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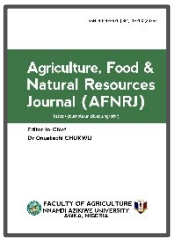

Original Article

Participation of rural women in groundnut cake-making enterprise in Kwara State, Nigeria

OPEN ACCESS

Mobolaji Omolabake MUSA[1]*, Francis Oluwadamilare AJAYI[2], Tawakalitu Abiola DOLAPO[1] & Barakat Omodunke ABDULKAREEM[1]

[1]*Department of Agricultural Extension and Rural Development, University of Ilorin, Ilorin, Kwara State, Nigeria*
[2]*Department of Agricultural Extension and Rural Development, Osun State University, Osogbo, Osun State, Nigeria*

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ABSTRACT

Groundnut cake-making is a value-adding activity in rural Nigeria. However, there is limited information on rural women's participation in the enterprise in Kwara State. This study examined rural women's participation in groundnut cake-making enterprises in Kwara State, Nigeria, focusing on their socioeconomic characteristics, level of involvement, perceived benefits, and challenges encountered. The study employed a three-stage sampling procedure to select 160 respondents. Data were analyzed using frequency counts, percentages, mean scores, multiple regression, and Pearson's Product-Moment Correlation (PPMC). Findings revealed that the average age was 46 years, more than half (53.1%) of the respondents were married, had an average of 16.9 years in processing, and had a mean annual income of ₦219,337.50. Most (71.9%) of the respondents had a high level of participation. Key benefits were improved economic growth of the community ($\bar{x}$ = 4.29) and increased employment rate for women ($\bar{x}$ = 4.25), while major challenges faced were inadequate capital ($\bar{x}$ = 3.68) and high cost of transportation ($\bar{x}$ = 3.44). Years of experience in groundnut processing (β=0.44, $p<0.01$) influenced the women's participation in groundnut cake processing. The study concludes that rural women in the study area were highly involved in groundnut cake processing activities despite being faced with challenges and recommends enhanced access to credit facilities, extension services, and cooperative structures to improve productivity and sustainability.

KEYWORDS: *Agro-processing, enterprise, women's economic empowerment, value addition*

INTRODUCTION

The agricultural sector remains the backbone of rural livelihoods in Nigeria, employing a significant proportion of the rural population, especially women (Adams, 2024). In rural communities, women engage in cultivation, harvesting, processing, and marketing of agricultural products, thereby supporting household incomes, food security, and rural development (Wadei *et al.,* 2025). Groundnut (Arachis hypogaea), commonly known as peanut, is one of the major cash and oilseed crops in Nigeria, widely grown in the central and northern parts (Umeukeje *et al.,* 2024). After oil extraction, the remaining paste is molded and fried to produce groundnut cake, an activity predominantly carried out manually by rural women. Groundnut cake is consumed locally and sold in markets, making it an important value-added product and small-scale enterprise because of its low start-up cost, simple processing, and high demand in local and regional markets (Hussaini *et al.,* 2024).

Rural women play a significant role in the agricultural value chain through agro-processing activities such as groundnut cake production, which promotes value addition, income enhancement, and reduction of post-harvest losses (Gona *et al*.,

*Corresponding author: musa.mo@unilorin.edu.ng

2023; Dawa *et al.,* 2024; Bonuedi *et al.,* 2025). However, they are confronted with numerous problems, including poverty, illiteracy, gender inequalities, and limited access to resources and productive capacity (Musa *et al.,* 2024). Many work at subsistence levels due to inadequate access to modern processing equipment, financial assistance, training, and market linkages, which reduces efficiency and profitability (Lo Bue *et al.,* 2022; Gelaye & Luo, 2024). Their enterprises are often informal, leaving them underrepresented in official statistics and overlooked in agricultural development policies, while insufficient support through cooperatives, extension services, and infrastructure further constrains their empowerment (Rachmawati, 2026). Addressing these constraints is critical to advancing Sustainable Development Goals on poverty reduction, gender equality, and decent work.

Several empirical studies have examined rural women's participation in agro-processing in Kwara State with socio-economic characteristics, enterprise involvement, access and utilization of improved facilities, income, and constraints limiting their participation (Falola *et al.,* 2022; Olooto *et al.,* 2024; Adewuyi *et al.,* 2024). Little research on rural women's involvement in groundnut cake making as a separate agro-processing activity in the State, including their level of involvement, benefits gained, challenges faced, and factors that encourage their involvement. This is a crucial gap as groundnut cake-making is a livelihood opportunity that can generate income and employment for rural women and enhance local economic development. Understanding women's participation and factors influencing participation can serve as a valuable source of evidence for intervention designs that can strengthen and sustain rural agro-processing businesses in Kwara State.

Against this background, the present study examined the participation of rural women in groundnut cake production in Kwara State, Nigeria. Specifically, it described their socio-economic characteristics, determined their level of participation in groundnut cake processing, identified the benefits of their participation, and examined the constraints to their involvement. The study hypothesized that socioeconomic factors do not significantly influence participation in groundnut cake processing, and that there is no significant relationship between the benefits derived and participation in groundnut cake processing.

METHODOLOGY

Study Area

Kwara State, located in the North-Central region of Nigeria, is the study area for this research and lies approximately between latitudes 8°00′N and 9°10′N and longitudes 3°45′E and 5°00′E. Kwara State has a tropical wet and dry climate with well-defined rainy and dry seasons. Precipitation is generally expected between April and October, with November to March considered the dry season. Mean annual rainfall is generally between 1000–1500 mm, with most rainfall occurring from April to October. Average annual rainfall at Ilorin, representative of the central part of the State, is about 1,234 mm, with an average annual temperature of about 27°C, with higher temperatures during the dry season and lower temperatures during the peak rainy season. It is bordered by Kogi, Niger, Osun, and Ekiti States, has 16 Local Government Areas (LGAs), and a projected population of over 3 million people (NBS, 2023). The state is predominantly agrarian, with rural communities relying on farming and small-scale agro-enterprises for their livelihoods. Agriculture is the backbone of Kwara State's economy, and key crops include groundnut, maize, cassava, yam, and rice, while agro-processing activities such as groundnut cake-making are widespread among rural women, contributing to household income and food security (Olooto *et al.*, 2024). Kwara State has a tropical climate with two main seasons: a rainy season (April–October) with sufficient rainfall to support crop production, and a dry season (November–March) characterized by harmattan winds and higher temperatures, which together provide favorable conditions for the cultivation and processing of groundnut and other staple crops.

Sampling Procedure and Sample Size

This study used a multi-stage sampling technique. In stage one, four Local Government Areas (LGAs), namely Edu, Moro, Asa, and Ifelodun, were purposively selected out of 16 LGAs in Kwara State because of their significant groundnut activities and production. Active groundnut farming was reported in Moro (Adewuyi *et al.,* 2024), while groundnut-processing activities were reported in Ifelodun (Kayode *et al.,* 2024). Moreover, Groundnut processing activities in Edu were reported to be mainly carried out by women (Adebayo *et al.,* 2020), and Asa is one of the crucial LGAs for groundnut farming in the state (Adejumobi *et al.,* 2022). Stage two involved a random selection of two communities in each of the selected LGA was randomly selected, making a total of eight (8) communities (Edu- Ankoro, Babanloma; Moro- Jeunkunu, Elemere; Asa- Alapa, Ogele; Ifelodun- Koko-araromi, Oke-ode). In stage three, 160 respondents were selected using the snowballing technique, as they did not have an association (Ankoro- 51, Babanloma- 45, Ogele- 43, Alapa-30, Jeunkunu-44, Elemere- 42, Oke-ode-31, Koko-araromi-34).

Data Analysis

Data were collected using an interviewer-administered schedule. The instrument was reviewed by experts in related fields at the University of Ilorin and other relevant disciplines to ensure content validity. A test–retest reliability procedure was conducted with 15 rural women who were not part of the main sample, and a Pearson's Product-Moment Correlation (PPMC) coefficient of 0.79 was obtained, indicating acceptable reliability of the instrument. Rural women's participation in groundnut cake processing was measured using a five-point Likert scale (very often, often, sometimes, rarely, never), scored 5, 4, 3, 2, and 1, respectively. The total participation score ranged from 10 to 50 and was used to categorize

respondents into low (10–23), medium (24–36), and high (37–50) levels of participation.

The perceived benefits of participation were measured based on a 5-point Likert scale (strongly agree, agree, neutral, disagree, strongly disagree) and a scale score of 5, 4, 3, 2 and 1, respectively. The challenges encountered in groundnut cake processing were evaluated on a four-point scale: Very Severe (4), Severe (3), Less Severe (2) and Not Severe (1). Descriptive and inferential statistical techniques were used to analyze the data collected from the field survey. Descriptive statistics such as frequency counts, percentages, means and standard deviations were used, and multiple regression analysis and Pearson's Product-Moment Correlation (PPMC) were used inferentially to test the stated hypotheses and examine the relationship between the socio-economic characteristics, perceived benefits, and participation in groundnut cake processing.

Mathematical expression for multiple regression:

$$Y = \alpha + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \epsilon \quad (1)$$

Y= Dependent variable, x= Independent (explanatory) variables - socio-economic characteristics, A= Intercept, β = Slope, ϵ = Residual (error). Where; Y= participation in groundnut cake processing, X_1= age, X_2= marital status, X_3= educational level, X_4= household size, X_5= years of experience and X_6= annual income

RESULTS AND DISCUSSION

Socio-Economic Characteristics of the Respondents

Table 1 shows that a considerable proportion (38.8%) of the respondents were above 50 years, with an average age of 46 years. This indicates that the majority of the rural women processors are in the middle to later adult age, and are physically equipped to undertake the strenuous tasks involved in groundnut cake processing, like molding, frying, and marketing. This age group could also suggest accumulated experience and social networks that can boost company functionality and profitability. This trend corroborates Christiana *et al.* (2021), who reported that most women involved in agro-processing activities in Nigeria were mature and not very young.

Regarding marital status, over half (53.1%) of the respondents were married, and 16.3% were widowed. Marital roles in rural families, particularly women's roles, relate to providing for extended and nuclear families. This can encourage women to be more involved in agro-processing activities like groundnut cake production for livelihoods to fulfil household needs. The high proportion of married women in this business corroborates earlier studies by Christiana *et al*. (2021), which found that marriage is common among rural women involved in agro-processing and this is often associated with enhanced economic participation.

The respondents' educational profile shows that 29.4% had no formal education; a higher proportion had some level of formal education, which was either primary (16.9%), secondary (38.8%), or tertiary (15.0%). In the agro-processing industry, formal education is expected to play an important part in introducing women to new technologies, better agro-processing methods, record-keeping, and better marketing techniques. This would happen because women with higher education levels are more likely to understand and use innovations, have access to information, and to be able to interact effectively with extension agents and financial institutions. The study concurs with Olooto *et al*. (2024), who found that over half of the women in rural areas in their study were educated, with education improving the adoption of improved processing and marketing techniques, which resulted in increased patronage and profitability.

Table 1: Socio-economic characteristics of respondents

Variables	Frequency =160	Percentage	Mean ± SD
Age in years			
≤ 30	19	11.9	
31 – 40	42	26.3	46±13
41 – 50	37	23.1	
Above 50	62	38.8	
Marital status			
Single	20	12.5	
Married	85	53.1	
Divorced	7	4.4	
Separated	22	13.8	
Widowed	26	16.3	
Level of Education			
No formal education	47	29.4	
Primary education	27	16..9	
Secondary education	62	38.8	
Tertiary education	24	15.0	
Household Size (people)			
1 – 5	57	35.6	
6 – 10	89	55.6	7±3
11 and above	14	8.8	
Year of processing experience (years)			
1 – 10	55	34.4	
11 – 20	50	31.3	17±11
21 and above	55	34.4	
Annual Income (#)			
≤ 100,000	81	50.6	
100,001 – 200,000	38	23.8	219337.50±
Above 200,000	41	25.6	32588.76

The mean household size was approximately 7 persons, of which over half (55.6%) had 6 to 10 persons per household. This reflects relatively large household size, a characteristic of rural areas. Large size can also lead to two consequences: it can place a strain on household resources due to the increased number of dependents, and it can also lead to the availability of family labour for groundnut cake processing. Family members can help source raw materials, process, package and sell, even if they are not paid for this work. This helps to save on labour expenses and may boost profit margins. The finding is consistent with Falola *et al*. (2020), who reported that rural women commonly have household sizes between six and ten persons, and that family labour contributes to agro-processing activities. Akakpo *et al.* (2024) similarly noted that use of family labour can minimize production costs and improve profitability in small-scale agro-enterprises.

With respect to years of processing experience, 34.4% of respondents had 1–10 years of experience, 31.3% had 11–20 years, and another 34.4% had 21 years and above, with an average of 16.9 years in groundnut cake (Kuli Kuli) processing. This indicates that many processors have long-standing involvement in the enterprise. Extensive experience suggests that these women have developed practical skills, tacit knowledge of product quality, and market understanding, which are critical for sustaining and expanding their businesses. Experience is likely to strengthen their confidence and efficiency in processing and marketing. Kayode *et al.* (2024) observed that while younger women may be more active in value addition activities, long years of experience among older women can translate into better mastery of the processing business and more stable participation.

More than half (50.6%) of the respondents earned ≤ ₦100,000 annually, while 23.8% earned between ₦100,001 and ₦200,000. Average annual income reported is relatively low with reference to the economic conditions (₦193,37). At a low level of income, the processing of groundnut cake does offer some livelihood support, but many of the groundnut cake processors may find it difficult to cope with the needs of their relatively large families. Shuaibu *et al.* (2021) also found that agro-processing women in rural areas are mostly low-income earners, which is a sign of low scale of operation and conditions like high cost of inputs and poor market access.

Participation in Groundnut Cake Processing

Results on respondents' participation in groundnut cake processing were presented in Table 2. Findings revealed that processing groundnut ($\bar{x}$ =4.48) was ranked first, selling the product ($\bar{x}$ =4.03) was ranked second, sourcing raw materials ($\bar{x}$ =4.03) was ranked third, managing business finance ($\bar{x}$ =3.71) was ranked fourth, packaging the product ($\bar{x}$ =3.68) was ranked fifth, while engaging in cooperative societies ($\bar{x}$ =3.51) was ranked tenth position as the least participating activity. This implies that processing groundnut, selling/marketing the product, and sourcing raw materials were the leading groundnut cake processing activities, as found in a similar study by Daba *et al.* (2023)

Table 2: Distribution of respondents by frequency of participating in groundnut cake processing

Activities	VO	O	S	R	VR	Mean $\bar{x}$	Rank
Managing business finance	69.4	20.6	20.6	2.5	4.4	4.48±1.00	1st
Selling the product	68.1	18.1	4.4	2.5	6.9	4.38±1.14	2nd
Packaging the product	41.9	38.8	8.1	3.1	8.1	4.03±1.17	3rd
Processing groundnut	28.7	43.1	8.8	8.8	10.6	3.71±1.27	4th
Sourcing raw materials	30.0	38.1	13.1	7.5	11.3	3.68±1.29	5th
Molding and shaping the paste	26.9	43.1	10.6	8.8	10.6	3.67±1.26	6th
Frying the paste	26.3	42.5	11.9	10.0	9.4	3.66±1.23	7th
Grinding and mixing the ingredients	26.9	42.9	11.3	8.8	10.6	3.66±1.26	8th
Extracting oil from the paste	26.9	42.9	10.0	10.0	10.6	3.65±1.27	9th
Engaging in cooperative societies	36.9	18.1	14.4	20.6	10.0	3.51±1.42	10th

Keys: VO=Very Often, O=Often, S=Sometimes, R=Rarely, N=Never

Table 3 presents results on levels of participation in groundnut-cake processing. The study showed that few (8.8%) had low participation, some (19.4%) had moderate participation, while the majority (71.9%) had high participation in groundnut cake processing. This implies that the respondents participated highly in groundnut cake processing. This confirms the importance of supporting women's roles in groundnut cake making for their economic empowerment and contribution to local food security, as found in a study by Amina *et al.* (2024).

Table 3: Level of participation in groundnut cake processing

Score obtained	Levels	Frequency	Percentage
10 – 23	Low	14	8.8
24 – 36	Moderate	31	19.4
37 – 50	High	115	71.9
Total		160	100.0

Possible score range: 10 – 50

Benefits of Participating in Groundnut Cake Processing

Table 4 shows that improved economic growth of the community ($\bar{x}$ = 4.29) was ranked as the most important benefit of groundnut cake processing, followed by increased employment rate for women ($\bar{x}$ = 4.25) and the perception that groundnut cake production is a profitable business ($\bar{x}$ = 4.24). Improved financial independence ($\bar{x}$ = 4.21) and increased profit ($\bar{x}$ = 4.19) were also highly rated, while improved social status in the community ($\bar{x}$ = 3.68) was ranked lowest. This implies that women primarily value the economic and employment benefits of participation in groundnut cake processing (Amina *et al.,* 2024).

Challenges Faced in Groundnut Cake Production

The mean ranking of challenges in Table 5 shows that inadequate capital ($\bar{x}$ = 3.68) was the most severe constraint, followed by high transportation costs ($\bar{x}$ = 3.44), high cost of raw materials ($\bar{x}$ = 3.35), and seasonal variation affecting raw material availability ($\bar{x}$ = 3.28). Availability of raw material ($\bar{x}$ = 2.96) was ranked 10th and found as the least severe problem. This pattern suggests that the primary constraints that affect rural women's effectiveness in groundnut cake production are financial constraints and cost constraints, which are similar to earlier findings that limited access to finance and high input and market costs are major constraints (Vilakazi *et al.,* 2025).

Results of multiple linear regression analysis in Table 6 revealed that the selected socio-economic characteristics of the respondents had a significant relationship with participation in groundnut cake processing, giving an R-square value of 0.396, implying that significant socio-economic variables predicted a 39.6% likelihood of processors' participation in groundnut cake processing activities in the study area. The only specific significant socio-economic predictor was years of experience in groundnut processing (β=0.44, $p<0.01$). This implies that an increase in years of experience will positively increase processors' participation in groundnut cake processing activities in the study area. This finding is consistent with studies that earlier found that increased years of experience significantly influenced participation of agro-processors and marketing in the positive direction (Mthombeni *et al*., 2022; Manasoe *et al*., 2024).

Table 4: Respondents' agreement on perceived benefits of participation

Statements	SA	A	N	D	SD	Mean ($\bar{X}$)	Rank
Improved social status in the community	22(13.8)	88(55.0)	33(20.6)	11(6.9)	6(3.6)	3.68±0.93	10th
Improved decision-making power	24(15.0)	86(53.8)	38(23.8)	10(6.3)	2(1.3)	3.75±0.83	9th
Increase access to financial resources (loan, savings)	28(17.5)	91(56.9)	21(13.1)	13(8.1)	7(4.4)	3.75±0.98	8th
Strengthened social networks	24(15.0)	94(58.8)	29(18.1)	8(5.0)	5(3.1)	3.78±0.88	7th
Reduced post-harvest loss	32(20.0)	114(71.3)	14(8.8)	0	0	4.11±0.53	6th
Increased profit	38(23.8)	115(71.9)	7(4.4)	0	0	4.19±0.50	5th
Improved financial independence	37(23.1)	119(74.4)	4(2.5)	0	0	4.21±0.46	4th
Groundnut cake production is a profitable business	49(30.6)	101(63.1)	10(6.3)	0	0	4.24±0.56	3rd
Increased employment rate for women	43(26.9)	114(71.3)	3(1.9)	0	0	4.25±0.48	2nd
Improved economic growth of the community	56(35.0)	96(60.0)	7(4.4)	1(0.6)	0	4.29±0.58	1st

Keys: SA= Strongly agree, A= Agree, N=Neutral, D=Disagree, SD=Strongly disagree

Table 5: Severity of challenges in groundnut cake production

Challenges	VS	S	LS	NS	$\bar{X}$(Mean)	Rank
Access to raw material	45(28.1)	79(49.4)	20(12.5)	16(10.0)	2.96±0.90	10th
Access to loan or credit	52(32.5)	63(39.4)	32(20.0)	13(8.1)	2.96±0.92	9th
Low product pricing	43(26.9)	105(65.6)	5(3.1)	7(4.4)	3.15±0.67	8th
Access to modern processing equipment	58(36.3)	81(50.6)	9(5.6)	12(7.5)	3.16±0.84	7th
Inadequate government support policies	55(34.4)	88(55.0)	10(6.3)	7(4.4)	3.19±0.74	6th
High competition in the market	51(31.9)	100(62.5)	6(3.8)	3(1.9)	3.24±0.61	5th
Seasonal variation affecting raw material availability	66(41.3)	82(51.2)	3(1.9)	9(5.6)	3.28±0.76	4th
High cost of raw materials	67(41.9)	86(53.8)	3(1.9)	4(2.5)	3.35±0.65	3rd
High cost of transportation	80(50.0)	74(46.3)	2(1.3)	4(2.5)	3.44±0.65	2nd
Inadequate capital	123(76.9)	27(16.9)	6(3.8)	4(2.5)	3.68±0.67	1st

Keys: VS=Very severe, S=Severe, LS=Less severe, NC= Not Severe

Table 6: Socio-economic factors determining participation in groundnut processing

Varables	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	33.46	3.79		8.82	<0.0001
Age in years	-0.07	0.07	-0.10	-1.04	0.30
Marital Status	0.19	1.49	0.01	0.13	0.90
Educational Level	1.25	1.73	0.06	0.72	0.47
Household Size	0.0029	0.29	0.00	0.01	0.99
Years of Experience in Groundnut Cake Production	0.43	0.08	0.51	5.38	<0.0001*
Annual income in naira	0.00001	0.00004	-0.02	-0.25	0.80

Dependent variable: participation in groundnut processing activities. R square = 0.396; F= 6.232; Std Error=8.521; Sig. 000[b]

CONCLUSION AND RECOMMENDATIONS

The study concludes that the rural women had a high level of involvement in groundnut cake processing in Kwara State. They were linked to significant economic benefits, such as greater community economic growth, women's employment, and profits. The main constraints to their participation in the enterprise were inadequate capital, high transportation costs, and high cost of raw materials. Also, years of experience and educational level influenced rural women's involvement in groundnut cake processing. Relevant government agencies and stakeholders should offer groundnut cake processors financial assistance, interventions, reduction in the cost of transportation and raw materials, and increased training opportunities in groundnut-cake processing.

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Authors' Contributions

MOM Conception/design, development of data collection instrument, interpretation of data, revised manuscript. FOA Conception/design, data analysis, interpretation of data, and final draft. TAD Conception/design, data collection, supervision, interpretation of data. BOA Data collection, Interpretation of data and first draft.

Ethical Statement

Not applicable

AI Declaration Statement

The authors declare that no Artificial Intelligence (AI) tools were used in the generation, analysis, interpretation, or writing of this manuscript.

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