



## Analysis of Women' S Participation in Processing Cassava

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### Abstract

#### Keywords:

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The study analysed women's participation in processing cassava to *gari* in Ekiti State, Nigeria. Primary data were obtained from 120 respondents with the use of a well-structured interview schedule in the study area. Descriptive and inferential statistics were used to analyse the data. The mean age of the respondents was 48 years and had the mean household size of 5 persons. The mean processing experience, annual income and quantity of processed tubers were 15 years, ₦472,200.00 and 7 bags respectively. Women's participation was high (3.1) in *gari* processing activities. Participation of women in cassava processing was significantly influenced by household size, annual income, processing experience and quantity of cassava roots processed. The major constraints to *gari* processing were inadequate storage facilities, poor transportation network, government policies on agricultural marketing, low capital, inadequate processing facilities, low returns from product sales and poor marketing channels. The study therefore, recommends that the government should encourage participation in packing activities by women *gari* processors to add value to processed products, ensure increased production of cassava roots by cassava producers, provide good transportation network, storage, credit and processing facilities, and formulate good agricultural marketing policies for these women for increased income and enhanced food security.

### 1. Introduction

Cassava (*Manihot esculenta* crants) is an important staple root crop in Africa. Cassava food products include *gari*, *lafun*, *fufu*, flour, *tapioca* and *chips*. Processing of cassava roots prior to consumption is essential because of its cyanide content and generally, they do not store for a long time after harvest (International Institute of Tropical Agriculture (IITA) as cited in Okpeke and Onyeagocha, 2015).

*Gari* as a cassava product is the overall most popular among others. *Gari* is a creamy-white, granular flour with a slightly fermented flavor and a slightly sour taste made from fermented, gelatinized fresh cassava tubers (Sanni as cited in Arinola and Olusola, 2017). Typical processing steps involved in the production of *gari* include peeling of cassava roots, washing, grating, fermentation, dewatering, sieving and roasting and the roasting process which usually dextrinizes the starch and dries the granules is called *garification* (Arinola and Oluwasola, 2017). Processing reduces food losses and stabilizes seasonal fluctuations in the supply of the crop (Taiwo and Fasoyiro, 2015). *Gari* processing in Nigeria is on the rise because it is seen as a convenience food; it is quick and easy to cook and can be stored (McNulty and Oparinde, 2015).

Fermentation is one method of processing cassava into different food forms which not only improve the flavour and taste of the product but extend the shelf life (Falade and Akingbala as cited in Uchekukwu-Agua et al., 2015). The fermentation process is carried out mostly by women. According to Kayode and Sunday (2013), Nigerian women are described as crucial factor for production because they are largely responsible for the bulk crop production, agro-

based food processing, preservation of crops and distribution of outputs or products from farm centers to urban areas. Women perform the majority of cassava processing in Nigeria (Curran et al., 2009).

In Southwest Nigeria, gari production was a profitable enterprise (Ijigbade et al., as cited in Okhankhuele, 2021). Gari, as a form of cassava product is one of the major staple foods popularly consumed in Ekiti State. In Ekiti State, specifically, processing cassava to gari is one of the major economic activities of the women. Cassava processing business is profitable in Ekiti State (Fatuase et al., 2019). Thus, women's participation in gari processing is crucial to economic boost of rural families. However, women, who specialize in traditional processed cassava products do not fetch much in terms of income (Olaomo, 2021). Despite the significant and potentially transformative roles played by women in agricultural growth in developing countries, they still face unrelenting obstacles and economic constraints limiting further contribution in agriculture (Lawanson, 2010). Rural women who are involved in processing of cassava to gari face difficulty in processing harvested roots as soon as possible to avoid loss of quantity and quality of their products. According to Karim et al. (2010), women were faced with challenges in peeling, fermentation/pressing and roasting during gari processing. The peeled roots are grated by women, using a simple traditional grater and the roasting process in gari processing is still done using firewood (Taiwo and Fasoyiro, 2015). This could result to low production and hence, low income which may limit the participation in cassava processing to gari resulting to inadequate availability of this cassava products to the consumers. Household food security is possible when individual household member has access to various choices of food items for their consumption (Ajayi and Ajiboye, 2020). Thus, there is a need to produce more consumable cassava products such as gari to meet the demand of ever-increasing population in the nation for food security and to increase the level of income of these women gari processors.

With reference to Ekiti State, considering the importance of cassava product such as gari and the role of women in cassava processing to gari in Nigeria, it is of expectation that more cassava roots should be processed to gari for household consumption, and sales to generate income by women in the study area; but these women are limited in their cassava processing activities. Although, female gari processors are very critical to the economic base of the individual family unit, they are still faced with some challenges in processing (Okpeke and Onyeagocha, 2015). Participation of women in cassava processing activities may not only improve economic growth but also, help in maintaining household food security. Hence, women's participation in cassava processing must be enhanced to ensure improvement in the production of consumable cassava product such as gari for increased income and to enhance household food security.

Therefore, it is imperative to analyse women participation in processing cassava to gari in Ekiti State, Nigeria.

Objectives of the study: The main objective of this study was to analyse women participation in processing cassava to gari in Ekiti State, Nigeria. Some of the specific objectives were to;

- i. describe the socio-economic characteristics of women gari processors in the study area;
- ii. identify activities performed by the respondents in the study area; determine the level of women participation in gari processing in the study area;
- iii. determine factors influencing cassava processing into gari by women; and
- iv. identify the constraints to cassava processing to gari in the study area.

## 2. Materials and Methods

The study area was Ekiti State. The state is located in the Southwest within the tropics with sixteen (16) Local Government Areas (LGAs). The state enjoys tropical climate with two distinct seasons; raining season (April-October) and Dry season (November-March). Agriculture is the main occupation and the major source of income for many people in the state. A multi-stage random sampling procedure was used in this study. The first stage involved the purposive selection of four (4) Local Government Area based on their involvement in cassava processing namely, Isan, Ikole, Emure and Ado-Ekiti. In the second stage, three (3) communities randomly selected from each of the four local Government Area. Finally, ten (10) respondents were randomly selected from each community making a total of one hundred and twenty (120) respondents for this study. Primary data were obtained through the use of a well-structured interview schedule to elicit relevant information from the respondents.

Descriptive statistics such as frequency counts, percentages, mean to describe objectives 1 and 2 while four - point Likert-type scale was used to measure objective 3 as High Participation - 4, Moderate Participation - 3, Low Participation - 2 and No Participation - 1. The mean score of the scaling statement is 2.5. Therefore, any mean score value greater or equal to 2.5 was regarded as high level of participation in cassava processing to gari and any mean score value less than 2.5 was regarded as low level of participation in cassava processing to gari. Also, objective 4 was measured using four - point Likert-type scale as Most Severe constraint (MS)-4, Moderately Severe constraint (MOS)-3, Least Severe constraint (LS)-2 and Not Severe constraint (NS)-1. The mean score was calculated and ranked

in order from highest mean score point to the lowest mean score point. The mean score point of the scaling statement is 2.5 and ranked.

Inferential statistics such as Multiple Regression analysis was used to determine factors influencing cassava processing into gari by women.

The model was specified in its explicit form thus;

$$Y = f(b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + e)$$

Where, Y = Participation index of the respondents

$b_0$  = Constant  $b_1 - b_5$  = Coefficients of multiple regression

X1 = Age of the respondents (years)

X2 = Processing experience (years)

X3 = Annual income (Naira)

X4 = Quantity of cassava roots processed (bags)

X5 = Household size (persons)

e = Error term

### 3. Results and Discussion

#### 3.1 Socio economic characteristics of women cassava processors

The mean age of the respondents was 48 years. It implies that most of the women involved in *gari* processing were still in their active age, this is expected because *gari* processing is laborious and requires more energy. The result revealed that most (75.8%) of the respondents were married, had a mean household size of 5 persons and mostly (64.2%) used family labour. It was also revealed that most (52.5%) of the respondents had formal education. This means that most of the respondents were educated and this could enhance the way they carry out their activities. More than half (52.5%) indicated trading as their secondary occupation. This could be because they would be able to sell their own products after processing the *gari* into finished products. The study also revealed that most of the respondents (64.2%) hired family labour with a mean annual income of ₦472,200.00 and a mean processing experience of 15 years. Also, the respondents had a mean quantity of cassava roots processed of 7 bags and 59.1 percent indicated part-time as nature of involvement in processing cassava to *gari*.

Table 1. Socio economic characteristics of women cassava processors

Variables	Frequency	Percentages	Mean
Age (years)			
<36	25	20.8	48
36- 50	44	36.7	
51- 65	38	31.7	
> 65	13	10.8	
Marital Status			
Single	9	7.5	
Married	91	75.8	
Divorced	10	8.3	
Widowed	10	8.3	
Household size (persons)			
< 4	20	16.7	5
4-6	71	59.2	
7-9	27	22.5	
>9	2	1.7	
Source of Labour			
Family	77	64.2	
Hired	35	29.2	
Others (friends, neighbours etc.)	8	6.7	
Level of education			
No Formal Education	57	47.5	
Primary Education	41	34.2	
Secondary Education	21	17.5	
Tertiary Education	1	0.8	
Secondary Occupation			
Civil service	19	15.8	

Trading	63	52.5	
Artisan	24	20.0	
Private service	14	11.7	
Processing Experience (years)			
1-10	36	30.0	15
11-20	55	45.8	
21-30	23	19.2	
31-40	5	4.2	
41-50	1	0.8	
Quantity of Cassava Roots Processed (bags)			
1-5	61	50.8	7
6-10	38	31.7	
11-15	10	8.3	
16-20	11	9.2	
Annual Income (₦)			
< 120,000	2	1.7	472,200.00
120,000- 360,000	48	40.0	
360,000- 600,000	21	17.5	
600,000- 840,000	46	38.3	
> 840,000	3	2.5	
Nature of involvement			
Part-time	71	59.1	
Full-time	49	40.8	

### 3.2 Gari Processing Activities Involved by Women

The study revealed that the respondents indicated practicing sorting activities (94.2%), performed peeling (91.1%), washing (93.3%), grating of the cassava tubers (88.3%), fermenting (87.5%), dewatering and pressing (85.0%). They further indicated their involvement in roasting (68.3%) sieving (65.8%) and 63.3 percent of the respondents each responded that they carried out sifting and packaged the processed *gari*. This means that these women were involved in all the listed *gari* processing activities.

Table 2. *Gari* Processing Activities Involved by Women

Activities	Frequency	Percentage
Sorting	113	94.2
Peeling	110	91.7
Washing	112	93.3
Grating	106	88.3
Fermenting	105	87.5
Dewatering and Pressing	102	85.0
Sifting	76	63.3
Roasting	82	68.3
Sieving	79	65.8
Packaging	76	63.3

\*Multiple Responses

### 3.3 Level of Women's Participation in Cassava Processing to Gari

The result from Table 3 revealed that most of the respondents participated in Roasting process with the mean score of 3.61 and it was accorded first position followed by sorting ( $\bar{x}=3.30$ ), sieving ( $\bar{x}=3.23$ ), grating ( $\bar{x}=3.21$ ), peeling ( $\bar{x}=3.16$ ), fermenting ( $\bar{x}=3.14$ ), washing ( $\bar{x}=3.02$ ), dewatering and pressing ( $\bar{x}=2.91$ ) and sifting ( $\bar{x}=2.87$ ) were second to ninth position respectively and regarded as involved activities. On the other hand, the respondents were involved in Packaging, accorded tenth position with the mean score of 2.36 which was less than 2.5, indicating low participation by women processors. This low participation in packaging activities might reduce the quality and shelf life of the processed products during storage. Packaging of processed products is vital in postharvest handling as it determines the shelf life and availability of the processed products (Uchekukwu-Agua *et al.*, 2015). The grand mean

was 3.1. This means that women had high level of participation in processing cassava to *gari*. This agrees with the findings of Azeez *et al.*, (2021) who found that the level of women's participation in processing of cassava is high.

Table 3. Level of Women's Participation in Cassava Processing to *Gari*

Level of Participation	HP	MP	LP	NP	Total	Mean	Rank
Roasting	344	81	8	8	441	3.61	1 <sup>st</sup>
Sorting	208	174	14	1	397	3.30	2 <sup>nd</sup>
Sieving	260	90	32	9	391	3.23	3 <sup>rd</sup>
Grating	212	141	30	4	387	3.21	4 <sup>th</sup>
Peeling	220	123	30	2	375	3.16	5 <sup>th</sup>
Fermenting	196	147	30	5	378	3.14	6 <sup>th</sup>
Washing	192	129	30	3	354	3.02	7 <sup>th</sup>
Dewatering and Pressing	156	159	18	6	339	2.91	8 <sup>th</sup>
Sifting	184	111	30	7	332	2.87	9 <sup>th</sup>
Packaging	136	63	44	10	253	2.36	10 <sup>th</sup>
Grand mean						3.1	

\*Multiple Responses

#### 3.4 Factors Influencing Participation in Cassava Processing to *Gari* by Women

The result from Table 4 revealed that quantity of cassava, farming experience, annual income and household size were factors influencing participation in cassava processing to *gari* by women in the study area. The coefficient of quantity of processed tubers (0.294) was significant and had positive relationship with women's participation in cassava processing to *gari* at 10% level of significance. This conforms to the a priori expectation. This implies that a unit increase in quantity of cassava roots processed would increase women's participation in cassava processing to *gari* by 0.294 unit. This means that the higher the quantity of cassava, the higher the level of women's participation in processing cassava to *gari*. This finding concurs with Olaomo (2021) that quantity of cassava to be processed determines women's participation in cassava processing. The coefficient of years of processing experience (0.026) was significant at 5% and positively related to participation in cassava processing to *gari* by women. The positive coefficient is in consonance with the a priori expectation, implying that as years of processing experience increase by a unit, the level of women's participation in cassava processing to *gari* also increases by 0.026 unit. This might be due to probability of making wise and productive decisions because of past observations from the processing activities. This finding is in line with Okebiorun and Jatto (2017) who found that years of processing have a significant influence on women's participation in cassava processing.

Annual income had a positive significant relationship with women's participation in cassava processing to *gari* at 10% level of significance with a coefficient of 7.167E-5. This is in line with is in with the a priori expectation. This implies that an increase in annual income might bring an increase in the participation of women in cassava processing to *gari*. This finding is in conformity with the finding of Onyemauwa (2012) who found that increase in income of women cassava processors would increase the tendency of the women to be involved in processing activities.

Furthermore, the coefficient of household size (2.801) was significant at 5% level of significance and had positive relationship with the participation of women in cassava processing to *gari*. This implies that a unit increase in household size would increase women's participation of cassava processing by 2.801 units. This could be because increased household size would bring easy access to family labour which is cheaper than hired labour and moreover that household members have mutual interests in the benefits of the processing activities. This agrees with the a priori expectation, implying as household size increases, participation of women in cassava processing to *gari* also increases. This could be because they would have easy access to farm labour for processing. This finding is in line with the report of Amadi (2020) that increase in household size would cause an increase in women's involvement in cassava processing.

Table 4. Factors Influencing Cassava Processing to *Gari* by Women

Variables	Coefficient	SE	T-value	Significance
(Constant)	21.909	3.381	6.480	0.000
Quantity of processed roots	0.294 *	0.153	1.924	0.058
Years of processing experience	0.026 **	0.110	2.359	0.021
Annual income	7.167E-5 *	0.000	1.739	0.086
Household Size	2.801 **	1.319	2.123	0.037
Age	0.059	0.068	0.862	0.391

\*\* = Significant at 5% level of probability, \* = Significant at 10% level of probability

### 3.5 Constraints to Processing Cassava to *Gari* by Women

The study revealed that inadequate storage facilities lead to cassava spoilage was indicated by the respondents as most constraint to *gari* processing with the mean of 3.59. This was followed by poor transportation network (3.41), low capital, government agricultural marketing policies and inadequate processing facilities with a mean score of 3.29 each. The result from Table 4 also revealed that low returns from product sales (3.24), poor marketing channels (3.12), poor packaging materials (2.86), high cost of processing implements/machines (2.57), and lack of improved technology (2.53) were indicated as constraints. However, the respondents indicated that theft (2.27), uncontrolled fermentation (2.11), and irregular cassava shape (1.99) were less constraints to cassava processing. This means that the most constraints faced by the women in *gari* processing were inadequate storage facilities, poor transportation, low capital, poor government agricultural marketing policies, inadequate processing facilities, low returns from product sales, poor marketing channels, poor packaging materials, high cost of processing implements/machines and lack of improved technology with a grand mean was 2.89. This finding supports the findings of Muhammad-Lawal *et al.* (2013) that high transport cost, poor road network, insufficient capital as some of the problems of cassava processors. This finding also agrees with the findings of Okpeke and Onyeagocha (2015) that inadequate capital and fund, inadequate processing and storage facilities, poor markets characterized by low pricing of products were the major constraints encountered by cassava processors. In addition, the finding concurs with Uchekukwu-Agua *et al.*, (2015) who stated that the type of packaging materials used could lead to degradation of quality attributes during storage of processed products.

Table 5. Constraints to *Gari* Processing by Women

Constraints	MS	MOS	LS	NS	Total	Mean	Rank
Inadequate storage facilities lead to spoilage	156	171	38	0	365	3.59	1 <sup>st</sup>
Poor transportation network	304	78	24	3	409	3.41	2 <sup>nd</sup>
Government agricultural marketing policies	304	69	8	14	395	3.29	3 <sup>rd</sup>
Low capital	252	123	14	6	395	3.29	3 <sup>rd</sup>
Inadequate processing facilities	220	162	10	3	395	3.29	3 <sup>rd</sup>
Low returns from product sales	204	168	14	3	389	3.24	6 <sup>th</sup>
Poor marketing channels	236	96	34	9	375	3.12	7 <sup>th</sup>
Poor packaging materials	148	138	46	11	343	2.86	8 <sup>th</sup>
High cost of processing implements/ machines	148	114	8	38	308	2.57	9 <sup>th</sup>
Lack of improved technology	192	51	18	43	304	2.53	10 <sup>th</sup>
Theft	112	87	28	46	273	2.27	11 <sup>th</sup>
Uncontrolled fermentation	40	132	38	44	250	2.11	12 <sup>th</sup>
Irregular cassava shape	28	129	30	52	239	1.99	13 <sup>th</sup>
Grand mean						2.89	

\*Multiple responses

### 4. Conclusion and Recommendation

The study analyzed women's participation in cassava processing to *gari*. The mean age of the respondents was 48 years. Most of the respondents were married with a mean household size of 5 persons and mostly used family labour and had a mean annual income of ₦472,200.00. Most of the women *gari* processors had no formal education with a mean processing experience of 15 years. The level of participation in cassava processing to *gari* by women was high in roasting, sorting, sieving, grating, peeling, fermenting, washing, dewatering and pressing and sifting as major *gari* processing activities but women indicated low participation in packaging activities. Women's participation in cassava processing was significantly influenced by household size, annual income, processing experience and quantity of processed tubers. Major constraints to *gari* processing identified by the respondents were inadequate storage facilities, poor transportation network, low capital, government policies on agricultural marketing, inadequate processing facilities, low returns from product sales, poor marketing channels, poor packaging materials, high cost of processing implements/machines and lack of improved technology.

Therefore, based on the findings, the study recommends the followings:

- i. Since the level of participation was low in packaging activities of cassava processing to *gari*, government should encourage women's participation in packaging activities so as to add value and increase the shelf life of the processed products by ensuring that good quality packaging materials are produced by the industry for the use of women cassava processors.
- ii. Government should encourage the production of more cassava roots by cassava producers and expansion of cassava industry for the use of these women processors.

iii. Efforts should be made by the government to provide adequate storage facilities to reduce spoilage of cassava products; better transportation network for easy transportation of cassava products to the market and; credit and processing facilities to women *gari* processors to enhance their processing activities.

iv. Government should also formulate good agricultural marketing policies for better marketing of processed cassava products such as *gari* and give subsidies on processing implements/machines to these women to motivate their participation in cassava processing.

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