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Research Paper

Analysis of Costs And Returns of Groundnut Processing in Taraba State,Nigeria.

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ABSTRACT: *This study analyzed the costs and return of groundnut processing in Taraba State, Nigeria. A purposive and three-stage sampling technique were adopted in selecting the data used for the study from a sample of 170 groundnut processors. Descriptive statistics, gross margin and return on investment were used to analyze the data. The study revealed that (31%) of the processors were between the age group 36-45, most of the processors (45%) were married and 95% of them were women. Majority of the processors 58% had house hold size ranging from 6-10. The study also shows that majority of the processors 58% had informal education and relied mostly on traditional tools and equipment for processing groundnut and most of the them 46% had years of experience in groundnut processing between 11-20. The gross margin of groundnut oil processors was estimated at ₦103 per kg of raw groundnut. The return on investment in the enterprise was estimated at 41%. Based on the findings, this study recommends that effort should be made to encourage groundnut processors to form cooperate societies in order to enable them acquire equipment and funds from banks and government. Government should encourage the public and private sectors to support and invest in ground processing.*
Keywords*: costs, Returns, Groundnut, Processing and Taraba State.*

I. INTRODUCTION

Groundnut (Arachis hypogea) originated from South America, but is now widely cultivated throughout the tropical, sub- tropical and temperate countries, and in Africa, Asia, North and South America. Processing of agricultural products is generally accepted as the efficient method of maintaining the shelf-life of produce. Such processed products provide local foods for consumption among the rural population (Zuberu et al., 2013). Hence, the importance of crop processing industries especially in Nigeria cannot be over emphasized. The crop processing industry of Nigeria like other African countries is dominated by the informal sector comprising mainly of small and medium scale rural enterprises owned and operated by men and women who depend solely on indigenous technology (Aseidu, 2009). Groundnut, soya beans, banana, palm kernel, potatoes, cassava, et cetra were some of the dominant agricultural produce that are processed into local foods consumed by the rural communities in Nigeria (Napodo and Ditto, 2013).

Groundnut is one of the most valuable legume crops of Nigeria and other tropical countries with 25 percent protein and more than 40% oil. Nigeria is a major producer of groundnuts accounting for 25 percent of world exports (IFPRI, 2012). In 2004 the country had 3500 hectares cultivated and production of 2750 tonnes (NBS, 2013). Groundnut accounted for 70% of total Nigeria export prior to petroleum oil boom (World Geography of Peanut, 2013). Groundnut is widely consumed in Nigeria as roasted or boiled nuts in the Western and Southern parts of the country (Adebesin et al., 2011).

Groundnut has contributed immensely to the development of the Nigerian economy in general and employment generation among the rural groundnut farmers and processors in particular. Also, they are important in the confectionary trade among the rural traders and the stable oil from groundnut is preferred by the deep-frying industries since it has a smoke point of 229.4^0 c compared to soyaoil.

The oil is also used to make margarine and mayonnaise (Hulme and Mosley, 1996). Confectionary products such as snack nuts, sauce, flour, peanut butter and cookies are made from high quality nuts of the crop.

Groundnut plays an important role in the diets of rural populations, particularly children, because of its high contents of protein and carbohydrate. It is also rich in calcium, potassium, phosphorus, magnesium and

vitamin E. Groundnut meal, a by-product of oil extraction, is an important ingredient in livestock feed. Groundnut haulms are nutritious and widely used for feeding livestock. The groundnut oil is composed of mixed glycerides, and contain a high proportion of unsaturated fatty acids, in particular Oleic (50-56%) and Linoleic (18-30%) (Young, 1996).

Nigeria was the third highest producer of groundnut in the world after China and India with a production of 16,114,231, 6,933,000 and 2,962,760 tons respectively in 2011. In Nigeria, the crop is presently grown throughout the country with the exception of the riverine and swampy areas. The leading producing states in Nigeria include Niger, Kano, Jigawa, Zamfara, Kebbi, Sokoto, Katsina, Kaduna, Adamawa, Yobe, Borno, Taraba, Plateau, Nasarawa, Bauchi, and Gombe States (Yusuf, 2008).

In the Northern part of Nigeria, apart from being consumed raw, edible groundnuts are processed into many local foods or included as an ingredient in a wide range of other products which includes groundnut paste which is fried to obtain groundnut cake salted groundnut, a gruel or porridge made with millet and groundnut, groundnut candy and groundnut soup. The shells are used for fuel by some local oil factories or they are sometimes spread on the field as a soil amendment. They could also be used as bulk in livestock rations or in making chipboard for use in joinery (Mukhtar, 2009).

In Taraba State, in particular, some of the processed local foods from groundnut include Nigeria groundnut cake called "kulikuli", groundnut oil, groundnut pap, salted groundnut etc. The root could also be processed in a variety of ways, like roasting, baking, boiling, frying or drying for flour while the seeds can be substituted for beans or lentile in soups and stews (Brian, 2009).

Groundnut cake is a popular local food consumed even by both the urban and the rural population in Taraba State. However, despite the importance of groundnut oil and cake processing ventures in employment generation and poverty reduction among the rural population in Taraba State, there was paucity of information about their impacts on the profitability level of the processors in the State. In order to close this gap, this research focused on the processing of groundnut into groundnut cake and groundnut oil in Taraba State.

Objectives of the study

i. examine the socio-economic characteristics of groundnut processing entrepreneurs in the study area;
ii. estimate the costs and returns of groundnut processing
iii. determine the return on investment in groundnut processing in the study area;
iv. identify the major constraints associated with groundnut processing in the study area.

II. METHODOLOGY

The Study Area

The study was conducted in Taraba State of Nigeria. Taraba State is located in the north-eastern part of Nigeria. The state lies between latitude 6º 30' and 9º 36' north of the equator and longitude 9º 10' and 11º 50, east of the Greenwich meridian (Taraba State Ministry of Information, Youth, Sport and Culture [TSMIYSC], 1999). The State consists of undulating landscape dotted with a few mountainous features. These include the scenic and prominent Mambilla plateau. Also the State lies largely within the tropical zone and has a vegetation of low forest in the southern part and grassland in the northern part. The Mambilla plateau within an altitude of 1,800 meters above sea level has a temperate climate all year round. It shares common boundary with Bauchi State in the north and Gombe State in the north east, Adamawa State in the east and Plateau State in the North West. The State is further bounded to the west by both Nassarawa and Benue States, while it shares an international boundary with the Republic of Cameroon to the south and south east. It consists of sixteen Local Government Areas with an estimated population of 2,688,944 (2006 census). It has a total land area of 54,473km. The soil type is predominantly sandy loam in the northern part and loamy clay in the southern part. The mean annual rainfall ranges from 800mm in the north to over 1800mm in the south, while the daily temperature ranges between 14.8°C and 34.4°C. Taraba State have many ethnic groups, including, Jenjo, Kutep, Chamba, Mumuyes, Mambila, Wurkums, Fulani's, Jukun, Ichen, Tiv, Kaka, Hausa and Ndoro. The major occupation of the people is Agriculture. Cash crops produced in the state include coffee, tea, groundnut and cotton. Crops such as maize, rice, sorghum, millet, cassava and yam are produced in commercial quantity. Also livestock such as cattle, sheep and goats are produced in fairly large scale.

Population and Sampling Procedure

The population of study consists of all groundnut processors in the study area. Sample was selected from the population of all groundnut processors in the study area. It was selected using multistage sampling techniques. Three Local Government Area (Zing, Ardokola and Yoro) were purposely selected at the first stage, due to the high level of groundnut production in the area. Two wards were also purposely selected from each of the Local Government Area because of the concentration of the respondents in the wards, making the total of six wards namely: Zing, Munkin, Kwanaduste, Sunkani, Yorro and Pupule at the second stage. Simple random

sampling was usd at the third stage to select 30% of the population of respondents from each of the six wards making a total of 170 respondents. The sample selection plan table shows how the simple random selection of respondent at ward level was done.

Table 1: Sample selection plan

Local Government Area	Wards	Population	Sample proportion	Sample size
Zing	Zing	83	0.3	25
	Munkin	100	0.3	30
Ardokola	Kwanadutse	118	0.3	35
	Sunkani	100	0.3	30
Yorro	Yorro	50	0.3	15
	Pupule	118	0.3	35
Total		569		170

Source: Researcher's sample design, 2016.

Data Collection and Analysis

Primary data were collected using structured questionnaire on the socioeconomic characteristic of groundnut processors and constraint associated with groundnut processing. Prior to the administration of the questionnaires, the questionnaires were pre-tested and necessary corrections were made. Content validity was used to determine the adequacy of the research instrument. In the process, the instrument was thoroughly examined by appropriate experts independently. The experts gave their critical opinion on the adequacy and relevance of the instrument to the objectives of the study. The observation was harmonized and necessary corrections were effected on the instrument before the field survey commenced. The test retest method was used to determine the reliability of the research instrument. Twenty copies of the research instrument was administered twice to the respondents at a given intervals. The two results were correlated and a correlation coefficient of 0.920 was obtained indicating high reliability.

The data collected for this study was analyzed using both descriptive and inferential statistics. The descriptive statistics such as mean, frequency and percentages was employed to analyze the socio-economic characteristics of groundnut processors in Taraba State while gross margin was used to determine the profitability of groundnut processing while return on investment was used to determine the profit per unit of investment in the study area.

Gross Margin Analysis

The gross margin of an enterprise is the difference between total revenue from production and variable cost of production. Gross margin is used as a measure of profitability when fixed cost of the enterprise is negligible. Gross Margin (GM) was used to determine the Profitability of groundnut processing. Total Revenue includes the returns from groundnut oil and groundnut cake, while total variable cost includes cost from raw groundnut, salt, water, pepper, firewood and cost of other variable inputs. Gross margin is expressed as follows:

GM = TR-TVC (N/Kg)

Where:

GM = Gross Margin (N/30Kg) groundnut

TR = Total Revenue (N/Kg) from

groundnut oil and groundnut cake

TVC = Total variable cost (N/Kg) of producing groundnut oil and groundnut cake.

Return on investment

Return on investment (ROI) was used to estimate how much money the enterprises earn in return for every one naira invested (Upland Development Program, 2002). Return on investment is expressed as follows:

ROI = TR - TVC ÷ TVC × 100

Where,

TR = Total return from groundnut cake and ground oil

TVC = Total variable costs of inputs in groundnut processing

ROI = Return on investment

III. RESULTS AND DISCUSSION

Social Economic Characteristics Of Groundnut Processors

The result in Table 2 shows that 31.2% of the respondents were aged group 41-50 while 3.5% were in age group 1-20. This implies that most of the respondents are middle aged and hence agile and economically productive. This is in line with the finding of Asa (2003) who studied the effect of Akwa Rubber Estate Limited on the Livelihood of Rural People and found out that people in this group are more economically active and independent than those in the age group less than 21 years and above 60. The result also reveals that 44.7% of the respondents were married while 10.0% were single. The large population of married women in groundnut processing could be as a result of high family responsibility on the women and as such there is need for them to engage in extra hard work to enable them meet up with home and business challenges. This is similar to findings of Abdulazeez et al. (2012) in a study of Economies of Small-scale Agro-enterprise which states that majority of women processors are married. The analysis of sex shows that majority of the groundnut processors were female (95.3%), only 4.7% were male. This could be due to the fact that the production of groundnut oil and groundnut cake involves a lot of tedious activities and patience that can only be conveniently carried out by women and also the business requires little amount of money to start, this makes it easier for them to embark on it as they are considered to be backward financially in the study area.

This is similar to the findings of Hussaini et al. (2010) in an evaluation of Groundnut Processing by Women which states that groundnut processing is mostly done by women. Analysis of the distribution of household size shows that most of the processors (57.6%) had household size ranging from six to ten; only 7.6% had household size above 15. This implies that the women processors have access to family labor especially for the tedious operation since a larger family may have sufficient family labor for production. This is similar to the finding of Ogundele (2003) who studied Technology Differentials and Resource-Use Efficient in Rice Production and found out that household size plays a significant role in small-scale enterprises where entrepreneurs rely on household members for the supply of about 80% of the labour requirement and it can be used as proxy to family labour availability. The result further revealed that majority (57.6%) of the respondents had informal education while 1.7% had tertiary education. This implies that processors in the study area have low level of education and relied mostly on traditional tools and equipment for processing groundnut, hence, earn low profit. Since education plays a significant role in technology transfer and skill acquisition, processors with high level of education earn high profit because they can easily adapt to new technologies.

This result is in line with the findings of Kumbhakar and Bhattacharya (1992) who studied Price Distribution and Resource Use Inefficiency and Abdulai and Huffman (1998) in an Examination of Profit Inefficiency of Rice Farmers and found out that education have positive impact on profitability of their respondents. Results of the years of experience shows that 46.5% of the respondents have been engaged in the enterprise for about 11-20 years, only 17.1% had processing experience for more than 20 years. This implies that the processors are highly experienced in the enterprise and that introduction of any change may be difficult to adopt. This is different from the findings of Abdulazeez et al. (2012) that studied the economies of small-scale agro-enterprise in Nigeria and found out that most of the women groundnut processors had household size ranging from 6-10.

Table 2: Socio-economic Characteristics of Groundnut Processors (n-170)

Variable	Frequency	Percentage	Mean	Standard deviation
Age (Years)			42.03	12.62
1-20	6	3.53		
21-30	22		12.94	
31-40	48		28.24	
41-50	53		31.18	
51-60	28		16.47	
Above 60	13		7.65	
Marital Status				
Single	17		10.00	
Married	76		44.71	
Divorced	32		18.82	
Widowed	43		25.29	
Sex				
Male	8		4.71	
Female	162		95.29	
Household Size			8.21	4.03
1-5	39		22.94	

6-10	98		57.65			
11-15	20		11.77			
Above 15	13		7.65			
Level of Education						
Primary	46		27.06			
Secondary	23	13.53				
Tertiary	3		1.77			
Informal	98		57.65			
Processing Experience				13.56		7.05
1-10	62		36.47			
11-20	79		46.47			
Above 20	29		17.06			
Income				10,006.38	696.6	
8,001-9,000	20		11.77			
9,001-10,000	44		25.88			
10,001-11,000	106		62.35			

Source: Field survey, 2016

Gross Margin Analysis

Gross margin (GM) was used to analyze the costs and returns in the production of groundnut oil and groundnut cake. It was used to measure profitability on the assumption that the fixed costs of production are negligible (Atingha, 2007). Total revenue include the returns from groundnut oil and groundnut cake, while total variable cost includes cost from raw groundnut, salt, water, pepper, firewood and cost of other variable inputs. Costs and returns in the production of groundnut oil and groundnut cake per 30kg of raw groundnut processed are presented in Table 3. The average total cost of processing was ₦7,440 which was dominated by the variable cost of raw groundnut that accounted for 89% of the average total cost.

The average gross returns of ₦ 10,630 was obtained from groundnut processing. The return from groundnut oil accounted for 81.3% of the average total revenue, while groundnut cake which is a bye product yield revenue of 18.7%. The gross margin per week of 30kg groundnut processed was estimated as ₦3,190. In a month, which on the average involved 4 cycles, a gross margin of ₦12,760 was realized. Therefore, this implies that groundnut processing is profitable in the study area. This is similar to the findings of Rahman (2003) and Iliyasu et al. (2008) that groundnut processing is a profitable enterprise. The return on investment in groundnut oil and groundnut cake production was estimated as 43% (₦0.43). This means for every one naira invested in production of groundnut oil and groundnut cake a profit of 43 kobo is realized, Since the prevailing interest is 24% in the economy. Therefore, investment in groundnut oil and groundnut cake production is profitable.

Table 3: Costs and returns in production of groundnut oil with 30kg of groundnut.

Items	**Quantity**	**Amount (₦)**	**Percentage (%)**
Revenue			
Groundnut cake (kg)	19.87	1987	18.69
Groundnut oil (liter)	57.62	8643	81.31
Average total revenue	**77.49**	**10630**	**100**
Variable cost			
Groundnut (kg)	30	6600	88.71
Labor (man days)	1	450	6.17
Grinding	-	200	2.74
Firewood (kg)	25	100	1.37
Salt(g)	0.5	20	0.27
Pepper(g)	0.2	10	0.14
Water (liters)	20	10	0.14

The Return on Investment

The return on investment in groundnut oil and groundnut cake production was estimated as 43% (₦0.43). This means for every one naira invested in production of groundnut oil and groundnut cake a profit of 43 kobo is realized, Since the prevailing interest is 24% in the economy. Therefore, investment in groundnut oil and groundnut cake production is profitable.

Table 4: Costs and returns in production of groundnut oil with 30kg of groundnut

Items	Quantity	Amount N	Percentage (%)
Revenue			
Ground nut cake (kg)	19.87	1,987	18.69
Ground oil (litre)	57.62	8,643	81.31
Average total revenue	**77.49**	**10,630**	**100**
Variable cost			
Ground nut (kg)	30	6,600	88.71
Labour (Man days)	1	450	6.17
Grinding	-	200	2.74
Firewood (kg)	25	100	1.37
Salt (g)	0.5	20	0.27
Pepper (g)	0.2	10	0.14
Water (litres)	20	10	0.14
Transport	-	50	0.69
Average total variable cost	**-**	**7,440**	**100**
Gross margin	**-**	**3,190**	**-**
Return on investment	**-**	**0.428**	**43**

Source: Field survey, 2016

Constraints Associated with Groundnut Processing

The result in Table 5 shows that the constraints faced by groundnut processors in the study area vary from one respondent to another. However, three major constraints were pointed out by the processors which include, seasonality nature of groundnut, unavailability of high oil yielding groundnut variety and inadequate capital for business expansion. The most important constraint faced by groundnut processors in the study area was the unavailability of high oil yielding groundnut variety. Processors prefer using raw groundnut with high oil content, since their profit depends on the quality and quantity of groundnut oil and groundnut cake they produce, and the aim of every business is to make profit. However, this groundnut variety is mostly unavailable or expensive.

This results in low profitability and hence leads to poor participation of women in the enterprise. However, this is different from the findings of Abdulazeez et al. (2012) in their study of economics of small-scale agro-enterprise in Kwara State, Nigeria, which states that the major constraints associated with groundnut processing are household size and processing experience. Secondly, seasonal supply of groundnut; It is available at the end of the crop production cycle. Its supply is usually available only during one or two brief periods in the year. The demand for groundnut oil and groundnut cake is relatively constant throughout the year.

Therefore, processors must contend with a supply imbalance and problems of inventory management, production scheduling and coordination among processing and marketing segments of the processors-to-consumer chain. Seasonality also leads to a shortage in the working capital available to handle the bulge in expenses and the heavy financial cost of carrying the inventory. Such financial shortages can lead to short falls in raw material procurement, causing severe under-utilization of the processing plant's capacity and hence decrease profitability. A similar finding was also made by Haruna et al. (2006) in their study of the economics of groundnut processing among the rural women in Katagun Local Government Area, Bauchi State, Nigeria. Thirdly, groundnut processors in the study area are poor and hence lack capital for business expansion. They work to acquire basic necessities such as food, clothing and shelter through groundnut processing. This has manifested in continuous food crisis associated with shortfall in supply, rising cost of living, poverty, malnutrition, and disease and social unrest. In the time past several programs were been carried out by researchers and government through the Microfinance Bank and Bank of Agriculture and these have impacted positively on the production of groundnut oil and groundnut cake. There are, however some locations in Taraba State that were not captured during the dissemination of financial support for increased return on groundnut processing. This is in line with the findings of Haruna et al. (2006).

Table 4: Constraints associated with the production of groundnut oil and groundnut cake.

Constraint	Mode	Ranking
Seasonality of groundnut	45	1
Unavailability of high oil yielding groundnut variety	38	2
Inadequate capital for expansion	25	3
Low volume of product	14	4
Inconsistent and insufficient supply of raw groundnut	11	5
Inappropriate or obsolete processing	9	6
Lack of readily available market	7	7

Inadequate processing equipment	6	8
Unstable price of output	4	9
Unstable price of inputs	3	10
Incomplete return from credit sales	2	11

Source: Field survey, 2016.

Conclusion and Recommendations

Groundnut processing in the study area is mostly carried out by married women between the age group 41-50, with household size ranging from 6-10. Most of them had informal education and experience in the production of groundnut oil and groundnut cake for about 11-20 years. Groundnut processing is a profitable business with attractive net return on investment. However, the production of groundnut oil and groundnut cake is affected majorly by seasonality of groundnut, in availability of high oil yielding groundnut variety and inadequate capital for business expansion. Groundnut processing has been a major source of employment and income to the society. Thus, more efforts need to be made at increasing the level of groundnut oil and groundnut cake production so as to improve the livelihood and economic activities of the small scale entrepreneurs in the study area.

Based on the findings of the study, the following recommendations are made:

i. Effort should be made to encourage groundnut processors to form cooperative societies in order to enable them acquire equipment and financial support from banks and government to increase their capital base needed to boost the level of groundnut oil and groundnut cake production.
ii. Government should provide adequate storage facilities at an affordable price in order to ensure the availability of groundnut throughout the year.
iii. Research institute should provide high oil yielding varieties of groundnut at affordable price and be made available to groundnut processors.
iv. Government should encourage the public and private sectors to support and invest in groundnut processing.

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