GROUNDNUT PROCESSING TECHNIQUES USED BY PROCESSORS IN EDU LOCAL GOVERNMENT AREA, KWARA STATE, NIGERIA

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Abstract: The study assessed the groundnut processing techniques used by processors in Edu local Government area, Kwara state, Nigeria. The objectives are to identify the available processing techniques in the area, determine the sources of information available to the processors, assess the factors that influence the groundnut processing techniques and identify the constraints of groundnut processing techniques. One hundred and fifteen (115) respondents were randomly selected. Data for the study was obtained with the aid of a well-structured questionnaire. Results revealed that all the processors were females (100%). Majority of them were married (83.5%), had no formal education (64.4%) and were in the age range of 31-40 years (53.9%). 58.1% had processing experience range of 11-20 years with an average of 14 years. The major source of information was the family/friends. 93.9% of the processors use mixed method of processing. The result shows a positive correlation between the processing techniques used in the area and educational status and occupational experience of the processors. It was concluded that the groundnut processors use a mixture of traditional and modern technology to process their groundnut. The study therefore recommends that education of female child should be encouraged in the rural areas to enable their handling of modern processing machines.

Keywords: Groundnut, processing technique, processors

Introduction

Groundnut (*Arachis hypogea*) belongs to the family of leguminoseae. It originated from Latin America and Portugal. *Arachis hypogeal* has unique characteristics of being both food and commercial crops; it contains 25% protein and 40% oil. Groundnut is also one of the crops cultivated in Kwara state and remains the major source of livelihood for small scale farmers. Groundnut which is rated the third major oil seed is also referred to as women's crop because they are mostly involved in the groundnut processing (Anchirinah *et al.*, 2001). Agricultural processing activities are small scale and require low investment capital which makes it easily undertaken by women (Raw Materials Research and Development Council, 2004). The processing of agricultural products is an efficient method of maintaining the shelf-life of agricultural produce. Such processed products provide local foods for consumption among the rural population (Zuberu *et al.*, 2013).

Therefore, the importance of crop processing industries especially in Nigeria cannot be over emphasized. The agricultural processing industry of Nigeria is dominated by small and medium scale rural enterprises owned and operated by men and women who depend solely on indigenous or traditional technology for processing (Aseidu, 2009). Groundnut processing helps in agricultural development through employment generation and poverty reduction by improving the living standard of the processor's household. Although groundnut processing is labor intensive and time consuming, majority of the processors depend on manual or traditional techniques to execute some vital processes. However, the use of technology has not been fully integrated into the processing of groundnut. It is against this backdrop that this study seeks to fill the information gap in the previous studies by assessing the groundnut processing techniques used in Edu local government area. The specific objectives are to:

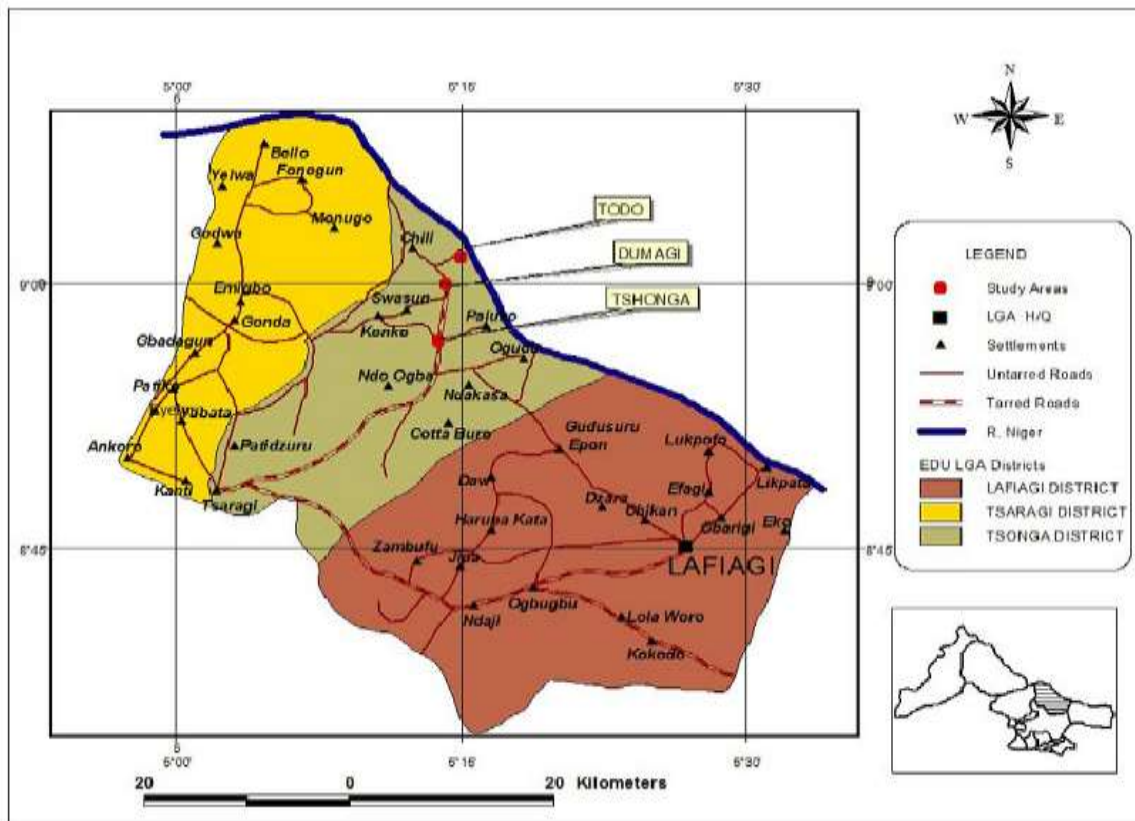1. describe the socio-economic characteristics of the groundnut processors.
2. identify the available processing techniques in the area.
3. identify the sources of information available to the processors.
4. assess the factors that influence the groundnut processing techniques in the area .
5. identify the constraints of groundnut processing techniques.

Hypothesis of the study

H0₁: There is no significant relationship between some selected socio-economic characteristics of the groundnut processors and the factors that influence the groundnut processing techniques used in the area.

Materials and Methods

The study area is Edu Local Government area of Kwara state, situated in the north central zone of Nigeria under the moist savannah agro-ecological zone (Fig. 1). Kwara state consists of sixteen local government areas. The state lies between latitude $4^0\ 3^{0'}E - 5^0\ 3^{0'}E$ and longitudes $8^0\ 3^{0'}N – 9^0\ 15^{0'}N$ of the equator with annual rainfall ranging between 1000 to 1500 mm and the average temperature lies between 30^0C and 35^0C. More than 90 percent of the rural populace are involved in farming. (Babatunde *et al.*, 2007) and covers a land area of approximately 36,825 square kilometers. The major crops cultivated in the state include cassava, groundnut, yam, maize, and some leafy vegetables. Edu local Government area has a total land area of 2,542 km^2 and a population of 201,469 as of 2006 national census. Lafiagi is the headquarters of Edu local government council and the inhabitants are mostly Nupe people. The main activity carried out in Edu Local Government area is farming and groundnut processing which is mostly done by women. The population of this study comprised of groundnut processors in Edu Local Government Area of Kwara state.

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Source: Kwara state website
Fig. 1: Map of Edu Local Government area of Kwara state

Sampling procedure and sample size
Two stage sampling technique was used. The first stage was purposive selection of 2 villages namely: Lafiagi and Tsaragi within the local government area due to the concentration of groundnut processors in the area. In the second stage, 40% of the groundnut processors was selected from the sampling frame of 168 groundnut processors in Lafiagi giving 67 respondents and 40% was also selected from the sampling frame of 120 groundnut processors in Tsaragi giving 48 respondents. A total sample size of 115 respondents was used for the study.

Data analysis
The study was analyzed using descriptive analysis (Objectives 1-5) i.e frequency, percentage, mean and ranks and inferential statistics (Hypothesis) i.e Pearson Product Moment Correlation was used to test the hypothesis.

Results and Discussion
Section A: Socio-economic characteristics of the respondents
Table 1 shows the socio-economic characteristics of the groundnut processors in the study area. Age can be used to determine efficiency of an individual, findings reveals that the average age for the study was thirty-nine (39) years. This implies that the respondents are in their productive age. This finding corroborate the report of (Oladeji and Thomas 2010) and (Folorunsho and Okoroji, 2015) who had reported that the population within the age group 31-40 years are productive, energetic and constitutes active work force. All the respondents were females (100%). This implies that processing of groundnut is women's business. The result agrees with (Ibrahim *et al.,* 2010) who found that in Nigeria, the processing of groundnut into various products is mostly done by women either for home consumption or for commercial purpose. Majority of the respondents were married (83.5%), this implies that they will be more

committed to their work because of family responsibility. Muslims (83.5%) and 64.4% had no formal education. Moreover, their limited level of education may likely make them to use local method in their processing rather than modern technique. The average household size of the respondents is seven (7) persons. This implies that the women have fairly a large household size that can assist them in their processing of groundnut. The finding is in line with (Folorunso and Okoroji, 2015) who agreed that a fairly big household size has a great capacity to reduce the incidence of food insecurity. The average processing experience for this study is fourteen (14) years. This implies that the women have been involved in groundnut processing for a long time and would have gain mastery of the processing techniques.

Section B: Available processing techniques
Table 2 shows the available method of processing in the study area. This finding shows that majority of the respondents (93.9%) use mixed method of processing for their groundnut processing. This may be because of the fact that modern method may be costly and may require some technical skill which majority of the women may not be able to handle as a result of their limited education. This finding agreed with (Aboki, 2015) who reported that the traditional and the small-scale modern groundnut processing methods were practiced because the traditional method applied some mechanical and modern methods in its activities; therefore, there may not be a purely traditional method of groundnut oil processing.

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Table 1: Distribution of the respondents by their socio-economic characteristics (n=115)

Variable	Frequency	%	Average
Age			
11-20	2	1.80	39 years
21-30	12	10.5	
31-40	62	53.9	
41-50	25	21.7	
51 &above	14	12.1	
Total	115	100	
Gender			
Female	115	100	
Total	115	100	
Marital status			
Single	6	5.2	
Married	96	83.5	
Divorced	2	1.7	
Widowed	11	9.6	
Total	115	100	
Religion			
Islam	96	83.5	
Christianity	19	16.5	
Total	115	100	
Education status			
Non education	74	64.4	
Primary education	29	25.2	
Secondary education	12	10.4	
Total	115	100	
Household size			
1-5	28	24.4	7 persons
6-10	72	62.6	
11-15	15	13.0	
Total	115	100	
Secondary occupation			
Rice processor	41	35.6	
Farmer	43	37.4	
Trader	23	20.0	
Hair dresser	8	7.0	
Total	115	100	
Processing experience			
1-10	46	40	14 years
11-20	54	58.1	
21-30	12	10.2	
31-40	3	2.6	
Total	115	100	

Source: Field survey, 2018

Table 2: Distribution of the respondents by the processing technique used

Method of processing	Frequency	Percentage (%)
Modern method	7	6.1
Mixed method	108	93.9
Total	115	100

Source: Field survey, 2018

Table 3 shows the available groundnut processing techniques in the study area. The findings shows that 66.1% of the respondents uses oil extractor during groundnut processing in the study area Other technologies available to groundnut processors include; groundnut desk inner, groundnut sheller and groundnut roaster. Although, oil extraction is the principal activity in groundnut processing and this should be done with modern techniques to prevent oil contamination in order to give good quality of the oil. However, the use of these technologies is greatly underscored by the lack of access to these technologies particularly for the women. Studies have also shown that rural women are usually disadvantaged in their access to all factors of production and processing in spite of their involvement in farming generally (Ani, 2004). There are only two traditional processing techniques in the study area which are; i.e 65.2% of the respondents uses mortar and pestle and 17.4% of the respondents uses hammer mill during groundnut processing in the study area.

Table 3: Distribution of the respondents by their processing techniques

Modern groundnut processing technologies	Frequency	%
Groundnut Sheller	61	53.0
Oil Extractor	76	66.1
Groundnut Roaster	58	50.4
Groundnut Kneader	50	43.5
Groundnut Deskinner	66	57.4
Multiple responses (respondents can use all, some or none of the technique)		
Mortar and pestle	75	65.2
Hammer mill	20	17.4

Source: Field survey, 2018; *Multiple responses (respondents can use either both, one of the two or none of the technique

Table 4 shows the frequency of usage of both modern and traditional groundnut processing techniques used in the study area. Oil extractor is ranked first in modern processing techniques with the mean score of 1.62 while mortar and pestle is ranked first in traditional processing techniques with the mean score of 1.60. Groundnut deskinner is ranked second in the modern processing techniques with the mean score of 1.22 and hammer mill is ranked second in the traditional processing techniques. Groundnut kneader is ranked last in the modern processing techniques with the mean score 0.87. This result is in line with Bello *et al.* (2016) who found out that the level of use of improved groundnut processing technologies among respondents was low, the most available and accessible technologies were Groundnut Sheller, Groundnut Roaster and Oil Extractor.

Table 4: Distribution of the respondents by groundnut processing techniques used

Groundnut processing techniques	Regularly (%)	Fairly (%)	Seldomly (%)	Mean score	Rank
Modern Groundnut processing techniques					
Groundnut sheller	20(17.4)	32(27.8)	9(7.8)	1.16.	4th
Oil extractor	45(39.1)	20(17.4)	11(9.6)	1.62	1st
Groundnut roaster	22(19.1)	16(13.9)	20(17.4)	1.02	5th
Groundnut kneader	11(9.6)	30(26.1)	9(7.8)	0.87	6th
Groundnut deskinner	29(25.2)	17(14.8)	20(17.4)	1.22	3rd
Traditional Groundnut processing techniques					
Mortar and pestle	40(34.8)	29(25.2)	6(5.2)	1.60	2nd
Hammer mill	2(1.7)	10(8.7)	8(7.0)	0.30	7th

Source: Field survey, 2018; *Multiple responses.

Section C: Sources of information available to processors
Table 5 indicates the available sources of information within the reach of the respondents in the study area. The result shows that all women processor (100%) obtain information from their family/friends. This may be because of the fact that most of them are engaged in the same work. 81.7 and 71.3% of the women obtain information as regard their activities through processors group and neighbors respectively. This shows that groundnut processors readily make use of informal group to obtain necessary information. Therefore, any innovation that should be introduced to them can easily get to

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them through this informal source identified. The findings agree with those of Kari (2007) who stated that rural communities in developing countries are naturally oral societies, thus prefer information that is delivered through face-to-face communication.

Table 5: Distribution of respondents by sources of information

Sources of information	Frequency	%
Neighbors	82	71.3
Friends/family	115	100
Cooperative society	17	14.8
Processors' group	94	81.7

Sources of information	Regularly (%)	Fairly (%)	Rarely (%)	Mean score	Rank
Neighbors	23(20)	41(65.7)	18(15.7)	1.47	3rd
Friends/family	60(52.2)	32(27.8)	23(20)	2.32	1st
Cooperative society	2(1.7)	10(8.7)	5(4.3)	0.27	4th
Processors' group	34(29.6)	50(43.5)	31(27.0)	2.03	2nd

Source: Field survey, 2018.   * Multiple responses

Table 6: Distribution of the respondents by the factors influencing the groundnut processing techniques used

Factors	Frequency	%
Availability of the processing techniques used	111	96.5
Affordability of the processing techniques used	71	61.7
Handling/Technicality of the processing techniques used	78	67.8
Saves time	114	99.1
Quality of end product	25	21.7
Social norm	73	63.5
Cost of production	115	100

Source: Field survey, 2018.   * Multiple responses.

Section D: Factors that influence the groundnut processing techniques used

Table 6 shows the factors influencing the groundnut processing techniques in the study area. The result shows that factors that influence the groundnut processing technique used are cost of production (100%), saves time (99.1%), availability (96.5%), handling/technicality (61.8%), among others. This implies that the availability of mortar and pestle will make it to be used frequently by the women. Whereas, the handling of some of the technique will make it not to be used frequently because of the technicality involved.

Section E: Constraints to groundnut processing
Table 7: Constraints of groundnut processing in the area

Constraints	SA (%)	A (%)	U (%)	D (%)	SD (%)	Mean score	Rank
Inadequate capital	114(99.1)	1(0.9))	-	-	-	4.99	1st
Inadequate processing machine and technology	13(11.3)	94(81.7)	2(1.7)	6(5.2)	-	3.99	5th
Inadequate information	13(11.3)	87(75.7)	7(6.1)	5(4.3)	3(2.6)	3.87	6th
Lack of infrastructural facilities	12(10.4)	92(80)	8(7.0)	3(2.6)	-	2.33	9th
Inadequate technical knowledge	11(9.6)	74(64.)	14(12.2)	16(13.9)	-	3.70	7th
Lack of access to credit	101(87.8)	13(11.3)	-	1(0.9)	-	4.86	3rd
Lack of management practices	6(5.2)	82(71.3)	4(3.5)	22(19.3)	1(0.9)	3.61	8th
Cost of fuel	82(71.3)	33(28.7)	-	-	-	4.71	2nd
Machine breakdown	34(30.0)	76(66.1)	1(0.9)	3(2.6)	1(0.9)	4.20	4th

SA – Strongly agree, A – Agree, U – Undecided, D – Disagree, SD – Strongly disagree
Source: Field survey, 2018; * Multiple responses

Table 7 shows the constraints to groundnut processing in the study area. Inadequate capital is the most challenging factor that is affecting the groundnut processors in the study area, followed by cost of fuel, there is no machine in the study area that uses electricity, they all uses diesel to run the machines which is relatively expensive than other petrol. Oladeji and Thomas (2010) also highlighted poor electricity supply, high cost of petrol, lack of credit facilities, high purchasing price of technologies and lack of operational facilities for processing as the major constraints faced by women processors.

Hypothesis testing
Table 8 shows the correlation coefficients of the relationship between selected socio-economic characteristics of the groundnut processors and the factors that influence the groundnut processing techniques used in the area.

Table 8: Pearson product moment correlation between the socio-economic characteristics of the groundnut processor and the factors that influence the groundnut processing techniques used in the area

Variable	p-value	r-value	Significant status
Age (x_1)	0.933	-0.008	Not significant
Marital status (x_2)	0.700	-0.251	Not significant
*Education status (x_3)	0.044	0.189	Significant
Household size(x_4)	0.738	-0.164	Not significant
Secondary occupation (x_5)	0.989	0.112	Not significant
*Occupation experience (x_6)	0.050	0.064	Significant

*-Significant at p 0.05   **Source:** Field survey 2018

Education ($p = 0.044$, $r = 0.189$) and occupation experience ($p = 0.050$, $r = 0.064$) are significant to the processing techniques used by the respondents. The level of education will enhance more usage of modern techniques and less of use of traditional techniques. This assertion agrees with the position of (Fabiyi

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and Akande, 2015) who posited that there is the need for a type of education which must equip the receiver with necessary skills to face the challenging situations which can be economic, social, political and cultural in nature. Experience gathered over the years will determine appropriate techniques to use. This implies that the higher the experience, the better the women gain mastery of the techniques used in the processing of groundnut.

Conclusion
The study concludes that the groundnut processors uses a mixture of traditional and modern technology to process their groundnut. It was discovered that only a few modern technologies are available for use in the study area. Moreover, literacy level of the processor being very low has affected the usage of modern technology in the study area. The result of the hypothesis confirms that education and experience influence the use of processing method by the respondents. The study therefore recommends that education of female child should be encouraged in the rural areas so as to enhance their skill in handling modern machines. Moreover, groundnut processors should use their processors group to acquire modern machines which should be accessible to their members at a reduced price.

Recommendation
❖ Education of female child should be encouraged in the rural areas to enable their handling of modern processing machines.
❖ Groundnut processors should acquire soft loans and credit facilities through their organization and not individually.
❖ Government should encourage the groundnut processors with modern machines, which will help to improve groundnut processors level if income and improve their standard of living.
❖ Extension services should be provided to groundnut processors on new techniques available and other products that can be derived from groundnut.

Conflict of Interest
Authors declare that there is no conflict of interest related to this study.

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