etc. Livestock kept include, goat, sheep, Pigs, etc. Plantain, palm fruit, cocoa and rubber are some of the cash crops produced by the people. Multi-stage sampling technique was adopted for this study. The first stage was the selection of two agricultural zones (Umuahia and Aba zones) out of the three agricultural zones in the state. The second stage involved the random selection of one local government each (Ikwano and Isiala Ngwa South) from the selected agricultural zones. In the third stage, five villages were selected while the last stage involved the random selection of five cassava and palm fruit processors respectively from the list of cassava and palm fruit processors from each village giving a total of 50 cassava and 50 palm fruit processors. Primary data were used for the study. Data collected were analyzed using simple descriptive statistics such as mean and percentages, costs and returns analysis and Z-test models.

**Model Specification**

$$\text{Profit} = \pi = \text{TR} - (\text{TFC} + \text{TVC}) \dots\dots\dots (1)$$

Where  $\pi$ -profit TR-Total revenue (comprises of Palm oil, cracked and un-cracked Palm kernel and sludge for palm fruit processors and garri, fufu, flour and starch for cassava processors) TFC-Total fixed cost (depreciation on fixed assets, interest on borrowed capital and rent) TVC-Total variable cost (transport, labour (family and hired), firewood, diesel, water, electricity palm fruits and cassava). The Z - test is given as:

$$Z_{cal} = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{S_1^2 \bar{X}_1}{n^1} + \frac{S_2^2 \bar{X}_2}{n^2}}}$$

where,  $\bar{X}_1$  is mean net income from cassava processors,  $\bar{X}_2$  is mean net income from palm fruit processors,  $S_1^2 \bar{X}_1$  is Variance of net income from cassava processors,  $S_1^2 \bar{X}_2$ , variance of net income from palm fruit processors,  $n^1$  is number of cassava processors, and  $n^2$  is number of palm fruit processors.

**RESULTS AND DISCUSSION**

**Socioeconomic Characteristics of Cassava and Palm fruit Processors**

The socioeconomic characteristics of cassava and palm fruit processors is presented in Table 1. The distribution of the respondents by age showed that majority (82% and 70%) of the cassava and palm fruit processors respectively were between the age of 25 and 54 years while 18% and 30% were between the ages of 55 and 74 years. This implies that cassava

**Table 1:** Socio-economic characteristics of the processors

Age	Cassava processors		Palm fruit processors	
	Freq- uency	Percent- age (%)	Freq- uency	Percent- age (%)
25-34	6	12	5	10
35-44	15	30	12	24
45-54	20	40	18	36
55-64	6	12	10	20
65-74	3	6	5	10
Total	50	100	50	100
Gender				
Males	20	40	18	36
Females	30	60	32	64
Total	50	100	50	100
Household size				
1-4	30	60	33	66
5-8	15	30	10	20
9-11	5	10	7	14
Total	50	100	50	100
Marital status				
Married	25	50	30	60
Single	15	30	10	20
Divorced	5	10	5	10
Widowed	5	10	5	10
Total	50	100	50	100
Level of education				
No formal education	10	20	9	18
Primary education	10	20	14	28
Secondary education	25	50	23	46
Tertiary education	5	10	4	8
Total	50	100	50	100

Source: Field Survey, 2016

and palm fruit processing are mostly done by young and middle aged people. This may be as a result of the energy and technical know-how needed to operate most of the processing machines. The gender distribution of the processors showed that 40% and 36% of the cassava and palm fruit processors were males while 60% and 64% were females. This implies that cassava and palm fruit processing in the area are dominated by the female. The distribution of respondents based on household size showed that majority (60% and 66%) of the cassava and palm fruit processors, respectively had household size of between 1 and 4 persons, 30% and 20% had household size of between 5 and 8 persons, while 10% and 14% of the cassava and palm fruit processors had household size of between 9 and 11 persons. The result implies that cassava and palm fruit processors in the study area have a small household size and this could affect the supply of labour needed in their enterprises. The distribution of the respondents based on their marital status showed that majority (50% and 60%) of the cassava and palm fruit processors were married, while 50% and 40% of the cassava and palm fruit processor respectively were either single divorced or widowed. This implies that cassava and palm fruit processing are dominated by married people. Given the income generating capacity of the cassava and palm fruit processing enterprises and the need to meet marital responsibility, married

people tend venture into the enterprises than the unmarried people. The majority (60% and 54%) of the cassava and palm fruit processors had at least secondary education implying that the processing business was dominated by literates/elites. The educational level of the processors will go a long way to helping them embrace new technology needed to help them improve the income.

### Cost and Return Analysis of Cassava and Palm fruit Processors

The cost and return analysis of cassava and palm fruit processors is presented in Table 2. The cost and return analysis of the cassava and palm fruit processors showed that both enterprises are profitable given their positive total revenue, gross margins and net returns. However, cassava processors gained monthly net returns of ₦308,000 as against ₦227,000 realized by palm fruit processors indicating that cassava processing is more profitable than palm fruit processing. Also the return on investment was ₦2.22 and ₦1.88 for cassava and palm fruit processors implying that for every ₦1 invested ₦1.22 and 88kobo was made in cassava and palm fruit processing respectively. The high return on investment of cassava processing was as a result of the low cost of processing cassava relative to that of palm fruit and also cassava is a staple with all round demand and market. This corroborates the finding of Onya *et al.* (2016) who found a return on investment of ₦2.36 for cassava processing and (Olagunju, 2008; Onoja and Ogali, 2014) who found a return on investment of ₦1.29 and ₦1.72 for palm fruit processing in their respective studies. Also, the gross ratio was 0.45 and 0.53 for cassava and palm fruit processing respectively which means that the total cost of processing is made up of 45% and 53% for cassava and palm fruit processing which make cassava processing more cost effective than palm fruit processing. It is expected that with increased capital, improved technology and skilled labour, this ratio would increase.

**Table 2.** Cost and returns analysis of cassava and palm fruit processors

Item (monthly expenses)	Cassava processors	Palm fruit processors
Average cost/unit (₦)	1,800	1,250
Average selling cost/unit (₦)	3,500	2,700
Average variable cost (₦)	154,000	143,000
Average fixed cost (₦)	98,000	115,000
Average total cost (₦)	252,000	258,000
Average total revenue (₦)	560,000	485,000
Gross margin (₦)	504,000	342,000
Net returns (₦)	308,000	227,000
Return on investment	2.22	1.88
Profit margin	0.55	0.47
Gross ratio	0.45	0.53

Source: Field Survey, 2016

**Table 3:** The z-test value between the estimated net income from cassava and palm fruit processing in the study area

Variable	Observation	Mean	Std. Err	Std. Dev	T test
Cassava Processors	50	308,000	15747.51	105637.5	5.093
Palm fruit Processors	50	227,000	10996.12	73764.21	

Source: Field Survey, 2016. \*\*\*Significant at 1% level

**Table 4:** Problems militating against the effectiveness of cassava and palm fruit processing in the study area

Constraint	Cassava processors			Palm fruit processors		
	Frequency*	Percentage	Ranking	Frequency*	Percentage	Ranking
Inadequate capital/finance	33	66.00	3 <sup>rd</sup>	34	68.00	4 <sup>th</sup>
Poor access to credit	9	18.00	8 <sup>th</sup>	10	20.00	8 <sup>th</sup>
Unstable price of product	36	72.00	2 <sup>nd</sup>	18	36.00	7 <sup>th</sup>
High charges from the government	5	10.00	9 <sup>th</sup>	8	16.00	9 <sup>th</sup>
High cost of processing machine	30	60.00	4 <sup>th</sup>	44	88.00	1 <sup>st</sup>
Lack of storage facilities	41	82.00	1 <sup>st</sup>	37	74.00	3 <sup>rd</sup>
High cost of transportation	20	40.00	5 <sup>th</sup>	22	44.00	6 <sup>th</sup>
Poor road network	12	24.00	7 <sup>th</sup>	30	60.00	5 <sup>th</sup>
Lack of electricity to reduce dependence on firewood	19	38.00	6 <sup>th</sup>	39	78.00	2 <sup>nd</sup>

Source: Field Survey, 2016, Multiple responses\*

**Test of Significant Difference between the Estimated Net Income from Cassava Processing and Palm Fruit Processing in the Study Area**

The test of significant difference between the estimated net income from cassava processing and palm fruit processing is presented in Table 3. The data show that the mean estimated net income for cassava processing was 308,000 and that of palm fruit processing was 227,000. The mean difference between cassava processing and palm fruit processing was 81,000. The value of Z cal. was 5.093\*\*\* and Z tab. = 2.423\*\*\*. Since Z cal. > Z tab., the null hypothesis which stated no significant difference between estimated net return generated from cassava processing and palm fruit processing is hereby rejected and the alternate accepted. Hence, there is a significant difference between the estimated net return of cassava processing and palm fruit processing. This is basically attributable to bad road network which characterizes the area.

The problem of high cost of processing machines was identified by the respondents followed by lack of electricity to reduce dependence on firewood. Regular dependence on processors of palm fruit on fuel wood as a major energy source portends serious environmental hazards such as desertification. Lack of storage facilities lead to spoilage of processed product and as such the processor can only process the one his storage capacity can hold.

**Problems Militating Against the Effectiveness of Cassava and Palm Fruit Processing**

The problems militating against the effectiveness of cassava and palm fruit processing in the study area is presented (Table 4). The data show that lack of storage facilities (82%), unstable price of product (72%); price instability reduces the uncertainty of the business and reduces the confidence of the processor, inadequate capital (66%); inadequate capital will hinder the processors from procuring modern processing plant and expanding their business capacity, high cost of processing machine (60%) and high cost of transportation (40%) were

the major problems constraining the effective and profitable processing of cassava in the study area. Also high cost of processing machine (88%), lack of electricity to reduce dependence on firewood (78%), lack of storage facilities (74%), inadequate capital/finance (68%) poor road network (60%) and high cost of transportation (44%) were the major problems constraining the effective profitability of palm fruit processing in the area. For the poor road network and high transportation cost, most vehicles charge the farmers very high amounts since they ply bad roads in the area as they haul the palm products from the processing centres to the markets. This supports of Obasi *et al.* (2014) and Obasi and Kalu (2015) that transportation is the most critical factor affecting marketers and their performance in many developing economies.

**CONCLUSION AND RECOMMENDATIONS**

This study has been able to comparatively analyse the profitability of cassava and palm fruit processing enterprises while looking at the viability of the businesses as well as the challenges hindering it in Abia state. It was found that the both business are viable and portend a very useful and reliable means of making profits and raising household incomes in the study area though there are still some major challenges with lack of storage facilities, unstable price of product, inadequate capital/finance, high cost of processing machine, lack of electricity to reduce dependence on firewood, poor road network and high cost of transportation constraining the profitability of cassava and palm fruit processing in the study area. The major findings of the study were that cassava processing was more profitable than palm fruit processing and that there is significant difference between the estimated net return of cassava processing and palm fruit processing which entails encouraging farmers who are in these businesses to solve their problems will go a long way in solving the problem of poverty and looming food crises in Nigeria. The study revealed some of these major problems being faced by cassava and palm fruit

processors in the area. Solving these problems will be a way forward in the drive for food security and poverty alleviation. It is recommended that the state and federal governments gear up efforts to provide basic infrastructure such as electricity and good, motor-able roads so that the efficiency of processing and marketing of cassava and palm fruit products can be guaranteed. The issue of electricity supply will reduce dependency on fuel wood, thus stemming environmental degradation in the area.

The state and federal government should also use their agencies and parastatals to subsidize inputs, especially processing machines. Processors revenue base can be more enhanced if multipurpose automatic machine could be supplied by government at subsidized rate to reduce extraction cost. This will boost their output and reduce the cost of production, processing and marketing.

Farmers should be encouraged by banks and agricultural extension agents in the state to form cassava and palm fruit processing cooperatives so that they may benefit from the banks' loan facilities or government agencies' loans. This can solve the problem of lack of capital.

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