

# DETERMINANTS OF BAKERS' ACCEPTABILITY OF WHEAT-CASSAVA FLOUR FOR BREAD PRODUCTION IN NIGERIA

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## ABSTRACT

Bread is a major staple food in Nigeria with rising costs occasioned by the increasing cost of importation of wheat. The Federal Government of Nigeria (FGN) initiated partial substitution of wheat flour with cassava flour, to reduce wheat importation and promote economic development. This study examined the determinants of the acceptability of wheat-cassava flour for bread production in Oyo state. Data collected on the acceptability of wheat-cassava flour from bakers in Ibadan, Ogbomosho and Oyo were analysed with descriptive statistics and a logit regression model. Some 80 percent of the bakers used 10 percent cassava flour for bread production. Results of Logit Regression showed that level of experience, provision of training, access to wheat-cassava flour, and revenue as determinant factors of Bakers' acceptability of wheat-cassava flour for bread production. The study recommends regular training for the Master bakers to increase the use of wheat-cassava flour throughout the country. The wheat-cassava flour should be made available for the bakers by ensuring adequate production through necessary policies.

**Keywords:** wheat-cassava flour; bread production; Nigeria.

## INTRODUCTION

Bread is a major staple food available in different types, sizes and packages in a ready-to-eat form for different classes of people in Nigeria. It can be eaten alone or combined with beverages, margarine, beans, stew and vegetables at any time of the day. The availability of bread in various sizes and packages also makes it a suitable gift for social occasions.

The consumption and utilisation of bread are growing in Nigeria due to the increasing population and preference for snacks and *small chops*. Bread is also a distinct food for people according to their health status. Currently, low, moderate and high sugar-containing bread is available for people, based on their blood sugar level. Bread is also a classical food in Nigeria because it can be formulated with fruits, chocolate, butter, eggs and coconut to enhance people's health.

Despite the quality, variety and importance of bread as a major staple food in Nigeria, it is becoming unaffordable for the poor due to its rising cost of production, occasioned by the increasing price of wheat- a major production input. Wheat is one of the three most important crops in the world (Olabanji *et al*, 2004) cultivated in Nigeria and other countries. Domestic wheat production in Nigeria was very low and not mechanised, hence importation to meet increasing domestic demand from countries with a comparative cost advantage. For instance, between 1990 and 2013, the average wheat production in Nigeria was about 81.9 MT while the average importation was 2,193M within the same period (FAO, 2015).

The increasing wheat importation has continued to gulp several billions of Naira, deplete Nigeria's external reserve and other associated economic hardships. The Presidential Initiatives on Cassava (PIC), in a bid to reduce wheat importation, introduced composite flour (wheat flour + cassava flour) for bread production. This aims to reduce wheat importation, achieve a cassava revolution, and create employment among other benefits.

A major objective of the PIC was to increase the value addition of cassava and increase the income of farmers and other actors in the production process. The initiative led to the inclusion of composite flour in the production of bread to achieve cassava industrialisation in Nigeria. The policy aims at achieving industrial utilisation of cassava for income generation, job creation, capacity building and food security attainment among other benefits. This study investigates the determinants of the acceptability of wheat-cassava flour for bread production by the bakers in Oyo State, Nigeria.

## Conceptual Framework

The Conceptual Framework for this study is the Unified Product Acceptability Framework (UPAF) developed by Venkateshi *et al*. (2003). The framework highlights the various factors responsible for the user's acceptability of a product which include *performance expectancy, effort expectancy and social influence*.

Performance expectancy refers to the degree to which an individual believes in using a particular product or process to attain job performance. With the introduction of a new technique or process, the new product is expected to outsmart the old one. Thus, bread produced from wheat-cassava flour is expected to be of high quality.

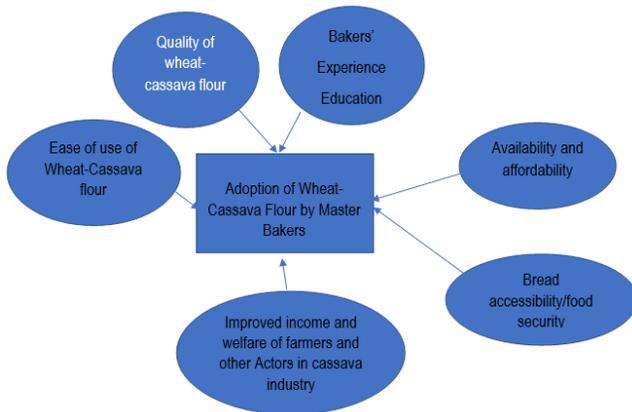
Efforts expectancy refers to the quantum of efforts, energy or drudgery associated with the use of a particular product. Under a modern production environment, products, production systems, machines or equipment being used are expected to be user-friendly. The ease of use of a new product, process, or machine is also expected to contribute positively to improving the user's performance. The adoption of wheat-cassava flour is expected to accommodate sugar, margarine, eggs, yeast and other additives used by the Master Bakers.

The effect of social influence on the use of wheat-cassava flour refers to preferences for a particular product. In this regard, the desired product is wheat-cassava flour for bread production. The adoption of wheat-cassava flour is expected to reduce the prices of bread because there will be a reduction in the quantity of wheat required for bread production. The cost of cassava flour is low in Nigeria because of abundant production coupled with government policy to make cassava an industrial crop. The Federal Government of Nigeria (FGN) has provided incentives for the millers to ensure success in the production of wheat-cassava flour.

The successful blending of cassava flour with wheat flour will amount to a reduction in the cost of flour for bread production. This will make bread to become more accessible and affordable to consumers and contribute positively to achieving food security in Nigeria. The adoption of wheat-cassava flour for bread production in Nigeria is equally expected to enhance the realisation of the cassava revolution in Nigeria. This will elevate cassava from the status of a mere food crop to an industrial crop and increase the income of the various stakeholders in the cassava industry in Nigeria.

The socioeconomic characteristics of the Bakers influenced the adoption of wheat-cassava flour for bread production. The level of education of the bakers and genuine information about wheat-cassava flour will influence the adoption of the product. In addition, business size, available capital, type of production technology and level of education of the bakers are also vital in the adoption of wheat-cassava flour for bread production. Though bakers are not the final consumers, they evaluate their products through feedback from the consumers via the wholesalers and retailers.

More importantly, good packaging, advertisement and certification will also assist in the adoption and utilisation of cassava-wheat flour for bread production in the country. For instance, a product with quality certification by the National Agency for Food and Drugs, Administration and Control (NAFDAC) and the Standards Organisation of Nigeria (SON) will enjoy greater patronage than products without certification



**Figure 1:** Unified Product Acceptability Framework (Venkateshi *et al.* 2003).

## REVIEW OF LITERATURE

Bread is an important ready-to-eat staple food in many countries. According to Singh *et al.* (2014), ready-to-eat food (RTE) refers to what could be eaten as purchased, without further processing. Bread is produced in various forms, and sizes and eaten almost everywhere as reported by Emeje *et al.* (2010). Bread is usually baked in an electric or firewood oven and characterized by its distinct taste, aroma, quality, appearance and texture which account for its appetizing appeal to consumers. (Emeje *et al.* 2010) reported that bread is made from wheat or cassava flour added with table salt, sugar, flavour, and fruits among other ingredients. Bread is currently an important staple food both in the developed and developing world (Abdel ghafor *et al.* 2011) In Nigeria, bread

is consumed in all geopolitical zones irrespective of socioeconomic and cultural backgrounds and religious affiliations in Nigeria (NAFDAC, 2010). It has become the second most widely consumed food after rice (Shittu *et al.* 2007). According to the bread and bakery market overview, from 2007 to 2015, 8.5 M tonnes of bread was consumed by Nigerians and therefore constituted the product with the largest volume (BBM, 2017). Bread is conventionally produced from whole wheat flour (*Triticum aestivum*).

A research report by Adebayo (2012) on “Cassava bread will save Nigeria a sum of N300bn annually” and Olanrewaju’s (2012) position on “We are triggering cassava-based industrial revolution” has reported that Nigeria spends between \$3.7b and \$ 4.2b yearly on wheat importation. Similarly, a research report by Momoh (2011) on “Bakeries to enjoy a smooth transition to 40 % cassava bread”, reported that Nigeria spent \$ 4.2 billion on wheat importation, in 2010 alone. It was estimated that Nigeria’s wheat importation could reach 17 million metric tonnes (MMT) by 2020, at this growth rate (Olanrewaju, 2012; Adeniyi, 2012).

The cassava flour used as composite flour is called High-Quality Cassava Flour (HQCF). The HQCF is defined as fine flour produced from wholesome freshly harvested and rapidly processed cassava tubers. A number of studies (Defloor, 1995; Eddy *et al.* 2007) have investigated the inclusion of cassava flour in bread making. The studies revealed that imported wheat flour can be replaced by 5 percent to 10 percent cassava flour without adverse effects on processing, taste and quality of bread. Many scholars have also alluded to the good quality of cassava inclusion flour for the production of bread. For instance, Eddy *et al.* (2007) reported that wheat flour, replaced by 5 percent to 10 percent cassava flour allows for easy processing and ensures quality bread while substitutions of up to 30 percent cassava also resulted in quality bread (Jensen *et al.* 2015). Cassava flour substitutions from 30 to 100 percent have been evaluated in the production of cakes; as the proportion of cassava was increased, the firmness, chewing, and cohesiveness decreased, a tendency that remained over time (Cueto *et al.* 2011).

Studies (Shittu *et al.* 2007 and Olanrewaju, 2012) have reported the economic benefits of the utilization of cassava for bread production in Nigeria. The utilization of cassava for bread production could lead to a reduction in wheat importation and propel it as an industrial crop in Nigeria. This is possible because Nigeria is the largest cassava producer in the World, and more than 80 percent is used for human food (Oyewole and Eforuoku, 2019). Nigeria produced 42.5, and 48.10 million metric Tonnes (MMT) of cassava in 2010 and 2018 respectively (FAO, 2020). These figures represent 18 percent and 21.5 percent of global production respectively. Studies conducted by Akinwumi (2012) and Ndichu *et al.* (2015) reported low utilization of cassava for industrial purposes in Nigeria while Thailand has used 80 percent of cassava produced for industrial purposes.

## MATERIALS AND METHODS

The study was conducted in 2021 and covered the 3 Senatorial Districts (SD) in Oyo State, Nigeria. One major city with a high population was selected from each of the 3 Senatorial districts in the state. The 3 major cities selected were: Ibadan Ogbomosho and Oyo in Oyo South, Oyo North and Oyo Central Senatorial districts respectively.

The Master Bakers Association of Nigeria (MBAN) in each of the selected cities were contacted to get the list of their members for data collection purposes. Random sampling and snowballing sampling techniques were used to select the Master Bakers (respondents). One hundred and fifty questionnaires were administered but 100 questionnaires were retrieved, due to constraints beyond the capacity of the Principal Investigator.

Both quantitative and qualitative data were collected from the survey. Data collected from the respondents include general information (age, sex, marital status, and level of education), type of flour used (10 percent cassava flour, 20 percent cassava flour and 30 percent cassava flour), and awareness about wheat-cassava inclusion flour for bread production.

The descriptive statistical tools (mean, mode, frequency and percentage) were used for analysing the general information about the respondents. The results were presented in Tables and Charts.

The study utilised the Logit Regression model for analysing the determinants of the Bakers' acceptability of wheat-cassava flour for bread production. The model is specified below:

$$WTU = \partial_0 + \partial_1 ACC + \partial_2 TRA + \partial_3 SAR + \partial_4 QTY + \partial_5 EXP + \partial AGE \dots (1)$$

Where WTU is the dependent variable that represents the willingness of the Bakers to use wheat-cassava flour.

$\partial_0, \partial^1, \partial^2, \partial^3, \dots, \partial^5$  are coefficients for estimating the willingness of the Bakers to use wheat – cassava flour

- AGE= Age
- ACC= Access to wheat-cassava flour
- TRA= Training on the use of wheat-cassava flour
- SAR= Sales revenue
- QTY= Quantity of cassava in wheat flour
- EXP=Experience

## RESULTS AND DISCUSSION

### Socio-Economic Characteristics of Bakers

Figures a, b, c and d showed the general information of the Respondents. The respondents' age varied from less 25 to above 60 years. Also, 86 percent of the Respondents were males while 14 percent were females. The reason being that bread production required high temperature and also strenuous. The selected respondents were predominantly married (75 percent).

Some 34 percent of the Bakers had HND/BSc degree while 30 percent had OND certificates. All the Bakers were educated with ability to comply with food safety regulations on bread production.

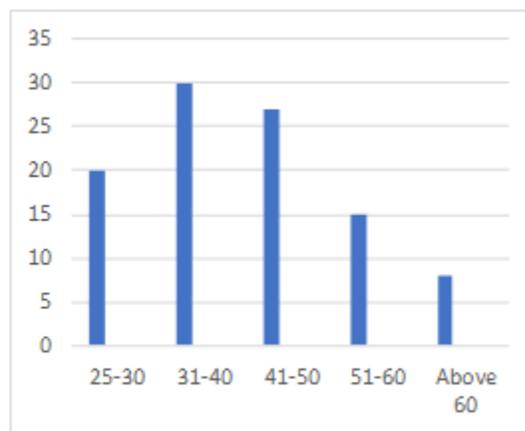


Figure a: Age of Respondents

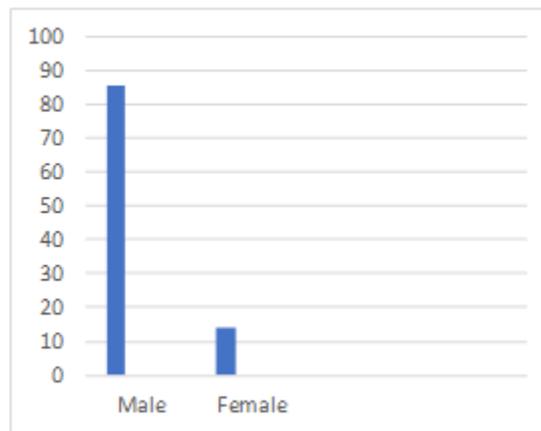


Figure b: Gender of Respondents

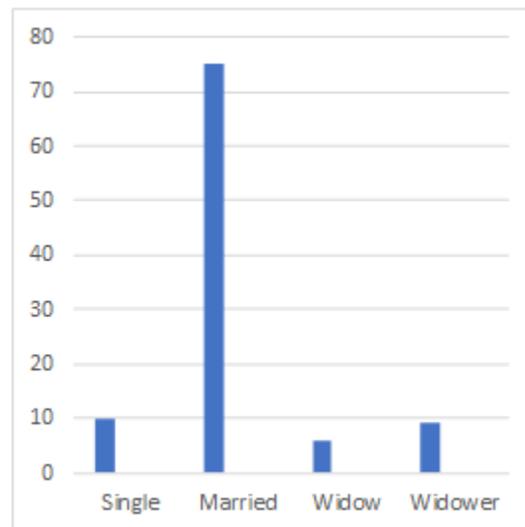


Figure c: Marital Status of Respondents

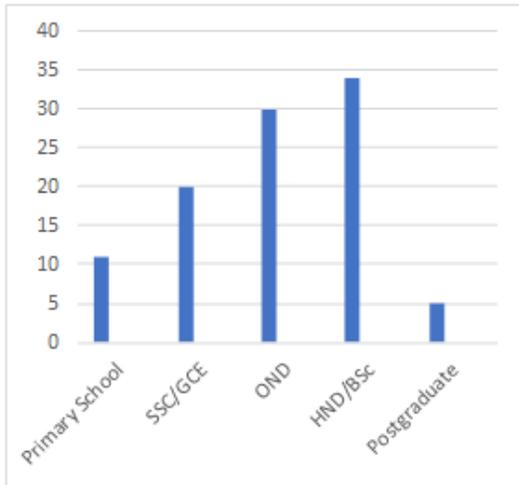


Figure d: Educational Qualification of Respondents

The weekly income of the Bakers ranged from less than ₦100,000 to above ₦200,000. The mean of the weekly income of the Bakers was ₦170, 546. The number of employees employed by the bakeries ranged from 1 to above 15. This shows that the selected baker belong to micro and small-scale enterprises (MSEs) according to business classification in Nigeria

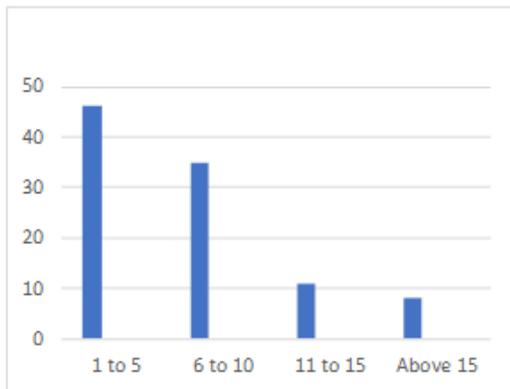


Figure e: Number of Employees of the Bakers

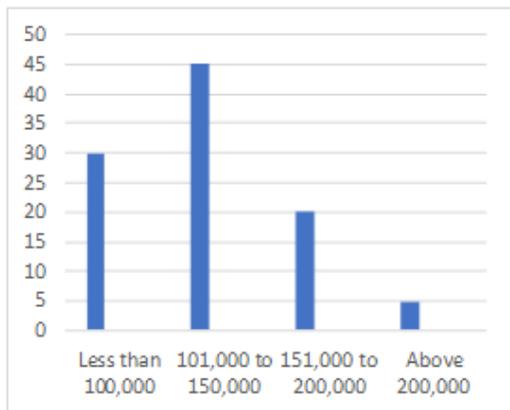


Figure f: Weekly Income of the Bakers (₦)

The mode of awareness of wheat-cassava flour by the respondents for bread production were Workshops, Seminars, Media and others (friends and colleagues). Figure g shows the percentage of the respondents according to their mode of awareness.

The percentage cassava flour in the bread produced by the selected bakers is shown in Figure h. Some 80 percent of the bakers used 10 percent cassava flour while 18 percent used 20 percent cassava flour in their bread production. This shows that 10 percent cassava flour was mostly used by the sampled bakers for bread production.

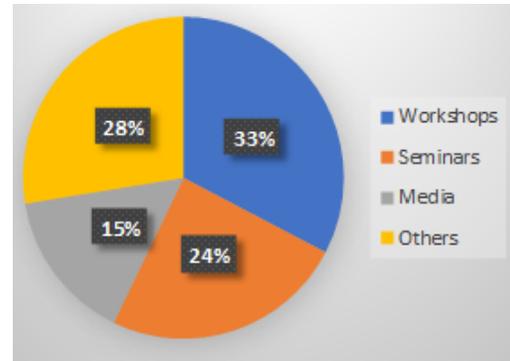


Figure g: Mode of Awareness of Cassava inclusion Flour

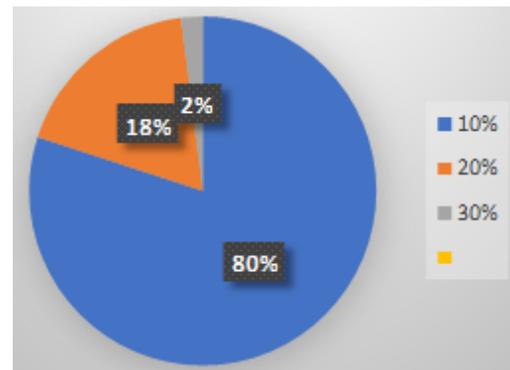


Figure h: Percentage of Cassava used in Bread Production

**Results of Logit Regression**

Table 1 shows the factors that determines the willingness of the Bakers to use wheat-cassava flour for bread production. The age and quantity of flour used did not significantly influence the bakers' willingness to use wheat-cassava flour for the production of bread. The reason being that age is different from experience and not a determinant factor of production.

The model showed a positive and significant of experience of Bakers and utilisation of wheat-cassava flour for bread production. The reason is that Bakers with a higher level of experience will have a better understanding of the use of wheat-cassava flour for bread production. The respondents' participation in training also shows a positive and significant relationship with the utilisation of wheat cassava flour for bread production. Training provides opportunities for the trainees to expose to the adoption of new techniques, the use of new machinery and equipment, and adaptation to new raw materials among other benefits. Access to wheat-cassava flour

also significantly influence the production of bread from wheat-cassava flour. Revenue (sales) realised also influenced significantly, the use of wheat-cassava flour to produce bread.

**Table 1:** Logit Regression Result for Willingness to Use Wheat-Cassava Flour

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Age	0.120412	0.087761	1.372051	0.1734
TRA	*0.700700	0.295730	4.398266	0.0000
ACC	*0.830813	0.279322	2.974396	0.0038
QTY	0.114769	0.145649	0.787985	0.4328
EXP	*0.623327	0.103482	2.158111	0.0336
REV	-0.271571	0.097516	-2.784903	0.0065
R-squared	0.201905	Mean dependent var	1.958763	
Adjusted R-squared	0.158054	S.D. dependent var	0.675733	
S.E. of regression	0.620037	Akaike info criterion	1.941783	
Sum squared resid	34.98453	Schwarz criterion	2.101044	
Log likelihood	-88.17650	Hannan-Quinn criter.	2.006181	
Durbin-Watson stat	2.374389			

Source: Field survey (2021)

### Conclusion

The selected Bakers were aware of and already using the wheat-cassava flour for bread production. Training, revenue, access to wheat-cassava flour and experience of Bakers significantly influenced the use of wheat-cassava flour for bread production.

### Recommendations

In order to actualise the objective of the Federal Government of Nigeria (FGN) on reduction in wheat importation through partial inclusion of cassava flour in wheat for bread production. This study proffers the following recommendations:

- There is need for the provision of on-the-job capacity building programme for the Master Bakers on the utilisation of wheat-cassava flour for bread production. Government should provide workshops, seminars for the Master Bakers on the utilisation of wheat-cassava flour for bread production. This will increase the use of wheat-cassava flour beyond 10 percent cassava flour inclusion to 20 percent or more. This will obviously boost the industrial utilisation of cassava and increase the income of the farmers and other actors in the cassava value chain.

Efforts should be made to improve the production of wheat-cassava flour in the country. This is necessary to make the product available for the use of the Bakers and enhance the utilisation of wheat-cassava flour for bread production in the country. In this regard, flour manufacturing companies in Nigeria should be given tax rebates and provide access to cassava flour to ensure adequate and sustainable production of wheat-cassava flour for the benefit of the Bakers and Nigerian economic advancement

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