



# ASSOCIATION OF LEADERS AND POLICY PROFESSIONALS (ALPP)



in collaboration with  
**UNIDEL CONSULT. UNIVERSITY OF DELTA,**  
Agbor, Delta State, Nigeria

Proceedings of the

**2ND**

**International**  
*Conference*

on Institutional Leadership and  
Capacity Building in Africa

**ICILCB 2022**

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THEME:

**INSTITUTIONAL LEADERSHIP,  
GOVERNANCE AND  
ECONOMIC RECOVERY**

**Venue:** University Auditorium  
University of Delta, Agbor, Delta State, Nigeria  
Opening Session: 10am

**DATE OF CONFERENCE**  
Arrival: Monday 26th September 2022  
Departure: 29th September 2022

Edited By:

**Prof. Prince Nwachukwu OLOLUBE**  
**Dr. Otekenari David ELISHA**



*Proceedings of the*

**2<sup>nd</sup> International Conference on  
Institutional Leadership and Capacity  
Building in Africa**

With the Theme:  
**Institutional Leadership, Governance and  
Economic Recovery**

Held on **26<sup>th</sup>-29<sup>th</sup> September, 2022** at the **University  
Auditorium**, University of Delta, **Agbor**, Nigeria.

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# COMPARATIVE ANALYSIS OF THE FACTORS AFFECTING THE MARKETING OF BIO-FORTIFIED VITAMIN-A GARRI AND ORDINARY WHITE GARRI IN OYO STATE, SOUTHWESTERN NIGERIA

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## ABSTRACT

Garri is one of the most popular cassava food in many West African countries. Due to its convenience and multiplicity of use, garri is gradually gaining a foothold in the international food market. However, garri marketing has been characterized by various constraints in least developed countries (LDCs), especially in Sub-Saharan Africa (SSA). The study therefore examined the socio-economic characteristics of garri marketers and factors affecting the marketing margin of marketers of bio-fortified vitamin A garri and ordinary garri in Oyo state. One hundred (100) garri marketers were drawn using multistage sampling technique involving a list of garri marketers collected from International Institute of Tropical Agriculture (IITA) Ibadan and snow ball technics from eighteen locations across seven local government areas in Oyo state. The data collected were on the socio-economic characteristics of the respondents, the cost and returns on the factors affecting the garri processing and marketing in the study region using structured questionnaire which were the instruments used for data collection. The result revealed that transportation cost, purchasing cost, processing and marketing experience of the marketer, and the age of the marketers, the years of formal education acquired and the marketing cost affects the marketing of both the ordinary and the bio-fortified garri.

**Keyword:** Comparative Analysis, Marketing Bio-Fortified Vitamin A, Garri,

Reference to this paper should be made as follows:

Lasisi, A. J. (2022). Comparative analysis of the factors affecting the marketing of bio-fortified vitamin-a garri and ordinary white garri in Oyo State, Southwestern Nigeria. *Proceedings of the 2<sup>nd</sup> international Conference on Institutional Leadership and Capacity Building in Africa ICILCB2020* (pp. 260-272). ICILCB2022 held on the 26<sup>th</sup>-29<sup>th</sup> September 2022 at University of Delta, Agbor, Nigeria.

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## INTRODUCTION

Cassava (*Manihot esculenta Crantz*) is a staple food crop grown by poor farmers on marginal lands, particularly in Africa, Asia and Latin America (International Institute of Tropical Agriculture- IITA, 2004). Nigerian cassava production is by far the largest in the world; a third more than production in Brazil and almost double the production of Indonesia and Thailand (FAO, 2020). The Bio-fortified cassava popularly called yellow cassava, was bred by a coalition of partners, including International Institute of Tropical Agriculture (IITA), National Root Crops Research Institute (NRCRI), Umudike, and International Center for Tropical Agriculture (CIAT), and released in Nigeria in 2017. Garri is produced following harvesting of cassava, peeling, grating, dewatering, fermentation (optional), sieving, frying and bagging. This process will give white or creamy white garri while addition of palm oil prior to dewatering will add yellow colour to garri. Yellow garri is preferred and can cost twice as much, making it less available to poorer households (Adeuya, 2014). Abu *et al.*, (2016) identified that with the growing population in Nigeria and declining real incomes, garri has the potential to become a highly demanded household food.

## Statement of the Problem

Despite the speculations about the growing demand for garri, however, the marketing structure of garri as a major source of food has not been ascertained (Abu *et al.*, 2016). Vanhuyse (2012) stated that the level of efficiency of the marketing system and its contribution to food security can be improved by analyzing the problem and proffering solutions to those problems militating against an efficient marketing system. Analysis on the performance of garri markets in Ibadan metropolis also revealed high transaction costs and weak marketing, resulting from high transportation cost, high marketing cost, low production facilities and high concentration of middle men (Abu *et al.*, 2016).

Kaine (2017) and Wihemina, (2019), opined that there had been a high and fluctuating consumer price in the marketing channel of garri arising from poor linkages in the distribution network and poor infrastructural facilities. Kaine (2017) also found in his study among many garri marketers in Delta state that most of the literate use both family and hired labour and marketers were youths and middle-aged, depended on garri processing and marketing as means of livelihood.

In a similar vein, Ayoade and Adeola (2019) and Knipscheer *et al.* (2017) among others, argued that garri production, processing and marketing were constrained by government agricultural policies and the poor state of infrastructural provisions. Also, these constrains are said to have ultimately raise processing and marketing costs and lead to unstable output prices, as well as reducing marketing incentives garri marketers (Adejobi, 2019; Faturoti *et al.*, 2016; Yusufu *et al.*, 2019). Hence, the following objectives became important.

## Aim and Objective of the Study

The aim of this study is to comparative analysis of the factors affecting the marketing of bio-fortified vitamin-a garri and ordinary white garri in Oyo State, Southwestern Nigeria. specially, the objectives of the study are to:

- examine the socio-economic characteristics of the marketers of the bio-fortified and ordinary garri;
- identify the possible factors affecting the marketing of bio-fortified and ordinary garri in the study area.

## Research Questions

- What are the socio-economic characteristics of the marketers of the bio-fortified and ordinary garri?
- What are the factors affecting the marketing of bio-fortified and ordinary garri in the study area?

## LITERATURE REVIEW

Garri is traditionally made at home in Africa. It is increasingly becoming common to produce garri at commercial level using mechanised means. Made from cassava, the tubers are harvested, peeled, removing the covering, and the white pulp is grated in a garri grinding machine. Before the advent of machines, the cassava is hand grated. The grated produce is then put into a jute sack and the sack tied.

## Types of Garri

There are different types of garri, depending on how it is processed, its grain size and the region of Africa where it is produced. The Standards Organization of Nigeria classifies garri into:

**Extra Fine Grain Garri:** where more than 80% of the grain passes through a sieve of less than 350 micro meter aperture

**Fine Grain Garri:** More than 80 % of the grains pass through a sieve of less than 1000 micro meter aperture

**Coarse Grain garri:** Not less than 80% of grains passes through a sieve of 1400 micro meter or less than 20 % of weight passes through a sieve of 1000 micro meter Extra Coarse Grain Garri - Not less than 20 % of grain is retained on a sieve of 1400 micro meter aperture.

Garri can also be classified based on fermentation length (days and extent) as well as whether palm oil is added to make it yellow or not. Such classifications include:

**Red Garri:** This is the type of garri commonly found in the Mid-Western part of Nigeria. It is also called Bendel garri. It is made exactly the way described above, but for the addition of red palm oil after grating the cassava and the garri is allowed to ferment for two to three days also. Adding palm oil to the garri further helps to reduce the cyanide content and gives it a unique flavour.

**White Garri:** Same as Bendel garri, left to ferment for two to three days as well, but red palm oil is not added during processing.

**Ijebu Garri:** Ijebu garri is made same way too, but allowed to ferment for up to seven days. No palm oil is added. It is also fried to become much crisped. It characteristically has a very sharp taste and less starchy. Many people from the Western part of Nigeria love this and find it great for “soaking”.

**Ghana Garri:** Ghana garri as the name implies is garri made in Ghana. Again the process is basically the same. The harvested and peeled cassava is soaked in water first. This step is skipped when making garri in Nigeria as above. After grating the peeled and soaked cassava, this is then sun dried, before frying it in a pot to cook it crisp. Ghana garri thus comes out quite starchy, very crisp, and lasts very long in storage. No palm oil is added. It is very good in making eba.

### **Acceptability of Bio-fortified Vitamin a Garri**

In 2011, environmental rights action group Friends of the Earth Nigeria (FoEN) demanded a halt to any research on genetically modified cassava in Nigeria. Suggesting the International Institute of Tropical Agriculture (IITA) research team in Nigeria—stop meddling with one of Nigeria's key food crops, arguing that IITA is undermining biodiversity. IITA ignored all health concerns brought to their attention, and proceeded with the launch of three controversial varieties (Ejolt, 2011).

It is normally risky to change the colour of a staple crop because colour preference can negatively affect consumer adoption rates (WRENmedia, 2012). This is not the case with yellow cassava. Since local consumers often add palm oil to white cassava flour in their foods, they are normally accustomed to the golden colour. Therefore the yellow colour has been shown not to deter consumers. (WRENmedia, 2012) On a taste panel comparing fufu produced with different types of cassava flour, the fufu containing yellow cassava flour was preferred (Omodamiro et al., 2008). The experiment also concluded that the yellowness of the fufu added to the appetites of the taste testers. (Omodamiro et al., 2008).

## **THEORETICAL FRAMEWORK**

The basic theory on which this work could be based is the perfect competition theory. Processing is part of the production process and garri marketers are producers of garri and marketers and operate under a competitive market structure.

### **Perfect Competition Model**

This model is characterized by the following:

Large numbers of sellers and buyers. Garri marketing has large members whose products are so small that it represents only a small fraction of the total market supply. As such no processor can influence the market price of the products,

### **The Products Are Homogenous**

The garri marketing is a group of firms that process cassava into various products. The stages of production are the technical characteristics of the various products and its sale and delivery are identical. This assumption implies that marketers are price takers. Their demand curve is infinitely elastic, an indication that the firm can sell any amount of output at the prevailing price. The variations in an individual firm output does not change the market price. And so the demand curve is the marginal revenue and average revenue curves.

$$D = MR = AR$$

- Free entry and exit of firms: there is freedom of movement in and out of the garri marketing industry. This assumption is supplementary to the assumption of large numbers of buyers and sellers.
- The goal of all the firms in the industry is profit maximization
- There are no government regulations in the market (like tariffs and subsidies etc)
- There is perfect mobility of factors of production
- Perfect knowledge of the conditions of the market.

### **Constraints in Marketing of Cassava**

Post-harvest physiological deterioration (PPD) is one of the most important constraints in cassava production and commercialization. It has been hypothesized that the antioxidant properties of carotenoids in yellow cassava roots may help reduce or delay PPD. The industrial sector prefers cassava with a high dry matter content. The challenge for industrialization of cassava is to integrate the production and transformation into easily stable products that possess desirable quality attributes and to market it at prices consumers and other end users are willing to pay. Studies assessing drivers for increases in garri marketing, also tend to agree that private and public participation and investment and upgrading of rural infrastructures will not only reduce costs of garri processing and marketing but also improve effectiveness and efficiency of garri production, processing and marketing in Nigeria (Adeniji, 2016; Awoyinka, 2019; Eze et al. 2020; Manyong et al., 2015; Ojo, 2019; Okoh, 2019; Oladele, 2012; Walkenhorst, 2017)

However, it is not in question that work done on the factors affecting marketing of garri has obviously been more on white garri, and few on the comparative analysis of profitability and not much work have been done on the factors affecting the marketing of both types of garri. With growing demand and the accompanying supply response of white and bio-fortified garri in Nigeria, studies on comparative analysis on the factors affecting the marketing of bio-fortified and white garri will be an eye opener to solve many problems affecting the marketing margin of garri marketers in south western Nigerian. It was also pointed out by various authors that garri

marketing has been characterized by various constraints in least developed countries (LDCs), especially in sub-Saharan Africa (SSA) (Awoyinka, 2019; Olowa & Olowa, 2020; Saingbe, 2020). According to Brown and Kennedy (2015), lack of capital is an important constraint for garri marketing. Low commodity prices was also found to discourage marketers from marketing garri surplus which, in turn, discourages new entry into marketing system (Adejobi, 2019; Faturoti *et al.*, 2016; Rosen and Shapouri, 2012; World Bank, 2012; Yusufu, 2019).

## **METHODOLOGY**

This research work was carried out in eighteen (18) farm locations across seven Local Government Areas (L.G.A) in Oyo State, Nigeria between January 26<sup>th</sup> and March 7<sup>th</sup>, 2021. The study was carried out in Oyo State, which lies within the tropical zone in the rain forest region of southwestern part of Nigeria. It is located between latitude 8.0° N and Longitude 4.0° E of Greenwich meridian of equator. Oyo State has a total of thirty-three Local Government Areas (LGAs) and a population of 5,591,589 and total land area approximately 28,454 square kilometers (Oladeebo and Oluwaranti, 2012). The State is located in Southwestern Nigeria, it is bounded in the South by Ogun State and in the North by Kwara State, in the West by the Republic of Benin while in the East, and it is bounded by Osun State. The topography is mainly plain to slightly gentle rolling lands.

A total of one hundred (100) garri marketers were interviewed using multistage sampling technique. The data were thus obtained from Eighteen (18) locations across seven (7) LGAs of the state which are: Egbeda LGA (Kulodi); Onireke LGA (Dugbe Market); Oyo North (Mokola Market); Ibarapa East (Idi-Ata Ibule-Ilo, Okolo, Olori Village, New Eruwa, Old Eruwa, Lagaye, Aderomu Village and Maya Market); Ibarapa Central (Igbo-Ora); Iseyin (Iseyin Central Market, Otiri Farm, Adugbe, Ija-Odola); Ogbomoso Orire (Iluju); The major garri markets in these areas were Maya market at Ibarapa east which is operated every five days. Closed ended questionnaire was used to obtain primary data from the respondents.

Information were collected on the socio-economic characteristics, such as the educational background of the respondent, age, marital status, sex, primary occupations, and sources of funds. Other variables on which data was collected were the input used, output, labour, processing methods and revenue. During interview, the questionnaire was constructed in the native language of the respondents to achieve the objectives of the study. Descriptive statistics such as frequencies, percentage, means and tables was used to determine mean of socio-economic characteristics of the garri marketers while regression analysis was used to analyse the factors affecting the marketing margin of ordinary garri marketers.

### **Measurements used in garri marketing**

- 1 jalukere of cassava tuber load =900kg
- 900kg of cassava tuber =320kg of garri
- 1 congo of garri = 1.2kg
- 1 jedimole =7 congos
- 1 bag of garri =67 congos =80kg
- 1 jalukere of white cassava tubers is sold at N18, 000.
- 1 jalukere of bio-fortified cassava tubers is sold at N19, 500.
- 1kg of garri is sold at N100 for white garri.
- 1 kg of bio-fortified garri sold for N120.

Note: jalukere is the name for old pickup car (equivalent to Cabstar) used in selling cassavatubers.

### **Linear regression analysis on factors affecting the marketing margin of bio-fortified garri marketers**

Regression analysis was used to analyse the factors affecting the marketing margin of bio-fortified garri marketers. An ordinary least square (OLS) regression model was estimated. The explanatory variables included in the model were:  $X_1$ =Transportation cost (NGN);  $X_2$ = Cost of purchasing cassava tubers (NGN);  $X_3$ =Processing/marketing experiences(year);  $X_4$ =Labour measured in manday;  $X_5$ =Marketers age (Years);  $X_6$ = Years of formal education (years);  $X_7$ = Gender (dummy, male=1; female=2);  $X_8$ = processing and marketing cost (NGN) and  $U_i$ =the error term or disturbance term.  $Y$ = Quantity of garri marketed (Kg)

The regression coefficient revealed the amount of change that was observed in the value of the dependent variables given a change in the values of the independent variables. According to Ibekwe (2019), the empirical regression analysis is:

$$F(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, U_i) \text{ -----Equation (v)}$$

**Linear function:**  $Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + X_9 + U_i$

Where:  $X_1$ =Transportation cost (NGN);  
 $X_2$ = Cost of purchasing cassava tubers (NGN);  
 $X_3$ =Processing/marketing experiences (year);  
 $X_4$ =Labour (manday);  
 $X_5$ =Marketers age (Years);  
 $X_6$ = Years of formal education (years);  
 $X_7$ = Gender (dummy, male=1; female=2);  
 $X_8$ = Processing and marketing cost (NGN) and  
 $X_9$ = Other costs (NGN)  
 $U_i$ =the error term or disturbance term.  
 $Y$ = Quantity of garri marketed (Kg)

The other costs measured in Nigerian naira includes the marketing commission paid, association levied etc. Due to the fact that both garri are processed and jointly marketed by the marketers, the cost is not separated but are shared by the quantity of white garri and bio-fortified garri marketed.

### Apriori Expectation

- $X_1$ =Transportation cost (NGN) is expected to be negative. This is because the higher the transportation cost, the lower the quantity of garri that will be marketed (Afolabi, 2019 and Faturoti *et al.*, 2016).
- $X_2$ = Cassava purchasing cost (NGN): the cost of purchasing cassava tubers is expected to be negative. This is because if the purchase price per unit increases, the quantity of cassava bought will decrease and so the quantity of garri marketed will also decrease (Nascimento *et al.*, 2017)
- $X_3$ =Processing/marketing experiences (year): is expected to be positively correlated with the quantity of garri marketed. This is because as a person stays longer in a business, the more experienced and efficient he will become in handling the marketing operations (Adejobi, 2019; Yusufu *et al.*, 2019).
- $X_4$ =Labour (manday) is expected to be positively correlated with the quantity of garri that will be marketed. As the labour increases, more quantity of garri will be marketed.
- $X_5$ =Marketers age (Years): the age of the marketer is expected to have negative effect on the quantity of garri that will be marketed. Nascimento *et al.*, (2012) indicated that entrepreneurship dwindles as the age of the entrepreneur increases. This is due to the fact that innovativeness and optimism of the entrepreneur and his mental capacity to cope with the

challenges of his marketing business activities and his mental and physical abilities to do manual work decreases with age as pointed out by Nascimento et al., (2012).

- $X_6$ = Years of formal education (years) is expected to be positively correlated with the quantity of garri marketed. Educated persons by implications have greater ability to understand and adopt new marketing strategies which helps them to enhance their proficiency in sale business (Knipscheer *et al.*, 2017 and Ibekwe *et al.*, 2012)
- $X_7$ = Gender (dummy, male=1; female=2): women are expected to dominate the garri marketing business (Rosen and Shapouri, 2012 and Olabode *et al.*, 2020)
- $X_8$ = Processing and marketing cost (NGN) is expected to be low and negatively correlated. If the marketing cost is high, the quantity of garri that will be marketed will reduced (Mafimisebi 2017 and Abolagi *et al.*, 2017)
- $X_9$ = other costs (NGN) are expected to be low. They negatively affect the quantity of garri that will be marketed (Folayan and Bifarin, 2017 and Wihemina *et al.*, 2019)

## RESULTS AND DISCUSSION

### Socio-Demographic Characteristics.

This involves the analysis of various socio-economic characteristics of the respondents which includes the age, sex, marital status, family size, level of education, sources of funds. Table 1 Showed that majority of the respondents (85%) were female while the remaining 15% of the respondent were male for both marketers of ordinary and bio-fortified garri. This shows that marketing of garri in the study area is predominantly a female dominated enterprise. Marketing of garri is generally accepted to be gender biased and largely attributed to female gender, however, the men were largely involved in manning the machineries in the enterprises which supports the study of Olabode *et al.*, (2019). The result also revealed that among respondents interviewed, the distribution shows that about 53.0% of the respondents were in their production ages 25-45 years while the remaining 39.0% were between 45 and 65 years.

According to Ibekwe (2012), these active population (25-45 years) have the mental capacity to cope with the challenges of the garri marketing and physical ability to do manual work decreased with age, majority 79% of the respondents were married, while the remaining were either divorced or widowed for both the marketers/processor. From table 1, it was shown that household size 3-4 people was the highest with percentage frequency of 40%, 25% has 1-2 people as their household size, 20% has family size of 5-6 people while the remaining 15% has household size above 6 people. On the average the household size, in the study area was 4.61 with the smallest household size in the study area was 5 per house. Clearly, the respondents had large family sizes. All things being equal, the respondents will have access to family labour which can help in the enterprises (Ibekwe, 2012).

**Table 1: Distribution of the respondents by their socio-economic characteristics**

Variables	Frequency No=100	Percent (%)	Cumulative percentage (%)
Gender			
<b>Male</b>	15	15.0	15.0
<b>Female</b>	85	85.0	100.0
<b>Total</b>	100	100.0	
Age			
<b>25-45</b>	53	53.0	53.0
<b>46-65</b>	39	39.0	92.0
<b>66-780</b>	8	8.0	100.0
<b>Total</b>	100	100	
Marital status			
<b>Married</b>	79	79.0	79.0
<b>Single</b>	5	5.0	84.0
<b>Divorced</b>	6	6.0	90.0
<b>Widowed</b>	10	10.0	100.0



<b>Total</b>	100	100.0	
Household number			
<b>1-4</b>	65	65.0	65.0
<b>5-8</b>	34	34	99
<b>10 and above</b>	1	1.0	100.0
<b>Total</b>	100	100.0	
Year of formal education			
<b>Primary1-6</b>	19	19.0	19.0
<b>JSS1-SS3</b>	32	32.0	51.0
<b>NCE</b>	31	31.0	82.0
<b>OND</b>	10	10.0	92.0
<b>HND</b>	8	8.0	100.0
<b>Total</b>	100	100.0	
Starting capital			
<b>1000-40000</b>	75	75.0	75.0
<b>41000-80000</b>	20	20.0	95.0
<b>81000-150000</b>	5	5.0	100.0
<b>Total</b>	100	100.0	
The sources of business finance			
<b>Personal savings</b>	88	88	88
<b>Cooperatives</b>	10	10	98
<b>Others</b>	2	2	100.0
<b>Total</b>	100	100	
Ways of passing market price information among traders			
<b>By traders</b>	80	80	80
<b>By buyers</b>	5	5	85
<b>By market association</b>	15	15	100.0
<b>Total</b>	100	100	

**Source:** Data analysis, 2021

The table showed that 31% of the respondents attended National college of Education (NCE), 20% has 7-9 years of formal education, 12% for 10-12 years of formal education and 16% of the respondents has 1-3 years of formal education, however, 18% were observed to have completed ordinary national diploma (OND), and higher national diploma (HND) and B.Sc. or its equivalent for both the processors and marketers of garri in the region. The relatively high concentration of NCE (31%) and 61% of the respondents has at least 10 years of formal education shows that most of the garri marketers are relatively educated and this implies that they could seek for and make use of information regarding market forces for increase productivity as well as modernization of their enterprises as cited by Olabode et al. (2019).

Also 75% of the respondents started their business with about N1, 000-N40, 000, 20% had starting capital of about N41, 000-N80, 000 while the rest 5% of the garri marketers started their marketing business with about N81, 000-N150, 000. The result indicates that majority of the garri processors and markets had low capital start up with cumulative frequently of 75% of the total 100 respondents starting with capitals between the ranges of N1, 000 to N40, 000. This result will invariables means that most of the processors and marketers of garri are in small scale enterprise and hence low standard of living (Ibekwe, 2012). Among 100 marketers examined, 88% financed them businesses though personal savings 10% borrowed money from cooperatives while only 2% source for fund through other means. The result shows that most of the garri markets do not have access to loans and grant making them marketing of Garri limited to only small scale. Eighty percent (80%) of the marketers were of the view that market price information is processed by traders, 5% agreed it is through the buyers while the remaining 15% were of the view that it's through the market association as found by Afolabi (2019).

### **Linear Regression analysis on factors affecting the marketing margin of white garri marketers**

The coefficient for age ( $X_5$ ) was negatively significant. The result showed that a unit change in age of the marketer will lead to 2788.367 unit change in the quantity of garri marketed. This implies that efficiency of the marketer decreases with age i.e. the older the marketer becomes the less efficient he tends to be. And that increase in age will lead to corresponding decrease in efficiency. Marketers who are younger in age may take more discrete decisions and are able to read the market situation better than those who are older (Ayoade & Adeola, 2019, Knipscheer et al., 2017; Ibekwe et al., 2012). The coefficient of transportation cost ( $X_1$ ) was found to be negatively correlated. This implies that the higher the transportation cost, the lower the quantity that will be marketed. It also showed that a unit change in the cost of transportation will lead to 16.212 units change in the quantity of garri marketed.

The coefficient of cost of purchasing white cassava ( $X_2$ ) was also found to be negatively significant. The higher the cost of cassava tubers, the lower the quantity of garri that will be processed and hence the lower the quantity of garri that will be marketed. Also, this implies that any increase in purchasing price would decrease marketing efficiency. It implies that a unit change in the cost of purchasing cassava will cause 0.348 changes in the quantity of garri marketed. This confirms an earlier study by Fafchamps *et al* (2002) that price is very pivotal in deciding the volume of sales and marketing effectiveness.

The coefficient of years of formal education ( $X_6$ ) was found to be negatively significant. The result indicates that a unit change in the year of education of garri marketer will lead to 3732.442 change in the quantity of garri marketed. This implies that the higher the years of education, the less the quantity of garri that will be marketed. This is because as the year of education increases, they tend to look for white collar jobs instead of garri marketing and this view is supported by Rosen and Shapouri, (2012) and Olabode et al. (2020). The coefficient of gender of the marketers ( $X_7$ ) was found to be positively significant. This reflects when we consider female as the major dominant in the garri marketing activities. The result implies that female are better marketers of garri than male counterparts which may be due to their ability to persuade buyers and attract customers as pointed out by Ibekwe (2012). The result indicates that a unit change in the gender of marketer will lead to 16107.95 unit change in the quantity of garri marketed.

**Table 2: Linear regression showing the factors affecting the marketing of ordinary garri**

VARIABLES	ORDINARY GARRI			
	LINEAR REREGRESSION			
	B	t-value	Sig. Level	
constant	516895.45	27.03	4.1417	
$X_1$ =Transportation cost (NGN)	-16.212	-1.200	0.0431**	
$X_2$ = Cost of purchasing cassava tubers (NGN)	-0.049	-6.32	0.002*	
$X_3$ =Processing/marketing experiences (year)	0.348	0.033	1.300	
$X_4$ =Labour (manday)	-3.765	-0.331	-1.351	
$X_5$ =Marketers age (Years)	-2788.367	-3.519	0.006*	
$X_6$ = Years of formal education (years)	-3732.442	0.77	0.014**	
$X_7$ = Gender (dummy, male=1; female=2)	16107.95	0.14	0.027**	
$X_8$ = Processing and marketing cost (NGN)	0.247	-5.50	-0.100***	
$X_9$ = Other costs (NGN)	-36.117	-1.05	0.031**	
$R^2$	6.606			
Adjusted $R^2$	0.781			
F-stat	6.606			

**Source:** data analysis, 2021.

Significant at \* ( $p > 0.01$ ); \*\* ( $p > 0.05$ ); \*\*\* ( $p > 0.1$ )

Also, the result showed that the coefficient of marketing cost ( $X_8$ ) and other cost ( $X_9$ ) were found to be negatively significant. This result implies inverse relationship between cost and the quantity of garri marketed as found by Afolabi (2019). The result indicates that the higher the cost, the lower the quantity of garri that will be marketed and vice versa and that for every 1 unit change in the marketing cost, there will be resultant 0.247 change in the quantity of garri that will be

marketed as found by (Folayan & Bifarin, 2017; Wihemina, 2019). However, the coefficient of marketers' years of experience ( $X_3$ ), and the coefficient of labour in man-day ( $X_4$ ) were found not to be significant for the factors affecting the marketing margin of white garri marketers. The adjusted ( $R^2$ ) which is the coefficient of determination was found to be 0.781 for ordinary garri, indicating that about 78.1% of the variability in the marketing of ordinary garri among garri marketers in the examined regions is explained by the specified independent variables in the model while the remaining 21.9% unexplained variability are embedded in the error term  $U_i$ .

### **Linear Regression analysis on factors affecting the marketing margin of bio-fortified vitamin A garri marketers**

The coefficient of transportation cost ( $X_1$ ) was found to be negatively correlated. This implies that the higher the transportation cost, the lower the quantity that will be marketed. The coefficient of cost of purchasing bio-fortified cassava ( $X_2$ ) was also found to be negatively significant. This implies that any increase in purchasing price would decrease the quantity marketed by 14.146 units. This confirms an earlier study by Fafchamps et al (2002) that price is very pivotal in deciding the volume of sales and marketing effectiveness. The coefficient of processing or marketers experience ( $X_3$ ) which was found not to be significant in the marketing of white garri. The processing and marketing experience, was however found to be positively correlated in the marketing of bio-fortified vitamin A garri. This imply that the longer the years of experience of the marketer, the more likely the quantity of bio-fortified vitamin A garri to be sold this may be due to the ability of marketers to introduce the new garri to customers in such a way that the consumer was able to adopt and have preference for the bio-fortified vitamin A garri.

A unit change in the in the processing or marketing experiences will result in 1.015units change in the quantity of garri that will be marketed. The coefficient of labour ( $X_4$ ) which was also found not to be significant in white garri was found to be positively significant in the quantity of bio-fortified garri marketed. This implies that the higher the labour, the higher the quantity of garri that will be marketed. The relationship is found to be linear. The coefficient for age ( $X_5$ ) was negatively significant at ( $p < 0.1$ ). This implies that efficiency of the marketer decreases with age i.e. the older the marketer becomes the less efficient he tends to be. And that increase in age will lead to corresponding decrease in efficiency. Marketers who are younger in age may take more discrete decisions and are able to read the market situation better than those who are older. The coefficient of years of formal education ( $X_6$ ) was found to be positively significant. This implies that the higher the years of education, the more the quantity of bio-fortified vitamin A garri that will be marketed. This may be due to increase in knowledge and interpersonal relationship of the marketer which the marketer will definitely bring into play while marketing the product (Rosen and Shapouri, 2012 and Olabode et al. 2020).

However, the coefficient of gender of the marketers ( $X_7$ ) was found to be negatively significant contrary to our a priori expectation. The reason for this may be due to the fact that the bio-fortified cassava is still limited in the market and the marketing of the garri is still considerably low compared to the white garri. Also, the result showed that the coefficient of marketing cost ( $X_8$ ) and other cost ( $X_9$ ) were found to be highly negatively significant. This result implies inverse relationship between cost and the quantity of garri marketed as found by Afolabi (2019). The result indicates that the higher the cost, the lower the quantity of garri that will be marketed and vice versa (Folayan & Bifarin, 2017; Wihemina, 2019).

The adjusted ( $R^2$ ) for bio-fortified garri was found to be 0.519 meaning that 51.9% of the variability affecting the marketing of bio-fortified garri in the examined region is explained by the specified independent variables in the model. The remaining 48.1% unexplained variability are embedded in the error term  $U_i$ . The F-value of the model was placed at significant level of 10%, 5%, and 1% of probability which means that if the experiment is carried out 100 times, about 90%, 95% and 99% outcomes will always give the same result for both the marketing of ordinary and bio-fortified garri. This explained that the explanatory variables jointly exert significant influence on the marketing of garri (Afolabi, 2019).

**Table 3: Linear regression showing the factors affecting the marketing of bio-fortified vitamin A garri**

VARIABLES	BIO-FORTIFIED GARRI		
	LINEAR REREGRESSION		
	B	t-value	Sig. Level
constant	447761.65	20.21	40.671***
X <sub>1</sub> =Transportation cost (NGN)	-14.146	-2.701	0.002*
X <sub>2</sub> = Cost of purchasing cassava tubers (NGN)	-0.042	0.111	-0.031**
X <sub>3</sub> =Processing/marketing experiences (year)	+1.015	6.65	0.003*
X <sub>4</sub> =Labour (manday)	-15.746	1.001	0.003*
X <sub>5</sub> =Marketers age (Years)	-1809.200	-3.65	0.100***
X <sub>6</sub> = Years of formal education (years)	-9816.216	2.60	0.051**
X <sub>7</sub> = Gender (dummy, male=1; female=2)	-7380.63	-1.33	2.650
X <sub>8</sub> = Processing and marketing cost (NGN)	-2.202	-1.312	-0.038**
X <sub>9</sub> = Other costs (NGN)	-114.982	-5.500	-0.101***
R <sup>2</sup>	0.623		-0.003*
Adjusted R <sup>2</sup>	0.519		
F-stat	59.65		

Source: data analysis, 2021.

Significant at \* (p>0.01); \*\* (p>0.05); \*\*\* (p>0.1)

## CONCLUSION

The study found that the females are the dominant marketers of both the ordinary and bio-fortified Vitamin A garri. The mean age of the garri marketers for both the ordinary and bio-fortified garri are high and garri marketers are all within their productive age. The garri marketers are relatively educated, have relatively high household size and have low capital startup. Transportation cost, purchasing cost, processing and marketing experience of the marketer, and the age of the marketers, the years of formal education acquired and the marketing cost affects the marketing of both the ordinary and the bio-fortified garri and Labour, gender and quantity of garri marketed do not affect the marketing of both the ordinary and bio-fortified vitamin A garri.

## Recommendation

Based on the result obtained, it is therefore recommended that government should encourage garri marketers and processors in terms of provision of credit to boost startup capital and increase the scale of marketing operations. Policies that will reduce the cost of marketing should be implemented.

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