

Ojo, Idowu Oladeji

Research Report

Economics of Cashew Nut Processing in Ondo State, Nigeria; Evidence from Jof Ideal Family Farms Limited

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ECONOMICS OF CASHEW NUT PROCESSING IN ONDO STATE, NIGERIA; EVIDENCE FROM JOF IDEAL FAMILY FARMS LIMITED.

*OJO Idowu Oladeji

Department of Agricultural and Resource Economics, School of Agriculture and Agricultural Technology, The Federal University of Technology, Akure. <https://orcid.org/0000-0001-5757-8872>
E-mail:idowufidelity@gmail.com 08137452535 (*Author)

Abstract

Purpose: This paper examines the economics of cashew nut processing in Ondo state using JOF Ideal Family Farms Limited, Owo as a case study. It specifically examined the socio-economic characteristics of the workers of the company, the by-products derived from cashew nuts processing and the costs and returns associated with cashew nut processing and the major constraints associated with the processing of cashew nuts in the company. **Research design, data and methodology:** Purposive sampling was used to select JOF Ideal Family Farms Limited, Owo as the case study being the only cashew nut processing company in the state. Descriptive statistics such as mean, mode, median, frequency distribution, the use of tables etc. were employed to know the socio-economic characteristics of workers of the company, the byproducts derived from processed cashew nuts and the problems associated with cashew nut processing. The cost and returns of the cashew nut processing were determined using the Gross margin analysis. **Results:** Findings revealed that 16.7% of the workers were within ages 21 and 30 years while 83.3% of them were between 31 and 40 years. 11.1% of the workers are skilled while 88.9% of them are unskilled. The Gross margin analysis showed that the company cashew nut processing is profitable with Margin of ₦ 29,192,000 and ₦ 60,870,000 in year 2011 and 2012 respectively. **Conclusion:** Based on findings from the study, Cashew nut processing is profitable in the study area. In spite of the fact that cashew nut processing has numerous potentials to create employment, especially for women, its level of production is still low. To mention few, the study recommended that more farmers especially the youths should engage in cashew farming, this will increase the availability of cashew nuts for the processing industries. Government should provide adequate mechanization and incentive to reduce drudgery of cashew nut processing in the state.

Key words: Cashew nut, JOF, Economics, Ondo state, processing.

JEL Classification: D24, L1, M11

1. Introduction

The Nigerian economy has a modern segment dependent on oil earnings, overlaid by a traditional agricultural economy. Agriculture has suffered a relative decline

because of the dominance of oil in the economy, but it still account for about a third of the country's Gross Domestic Product(GDP), two – third of employment generation, provision of shelter, food security, foreign exchange earnings and so on (World Bank, 2016). The Nigerian economy

is ranked 30th in the world in terms of GDP as at 2011, and 1st in Africa and 25th in the world in terms of farm output (Wikipedia, 2012).

Several cash crops produced in commercial quantities in Nigeria (cocoa, rubber, cotton, groundnut, cashew, etc.) offers a great scope for agro – processing activities. Nigeria was once one of the world’s largest producers of palm-oil which contributed more than 82 percent to the country’s domestic exports before the advent of petroleum oil in the last quarter of the 20th century. Nigeria was the world’s largest producer of cashew nut in 2010 with about 650,000 metric tons leading India with 37,000 tons since 2008.

Cashew is generally known as “kasu” to the Yoruba tribe of Nigeria, “caju” to the Portuguese, “acajou” to the Dutch and “cadju” to the Hindi. It is an essential part of the drupe family and its setting begins in the middle of dry season (Ezeagu, 2002) and its harvesting is usually done between early February to late March. The cashew tree is small and evergreen, growing to 10 – 12 meters (32ft) tall with a short, often irregularly shaped trunk. Both the cashew nut and apple grows together. The cashew apple ripens into a yellow and/or red structure of about 5 – 11 centimeters long with a fragile skin making it unsuitable for transport. The cashew nut has a shape which looks like an inverted kidney or boxing-glove (New world encyclopedia, 2008).

The current crisis in the cashew industry is mainly due to heavy fluctuations in kernel as well as raw nuts prices. Unethical practices, shipment delays and quality variations increased number of disputes (WCCE, 2019).

The economic importance of Cashew (*Anacardium occidentale* L.) as an export oriented cash crop is advancing much faster than anticipated. Many factors could be attributed to this, but most importantly is its

nut which is an important source of supplementary farm income to many local farmers and processors and from which Cashew Nut Shell Liquid (CNSL), an important industrial raw material for the manufacturing industry. The primary products of cashew nuts are the kernels which have values as confectionery nuts.

The cashew industry has contributed to the health sector of the economy. Ohler (1979) reported that fresh CNSL contains *anacardic* acid of about 90% by weight and these acids have been used effectively against tooth abscesses due to their lethality to a wide range of gram – positive bacteria. Cashew nut milk is a substitute for cow’s milk for the vegans. Magnesium content in cashew nuts is beneficial for promoting bone growth. The boiled bark of cashew plant is used as an anti-diarrhea medicine and the raw nuts powder of cashew are used for manufacturing anti- venom for snake bite.

Nigeria is the third world’s best cashew producing country with 594,000 metric tons (Food and Agricultural Organization, 2012) thereby generating over 600,000 jobs. The agro–processing industry has increased the export rate of Nigeria with the non-oil product value at 1.3billion dollar for the first half of 2012 (Nigerian Export Promotion Council). This has in turn given a face-lift to the domestic and international value of Nigeria.

In Ondo state, the amount of processed cashew nut and products is grossly inadequate compared to its demand. Some of the factors that have led to this are the scale of production and the processing methods and these have to be investigated.

In spite of the fact that cashew nut processing has numerous potentials to create employment, especially for women, produce kernels which have value as confectionery

nuts, CNSL which is a good raw material for manufacturing resin, generate income and thus improving the standard of living of the teeming rural populace, its level of production is still low. Many factors can be attributed to these low processing volumes; cashew production is dependent on weather, thereby leading to supply variance, there are limited nut processors and many people are not aware of the benefits that could be earned from the business, many local producers only engage in subsistence processing on a small scale, the exploration of by-products requires new technology rather than the locally fabricated equipment; most processors do not have access to finance to procure these modern equipment. Many producing families are small businesses emerging as small entrepreneurs and have hardly undergone any training or acquire the requisite skills for technical handling, branding and packaging, and processing of cashew nuts. Hence this study was conducted to examine the economics of cashew nut processing in the study area.

The following research questions were addressed in the course of carrying out this research;

State and in the South by Atlantic Ocean. The climate is tropical with two distinct seasons, the rainy season, (April-October) and dry season (November – March) with slight variations from year to year. Ondo State is one of the states created on 3rd February, 1976 with the capital in Akure, it covers an area of 14,798.8 Sq Km. The state has a population of 3,640,877 (National Population Commission, 2006). The people of the State are predominantly Yorubas. Major languages spoken by the inhabitants are Yoruba, Ijaw and English. Ondo state enjoys luxuriant vegetation where various

1. What are the socio-economic characteristics of the workers of the company?
2. What are the by-products derived from cashew nuts processing?
3. What are the costs and returns associated with cashew nut processing?
4. What are the major constraints associated with the processing of cashew nuts?

2. RESEARCH METHODOLOGY

Study area

This project was carried out in Ondo State, Nigeria. Ondo State lies between latitude 5° 45'

and 8° 15' North of the equator and longitude 4° 45' and 6° 60' East of the Greenwich meridian (Ministry of Economic Planning and Budget report, 2010). The State is bounded in the North-West by Ekiti State, West-Central by Osun State, South-East by Ogun State, South-East by Delta

cash crops such as Cashew, Palm produce, Kola nut, Timber, Maize, Yam, Plantain, Cocoyam, Cassava, Banana e.t.c are grown. The traditional occupation of the people inhabiting the study area is agriculture.

JOF Ideal Family Farms Limited, is the major cashew nut processing company in the state, the headquarter is located in Okeogun street, Owo. The processing plant is located along Benin/Owo expressway, Owo, Owo Local Government Area of the state. The company is an agro-allied company with large agro- processing activities using

cashew, palm kernel, cotton seed, e.t.c as her raw material. The products of the company include; cashew kernel, vegetable oil, cotton seed oil, camellia oil, olive oil and soyabeans oil.

Nature and sources of data

This research was carried out in Ondo State, focusing mainly on JOF Ideal Family Farms Limited, Owo as the case study. Primary and Secondary data were collected for the purpose of this study. Both data were collected from JOF Ideal Family Farms Limited, Owo.

Sampling Technique

Purposive sampling was used to select JOF Ideal Family Farms Limited in Owo, Owo local Government area of Ondo state as

Model Specification

Gross Margin Analysis

$$GM = TR - TVC$$

Where;

GM = Gross margin

TR = Total Revenue

TVC = Total Variable Cost

Regression Analysis

The Multiple Regression Model is stated below;

the case study. This was done because JOF Ideal Family Farms is the only cashew nut processing company in the State. The primary data were collected from the 'key' workers in the company through a Focus Group Discussion (FGD) with the aid of an interview schedule, while the secondary data were collected from the archive of the company.

3.0 Method of data analysis

Descriptive statistics such as mean, mode, median, frequency distribution, the use of tables etc. were employed to know the socio-economic characteristics of workers of the company, the byproducts derived from processed cashew nuts and the problems associated with cashew nut processing. The cost and returns of the cashew nut processing were determined using the Gross margin analysis.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e_i$$

Y = Total output (proxy by the income generated from sale of processed cashew nut products).

X₁= Cost of Labour in Naira

X₂= Maintenance cost in Naira

X₃= Cost of fuel/power source in Naira

X₄= Cost of transportation in Naira

e_i= Random error term

Y is the dependent variable

X₁....X₄ are the independent variables

Different functional forms such as linear, semi-log exponential and log-linear were fitted to the data after which the model that best satisfy the evaluating criteria was chosen. The explicit forms of the linear, semi-log, exponential and double-log are given by the following equations:

Linear function

$$Y_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e_i \dots\dots\dots 1$$

Cobb–Douglas Function

$$\text{Log } Y_i = \beta_0 + \beta_1 \log X_1 + \beta_2 \log X_2 + \beta_3 \log X_3 + \beta_4 \log X_4 + e_i \dots\dots\dots 2$$

Semi – Log function

$$\text{Log } Y_i = a_0 + \beta_1 \log X_1 + \beta_2 \log X_2 + \beta_3 \log X_3 + \beta_4 \log X_4 + e_i \dots\dots\dots 3$$

Exponential Function

$$Y_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e_i \dots\dots\dots 4$$

The evaluating criteria

The following criteria enabled the selection of the lead equation:

1. The goodness of fit: using the coefficient of multiple determination (R^2) and adjusted R^2 . The adjusted R^2 is a more desirable measure of goodness of fit than the R^2 because it is not influenced by the number of regressors.
2. The appropriateness of the signs and magnitude of estimated regression coefficients
3. The significance of the F- ratio as an indication of the specification of the whole output response model.
4. The statistical significance of the regression coefficient as determined using t - values

4.0 RESULTS AND DISCUSSION

4.1. Socio-economic characteristics of the workers of the company

The variables considered in the staff strength of the company include: Age, sex, level of education, number of male workers, number of female workers, and worker's qualification.

Frequencies and percentages were used in analyzing these. They are discussed below;

a. Age of the Respondents

The ages of the cashew nut processing workers ranged between 21 – 40 years. Table 1 shows that 16.7% of the workers were within ages 21 and 30 years while 83.3% of them were between 31 and 40 years. The implication of this is that they are still very young, agile and active.

Table 1. Age Distribution of the workers

Age in years	Frequency	Percentage (%)
21 – 30	15	16.7
31- 40	75	83.3
Total	90	100

Source: Field Survey, 2013

b. Gender of the respondents

Table 2 reveals that 83.3% of the cashew nut processing workers were

females while 16.7% were male. The dominance of the females in the processing activities may be due to the fact that it involves little or no stress.

Table 2: Gender Distribution of the Workers

Sex	Frequency	Percentage
Male	15	16.7
Female	75	83.3
Total	90	100

Source: Field Survey, 2013

c. Qualification of the respondents

Table 3 reveals that 11.1% of the workers are skilled while 88.9% of them are unskilled.

Table 3: Educational qualifications of the workers

Qualification	Frequency	Percentage
Skilled	10	11.1
Unskilled	80	88.9
Total	90	100

d. Marital status of the respondents

Table 4 below shows that 12.2% of the male workers are married, 70% of the female workers are married while the remaining 17.8% of the workers are singles.

Table 4: marital status of the respondents

Status/Sex	Frequency	Percentage
Married Male	11	12.2
Married Female	63	70
Others	16	17.8
Total	90	100

4.2 COMPANY PROFILE

The table below shows some of the company's information collected during the study

Table 5: Company profile

NAME	JOF Ideal Family farms Limited
YEAR OF ESTABLISHMENT	1989
OWNERSHIP OF THE COMPANY	Private ownership
MAJOR SOURCES OF FUNDING	Personal savings and Bank loan
DIVISIONS/SUBSIDIARIES	Water/juice division Oil division (vegetable and groundnut oil) Cashew nut division
MAIN PRODUCTS	Executive (Chef pure Soyabean oil) Ideal Nuts (Salted Cashew) Cedar Nuts (Salted Cashew) Quartz table water Quartz drink (Lemon/lime touch) Quartz Drink(Strawberry Touch) Tropicana (Pineapple Juice) Tropicana (Apple Juice) Tropicana (Mixed Fruit Juice) Royale Ground nut oil
LOCATION	6/7, Light Industrial Layout, Akure – Benin Expressway, Owo, Ondo state
MOTTO	Producing Lifestyle products for healthy living

Source : Field Survey, 2013

4.2.1 Organizational Structure of the company

The figure below shows the organizational hierarchy and chain of responsibility of the company

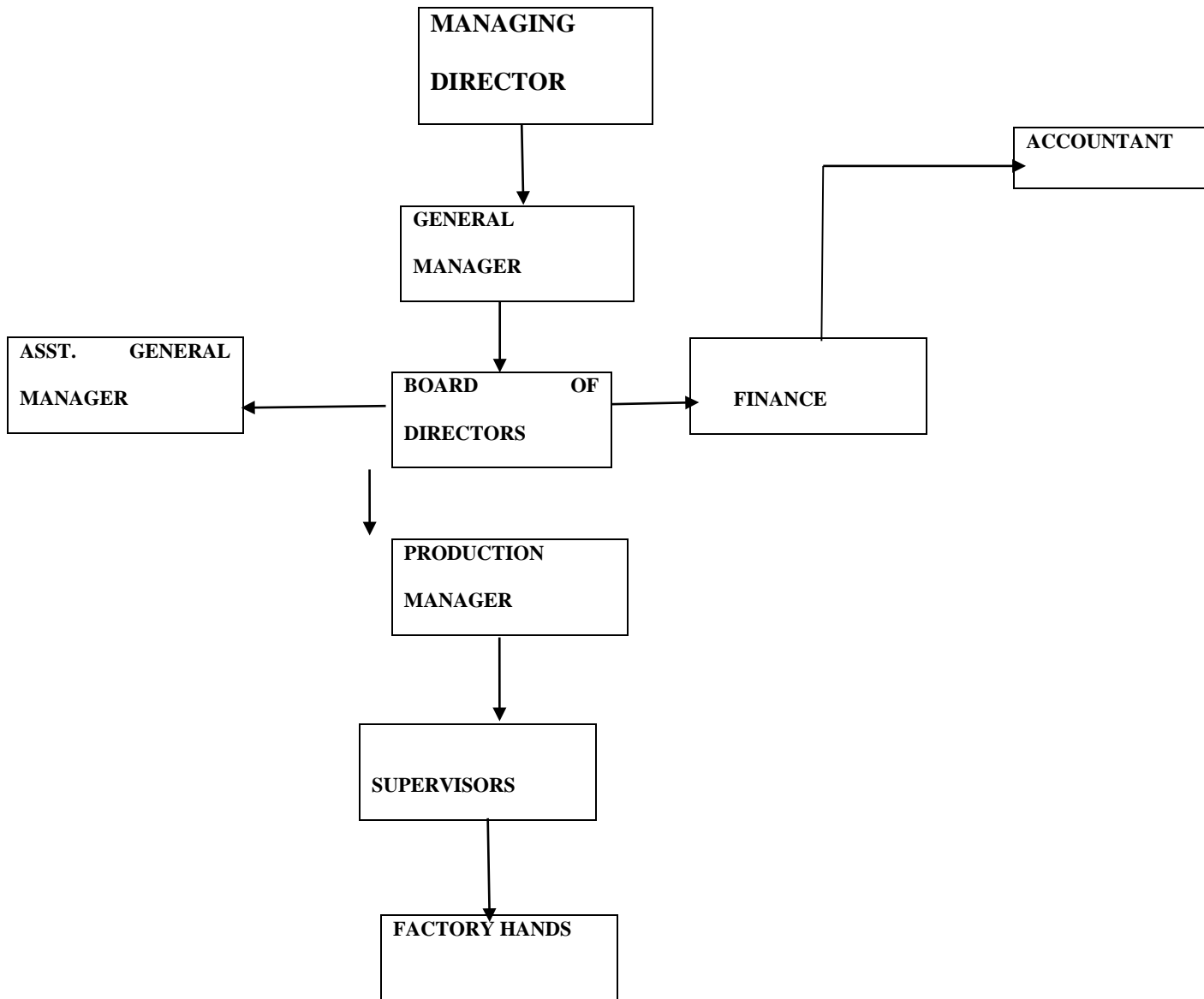


Fig. 7: Organogram of the company

Source; Field Survey, 2013

4.3 ECONOMICS OF CASHEW NUT PROCESSING

First stage: Boiling stage

a. Methods of processing

Different types of cashew nut processing methods are being adopted around the world, but the one adopted by JOF Ideal Family Farms Include the mechanical and manual methods of processing involving 6 principal stages as discussed below;

The raw cashew nuts after sun dried are poured to the boiling container. The steam engine attached to the boiling container is rolled to supply steam at 150⁰c to the container to pre-cook the nuts. The reason for pre-cooking is to reduce the acidic content of the cashew nut. The nuts are then roasted with a manually supplied fire with wood to shrink the whole for easy removal of the kernel. The nuts are then spread under shade to dry for a minimum of 8 hours.



Plate 1: The cashew boiling container

Source: Field Survey, 2013



Plate2: The steam Engine used to supply boiling gas

Source : Field Survey, 2013



Plate 3: The fire roasting of the nuts

Source : Field Survey, 2013

Second Stage: The cutting stage

The cashew nuts are put on the cutter manually to break the shell. The reason for not

adopting the mechanical method of cutting is because of the irregular shape of the nuts. The whole kernels are then collected on the other side of the cutter and weighed.



Plate 4: The cutter showing the nut cutting style

Source: Field Survey, 2013

Third Stage: The Drying Stage

The collected kernels are dried using a drying machine at 90⁰c

Fourth Stage : peeling Stage

The testa is stylishly removed from the kernel manually with knife as shown below;



Plate 5: Removal of the testa from the kernel

Source: Field Survey, 2013

Fifth Stage: Grading Stage

The spoilt (any spotted kernel) are first removed from the whole ones. The whole is then separated based on colour, structure and sizes. Table 6 shows the grades of the cashew nuts. The figures i.e 240, 230 and 450 are the various standard gross weights.

Table 8: Cashew Grades

S/N	CATEGORY	GRADE	NAME
1	Whole	W – 240 W- 320	White Wholes
2	Scorched wholes	SW-320 SW-450 SSW-240	Scorched Wholes Scorched Whole Seconds
3	Splits	FS-320	Fancy Splits
	Splits	SS-450	Scorched Splits
4	Butts	FB-320	Fancy Butts
5	Pieces	LWP	Large White Pieces
	Pieces	SWP	Small White Pieces
		BB	Babby Bits

Source: Field Survey, 2013

Sixth Stage : Packaging and Storage

The last stage is to package the kernels with 22.9kg/bag and sealed using oltremare sealing machine and later packed in cartons. The kernels are then stored for marketing. The machine contains CO₂ gas which prolongs the shelve life of the kernels for over two (2) years.



plate 6: The Oltremare nut sealing machine

Source: Field Survey, 2013

The flow chart for the production of cedar salted cashew is shown below;

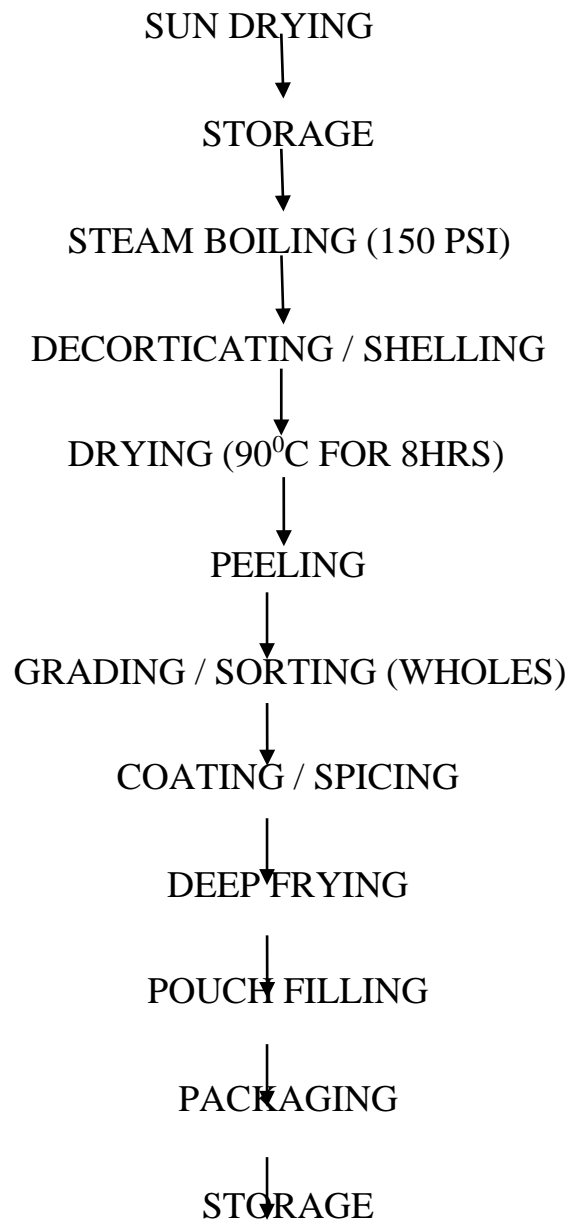


Figure 8: The flow chart for the production of cedar salted cashew Source: field Survey, 2013

b. Materials needed for processing the cashew nuts

The table below shows the materials needed for the processing of cashew nuts

Table 6: Materials needed for processing the cashew nuts

S/N	ITEM
1	Factory Building
2	Nut heater
3	Gas and Electric raw machine
4	Sheller/processing machine
5	Drum roaster
6	Bundles of firewood
7	Steam engine
8	Boiling container
9	Packaging nylon
10.	Oltremare sealing engine
11	Peeling knives
12	Trays
13	Benches and tables
14	Plastic containers
15	Cutting machine
16	Generator/power supply and
17	Labour

Source : field survey, 2013

4.3.1 Costs and Returns of Cashew nut processing

Table 7 shows the costs incurred by the company in processing cashew nut.

Table 7: Cost of processing the cashew nuts

S/N	ITEM DESCRIPTION	COST IN YEAR 2011(₦)	COSTS IN YEAR 2012 (₦)
1	Machinery/ Equipment	1,740,000	-----
2	Fuel (Diesel and petrol)	168,000	275,000
3	Maintenance	800,000	100,000
4	Transportation	40,000	55,000
5	Labour	1,800,000	1,200,000
6	Raw materials	23,200,000	13,000,000
	Total	27,748,000	14,630,000

Source; Field Survey, 2013

The table below shows the total output and average prices of the processed cashew nuts

Table 8: Total output, revenue and average prices of the processed cashew nuts

Total output	2011	2012
	27.6 Tons (27,600kg)	30.2 Tons (30,200kg)
Average price/Kg	₦ 2,000	₦ 2,500
Total revenue	2,000 X 27,600Kg = ₦ 55,200,000	2,500 X 30,200Kg = ₦ 75,500,000

Source: Field Survey, 2013

For year 2011;

$$GM = 55,200,000 - 26,008,000$$

Total Variable Cost = cost of Fuel +
maintenance + transportation + Labour + Raw
materials = ₦ 26,008,000

$$= ₦ 29,192,000$$

The Gross margin Analysis (GM) = TR
-TVC

For year 2012;

Total Variable Cost = cost of Fuel + maintenance + transportation + Labour + Raw materials = ₦ 14,630,000

The Gross margin Analysis (GM) = TR – TVC

GM = 75,500,000 - 14,630,000

= ₦ 60,870,000

The above analyses show that cashew nut processing is highly profitable

4.4. THE FOCUS GROUP DISCUSSION RESULT

Primary data were collected from 14 key workers in the company using a Focus Group Discussion approach. Interaction with the workers shows that 70% of the female workers are married, about 12.2% of the male workers are also married while the remaining 17.8% of the workers are single. The total number of unskilled workers accounted for 88.9% of the workers as reported by the production manager. The average monthly salary of the unskilled workers is based on work done/output. Most of the women were engaged in peeling, pouch filling and packaging while few men engage in Steam boiling, Roasting and storage. Most of the workers said they have other petty jobs after the closing hour (7am- 5pm Monday to Saturday). The discussion revealed that the company gets their major raw material supply from Enugu, Ibadan, and Kogi cashew depots in trailers and not usually from individual subsistent farmers. The major by-product

derived from the cashew nut processing is Cashew Nut Shell Liquid (CNSL).

4.5 Constraints facing the cashew nut processing company

The discussion revealed that the company was closed down in 2010 (prior to re-opening in 2011) due to branding and packaging problems and high cost of labour and delay in salary payment of workers, poor access to quality raw materials and large Demand-Supply gap. However, these problems were ranked using 5-point Likert Scale of 1 to 5;

1—most severe constraint

2—more severe constraint

3—severe constraint

4—less severe constraint

5— constraint

The major problems that the company has encountered were listed as;

1—Poor access to quality raw materials

2—Large Demand-Supply gap

3—High cost of labour

4—Delay in salary payment of workers.

5—branding and packaging problem



Plate 7: Data collection on the opinions/problems facing the workers, using Focus Group Discussion

Source : Field Survey, 2013



Plate 8: Data collection from the 14 ‘key’ workers on production Dynamics of the processing industry, using Focus Group Discussion Source : Field Survey, 2013

5. CONCLUSION

The study examined the economics of cashew nut processing in Ondo State, Nigeria using JOF Ideal Family Farms Limited, Owo as a case study. The study revealed that majority of the workers engaged in the cashew nut processing activities were of middle age whose ages ranged between 21 and 40 years. The female workers accounted for 83.3% of the workers. 11.1% of the nut processing workers were skilled while 88.9% of them were unskilled. The Focus Group Discussion revealed that 70% of the female workers and 12.2% male workers are married while the remaining 17.8% of the workers are single. The result showed that the total variable cost incurred by the company for processing cashew nuts in year 2011 was ₦ 26,008,000 with ₦ 55,200,000 revenue, indicating a gross margin of ₦ 29,192,000, while in 2012, a total variable cost of ₦ 14,630,000 was incurred with ₦ 75,500,000 revenue indicating a Gross Margin of ₦ 60,870,000.

The study however identified some constraints facing cashew nut processing by the company. They include; poor access to quality raw materials, large demand-supply gap, High cost of labor, delay in the payment of salary of workers, branding and packaging problem.

Manual cutting of the roasted cashew nuts during processing wastes time, a mechanical method is preferable but it was not adopted because of the irregular shape and sizes of the cashew nuts.

The discussions and analyses showed that cashew nut processing is a profitable venture in Ondo State but requires a huge initial capital investment to start full operation.

Based on the findings of this study, the following recommendations were made:

1. Government should take drastic steps in funding agro allied companies and individuals who are interested in cashew nut processing as a business in Ondo state.
2. More farmers especially the youths should engage in cashew farming, this will increase the availability of cashew nuts for the processing industries.
3. Government should provide adequate mechanization and incentive to reduce drudgery of cashew nut processing in the state.
4. There should be adequate public sensitization on the prospects in cashew nut processing as a business.
5. Cashew nut marketers should ensure adequate grading and measuring standards to reduce adulteration of nuts and also improve branding and packaging systems.
6. Also, Government cannot do everything, there is the need for Public-Private Partnership

(PPP) in cashew nut processing.

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