



## GENDER ANALYSIS ON GROUNDNUT PROCESSORS IN SOKOTO STATE, NIGERIA

<sup>1</sup>Idris, A. A., <sup>1</sup>Abdullahi, A. and <sup>2</sup>Attahiru, M.

<sup>1</sup>Department of Agricultural Economics and Extension, Faculty of Agriculture, Bayero University, Kano, Nigeria

<sup>2</sup> Department of Agricultural Extension and Management, College of Agriculture Umaru Ali Shinkafi Polytechnic, Sokoto, Sokoto State, Nigeria

### ABSTRACT

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*The study assessed the gender roles in the groundnut value chain in Sokoto State. The study employed multistage sampling to select 60 processors from four communities in two LGAs. Data was collected using a well-structured questionnaire. Descriptive statistics and inferential statistics (regression analysis and Kendall's coefficient of concordance) were used to analyse the data. The result reveals that male groundnut processors' average age was 44 years for females and 45 years for male; the majority were married (77.5% and 71.1%), with the average household size of male being 8 and female 6, The male processors (36.4%) had secondary education, and the female processors (65.8%) had a non-formal education. The most processing activities engaged by the male was grinding of groundnut cake (59.1%), while 81.5% of the females engaged in dehusking the groundnut. Furthermore, the years of experience of the male processors were significant ( $P \leq 0.1$ ), and for females, access to credit was also significant ( $P \leq 0.1$ ). The most important information needed by the processors (males) was modern processing equipment, and method of groundnut processing information. Similarly, female processors needed modern processing equipment, and price information. Constrains encountered include; accessing credit (100%) and adequate capital (95.5%), inadequate capital (97.4%), poor quality of groundnut, low technical know-how. Majority of them require information on modern processing methods and equipment. Financial institutions and policymakers are encouraged to provide soft loans and grants to processors at regular interval.*

**Key Words:** Processors, Groundnut, Sokoto, Gender, Information needs.

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**Corresponding Author:** [aaidris.ext@buk.edu.ng](mailto:aaidris.ext@buk.edu.ng)

### INTRODUCTION

Agro-processing is a set of technological and economic activities that are done on farm products to turn them into things that can be used as food, feed, fibre, fuel, or industrial raw materials (Ayantu, 2018). It is usually done to add value so that the same or a new product can be made in a better way and with better quality. Processing agricultural products has become more important to the economies of most developing countries, just as it has been to the economies of industrialised countries at different times of their growth. Some of the most

common crops grown and turned into local foods in Nigeria's rural areas are groundnut, soy beans, bananas, palm kernels, potatoes and cassava (Samuel and Ocholi, 2017).

Groundnut, often known as peanut is a legume farmed primarily for its edible seed. It is commonly grown in the subtropics and is significant for both small and large commercial growers (Shuaibu *et al.*, 2019). It is classed as a grain legume and an oil crop due to its high oil content. In 2016, China produced 44 million tons of shelled peanuts, accounting for 38% of the global total. Nigeria is the major producer of groundnuts in West Africa, accounting for 51% of the region's production (Samuel and Ocholi, 2017). The country accounts for 10% of worldwide and 39% of African output. Groundnut is often farmed as a smallholder crop in semi-arid tropics with rain-fed conditions. It is a staple crop in many nations, providing protein, cooking oil, and vitamins.

Currently, Nigeria ranks as the fourth largest producer of groundnut globally, yet it ranks as the 63rd largest exporter in 2021 (FAO, 2022; OEC, 2022). This is an indication that there are yet abounding potentials for Nigeria to outperform its current levels of exports if given the required attention. The departure points for reviving the groundnut subsector are hinged on a good understanding of the processors, its participants and their activities. However, Gender-defined roles and relationships within agricultural processing and households affect men's and women's access to productive resources, financial services, and control over incomes. Gender inequalities in resources result in different levels of participation, methods of processing and bear consequences for women's potential outcome in the value addition of this high-value crops (Lambrecht *et al.*, 2018). For both men and women, improving agricultural yields is important to those who support their households.

As the processing of groundnut products and associated derivatives involved men and women, the roles of men and women are very paramount. Gender analysis might be described as steps adopted to elucidate the various relationships between men and women in their diverse capacities to access resources, activities engagement, decision making powers between men and women. Mugisha *et al.* (2019) suggested that legumes are referred to as women's crops, since they dominate the sector compared to their male counterparts. However, the study aimed to analyse and appraise gender roles in the processing of groundnuts, as both men and women actively participate in these tasks. The specific objectives were to;

- i. describe the socio-economic characteristics of groundnut processors;
- ii. analyse the roles engaged in by gender along the groundnut processing;
- iii. determine the factors that influence gender participation along the processing;
- iv. determine the information needs of different actors along groundnut processing, and;
- v. Identify the constraints encountered by different actors (men and women) in the groundnut processing.

## METHODOLOGY

### The Study Area

The research was conducted in Sokoto State, and the State shares a boundaries with Zamfara State to the east, Kebbi State to the west and Republic of Niger to the north. Sokoto State occupies an area of short-grass savannah vegetation in the south and thorn scrub in the north. It lies within the dry Sahel savannah and isolated hills and geographically located between longitudes 11°30'– 13°50' East and longitude 4° to 6° north. And also, the latitude and longitude GPS coordinates are: 13.005873 and 5.247552 respectively. Sokoto State has a land

area of 28,232.37 square kilometres. The State comprises of 23 Local Government Areas, and has an estimated population of 7,100,000 (2023 projection (NPC, 2023)).

Sokoto State is dominantly Muslims and Hausa-Fulani and few other tribes. The state has a mean annual rainfall of 380mm-763mm and an annual average temperature of 28.3<sup>0</sup>C. The State is a very hot area Nevertheless, the typical daily temperatures throughout the year usually reach 40<sup>0</sup>C, and the aridity of the climate helps to make the heat tolerable. The period of rainfall occurs from June to October. Over eighty percent (80%) of the inhabitant of Sokoto State are practicing one form of agriculture or the other. These Production activities include upland arable crop production under rain fed condition and dry season Fadama irrigation production. Major crops cultivated in the state include groundnut, Sorghum, millet, maize, cassava, wheat, rice, cowpea, and different types of vegetables. Local craft such as blacksmithing, weaving, carving and leatherwork also play an important role in the economic life of the people of the state. Large numbers of people along the river basins also engaged in fishing activities (MDG, 2006). There are all kinds of animals both wild and domestic in the State. Sokoto ranks second in livestock production in the country with animal population of over eight (8) million. Goats, sheep, cattle and poultry are reared to justify their mixed production practices and off-farm activities.

The State is endowed with most of the natural resources. Agro allied industries using cotton, groundnut, sorghum, maize, rice, wheat, sugar cane, cassava, gum arabic, and tobacco as raw materials can be established in the State. Large-scale production can also be practiced in the state using irrigation water from Goronyo dam, Lugu, Kalmalo, Wamakko and Kwakwazo lakes. Minerals such as Kaolin, Gypsum, Limestone, Laterite, Red mills, Phosphate, both yellow and green shade clay, sand etc., are available in the state in commercial quantities.

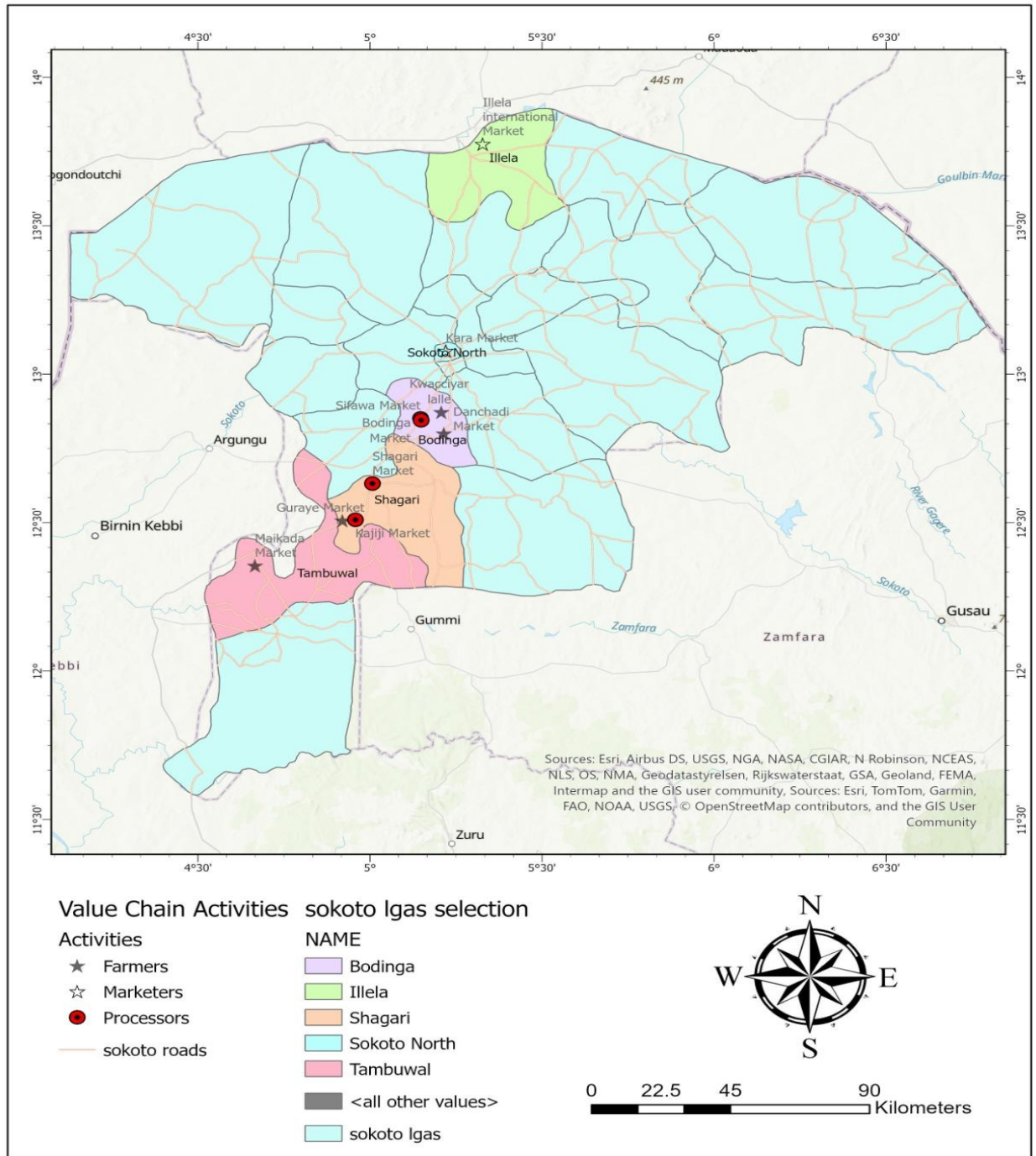


Figure 1: Map of Sokoto State Showing the Study Area  
 Source : Sokoto State Urban and Regional Planning Board

**Sample Size and Sampling Technique**

A multi-stage sampling technique was used for the study. There are five LGAs—Tambuwal, Bodinga, Illela, Sokoto North, and Shagari that are prominent groundnut zones in Sokoto State, out of which two LGAs (Bodinga and Shagari) were purposively selected based on the intensity of groundnut processing activities in the state. The second stage involves the purposive selection of two (2) communities from each of the selected local government areas in Bodinga LGA (Bodinga and Sifawa) and in Shagari (Shagari and Kajiji) for being the most prominent communities for the processing of groundnut. The last stage involves proportionate random sampling of 40% of the total number of groundnut processors in selected communities

(men and women) from the list of groundnut processors obtained from the Sokoto agricultural development programme (SADP), which gives a total of 60 processors (22 men and 38 women) for the study.

**Table 1: Sample Size for Groundnut Processors**

LGA	Community Frame	Sample Size	Male Sample Size	Female Sample Size	Sample Size
Bodinga	Bodinga	45	7	11	18
	Sifawa	30	4	8	12
Shagari	Kaiji	44	8	10	18
	Shagari	30	3	9	12
<b>Total</b>		<b>149</b>	<b>22</b>	<b>38</b>	<b>60</b>

Source: SADP Sokoto, 2022

**Method of Data Collection and Analysis**

The data was collected by the use of well-structured questionnaire and with the help of well-trained enumerators. The data was analysed using both descriptive and inferential statistics. Objectives one, two and five were achieved through descriptive statistics such as frequency, percentage, charts, mean, and standard deviation. Objective three was achieved using regression analysis, while objective four (4) was achieved using Kendall’s Coefficient of Concordance.

**Regression analysis**

The multinomial regression model was used as follows:

$$Y = f(X_1, X_2, X_3, X_4, X_5, \dots, X_n) \dots\dots\dots(1)$$

While the explicit form of the model is as follows;

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \beta_9X_9 + e \dots\dots\dots(2)$$

This model was used to test the relationship between the socio-economic variables and the gender roles

Y= number of activities processors involved

X<sub>1</sub>= age (Years)

X<sub>2</sub> = household size (numbers)

X<sub>3</sub> = educational status (years)

X<sub>4</sub> = farming Experience (years)

X<sub>5</sub> = farm size (ha)

X<sub>6</sub>= income of the farmers (naira)

X<sub>7</sub>= contact with extension agents (1=yes, 2=no)

X<sub>8</sub>= societal norm (accepted =1, non-accepted= 2)

X<sub>9</sub>= membership to cooperative association (1=yes, 2=no)

**Kendall’s coefficient of concordance**

The Kendall’s Coefficient of Concordance test was used to identify and rank the information needs of groundnut value chain actors in the study area. The Kendall’s Coefficient of Concordance test is a nonparametric statistical procedure used to identify a given set of variables or problems, from the most influential to the least influential as well as measure the degree of agreement or concordance among the respondents. The information needs were ranked from the most influential to the least influential using numerals 1, 2, 3 ... n in that order (where n is a positive integer).

The total rank score for each information was computed and the information need with the least score was ranked as the most pressing need, while the need with the highest score was ranked as the least information need. The total rank score computed was used to calculate the Kendall's Coefficient of Concordance (W), which measures the degree of agreement between respondents in the ranking. The equation for the Kendall's coefficient of concordance according to (3) was given as:

$$W = \frac{12[\sum T^2 - (\sum T)^2 / n]}{nm^2(n^2 - 1)} \dots\dots\dots(3)$$

Where, W = Kendall's Coefficient of Concordance,  
 T = Sum of ranks for information needs being ranked,  
 m = Total number of respondents, and  
 n = Total number of information needs being ranked.

The Coefficient of Concordance (W) was tested for significance in terms of the F – distribution. The F – ratio is given by:

$$F = [(m-1)W/(1-W)] \dots\dots\dots(4)$$

From (4), the numerator degrees of freedom were given as:

$$(n-1) - (2/m) \dots\dots\dots(5)$$

Similarly, the denominator degrees of freedom are given as:

$$m-1[(n-1)-2/m] \dots\dots\dots(6)$$

**RESULTS AND DISCUSSIONS**

**Socio-economic Characteristics of Processors**

The result in Table 2 presents the quantitative socio-economic characteristics of the groundnut processors. The result indicated that 36.36% and 31.82% of the male processors were within the age group of 50–60 years and 28–38 years, respectively. The minimum age was 17 years and the maximum was 72 years, with a mean age of 44 years for male processors, indicating that the male processors were within their active age and would be able to carry out their processing activities. The result also indicated that 36.84% and 21.05% of the women processors were within the age groups of 50–60 years and 28–38 years respectively. The average age of the female processors was 45 years, indicating that they were at the last phase of their active age and hence would not be able to carry out hectic processing activities. This is in line with the findings of Tafida *et al.* (2021) who reported that the average age of the farmers was 30 years. The result also indicated that 40.9% of the male and 60.5% of the female processors had a household size of 5-8 persons accordingly; the minimum was 1 and the maximum was 20; the average household size of the male respondents was 8 and 6 for females, indicating that the respondents had enough members to assist in carrying out their processing activities. This coincides with the findings of Idris *et al.* (2021) who reported the average household size was 14 people, with range of 2 to 25 people. More so, the result also revealed that 59.1% of the male and 55.3% of the female processors had 3–11 years of experience. The average years of experience of the male and female processors was 14 and 5 years, respectively. The processors years of experience made them have good knowledge and new technologies for groundnut processing.

**Table 2: Socio-Economic Characteristics of Groundnut Processors**

Variables	Male		Female	
	Frequency	Percentage	Frequency	Percentage
<b>Age</b>				
17 – 27	2	9.09	5	13.16
28 – 38	7	31.82	8	21.05
39 – 49	3	13.64	7	18.42
50 – 60	8	36.36	14	36.84
61 – 72	2	9.09	4	10.53
Minimum	18		19	
Maximum	69		69	
Mean	44		45	
<b>Household Size</b>				
1 – 4	6	27.27	11	28.95
5 – 8	9	40.91	23	60.53
9 – 12	4	18.18	4	10.53
13 – 16	1	4.55	-	-
17 – 20	2	9.09	-	-
Minimum	1		1	
Maximum	20		12	
Mean	8		6	
<b>Years of Experience</b>				
3 – 11	13	59.09	21	55.26
12 – 21	5	22.73	7	18.42
22 – 29	1	4.55	3	7.89
30 – 38	2	9.09	-	-
39 – 47	1	4.55	1	2.63
Minimum	3		5	
Maximum	36		45	
Mean	14.0		16	
<b>Total</b>	<b>22</b>	<b>100</b>	<b>38</b>	<b>100</b>

**Source:** Field Survey, 2022.

Table 2 further shows that 77.3% of the male and 71.1% of the female processors were married. This implied that the majority of the processors were married and had a responsibility to provide for their families, which would increase their level of participation in groundnut processing. This was in line with the findings of Abdullahi *et al.* (2014) that majority of rural women processors were married. Furthermore, the result indicated that 22.7% and 65.8% of the male and female processors had non-formal education respectively. This implies that the majority of the female processors had non-formal education. This could be a result of the traditional beliefs of rural communities in the study area not enrolling females in formal education, and less formal education made them source most of their processing information from business partners. The result also shows that 45.5% and 65.7% of the male and female processors had access to credit, respectively. This indicated that females' processors had more access to credit facilities than male, this is largely because most of the processing credit schemes from the government and other development bodies target women. The male processors (54.5%) belong to cooperative associations, while 86.8% of the females are

members of cooperative associations. This shows that females in groundnut processing activities participated more in cooperative organisations than males, hence the reason why they obtained credit more than men.

**Table 3: Socio-Economic Characteristics of Men and Women Groundnut Processors**

Variables	Male		Female	
	Frequency	Percentage	Frequency	Percentage
<b>Marital status</b>				
Single	5	22.7	5	13.2
Married	17	77.3	27	71.1
Widow	-	-	6	15.8
<b>Level of Education</b>				
Non-formal	5	22.7	25	65.8
Primary	5	22.7	2	5.3
Secondary	8	36.4	10	26.3
Tertiary	4	18.2	-	-
Adult education	-	-	1	2.6
<b>Access to training</b>				
Access	10	45.5	25	65.7
No access	12	54.5	13	34.3
<b>Membership to cooperatives</b>				
Member	12	54.5	33	86.8
Non- member	10	45.5	5	13.2
Total	22	100	38	100

Source: Field Survey, 2022.

**Activities Engaged by Different Gender in Groundnut Processing**

The result of activities engaged by different gender in groundnut processing in the study area is presented in Table 4. The result shows that 18.18% and 31.8% of the male processors were engaged in dehusking and milling respectively, while 89.47%, 86.84% and 68.42%, of the female processors were into similar activities in addition to roasting and tasting respectively. The result further revealed that 4.5% of men processors engaged in both paste preparation and oil extraction, and 9.1% were into paste frying, while 76.3%, 84.21%, and 50.0% of the women processors were into similar activities. The results also depict that 40.9% and 59.1% of the male processors were into packaging groundnut oil and grinding groundnut cake, while 63.17%, 84.21%, and 81.57% of the female processors were engaged in similar activities. The females in the study area were more active in the processing activities.

**Table 4: Distribution of Groundnut Processing Activities Engagement by Gender**

Activities	Male		Female	
	Frequency	Percentage	Frequency	Percentage
Dehusking	4	18.18	34	89.47



Roasting/toasting	-	0	26	68.42
Milling	7	31.8	33	86.84
Paste preparation	1	4.5	29	76.31
Oil extraction	1	4.5	32	84.21
Paste frying	2	9.1	19	50.0
Packaging of groundnut oil	9	40.9	24	63.17
Packaging of groundnut cake	6	27.27	32	84.21
Grinding of groundnut cake	13	59.1	31	81.57

\*Multiple Responses

Source: Field Survey, 2022.

### **Determinants of Participation in Groundnut Processing**

The result from Table 5 shows the factors that influence male and female participation in groundnut processing. The results revealed that the R-value was 35.2% for males and 40.2% for females. This is an indication that the level-dependent variables are explained by the independent variable. It shows that age, household size, access to training and credit, quantity of groundnut processed and level of education are not significant factors that affect males' participation, while years of experience in processing is significant (at  $P < 0.1$ ) with a positive direction. This implies that an increase in the experience of the male processors will lead to a significant increase in their level of participation in groundnut processing. The result also shows that age, household size, access to training, quantity processed per week, and level of education are not significant factors that affect female participation, while access to credit is significant at  $P < 0.1$  with a positive direction. This indicates that a unit increase in the accessibility of credit to women processors will lead to an increase in the level of participation in groundnut value chain activities. This finding is in agreement with the findings of Shuaibu *et al.* (2019) in a study on the socioeconomic factors and profitability of groundnut processing by women in Kano State, Nigeria.

**Table 5: Estimates of Determinants of Participation in Groundnut Processing**

<b>Variables</b>	<b>Male</b>		<b>Female</b>	
	<b>B</b>	<b>Sig</b>	<b>B</b>	<b>Sig</b>
Constant	-0.545	0.290	0.983	0.000
Age	-0.303	0.731	-0.004	0.336
Household size	0.014	0.443	-0.009	0.651

Access to training	0.251	0.232	0.100	0.311
Access to credit	0.238	0.200	0.056	0.055*
Quantity processed per week	0.008	0.364	-0.004	0.596
Level of education	0.098	0.297	-0.012	0.807
Experience in gnut processing	0.026	0.087*	0.008	0.594
R – value	35.2%		40.2%	

Source: Field Survey, 2022.

### Information Needs of Groundnut Processors by Gender

The result presented in Table 6 revealed the information needs to be rated with the lowest mean rank, signifies the highest priority for male processors, and encompasses details on modern processing equipment, contemporary processing techniques, and the selection of high-quality groundnuts. Male processors in the study area believe these aspects to be most important. Each male processor has individually assigned ranks to specific information needs, providing a perspective on their preferences and priorities.

Kendall's W value of 0.360 suggests a moderate level of agreement among groundnut men processors concerning the importance of diverse information needs. Although some consensus exists, there is still potential for divergence in opinions or priorities among men in the study area. The Chi-Square test, with a p-value of 0.000, underscores the highly statistically significant differences in the rankings of information needs among male processors. These variations in individual preferences are substantial and not likely to be attributable to chance.

The priority information needs resulting for women processors presented in the Table 6 indicated by the lowest mean ranks, encompass details on modern processing equipment, the price of groundnut from the previous seasons, and modern processing methods. Women processors in the area deemed these factors to be of utmost importance. Each woman processor has individually ranked these information needs, providing a comprehensive perspective on their specific preferences and priorities. Kendall's W value of 0.448 suggests a moderate to strong consensus among groundnut women processors regarding the significance of different information needs. There was substantial agreement among women processors in the study area. The Chi-Square test, with a p-value of 0.000, signified that the distinctions in the rankings of information needs among women processors were highly statistically significant. Clear variations in individual preferences were evident and these differences were unlikely to be mere chance occurrences.

**Table 6: Distribution of Information Needs of Groundnut Processors by Gender**

Information Needs on	Male		Female	
	Mean Rank	Rank	Mean Rank	Rank
Modern processing equipment	3.77	1	3.55	1 <sup>st</sup>
Modern method of processing	4.23	2	4.18	3 <sup>rd</sup>
Selection of good quality groundnut	4.30	3	4.34	4 <sup>th</sup>
Price of groundnut from previous season	4.75	4	3.95	2 <sup>nd</sup>
Future price	5.07	5	5.89	6 <sup>th</sup>
Bagging/packaging method	6.34	6	8.00	9 <sup>th</sup>

Market place/location	6.70	7	6.14	7 <sup>th</sup>
Access to credit	6.91	8	4.87	5 <sup>th</sup>
Appropriate drying method	7.34	9	7.68	8 <sup>th</sup>
Storage method	7.95	10	8.37	10 <sup>th</sup>
Kendall's W	0.360		0.448	
Chi-Square	79.122		170.309	
Asymp. Sig.	0.000		0.000	

Source: Field Survey, 2022.

### Constraints Militating against Gender Participation in Groundnut Processing

Table 7 shows the constraints that affect male and female participation in groundnut processing. The result revealed that 72.72% and 90.9% of male processors are affected by poor quality of groundnut and inadequate raw materials respectively, while 40.9%, 100%, and 50.0% are affected by inadequate storage facilities, access to credit, and access to market information respectively. The result also shows that 77.27%, 90.9%, 95.45%, and 63.63% of the male processors are affected by consumer taste and preference, low technical know-how, inadequate capital, and insect and rodent infestation. The table further shows that 92.10%, 84.21%, and 31.58% of female processors were affected by poor quality of groundnut, inadequate raw materials, and storage facilities, respectively. It also revealed that 86.84% and 55.26% were affected by access to credit, access to market information, and consumer taste and preference, while 92.10%, 97.36%, and 39.47% were affected by low technical know-how, inadequate capital, and insect and rodent infestation.

**Table 7: Distribution of Constraints Militating against Gender Participation in Groundnut Processing**

Variables	Male		Female	
	Frequency	Percentage	Frequency	Percentage
Poor quality of groundnut	16	72.72	35	92.10
Inadequate raw material	20	90.9	32	84.21
Inadequate storage facilities	9	40.9	12	31.58
Access to credit	22	100	33	86.84
Access to market information	11	50.0	21	55.26
Consumer taste/preference	17	77.27	21	55.26
Low technical know-how	20	90.9	35	92.10
Inadequate capital	21	95.45	37	97.36
Insect and rodent infestation	14	63.63	15	39.47

\*Multiple Responses

Source: Field Survey, 2022

### CONCLUSION AND RECOMMENDATIONS

Groundnut processors were of active age, married, with mean household size of 8 and 6 for male and female processors respectively and attended one form of formal education or the other. The processors mostly require information on modern processing methods and modern equipment. Female participation was pronounced in the processing business. Age and processing experience appear to be the factors that influence male participation in groundnut processing. Furthermore, poor quality groundnut, low technical know-how, and inadequate raw materials were the major constraints faced by processors.

It is recommended that financial institutions and policymakers should encourage more gender participation in groundnut processing through the provision of soft loans and grants at regular intervals. Stakeholders should encourage processors to match their processing techniques with consumer tastes and preferences, and there should be ongoing market feedback mechanisms to aid processors in adapting to shifting consumer preferences.

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