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Original Research Article

Utilization of *Garri*-Processing Methods among Rural Women in Iwo Local Government Area, Osun State, Nigeria

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Abstract

The study assessed utilization of conventional and modern *Garri*-processing methods among rural women in Iwo Local Government Area, Osun State, Nigeria. A two stage sampling technique was used to select one hundred and twenty-eight (128) respondents with the aid of a structured interview scheduled. Descriptive statistics and Pearson Product Moment Correlation were used to analyze the data. Results show that The level of utilization of the conventional method (2.92) was high compared with the modern method (mean=1.09). Level of use of the conventional method was significantly influenced by Years of experience (r=0.388), and household size (r=0.276), while significant relationships existed between level of use of modern *Garri*-processing and years of formal education (r=0.237), income (r=0.201), and quantity processed (r=0.336). Also, constraints to use of the modern method were poor power supply, and high costs of acquisition and maintenance of equipment. It was recommended, among others, that there is need for advocacy on the benefits of use of modern methods. Also government and relevant agencies should make the modern equipment available at subsidized rates for processors to purchase or hire.

Key words: Garri, Processing, Methods, Conventional, Modern

Introduction

The International Fund for Agricultural Development (IFAD) (2013) reported that Africa is one of the continents of the world where some 600 million people are dependent on cassava for food. Cassava is a staple food that belongs to the family *Euphorbiaceae.* It is the underground part of the cassava shrub which has *Manihot esculenta* as its botanical name. It is also known as manioc, yucca and tapioca. Cassava may have been introduced into Nigeria over 300 years ago, although its systematic cultivation was never generally accepted and practiced until the late 1990s. It became generally accepted and fully integrated into the farming systems of southern Nigeria a little over 150 years ago (Raw Material Research and Development Council, 2004). It is one of the most drought-tolerant crops, and can be successfully grown on marginal soils, giving reasonable yields where many other crops do not grow well. It is a tuber crop which has the same root shape as sweet potato.

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Cassava is produced largely by small-scale farmers using rudimentary farm implements, and most of the cassava produced is used for human consumption with less than 5% used in industries. Cassava per capita consumption is very high, and provides about 80% of the total energy intake of many Nigerians (Ani, 2010) Compared to grains, Cassava is more tolerant to low soil fertility and more resistant to drought, pests and diseases (Obisesan, 2012). With poor market access, marketing of cassava can be particularly problematic because of its bulky nature, especially if it is not processed (Cassava Report final 2013).

Cassava is usually consumed in processed forms. The processing of cassava in Nigeria can be categorized into different capacity levels as cottage or household, micro, medium and large scale levels. The cottage level requires no labour but members of the household. The micro processing level requires one or two units of labour, while the large scale requires three to ten workers (FAO, 2006).

The most popular product from cassava in Nigeria is *Garri*. *Garri* is a dry granular product made from roots of cassava through a series of processing steps. The granules are added to hot water and stirred to make a paste of varied consistency and consumed with soup or stews of various types by chewing or swallowed in morsels. Currently *Garri*, a dry granulated product with a slight acidic taste (Westby, 2002; Adeoti *et al*., 2009), is the predominant form of cassava consumption across the different regions of Nigeria. Cassava can be processed into *Garri* using the following pattern from harvesting to storage: Harvesting-------Peeling----Washing-------Grating/Milling--Fermentation------ Pressing-----Sifting-----Frying-----Cooling-----Sieving-----Packaging--Storing in a cool/dry place. *Garri* is a pre-cooked food obtained by processing cassava [*Manihot esculenta]* and is consumed in Nigeria and other African states such as Ghana, Togo, and Benin. The average urban consumers prefer *Garri* because it is a pre-cooked food product which serves as a source of food for the consumers.

The conventional method of producing *Garri* involves peeling and grating the fresh roots. The grated pulp is normally allowed to ferment for two or three days. The pulp is then compressed to eliminate liquid, after which it is sieved and fried in heated pans. Oftentimes, palm oil is added either during the grating process or at the point of frying. The resultant *Garri* is yellowish as distinct from white *Garri* that results when no oil is added. In a recent study it was reported that fermentation significantly reduced the cyanide content of either the sweet or bitter variety of cassava (Asegbeloyin and Onyimonyi, 2005).

Modern technology is simply an advancement of old technology that gives easy access to information on how to get things done faster and easier. It is the key to empowering rural women on the use of machines for the production of many things. The impact of technology in modern life is unmeasurable. We use technology on a daily basis to accomplish specific tasks or interests. In the modern day processing of cassava, we see the introduction of machines which aid the production process, and serve as a key tool to tap into the market as it will eliminate the stress and waste associated with traditional *Garri* production, and ultimately increase turnover/profit. Several attempts at improving *Garri* production have resulted into the manufacture of separate machines for the various processes involved in the *Garri* production which include machines like: Cassava peeler, Cassava grater, hydraulic press de-waterer, Sifter, and Fryer or roaster. Women play a central role in cassava production, harvesting, processing and marketing, and contribute about 58 percent of the total agricultural labour in the Southwest, 67 percent in the Southeast and 58 percent in the central zones (Onyemauwa, 2012).

Different *Garri*-processing methods which are mainly conventional and modern have their own advantages and disadvantages, which make *Garri* processors prefer the use of one method over the other. Factors influencing either of the methods (conventional or modern) can also make *Garri* processors prefer to use either of the methods.

In view of the set objective of this project, this study was designed to assess the level of use of conventional and modern *Garri*-processing methods among rural women in Iwo Local Government Area of Osun state. The specific objectives were to:

i. describe the socio-economic characteristics of women in the study area.

ii. identify the level of usage of both conventional and modern methods of *Garri*-processing in the study area.

iii. ascertain the perceived factors influencing the level of use of the conventional method of *Garri*-processing in the study area, and

iv. ascertain the factors influencing the level of use of the modern method of *Garri*-processing in the study area.

The hypothesis of the study was as follows:

There is no significant relationship between the socio-economic characteristics of the rural women and the level of usage of *Garri*-processing methods.

Methodology

This study was carried out in Iwo Local Government Area of Osun State, Nigeria. Iwo Local Government Area has its administrative headquarters located in Iwo Town. Iwo has an agriculturally rich advantage, which makes it a major trading center for cocoa, kola nut, cassava, yam, meat and timber.

A two stage sampling approach was used to select the respondents. The first stage was a random selection of 20% out of 41 towns and villages in Iwo Local Government Area, making a total of 8 towns. The towns/villages were Agberire, Adana, Anaru, Olobeere, Moleefon, Ologun ogunjana, Ikire-ile, Ogburo. The second stage was the random selection of 16 women that were *Garri*-processors from each selected towns/villages making a sample size of 128 which was used for the study. Data were collected from the respondents using structured interview schedules. The instrument was sectioned from A-D based on the objectives. Section A was used to elicit information on the socio-economic characteristics of rural women involved in *Garri*-processing. Section B was used to identify the levels of use of both conventional and modern methods of *Garri*-processing; responses were solicited on a 3 point Likert-type scale of *Not used at all* (1), *Used often* (2) and *Used very often* (3). The expected mean score was 2. Any mean score ≥ 2 was considered as highly used; mean scores ≤ 2 was lowly used. Section C was used to identify the factors influencing the use of the conventional method of *Garri*-processing, while Section D was used to identify the factors influencing the use of the modern method of *Garri*-processing. Both sections (C and D) were measured on a 4-point Likert-type scale of *Strongly disagree* (1), *Disagree* (2), *Agree* (3) and *Strongly Agree* (4).

The Pearson's Product-Moment Correlation was used to test the relationship between the socio-economic characteristics of the respondents and the level of use of the *Garri*-processing methods.

Results and Discussion

Socio-economic characteristics of the Garri processors

Table 1 indicates that the mean age of the respondent was 37.9 years. The result is in line with the findings of Olatinwo *et al* (2018) which states that cassava processors in their middle age years have positive implication on productivity.

Table 1: Distribution of respondents according to socio-economic characteristics (n=128)

Variables	Frequency	Percentages	Mean	SD
Age in Years				
≤30	46	35.9	**37.92**	**12.80**
31-40	34	26.6		
41-50	21	16.4		
≥50	27	21.1		
Years of formal Education				
0	25	19.5	**11.23**	**2.26**
1-6	20	15.6		
7-12	53	41.4		
>12	30	23.4		
Marital Status				
Married	60	51.6		
Otherwise	62	48.4		
House- hold size				
1-3	23	18.0	**7.83**	**1.11**
4-6	40	31.2		
>6	65	50.8		
Income (₦)				
≤ 50,000	9	7.0	**263,758.43**	**73,501.55**
50,001-100,000	23	18.0		
100,001-150,000	15	11.7		
150,001-200,000	36	28.1		
> 200,000	45	35.2		
Experience Years				
1-3	53	41.4	**5.75**	**1.89**
4-6	45	35.2		
7-9	11	8.6		
> 9	19	14.8		
Quantity Processed (Bags)				
< 2	9	7.0	**7.95**	**2.59**
2-4	22	17.2		
5-7	50	39.1		
> 7	47	36.7		
Contact with Extension Agents				
Yes	67	52.3		
No	61	47.7		
Frequency with Extension Agents (67)				
1	23	34.3	**1.87**	**0.45**
2	27	40.3		
3	9	13.4		
4	8	11.9		

Source: Survey, 2020.

Results in Table 1 further reveal that the mean household size was 7.83. This indicates a relatively large household size. This has implications for more economic viability in *Garri*-processing, as this number also adds to family labour, according to Chikezie *et al.* (2012).

About 11.23 years was recorded as the mean years of formal education. This implies that the educational level of the respondents is relatively low and could be responsible for their reliance on local technologies for their operations. This is in consonance with the findings of Shittu (2012) that low level of literacy is frequent in the rural areas and this will affect their level of new technology adoption as well as their income and savings. Also, the mean annual income generated is ₦263,758.43. This will give an amount of ₦13,187.93 per month. This is relatively too small for household upkeep and may not be a reliable source of income.

Results on table 1 further shows that the mean years of *Garri*-processing is 5.75 years, this may likely be attributed to the fact that as the number of years' advance, processors tend to leave the business to less stressful ones and also because of the little income realized from it. The mean quantity of *Garri*-processed per annum is 8.95 bags. This is small and may likely be due to the method of processing *Garri* adopted by the respondents which is the conventional method. Modern method may yield more quantity than conventional method. The mean contact with extension agents is 1.87 times. This agrees with Adesoji (2009) that there was low level of extension contact among fish farmers in Osun state. This might be due to the fact that extension agents are not well equipped as a result of inadequate training and funding. Although majority of the respondents had contact with extension agents twice, they still claimed not to adopt any other method aside their old *Garri*-processing method because there was no frequent contact with extension agents.***Level of usage of Garri-processing methods***

Result in Table 2 reveals that conventional method (× = 2.92) is the most popular method used for processing Result in Table 2 reveals that conventional method (× = 2.92) is the most popular method used for processing *Garri* in the study area with about 95.3% of the respondents made use of conventional method very often. Though, some of the respondents claim they have modern knowledge of *Garri*-processing but still adhere to the age long method since they are used to conventional method. Omolara *et al.* (2017) also confirm the in a study titled "Cost and Return Analysis of Cassava Flour Production among Women in Osun State, Nigeria that every single respondent made use of local method of processing in the study area and none of them use semi-modern and modern methods. Although conventional method seems simple and convenient for use by respondents. There is dire need for advocacy of modern method to replace the outdated conventional use which is low yielding, time consuming, low quality and labour intensive (Scott *et al.* 2000**;** Westby 2002).in the study area with about 95.3% of the respondents made use of conventional method very often. Though, some of the respondents claim they have modern knowledge of Garri processing but still adhere to the age long method since they are used to conventional method. Omolara *et al.* (2017) also confirm the in a study titled "Cost and Return Analysis of Cassava Flour Production among Women in Osun State, Nigeria that every single respondent made use of local method of processing in the study area and none of them use semi-modern and modern methods. Although conventional method seems simple and convenient for use by respondents. There is dare need for advocacy of modern method to replace the outdated conventional use which is low yielding, time consuming, low quality and labour intensive (Scott *et al.* 2000; Westby 2002).

Table 2: Distribution of respondents according to level of usage of *Garri*-processing methods

Processing Methods	Not used at all Frequency (%)	Used often Frequency (%)	Used very often Frequency (%)	Mean score
Conventional	4(3.1)	2(1.6)	122(95.3)	2.92
Modern	122(95.3)	1(0.8)	5(3.9)	1.09

Source: Author's field survey, 2020.
The expected mean score is 2. Any mean score ≥ 2 is considered as highly used, mean score ≤ 2 is considered as low level of use.

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Perceived factors influencing the use of conventional method of Garri processing

Result in Table 3 shows that "beliefs and norms", more than other factors, supported the use of the conventional method (MS=3.72), followed by "conventional method is not costly" (MS=3.23); next to it was "using conventional method produces higher quality product" (MS=3.14) other factors includes; conventional method usage helps process higher quantity of cassava (MS=3.13), use of conventional method does not cause health challenges (MS=2.83). Also, use of conventional method does not cause environmental pollution (MS=2.8), the use of conventional method is not labour intensive (MS=2.34), use of conventional method is not time consuming (MS=2.30).

Table 3: Distribution of the respondents according to their perception on factors influencing the use of conventional method of *Garri*-processing

PERCEIVED FACTORS	SD	D	A	SA	MS
Beliefs and norms support the use of conventional method	0(0)	9(0.7)	19(14.8)	100(78.1)	3.72
Use of conventional method is not costly	10(7.8)	38(29.7)	5(3.9)	75(58.6)	3.23
Using conventional method produces higher quality products	10(7.8)	12(9.4)	50(43.8)	50(39.1)	3.14
Conventional method helps process higher quantity of cassava	7(5.5)	10(7.8)	71(5.5)	40(31.3)	3.13
Use of conventional method does not cause health challenges	20(15.6)	15(11.7)	60(46.9)	33(25.8)	2.83
Use of conventional method does not cause environmental pollution	10(7.8)	28(21.9)	70(54.7)	20(15.6)	2.78
Use of conventional method is not labour intensive	24(18.8)	50(39.1)	40(31.3)	14(10.9)	2.34
Use of conventional method is not time consuming	26(20.3)	70(54.7)	0(0)	32(25.0)	2.30
Use of conventional method is not unhygienic	40(31.3)	50(39.1)	27(21.11)	11(8.0)	2.07

Source: Author's Field Survey, 2020. Overall mean score: 2.84
SD=Strongly Disagreed, D=Disagreed, A=Agreed, SA=Strongly Agreed.

Then, the use of conventional method is not unhygienic this means that the use of conventional method is hygienic (MS=2.07). This implies that belief and norms is the major factor influencing the use of conventional method because the respondents believed in the old method of *Garri*-processing which is the conventional method and also, 78.1% of the respondents strongly agreed that their belief and norms cannot be changed and that since they are accustomed to this method, they might find it difficult to process *Garri* with other method other than the conventional method.

Perceived factors influencing the use of modern method of Garri processing

The result presented in Table 4 shows the most of the perceived factors have negative influencing on the use of modern method for processing *Garri*. Result shows that poor power supply hinders the use of modern method of *Garri*-processing (MS=3.36), 67.97% of the respondents strongly agreed to this factor, this implies that the modern method of *Garri*-processing will be more effective if there is adequate power supply. This is in agreement with the result reported by (Ayoade and Adeola, 2009) that poor power supply is one of the constraints women processors are facing.

Table 4: Distribution of respondents according to their perception on the use of modern method of Garri processing

PERCEIVED FACTORS	SD	D	A	SA	MS
Poor power supply hinders the use of modern method	10 (7.8)	21 (16.4)	10 (7.8)	87 (67.97)	3.36
Modern method requires high cost of maintenance	10 (7.8)	38 (29.7)	5 (3.9)	75 (58.6)	3.13
High cost of purchasing machine hinders the use of modern method	20 (15.6)	27(21.11)	11(8.6)	70(54.7)	3.02
Poor technical know-how hinders the use of modern method	20 (15.6)	38 (29.7)	5 (3.9)	65 (50.8)	2.90
Use of modern method can be used for higher quantity	25 (19.5)	28 (21.9)	50 (39.1)	25 (19.5)	2.59
Illiteracy hinders the use of modern method	40(31.3)	31(24.2)	7(5.5)	50(39.1)	2.52
Government policies is not favorable for the use of modern method	11 (8.6)	30 (23.4)	67 (52.3)	10 (7.8)	2.44
Lack of adequate information hinders the use of modern method	30 (23.4)	38 (29.7)	45 (35.2)	15 (11.7)	2.35
Land tenure system hinders the use of modern method	50 (39.1)	5 (3.9)	63 (49.2)	10 (7.8)	2.26
Use of modern method produces higher quality product	50 (39.1)	40 (31.3)	8 (6.5)	30 (23.4)	2.14

Source: Author's Field Survey, 2020; Overall mean score: 2.67; (SD=Strongly Disagreed, D=Disagreed, A=Agreed, SA=Strongly Agreed); Values in parentheses are percentages.

Next to it is modern method of *Garri*-processing requires high cost of maintenance (MS=3.13) Also among the least ranked factors were lack of adequate information hinders the use of modern method of *Garri*-processing, this implies that some respondents are still not yet aware of modern method of *Garri*-processing and Land tenure system hinders the use of modern method of Garri processing (MS=2.14).

The results of the Pearson Product Moment Correlation (PPMC) analysis presented in Table 5 shows the relationship between some selected socio-economic characteristics and the level of usage of conventional and modern methods of processing *Garri*. The results revealed that years of experience had a positive significant influence (r= 0.388) on use of the conventional method. This implies that processors with vast experience of this method may be perennially adhering to

Table 5: Result of the Pearson Correlation Analysis showing the Relationship between Socio-economic Characteristics and their Use of *Garri*-Processing Methods

Socio-economic Characteristics	Conventional Method			Modern Method		
	R-value	P-value	Remark	R-value	P-value	Remark
Age	-0.080	0.371	Not significant	0.093	0.299	Not Significant
Year of education	**-0.229****	**0.009**	Significant	**0.237****	**0.007**	Significant
Income	-0.045	0.577	Not significant	**0.201****	**0.013**	Significant
Experience	**0.388****	**0.001**	Significant	0.120	0.140	Not Significant
Household size	**0.276****	**0.002**	Significant	0.036	0.686	Not Significant
Quantity Processed	**-0.312*****	**0.000**	Significant	**0.336*****	**0.001**	Significant

Source: Survey, 2020.
****Correlation is significant at the .05 level (2-tailed)**; *****Correlation is significant at the .01 level (2-tailed)

the age-long method, since they are used to it. Also, a positive relationship (r= 0. 276) was found to exist between household size and level of usage of the conventional method. It could likely be that large household sizes discourages use of the modern method, due to its financial implication which may likely affect household domestic consumption needs. Furthermore, the negative, but significant, relationship (r=-0.229) found between years of formal education and level of usage of the conventional method implies that higher levels of education resulted in lower usage of the conventional method. This could be as a result of exposure to the usage of modern methods. Quantity processed also had a negative but significant relationship (r=-0.312) with level of usage of the conventional method. This may likely be that as the quantity of *Garri* produced increased, respondents tended to shift to the modern method, probably because it is not as energy-consuming as the conventional method.

Furthermore, results on Table 5 show that correlation coefficients for Years of formal education (r=0.237) Income (r=0.201) and Quantity processed (r= 0.336) were positively and significantly related with Use of Modern method of *Garri* processing. The positive nature of the relationships between education (r= 0.237), Income (r= 0.768), Quantity processed (r=0.336) and level of usage of the modern method of processing *Garri* indicate that processors with higher levels of education, those who earned more income, and respondents who processed more quantity were more likely to use the modern method. This could be as a result of the fact that education promotes innovation (Alemayehu, 2014).

Conclusion

Based on the findings of this study, it was concluded that the level of use of the conventional method was higher than use of the modern method of *Garri* processing in the study area. Years of formal education, income, experience, household size and quantity processed had significant relationships with the level of use of these methods. Major constraints of using the modern method were poor power supply and high cost of maintenance, while norms, beliefs and reduced cost of

equipment compared to the modern method were major factors that influenced the conventional method. Extension services had little or no contribution to the activities of the processors.

Recommendations

For the upgrade of the *Garri* processing industry, it was recommended that;

- Government and relevant agencies should make modern *Garri-processing* equipment available at subsidized rates for processors to purchase or hire.
- Provision of adult education programs, and enlightenment of young women on the need for acquiring more education will help them to know the advantages of employing the mechanized method over use of the manual method.
- Research institutes and relevant stakeholders should be mandated by the government to produce prototype of non-electric technologies (Machines that do not use electricity) to solve the problem of inadequate electricity supply.
- Government and private extension agents should be encouraged to increase their visits to educate the processors to adopt the modern processing method.

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