WHY THE ECONOMICS OF GROUNDNUT PROCESSING IN AKWANGA LOCAL GOVERNMENT AREA, NASARAWA STATE, NIGERIA

Abdulahmeed A. GIREI[1], Saleh I. AUDU[2], Enai G. ONUK[1], Zainab M. ISMAIL[1]

[1]Nasarawa State University, Department of Agricultural Economics and Extension, Keffi, Nigeria, Email: agirejo@gmail.com
[2]Kogi State University, Department of Agricultural Economics & Extension, Anyigba, Nigeria

Corresponding author: agirejo@gmail.com

Abstract

Despite Nigeria`s plentiful agricultural resources and oil wealth, poverty is widespread in the Country and has increase since the late 1990`s, neglect of rural infrastructure affects the profitability of agricultural production. The lack of roads impedes the marketing of agricultural communities prevents farmers from selling their produce at reasonable price and leads to spoilage. The study was designed to analyze the economics of groundnut processing in Akwanga Local Government Area of Nasarawa State, Nigeria. A purposive sampling technique was adopted in collecting the data used for the study from a sample of 60 groundnut processors. Descriptive statistics and gross margin analysis was used to analyzed the data collected. The study revealed that 98.3% of the respondents are females who used groundnut seed, firewood, water, labour and grinding machine in processing groundnut. The study estimated the average variable cost per 100 kg of groundnut seed per cycle at ₦27,487.12 while the average total revenue was estimated at N36,340.00 thus, a gross margin of ₦8,852.88 per 100 kg of groundnut seed per cycle. The return per naira invested (ROI) was estimated at ₦0.322. This indicates that groundnut processing is a profitable business in the study area. The study further revealed that majority of the respondents were constrained by inadequate capital, inadequate processing machine, risk of buying low quality raw materials, inadequate capital, unstable prices of inputs and unsteady market for products. Based on the findings the study recommended that groundnut processors should be encouraged to form cooperative societies so that they can speak with common voice in their attempt to acquire input and sell their output, affordable and accessible credit facilities should be made available to processors among others. Farmers should be persuaded to dry their groundnut seed properly before barging them to prevent the seed from spoilage.

Key words: *economics, groundnut, processing*

INTRODUCTION

Agro-processing could be defined as a set of techno-economic activities carried out on an agricultural commodity for the purpose of making it usable as food, feed, fibre, fuel or industrial raw material [25]. It is generally a value additional that is being carried out in order to produce same or new product in a more acceptable form and quality. A common and traditional definition of agro-processing industry refers to the subset of manufacturing that processes raw materials and intermediate products derived from the agricultural sector. Agro-processing industry thus, means transforming products originating from agriculture, forestry and fisheries, livestock [9].
According to [25], the agro-processing value chain encompasses all subsequent operations after the stage of harvest till the produce reaches the final consumer in the desired form, packaging, quantity, quality and price. Such activities comprise two major categories; primary and secondary processing operations. The agro-processing industry is of strategic importance to the economy, first, due to its high multiplier effect towards job creation and second, due to its backward linkage with primary agriculture and forward linkage with other tertiary economic sectors such as manufacturing and retail Department of Trade Industry [6].
Department of Agriculture and Forestry [7] asserted that, in 2011 the agro-processing industry contributed 30.5% of real value added (GDP) to the manufacturing sector and 29.8% of output in real terms. In addition it

contributed 39.2% of the total employment in the manufacturing sector [7]. According to [9], most preservation techniques, for example, are basically similar over a whole range of perishable food products, whether they are fruit, vegetables, milk, meat or fish. In fact, the processing of the more perishable food products is to a large extent for the purpose of preservation. Non-food industries, in contrast to the food industries, have a wide variety of end uses. Almost all non-food agricultural products require a high degree of processing. Much more markedly than with the food industries, there is usually a definite sequence of operations, leading through various intermediate products before reaching the final product. Because of the value added at each of these successive stages of processing, the proportion of the total cost represented by the original raw material diminishes steadily. A further feature of the non-food industries is that many of them now increasingly use synthetics and other artificial substitutes (especially fibres) in combination with natural raw materials.

Another useful classification of agro-processing industry is in upstream and downstream industries. Upstream industries are engaged in the initial processing of agricultural commodities. Examples are rice and flour milling, leather tanning, cotton ginning, oil pressing, saw milling and fish canning. Downstream industries undertake further manufacturing operations on intermediate products made from agricultural materials. Examples are bread, biscuit and noodle making, textile spinning and weaving; paper production; clothing and footwear manufacturing; and rubber manufactures [25]. Groundnut (*Arachis hypogeae* Linn) also known as peanuts, earthnuts, gobbers, pinders, manila nuts, monkey nuts, etc originated from Latin America [5, 18]. The Portuguese introduced it into African continent from Brazil in the 16th century [14, 1]. It is a member of the genus Arachis in the family of *leguminosae* (*fabaceae*). Groundnut is the 13th most important food crop of the world. It is the world's 4th most important source of edible oil and 3rd most important source of vegetable protein [13, 27].

Groundnut is grown on 26.4 million hectares worldwide with a total production of 36.1 million metric tonnes, and an average yield of 1.4 metric tons/ha [11]. According to [12], [13] groundnut is grown in nearly 100 countries with China, India, U.S.A, Indonesia, Nigeria, Myanmar and Sudan as major producers. Nigeria account for 25% of world exports [17]. Groundnut accounted for 70% of Nigeria's total export prior to petroleum oil boom World Geography of Peanut [28].

The groundnuts are shelled and cleaned by winnowing to get the seeds. The seeds are roasted and then allowed to cool. The roasted seeds are rubbed against one another in a container to remove the covering. The clean seeds are groundnut into paste. The paste is then mashed with warm water and oil rises to the surface and is skimmed off. The oil with some water is fried over a low fire flame to remove the water from the oil. The remaining chaff (Tunkuza) is then molded into different shapes and fried in the extracted oil to produce groundnut cake (*Kulikuli*) [4]. Groundnut kernels contain 40-50% protein and 10-20% carbohydrates [10], [26]. According to [10] groundnut seeds are nutritional source of Vitamin E, niacin, falacin, calcium, phosphorus, magnesium, zinc, iron, riboflavin, thiamine and potassium. Groundnut kernels are consumed directly as raw, roasted or boiled forms. Oil extracted from the kernels is used as culinary oil. The vines are used as fodder for cattle [15].

Groundnut is useful in treatment of *haemophilia*, and can cure *stomatitis,* prevent *diarrhoea* and is beneficial for growing children, and for both pregnant and nursing mothers [3]. The crop is used as industrial materials for producing oil-cakes and fertilizer. All parts of the groundnut plant are used in one way or the other. These multiple uses of groundnut plant make it important for both food and cash-crop for the available domestic, or worldwide external markets in several developing, and developed countries. Globally, 50% of the produce is used for oil extraction, 37% for confectionery use and 12% for seed purpose [27].

As reported by Rural Poverty in Nigeria [24] despite Nigeria's plentiful agricultural

resources and oil wealth, poverty is widespread in the country and has increased since the late 1990s. Some 70 percent of Nigerians live on less than US$1.25 a day. Poverty therefore, is said to be severe in rural areas, where up to 80 percent of the population lives below poverty line, and social services and infrastructure are limited. The country's poor rural women and men depend on agriculture for food and income. About 90% of Nigeria's food is produced by small-scale farmers who cultivate small plots of land and depend on rainfall rather than irrigation systems. The small scale farmers consider agriculture as an occupation rather than business. The poorest groups eke out a subsistence living but often go short of food particularly during the pre-harvest period. Women play major roles in the production, processing and marketing of food crops, yet women and households headed by them are often the poorest members of rural communities.

Neglect of rural infrastructure affects the profitability of agricultural production. The lack of roads impedes the marketing of agricultural commodities, prevents farmers from selling their produce at reasonable prices, and leads to spoilage. Limited accessibility cuts small scale farmers off from sources of inputs, equipment and new technology, and this keeps yields low (RPN, 2015) [24]. In the face of such severe constraints to livelihood, self-employment in small-scale business presents a constructive option for income generation. In many communities, a high percentage of small-scale businesses that cater for local needs most especially groundnut processing, are controlled or owned by women. These women undertake these small-scale businesses as an alternative means to livelihoods.

The enormous contribution of Small-Scale Enterprises (SSEs) to the social and economic advancement of any locality cannot be over-emphasized. There are quite a number of researches on groundnut production in Nigeria, but researches on groundnut oil processing are few. Moreover, the available ones are broad to some extent. For instance, [16] evaluated groundnut processing among

women in North-Central Nigeria. It is against this background that this study intends to address the following research questions.
(1) What are the socio-economic characteristics of the respondents?
(2) What are the resources used in groundnut processing?
(3) What are the costs and returns in groundnut processing in the study area?
(4) What are the constraints to groundnut processing in the study area?

Objectives of the study
The broad objective of the study is to analyze groundnut processing in the study area. The specific objectives of the study are to:
(i) describe the socio-economic characteristics of the respondents;
(ii) identify the resources used in groundnut processing
(iii) estimate the costs and returns in groundnut processing in the study area; and
(iv) identify the constraints to groundnut processing in the study area.

MATERIALS AND METHODS

Description of the Study Area
The study was carried out in Akwanga Local Government Area of Nasarawa State, Nigeria. Akwanga Local Government Area is one of the thirteen Local Government Areas of Nasarawa State located within latitude 8°5' and 9°0' North of the equator and between longitude 8°15' to 8°30' East of the meridian with a point location of 8°55'- 8°25'E [21]. The Local Government Area is bounded in the north by Sanga Local Government of Kaduna State, Nasarawa-Eggon in the South, and Wamba in the East and lastly Kokona in the West. Its Headquarters is in the town of Akwanga. It has an area of 996 km² and a population of 113,430. Male has the total population of 57,430 whereas female has the total population of 56,000 [20]. The major occupation of the inhabitants is farming. The major crops grown are maize, groundnut, yam, cassava, cashew trees, orange trees, mango, sorghum, sesame, millet etc. Major tribes in the area are Mada and Eggon. Others include Hausa/Fulani, Yoruba and Igbo.

Sample Size and Sampling Technique

Three (3) wards out of (11) wards from Akwanga Local Government Area popular for processing groundnut kernels were selected, in each of the wards selected, twenty (20) processors were randomly selected, making a total of 60 respondents as the sample size.

Data Collection

Primary data were used for this study. Primary data were collected with the use of structured questionnaire. Information collected from the respondents was on their socio-economic characteristics such as age, education level, sex, marital status, etc. Information was also collected on inputs used in groundnut processing. The prices of inputs such as groundnut kernels, labour, firewood were also obtained. Revenue information was also collected.

Data Analysis

The data were analyzed using simple descriptive statistics such as frequency counts, means and percentages. Gross Margin (GM) analysis was employed to determine the costs and returns associated to groundnut processing. The descriptive statistics was used to achieve objectives (i), (ii) and (iv) while the Gross Margin (GM) was employed to determine objective (iii).The Gross Margin (GM) model is expressed as:

GM = TR – TVC

Where GM = Gross margin (₦/kg)

TR = Total Revenue (₦/kg)

TVC = Total Variable Cost (₦/kg)

Fixed cost was negligible and so it was ignored in traditional agriculture [22].

The variable cost items considered included cost of transportation, firewood, labour, water, salt and groundnut seed. The Total Revenue for processing 1,000 kg (1 tonne) was from the groundnut oil and groundnut cakes realize from 1,000kg of the groundnut seeds.

RESULTS AND DISCUSSIONS

Socioeconomic Characteristics of the respondents

The distribution of the respondents according to their socioeconomic characteristics including age, sex, marital status, household size, education, experience, membership of association and income is presented in Table 1.

Distribution of the respondents according to their age

The Table shows that majority (50.0%) of the respondents were within the age bracket of 30-39 years. The mean age of the respondents was 34.80. According to [2], age is inversely proportional to performance. Age is an critical factor in determining the level of activity implementation as it influence the volume of physical effort to be put in any economic activity. Young individuals tends to have more and strong body build-up and are highly energetic than the elderly persons.

Distribution of the respondents according to their sex

The sex of the respondents shows that majority (98.3%) of the respondents were females. This agrees with the statement of [16] that, processing of groundnut into various products in Nigeria is mostly done by women either for home consumption or for commercial purposes.

Distribution of the Respondents according to their marital status

The distribution of the marital status shows that majority (73.3%) of the respondents were married, 3.3% of the respondents were single while an equal percentage (11.7%) of the respondent were divorced and widowed, This shows that groundnut processing is a responsible venture through which people make money to support their family.

Distribution of the respondents according to their household size

Table 1 further shows that majority (53.3%) of the groundnut processors in the study area had household size ranging between 1 and 10. [23] opined that household size and number of dependents have influence on agricultural production since they affect consumption and production. On the same note, [8] noted that, business which is labour intensive require big household size that could provide the labour needed at least cost.

Distribution of the respondents according to their education

Educational status of the respondents shows that 31.7% of the respondents had no formal education, 26.7% had primary education, and 31.7% had secondary education while only 10.0% had tertiary education.

Table 1. Distribution of Respondents According to their socioeconomic characteristics

Response	Frequency	Percentage
Age (years)		
20-29	15	25.0
30-39	30	50.0
40-49	15	25.0
Total	60	100
Average= 34.80		
Sex		
Male	1	1.7
Female	59	98.3
Total	60	100
Marital Status		
Single	2	3.3
Married	44	73.3
Widowed	7	11.7
Divorced	7	11.7
Total	60	100
Household size (no. persons)		
1-10		
11-20	32	53.3
21-30	23	38.4
31 – 40	5	8.3
Total	60	100
Average= 12.10		
Education		
No formal education	19	31.7
Primary	16	26.7
Secondary	19	31.7
Tertiary	6	10.0
Total	60	100.0
Experience		
1-5	19	31.7
6-10	20	33.3
11-15	17	38.4
16-20	14	6.7
Total	60	100
Average= 8.73		
Membership of Association		
Members	4	6.7
Non members	56	93.3
Total	60	100

Source: Field survey, 2016

According to [19], people with high educational level are likely to analyze and interpret information than those who have less education or no education at all. In this regards, it is expected an increase in educational level of an individual would positively influence adoption of improved technologies, innovations and practices. This may eventually help in the improvement of any development and business enterprise executed by the entrepreneur. This will eventually lead to improvement in the socio-economic livelihood of the concern individual or group.

Distribution of the respondents according to their experience

The experience of the respondents in groundnut processing activities shows that 38.4% of the respondents had between 11 to 15 years of experience in groundnut processing, 33.3% had between 6 to 10 years of experience, and 31.7% had between 1 to five years of experience whereas 6.7% had between 16 to 20 years of experience.

Distribution of the respondents according to their membership to an association

On the membership of association, majority (93.3%) of the respondents do not belong to any groundnut processing related association. Possibly they might not be aware of the existence of any or might not be interested in joining any. Similarly, the non-membership might equally be due to personal reasons that may only be known to them alone.

Distribution of the respondents according to the resources used in groundnut processing

The resources used by the respondents to process groundnut into various products in the study area are presented in Table 2. The result shows that all the respondents, 60 (100%) used groundnut seed, firewood, water, labour and grinding machine to process groundnut Majority, 57 (95.0%), 52 (86.7%), 58 (96.7%), and 51 (85.0%) of the respondents used salt, sugar, basin and mortar respectively to process groundnut while minority, 16 (26.7%) and 4 (6.7%) of the respondents made use of pepper and oil extractor to process groundnut.

Raw groundnut seed serves as the major resource used in groundnut processing in the sense that the amount and/or quantity of all other resources are dependent on the quantity of raw groundnut seed to be processed. For instance, the amount of labour, quantity of salt, sugar, water, pepper and firewood are all dependent on the quantity of raw groundnut to be processed. Firewood wood played a vital role in groundnut processing as it is the source of heat the processors used in frying the groundnut seeds and extracting the oil from

the groundnut. Salt, pepper and sugar were also essential resources as they add taste and flavour to the product. Labour is necessary in carrying out all the processing operations. Among the fixed resources used in groundnut processing, grinding machine is used to grind the fried groundnut into paste while the oil extractor is used to extract oil from the paste. Processors sometimes use mortar for extraction of oil in the absence of oil extractor.

Table 2. Distribution of the respondents according to the resources used in groundnut processing

Resources	Frequency	Percentage
Variable:		
Groundnut seed	60	100
Firewood	60	100
Salt	57	95
Water	60	100
Sugar	52	86.7
Labour	60	100
Fixed:		
Grinding machine	60	100
Oil extractor	4	6.7
Mortar	51	85
Total	464*	

Source: Field survey, 2016   *Multiple responses

Costs and Returns to groundnut processing in the study area

The costs and returns to groundnut processing in the study area are presented in Table 3. The average variable cost per tonne of groundnut seed per cycle was estimated at ₦274,871.20. The items included were groundnut seed, firewood, transportation, grinding, salt, water, labour and sugar.

Among the variable items included, groundnut seed contributed the bulk of the total variables costs (89.3%).

Table 3 shows that an average value of ₦117,900.00 was realized from groundnut oil while ₦245,500.00 was generated from groundnut cake.

More revenue (67.6%) was realized from groundnut while groundnut oil contributed only 32.4% to the total revenue. Based on gross margin analysis, and average value of ₦88,528.80 was realized as returns to groundnut processing per tonne of groundnut seed per cycle.

Table 3. Costs and returns of processing 1,000kg (tonne) of groundnut seed

Item	Value (₦)/tonne	Percentage
A. Revenues		
i. Groundnut oil	117,900.00	32.40
ii. Groundnut cake	245,500.00	64.60
Total Revenue (TR)	363,400.00	100.00
B. Variable Costs		
i. Groundnut seed	245,516.70	
ii. Firewood	5,108.30	
iii. Transportation	4,588.30	
iv. Grinding	6,525.00	
v. Salt	560.00	
vi. Water	479.20	
vii. Labour	5,308.30	
viii. Sugar	6,785.40	
Total Variable Costs (TVC)/tonne	274,871.20	
Gross margin (A-B) 363,400.00 - 274,871.20 =	**88,528.8**	
G M /Naira invested on groundnut processed	0.322	
Benefit cost ratio $\frac{363,400.00}{274,871.20}$ =	1.322	

Source: Field survey, 2016

The benefit cost ratio is 1.322 these indicated that, processing of groundnut is profitable in the study area.

The Gross Margin per Naira invested was estimated at ₦ 0.322 indicating that for every one naira invested in the enterprise, the processor gets 32.2 kobo and this further confirms that groundnut processing is a profitable venture to be engaged in. Though, it is seen that much need to be done in order to improve the revenue by improving the productivity of the resources employed in the processing process.

Constraints to groundnut processing in the study area

The problems faced by groundnut processors in the study Area were ranked according to the magnitude of the problems as stated by the processors. Table 4 below shows that most

common obstacle faced by groundnut processors are risk of buying low quality raw materials, inadequate processing machine, inadequate capital were ranked first, second and third with 57, 57 and 56 respectively. Other constraints indicated by the processors were instable prices of inputs unsteady market for products and drudgery, their responds also point out that their profit will increase if the constraints can be overcome.

Table 4. Constraints to groundnut processing in the study area

Constraints	No. of processors	Rank
Risk of buying low quality raw materials	57	1st
Inadequate processing machine	57	2nd
Inadequate capital	56	3rd
Unstable prices of inputs	52	4th
Unsteady market for products	49	5th
Drudgery	77	6th
TOTAL	348*	

Source: Field survey, 2016   *Multiple responses

Just like any other business enterprise groundnut processing requires capital. Most of the processors indicated their wish to process more bags of groundnut within the processing cycle but they are limited by the amount of capital they have. Also, machine required for grinding and extraction of oil are not readily available to the processors as at when due owing to the limited number of owners of this machine. Some processors prefer buying the shelled groundnut as they believe they realized more profit from buying the shelled groundnut. But, there is high probability that shelled groundnut contain bad seeds with low oil content. Processors are always faced with the tension of buying low quality groundnut seed. The tedious nature of the processing activities and/or operations lowers the morale of the processors, thus, their interest in the operation reduces. Moreover, processors are not certain of the prices for their products as a result of the fluctuation in prices which also discourage them from engaging in groundnut processing operations.

CONCLUSIONS

Most of the respondents were within the active working age and most of them (98%) were female and married with majority having large household size. Major input used in groundnut processing were groundnut seed, firewood, water, sugar, salt, labour and grinding machine. About ₦ 88,528.80 were realized as gross margin from one tonne (₦8,852.88/100kg) of groundnut seed. The major problem faced by the processors include; inadequate capital, drudgery, unstable price of input and output, risk of buying low quality raw material. The study further revealed that all the respondents, 60 (100%) used groundnut seed, firewood, water, labour and grinding machine in processing groundnut while majority of the respondents used salt, sugar, basin and mortar respectively. The study estimated the average variable cost per tonne of groundnut seed per cycle at ₦274,871.20 (₦27,487.12/100kg), while the average total revenue was estimated at ₦363,400.00 (₦36,340.00/100kg).

Thus, a gross margin of ₦88,528.80 per tonne (₦8,852.88/100kg) of groundnut seed per cycle. The outputs which were groundnut oil and groundnut cake were highly valued and fetched a higher income. Reasonable profit was made by the processors even though they were constrained by many factors such as shortage of capital and inadequate processing facilities.

Recommendations
The following recommendations are made to enhance groundnut processing in the study area.
(i)The processors should be encouraged to form cooperative societies so that they can speak with one voice in their attempt to acquire input, and sell their outputs.
(ii)Affordable and accessible credit should be made available to the processors so that they can expand their business and take advantage of large scales production.
(iii)Labour saving machineries be developed and subsidized to the entrepreneurs to sustain them in the processing venture.
(iv)Farmers should be sensitize on the need to dry their groundnut seeds properly before

bagging them, to prevent the seed from spoilage and self-destruction.

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