

# Analysis of the consumption patterns of cassava food products amongst rural households in Imo State, Nigeria

C.C. APEH\*, O.P. UGWUOTI & A.C. APEH

(C.C.A.: Department of Agricultural Economics, University of Agriculture and Environmental Sciences, Umuagwo, Imo State, Nigeria; O.P.U.: Department of Agricultural Extension, Federal University of Technology, Owerri, Nigeria; A.C.A.: Department of Mass Communication, Enugu State University of Science and Technology, Enugu, Nigeria)

\*Correspondence author's email: [apehchikams@yahoo.com](mailto:apehchikams@yahoo.com)

## ABSTRACT

Cassava is a staple food in Nigeria and many households largely depend on its food products for their daily calorie requirements. The need to critically evaluate the consumption pattern of cassava food products (CFPs) amongst households in Imo State, Nigeria necessitated this study. A multilevel sampling technique which involves purposive and random sampling was used to select 432 farmers for the study. Data was collected using questionnaire and analysed using SPSS version 16. A three- and four-point Likert scale rating with 2 and 2.5 decision points respectively was used to measure the consumption pattern of CFPs and factors affecting them. The results show that 43% of the farmers were male, 93% attended at least primary school and 60% were aged between 30–50 years. About 65% cultivated UMUCASS 1379 cassava variety. Abacha (89%) and Garri (88%) were the most available CFPs and Garri with the highest mean score (MS = 2.84) was the most consumed. Consumer preferences (MS = 2.91), and culture, custom or tradition (MS = 2.88) were the major factors affecting the consumption pattern of CFP in the area. To effectively promote CFPs consumption, policies should emphasize more on culture and the provision of necessary processing equipment to encourage more families to produce, process and consume more CFPs.

**Keywords:** Cassava food products; consumption patterns; consumer preferences; processing; production

Original scientific paper. Received 13 Mar 2023; revised 13 Jun 2023

## Introduction

Cassava (*Manihot esculentus* Crantz) is a major staple crop in Nigeria typically grown across the six geopolitical zones of the country (Onyemauma, 2010; Ogbe *et al.*, 2007), as well as in Africa, and serves as a major source of carbohydrate (Okoye *et al.*, 2021; Theodory *et al.*, 2014; Akinpelu *et al.*, 2011; Onyemauma, 2010). Cassava is known as an all-season

crop because its lower sensitivity compared to most crops to environmental changes and versatile usage (Arua, 2019; IITA, 2004). The economic importance of cassava is enormous as it serves as both food and industrial raw material (Akinola *et al.*, 2022; Asante-Pok, 2013; Ogunniyi, 2011; Chukwuji, 2006). In short, cassava is known as the major rural food consumed in Nigeria in the forms of Garri,

Fufu, flour or chips, and its leaves are used as vegetable and the dry stem as firewood by low-income households (Nweke, 2004). Nigeria accounts for about 20% of the world cassava production with about 63 million metric tonnes of cassava produced per annum (Knoema.com, 2023).

Cassava is valued for its role as the major source of carbohydrate (Okoye *et al.*, 2021; Akinpelu *et al.*, 2011; Onyemauma, 2010) and raw materials for agro-allied industries with huge potential for the export market (Akinola *et al.*, 2022; Asante-Pok, 2013; Ogunniyi, 2011; Egesi *et al.*, 2007). It produces about 25% and 40% more carbohydrates than maize and rice respectively (Theodory *et al.*, 2014), and is used in making starch, glucose, biscuits, ethanol, biofuel, bread, thickeners, custard powders, confectioneries, jelly etc. in industries (Echebiri & Edaba, 2008). It is comparatively more affordable in Nigeria than other staple foods and consumed often on daily basis, and sometimes more than once per day (Okoye *et al.*, 2021). It forms a considerable chunk of the diet for many and the acceptance of its products by all classes of Nigerians is on its own a production motivator. Its adaptability (as a marginal crop) to poor resource base and climatic conditions has endeared it to most producers than maize, rice and other grains.

The cassava's increasing popularity in Nigeria as a staple food, cash crop, export crop and industrial raw material (Akinola *et al.*, 2022; Okoye *et al.*, 2021; Asante-Pok, 2013; Ogunniyi, 2011; Akinpelu *et al.*, 2011; Onyemauma, 2010; Egesi *et al.*, 2007) is due to its great purpose in usage and consumption pattern. The consumption pattern could be in raw form or processed form of the product on various value chain. Cassava stem produces the cassava tubers that are processed in different form for consumption. The raw form

of consumption pattern is the direct usage of the product such as eating the product without passing any process, whilst the processed form is through adding value to the product at various processes.

The processed form especially at the rural areas kicks off from the fresh roots (tubers) which are the first output of cassava products that cannot be stored for a long period because of their perishability with over 70% water content and cyanide which is toxic to faunas (Okoye *et al.*, 2021; Ogunniyi, 2011). Therefore, the cassava tubers are processed into various products to increase its shelf life, improve palatability, nutrition and storage (Ogunniyi, 2011), and fermented to reduce cyanide content by 70.67% (Kobawila *et al.*, 2005). This helps to stabilize seasonal supply fluctuations and reduce food losses. Apart from processing cassava into foods like Garri, Fufu, flour among others, it can also be processed into chips for animal feed and starch for food and non-food uses. Due to cassava's wide variety, many food products can be produced from its fresh roots across the world (Arua, 2019). It can be consumed as fresh tubers, or roasted tubers (depending on the varieties), whilst in some places, they are processed to starch, Tapioca, Garri, Manioca, unfermented flour, fermented flours, Cossette, Fufu, Agbelilakia, Lafun, Placali, Yakayake, Eberebe, Chikwangu, Fede etc. before being consumed (Okoye *et al.*, 2021; Younoussa *et al.*, 2013; Ezeh, *et al.*, 2011; Echebiri & Edaba, 2008; Andrew, 2002). In addition, high quality cassava flour can be used in industries to make bread, biscuits, confectionary, and pasta (Akinpelu *et al.*, 2011). Also, it can be used to process alcohol (Kenyon *et al.*, 2006) and biogas (Kobawila *et al.*, 2005).

Cassava-based food products plays a vital role in the reduction of food insecurity

among farmers and their households (Salau *et al.*, 2019). It is pertinent for consumption in their living standard due to their affordability, and cultural significance. Whilst cassava has been noted to give the maximum earnings in pecuniary terms to Naira invested when compared to other food crops (Ezike *et al.*, 2011), basically, its production by households is mostly for consumption. About 90% of Nigeria's production is for consumption as food after processing it into various forms, whilst the surplus is sold either locally or internationally (Githunguri *et al.*, 2017; Denton *et al.*, 2004).

The consumption pattern across the six geographical zones of Nigeria varies and mainly depends on income, relatively price and taste preference (Okoye *et al.*, 2021). Empirical studies have shown that the consumption pattern of the south-western part of Nigeria is rising (Edamisan, 2020; Salau *et al.*, 2019). However, little considerable research has been made to bring to the fore the existing situation in the south-eastern part of the country with the exception of Okoye *et al.* (2021), who studied the cassava products consumption behaviour in rural areas of Ebonyi State, Nigeria, but not the pattern. It is against this backdrop that this study seeks to explore the consumption pattern of cassava food products in Imo state, South-East Nigeria. It aims to identify the different cassava food products available, ascertain their consumption pattern, and determine the factors affecting their consumption.

### Materials and Methods

Imo State is where the study was conducted. It is one of the five states in the South-East geopolitical zone of Nigeria (Ugwuoti *et al.*, 2023). It covers a 5,067.20 km<sup>2</sup> area of land which lies between 5°45'N & 6°35'N latitudes and 6°35'E & 7°28'E longitudes (Anyiam *et al.*, 2019). Its estimated population from the

2016 census is 5,408,756 (NBS, 2016). The state falls between the tropical rainforest and savannah and is divided into three agrarian zones viz. Okigwe, Owerri and Orlu (Anyiam *et al.*, 2019; Anyaegbu *et al.*, 2020). Cassava is among the major food crops produced in the state.

A multilevel sampling method was used to choose the areas and farmers for the study. In the first level, three Local Government Areas (LGAs) were purposively chosen from each of the three agrarian zones because of their relatively high level of cassava production. In the second level, three farming communities were randomly chosen respectively from each of the LGAs. Finally, simple random sampling technique was employed in the selection of 16 farmers each from the sample frame provided by the communities who participated in this study. This sums to a total of 432 farmers for the study as shown in Table 1 below.

A well-structured questionnaire was used to collect data from the farmers. Out of the 432 copies of the questionnaires shared, 411 copies were used for the analysis having discarded 21 for inconsistency, therefore, making a response rate of 95.14%. Data was coded in Excel and transported into SPSS version 16 for analysis. A three- and four-point Likert scale rating was used to measure the consumption pattern and factors affecting the consumption of cassava products respectively. The three-point Likert scale is rated as 'Very serious (3)', 'Serious (2)' and 'Not serious (1)'; the four-point was rated as 'Frequently (4)', 'Sometimes (3)', 'Rarely (2)' and 'Never (1)'. Their decision points were gotten as 2 and 2.5 respectively. Therefore, if the mean score is greater than or equal to 2 or 2.5, accept respectively, but if the mean score is lesser than 2 or 2.5 reject respectively.

TABLE 1  
*Summary of Sampling Method*

Agricultural zones	LGAs	Farming communities	Number of farmers	
Okigwe	Okigwe	Amaeze-ogii	16	
		Aro-ubana	16	
		Ozara	16	
	Onuimo	Ehime Mbanzo	Eziama	16
			Oji ama	16
			Umuoram	16
			Agbagbara	16
			Ehime	16
			Umuihim	16
Njaba	Njaba	Amafor	16	
		Duriaku	16	
		Ebeasaa	16	
Orlu	Nkwere	Amaigbo	16	
		Onusa	16	
		Umuoke	16	
	Ohaji/Egbema	Ohaji/Egbema	Ohaba	16
			Oloshi	16
			Umuagwo	16
	Owerri	Ikeduru	Amambara	16
			Owalla	16
			Umuezizi	16
Ngor Okpuala		Ngor Okpuala	Obiangwu	16
			Umuekwune	16
			Umukabia-ogodo	16
			Ezido	16
			Ngali	16
			Ogbor	16
Aboh Mbaise	Aboh Mbaise	Ezido	16	
		Ngali	16	
		Ogbor	16	
Total	9	27	432	

## Result and Discussion

### *The sociodemographic summary of the farmers*

The results of Table 2 show that 43% of the farmers were male, whilst 57% were female. This indicates that cassava production and processing is dominated by female farmers in the area. This study is in line with Osuji & Onubuogu (2018) and Anyiam, *et al.* (2019),

who found that 56.7% and 70% respectively of farmers in Imo State were females. They averred that female farmers dominated cassava farming because it is regarded as a female crop in some areas of the state.

Table 2 further showed that 93% of the farmers attended at least primary school, whilst only 7% had no formal education. Therefore, in this study, we regarded those that attended at least primary school as literate, whilst those with no formal education were considered illiterate. This means that the farmers in this area can be able to understand and apply new techniques involved in cassava farming and value chain processing. This finding is in line with Ehirim *et al.* (2006), Osuji & Onubuogu (2018) and Anyiam, *et al.* (2019), who found in their studies that 94.4%, 96.1% and 100% of farmers in Imo State respectively have a considerable level of education positive to drive changes in their farm practices. This is because farmers' literacy enhances their ability to comprehend and appraise information on farm innovations that improves their farming and yield (Tikon *et al.*, 2023; Apeh, 2018; Onyekuru & Apeh, 2017).

The result of Table 2 also showed that 60% of the farmers were aged between 30–50 years in the area of the study. This means that most farmers were young, full of life and very decisive in their choice of farming. This aligns with the study of Onubuogu *et al.* (2013), Ehirim *et al.* (2006) and Anyiam, *et al.* (2019) who found the majority of the farmers aged between 41–50 years, and 42–54 years, and 40–59 years, respectively. This implies that the farmers in this locality may be capable of improving productivity by adequately withstanding farm stresses and shocks involved in cassava crop farming.

The marital status result shows that 76% of the farmers were married. This is an

encouraging outcome because married farmers take the responsibility of providing for their wards and therefore may be more committed to their farming. This finding aligns with Henri-Ukoha *et al.* (2015); Osuji & Onubuogu (2018), and Anyiam *et al.* (2019), who stated that married farmers were more involved in agricultural activities.

The majority (70%) of the farmers were shown to have had access to the extension officers and 54% had about 11–20 years of farming experience. Also, a majority (30%) of the farmers farmed on less than one hectare of land. This means that farming is done on a small-scale subsistence level in the area of study maybe as a result of the land tenure system in practice. This reinforces the outcome of the study of Nwaiwu *et al.* (2013) and Anyiam, *et al.* (2019) in the South-East and Imo State, Nigeria, and found that farmers farmed on a small portion of the land between 0.1–5.99 hectares and 0.6–1.0 hectares respectively.

Table 2 also indicated that 51% of the farm households had between 6–10 members per household. This implies that most households had at least one or two extra labour forces for farming purposes. And it is in line with the study of Igwe *et al.* (2011), Ehirim, *et al.* (2006), Osuji, & Onubuogu (2018) and Anyiam, *et al.* (2019), who found that the majority of the households lived with at least 5–7, 5–7, 5–9 and 6–10 members respectively, in their studies. This is good for the farmer who may rely solely on family labour in their farming especially when the size of the land is too small as indicated above.

The result equally showed that 35% of the farmers belonged to the age-grade group. This is encouraging because it is advantageous for the farmers to belong to at least one farm group because it helps improve farmers'

access to information, inputs and knowledge on technical skills. Finally, Table 2 shows that 53% of the farmers supported their farming through their savings, family and friends' financial support. This implies that farmers in this area receive less government support in their farming and that financial institutions like the bank and cooperatives. This seems rather difficult for the farmers because they don't find it easy not getting enough funds to carry out their agricultural activities effectively and this financial investment may translate to low cassava production.

TABLE 2  
*Sociodemographic features of the farmers*

Sociodemographic variables	Description	Percentage (n = 411)
Gender	Male	43
	Female	57
Level of Education	Attended at least primary school	93
	No formal education	07
Age	Below 30	13
	30 – 50	60
	Above 50	27
Marital status	Single	18
	Married	76
	Divorced/separated	06
Access to extension officer	Yes	70
	No	30
Farming experience	Below 5-years	04
	5 – 10 years	16
	11 – 20 years	54
	21 and above	26
Farm size	Below 1 hectare	30
	1 – 3 hectares	29
	4 – 7 hectares	23
	8 – 10 hectares	17
	Above 10 hectares	01
Household size	1 – 5 members	29
	6 – 10 members	51
	Above 10 members	20

Farm group membership	Age grade	35	TMS 98/0505 (golden stem, pinkish leave, branching stems)	62
	Farmers' cooperative	16	NR-03/0155 (Matures early, tolerance to drought)	63
	Farmers Club	19	TMS 30572 (Dark brown stem, dark green leave and tall straight stems)	35
	Market union	19	TMS 3055 (Brown stem, green leave, and straight growth)	35
	Others (ADP group)		IBA961632 ( <b>Farmer's Pride</b> ), (Green purple leave, light brown stem, white root, drought-tolerant)	31
Sources of financial support	Bank loan	08	NR130124 (Hope) (Brown Stem, Rapid branching, High yielding and broadly adapted, moderately suitable for high-quality flour, and 100% sprouting ability)	41
	Cooperative society (thrift)	24	Local varieties	50
	Federal Government Grant	53		
	Others (savings, family, friends etc.)			

2022 Field Survey

### *Varieties of cassava cultivated by farmers*

Table 3 showed the distribution of the cassava varieties cultivated by farmers in the study area. The result indicated that 65% of farmers cultivate UMUCASS 1379; 63%, NR-03/0155; 62%, TMS 98/0505; 59%, TME 419; 53%, UMUCASS; and 50%, local varieties. This implies that there are many varieties of cassava for farmers to choose from based on their farm management decisions and climate change adaptation. Farmers are also able to compare the suitability of different varieties of cassava tubers for particular value chain products.

TABLE 3  
*Cassava varieties cultivated*

Varieties	% Yes (n = 411)
UMUCASS 47 (Game-changer) (High starch, high fresh root yield)	44
TME 419 (Broad leaves and tall and robust stems, non-branching, creamy ash to bluish green)	59
UMUCASS 1368 (Yellow root, green stem and golden leaves)	53
UMUCASS 1379 (Yellow root and dark green leaves)	65

2022 Field Survey

### *A*

#### *available cassava food products*

The result of Table 4 shows that the most available cassava products in the study area were Abacha (89%), Garri (88%) and Fufu (Akpu) (87%). Others were flour (77%), Akara-Akpu (66%), chips (62%) and starch food (56%). Ground-Fresh tubers (48%), Tapioca (43%), Alibo (35%) and roasted tubers (34%) were rarely available in the study area. Some of the factors limiting the availability of some of these food products may include but are not limited to cultural factors which entail belief systems and values attached to a particular food product. On the other hand, technological factors entail storage and processing facilities and techniques amongst others.

TABLE 4  
*Cassava Food products*

Value chain product	% Yes (n = 411)	Ranking
Abacha	89	1 <sup>st</sup>
Tapioca	43	9 <sup>th</sup>
Garri	88	2 <sup>nd</sup>
Flour	77	4 <sup>th</sup>
Starch food	56	7 <sup>th</sup>
Fufu (Akpu)	87	3 <sup>rd</sup>
Akara-Akpu	66	5 <sup>th</sup>
Alibo	35	10 <sup>th</sup>
Cassava chips	62	6 <sup>th</sup>
Ground-Fresh tuber	48	8 <sup>th</sup>
Roasted tubers	34	11 <sup>th</sup>

2022 Field Survey

#### *Consumption pattern of cassava food products*

The result of Table 5 shows that Garri (MS = 2.84), Fufu (MS = 2.57), Abacha (MS = 2.40) and Alibo (MS = 2.21) were often consumed, whilst others were rarely consumed in the study area. Among all the cassava food products, garri is the most widely consumed having the highest mean score. Garri is partially gelatinized and roasted with a creamy-white/yellow colour and sour taste. The high rate of demand or consumption of garri may be due to its reliable prices (Okoye *et al.*, 2021). It is consumed by both urban and rural households alike. Garri market is characterized by perfect competition in the sense that no buyer or seller can influence the market price by refusing to either sell or buy. It is produced by numerous smallholder farmers and sold essentially in the village markets.

Fufu (Akpu) is a fermented wet paste cassava product and is the second most consumed by households, ranked next to Garri in importance according to results of this study and those of Egwim *et al.* (2013) and

Chijioke *et al.* (2021). The marketing structure is similar to that of Garri, however it is priced comparatively lower due to complaints of its foul odour which usually drives its demand low. In recent times, a modified version of Fufu (Instant Fufu flour) has been developed and it has become popular due to its ease of preparation, longer shelf life, convenience of storage and compact size (Johnson *et al.*, 2006). Abacha is consumed as a snack and is the third most consumed cassava product in the state. It is considered a special delicacy for some communities, prepared with palm oil and smoked fish or meat. It is also a ceremonial food served during indigenous festivals such as agricultural festivals, funerals and child naming ceremonies. This finding resonates with the results of findings that Garri and Fufu (Akpu) were the major cassava products consumed among households in Nigeria (Onyemauwa, 2010; Salau, *et al.*, 2019; Okoye *et al.*, 2021).

TABLE 5  
*Consumption pattern of cassava food products in the study area*

Value chain product	Mean score	Remarks
Abacha	2.40	Often consumed
Tapioca	1.59	Rarely consumed
Garri	2.84	Often consumed
Flour	1.51	Rarely consumed
Starch food	0.59	Rarely consumed
Fufu (Akpu)	2.57	Often consumed
Akara-Akpu	1.36	Rarely consumed
Alibo	2.21	Often consumed
Cassava chips	1.40	Rarely consumed
Ground-Fresh tuber	1.25	Rarely consumed
Roasted tubers	1.78	Rarely consumed

2022 Field Survey; (NB: accept if MS  $\geq$  2 and reject if MS < 2)

### *Factors affecting the consumption of cassava food products in the study area*

The result of Table 6 indicated that factors such as culture, custom and tradition (MS = 2.88), availability of processing equipment (MS = 2.77), associated technologies access (MS = 2.67), technical know-how (MS = 2.63), alternative foods (MS = 2.81), consumer preferences (MS = 2.91), access to storage facilities (MS = 2.73), and the cost of the product in the market (MS = 2.57). These challenges were highlighted by Okoye et al., (2021) who amongst other factors noted that nutritional needs remain the most influential factor in the preference for cassava value chain products.

TABLE 6  
*Factors affecting the consumption of cassava food products in the study area*

Factors	Mean score	Remarks
Farming season/period	1.65	Not serious
Culture, custom and tradition	2.88	Serious
Peer group influence	1.94	Not serious
Availability of processing equipment	2.77	Serious
Access to the associated technologies	2.67	Serious
Availability of technical know-how	2.63	Serious
Availability of alternative foods	2.81	Serious
Consumer preferences	2.91	Serious
Access to storage facilities	2.73	Serious
Cost of the products in the market	2.57	Serious

2022 Field Survey; (NB: accept if MS  $\geq$  2.5 and reject if MS < 2.5)

### **Conclusion and Recommendation**

The study assessed the consumption pattern of cassava food products in the Imo State. The result indicated that the most available cassava varieties in the area are TME 419, UMUCASS 1378, and TMS 98/0505, whilst the most common cassava food products are Abacha, Garri and Fufu. The consumption and availability of cassava and its food products were mostly influenced by culture, custom and tradition, availability of processing equipment, technology access and knowledge gap-related challenges. The consumption of cassava food product is limited by the poor or absence of mechanization equipment and capital.

To effectively promote CFPs consumption, policies should emphasize more on culture and the provision of necessary processing equipment to encourage more families to produce, process and consume more CFPs. Sophisticated technologies with requisite technical know-how if deployed in cassava production and processing can influence consumer preferences, storage, cost, and strengthen off-season availability of CFPs.

### *Acknowledgement*

The authors wish to acknowledge our research assistants for their assistance in the data collection process.

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