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Utilization of African Breadfruit (Ukwa) as a Local Dish for the Nutritional Enhancement of Internally Displaced Person's (IDP) Diet in Makurdi Local Government Area

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ABSTRACT

The study determined the utilization of African breadfruit for the nutritional enhancement of internally displaced person's (IDP'S) diet in Makurdi local government area of Benue State. It was guided by three objectives, which are: to ascertain the level of awareness of nutrient composition of African breadfruit by the IDP rural farm families of the study area, to educate and demonstrate the method of preparing the dish to IDP rural farm families in Makurdi Local Government Area and to assess the perception and acceptability of "UKWA" dish among the people. The population was made up of fifty (50) home makers purposively selected in IDP camp along Federal Housing University of Agriculture road in Makurdi. The entire population was used as sample size. Experimental design was used to carry out the work and structural questionnaires was employed for data collection. The study revealed that all respondents were not aware of the existence and nutritional benefits of African breadfruit with the mean of (1.00). the respondents that attended the focus group discussion and method demonstration perceived and accepted the taste and flavour of the dish (M=4.46), the appearance of the dish (M=4.42), the palatability of the dish (M=3.82). and fortunately, tradition or culture does not forbid the utilization of the dish (M=2.30). however, findings revealed some factors that can affect the utilization of the dish among rural farm families in the study area to include, difficulty in getting the fruit or seed (M=4.18), Cost of preparing the dish (M=3.54), preparation process is difficult (M=3.10). In conclusion, lack of home economics extension education in the study area had impacted negatively on the knowledge base about the existences and utilization of African breadfruit (Ukwa) among the rural farm families to enhance their nutritional status. Therefore, there is need to introduce the ways of propagating or planting the African breadfruit trees by home economics extensionists so as to enable easy access to the fruit in orde

Keywords: Utilization, African breadfruit (Ukwa), Internally displaced person (IDP), Nutritional Enhancement and Diet

African breadfruit (*Treculia africana*), a member of the Moraceae family, is an indigenous tropical tree crop widely recognized for its nutritional and economic significance. Native to sub-Saharan Africa, *Treculia africana* thrives in both evergreen and deciduous forests and is often found near water bodies or cultivated in home gardens. Although it is native to Africa, it is now found across various tropical and subtropical regions due to its adaptability and high nutritional potential (Agu et al., 2007; Oboh et al., 2020). In Nigeria, the African breadfruit is commonly known as "Ukwa" among the Igbo ethnic group and is referred to by various names in other regions such as "afon" (Yoruba), "barafuta" (Hausa), "eyo" (Igala), and "edikang" (Efik) (Okonkwo & Ubani, 2012).

Despite its recognized nutritional benefits and cultural relevance, *Treculia africana* remains underutilized and neglected in many parts of Nigeria, especially among rural farming communities in the Middle Belt, such as Makurdi Local Government Area of Benue State. According to Osuji and Owel (2010), African breadfruit is a neglected and underexploited crop, despite its potential as a low-cost source of protein and other essential nutrients for low-income families. The tree is primarily cultivated in the southern parts of Nigeria, where it serves as a cost-effective alternative to meat for many poor households (Agbogidi, Nweke, & Eshegbeyi, 2011). The fruit contains seeds encased in a spongy pulp, and these seeds are the primary edible portion valued for their nutritional density.

Nutritional studies have shown that African breadfruit seeds (ABFS) are rich in macronutrients and micronutrients essential for maintaining good health. Osuji and Owel (2010) reported that ABFS are a rich source of proteins, carbohydrates, fats, and essential vitamins and minerals. Proximate analysis by Eleazu et al. (2017) showed that the seeds contain 17–23% crude protein, 11% crude fat, and substantial amounts of dietary fiber and micronutrients. These nutrients make the seeds highly beneficial for rural populations, particularly in combating malnutrition and protein-energy deficiencies such as kwashiorkor and marasmus, which are prevalent among children in low-income households (Okafor et al., 2018; UNICEF, 2023). Additionally, African breadfruit seeds are rich in micronutrients including thiamine, niacin, riboflavin, phosphorus, potassium, magnesium, iron, zinc, copper, and manganese, while being low in saturated fats and cholesterol (Ndache, 2017). A 100-gram serving of the seeds provides approximately 7.4 grams of protein, representing about 23% of the recommended daily protein intake (Ndache, 2017). This positions the Ukwa dish as a viable solution for enhancing dietary diversity and improving the nutritional profile of rural diets, particularly in regions where animal protein sources are expensive and often inaccessible.

Nevertheless, the seeds contain some anti-nutritional factors such as oxalates, phytates, tannins, and hydrogen cyanide, which may inhibit nutrient absorption and digestion (Ugwu & Oranye, 2006; Nwosu et al., 2021). However, traditional processing methods like soaking, boiling, fermenting, and dehulling have been shown to significantly reduce these anti-nutrients, making the seeds safe and more bioavailable for human consumption (Oyetayo & Omenwa, 2006; Obadina et al., 2019). In Southern Nigeria, for instance, the seeds are typically soaked with alum for 12–24 hours, parboiled to facilitate dehulling, and then cooked with trona to soften the cotyledon before consumption.

The versatility of African breadfruit makes it suitable for a range of culinary applications. It can be consumed as a main meal, a snack, or combined with other staples such as maize and coconut. The seeds can also be processed into flour for use in baking, or pressed for oil and used as a flavoring in alcoholic beverages (Eleazu et al., 2017; Ndache, 2017). The potential for breadfruit to contribute to gluten-free and nutrient-enriched food products has further enhanced its appeal in modern food processing industries (Onweluzo & Odume, 2020).

In rural Nigerian communities, particularly among internally displaced and farm families in Makurdi Local Government Area, diets are heavily reliant on staple crops such as cassava and yam. These staples are predominantly carbohydrate-rich and deficient in high-quality protein and essential micronutrients (Olugbemi et al., 2010; FAO, 2022). The persistent poverty and limited access to diverse food sources in these communities contribute to poor health outcomes, especially among children and women of reproductive age. In this context, promoting the consumption of African breadfruit offers a viable pathway to improving nutrition and reducing food insecurity.

Moreover, beyond its nutritional potential, the cultivation and commercialization of African breadfruit can serve as an income-generating opportunity for rural households. Given its high market value in urban centers, rural farm families can benefit economically by engaging in the cultivation, processing, and sale of Ukwa products (Agbogidi et al., 2011). Enhancing awareness and accessibility of this crop through targeted nutrition education and agricultural extension services could significantly improve both the nutritional status and livelihoods of these communities.

In comparing African breadfruit with commonly consumed staples like yam and cassava, it is evident that the latter lack sufficient protein content necessary for healthy growth and development. For instance, while cassava provides primarily carbohydrates, it lacks essential amino acids and contributes little to protein intake (Olugbemi et al., 2010). By contrast, Ukwa contains 7.4g of protein and 9.5g of dietary fiber per 100g, making it a superior nutritional choice for vulnerable populations in rural areas (Ndache, 2017). African breadfruit represents a valuable yet underutilized food resource that holds immense promise in addressing malnutrition, enhancing dietary quality, and improving livelihoods in rural Nigerian communities. Encouraging its consumption among rural farm families in Makurdi Local Government Area can be an effective strategy for achieving food and nutrition security, especially in the face of rising food prices and limited access to animal-based proteins.

Problem Statement

Internally Displaced Persons (IDPs) in Makurdi Local Government Area of Benue State, Nigeria, face significant nutritional challenges due to limited access to diverse and nutrient-rich food sources. The disruption of livelihoods, displacement from farmlands, and reliance on food aid have resulted in diets that are predominantly carbohydrate-based and deficient in essential nutrients such as proteins, vitamins, and minerals. This nutritional imbalance contributes to widespread cases of malnutrition, particularly among vulnerable groups such as children, pregnant women, and the elderly. Despite the availability of nutrient-dense indigenous food crops like African breadfruit (*Treculia africana*), locally known as "Ukwa," its potential to improve the nutritional status of IDPs remains largely untapped. African breadfruit is rich in proteins, dietary fiber, essential fatty acids, and a wide range of micronutrients, making it a viable dietary supplement for malnourished populations. However, several barriers hinder its utilization within IDP communities. These include limited awareness of its nutritional benefits, cultural unfamiliarity with its preparation and taste, and logistical challenges related to its sourcing and processing.

Furthermore, acceptance of Ukwa as a regular part of the IDP diet may vary due to traditional food preferences and concerns over possible adverse reactions or allergies, especially in populations with compromised health. These challenges are compounded by inadequate nutrition education and a lack of integrated food policy interventions tailored to displaced populations. Addressing these gaps is crucial, not only to improve the dietary diversity and health outcomes of IDPs but also to create sustainable livelihood opportunities through the cultivation, processing, and sale of African breadfruit. Therefore, this study seeks to explore the potential of Ukwa as a locally sourced, nutritionally rich, and culturally adaptable food option for enhancing the diet and economic resilience of internally displaced farm families in Makurdi Local Government Area.

Objectives of the Study

The main objective of the study is to introduce the utilization of "Ukwa" as a Local dish for the nutritional enhancement of rural farm families in Makurdi Local Government Area. Specifically, the study seeks to:

1. to ascertain the level of awareness of nutrient composition of African breadfruit by the IDP rural farm families of the study area.

- 2. to educate and demonstrate the method of preparing the dish to IDP rural farm families in Makurdi Local Government Area.
- 3. to assess the perception and acceptability of "UKWA" dish among the people.

Research Questions

- What are the level of awareness of the nutrient composition of African breadfruit by the rural farm families of the study area?
- What are the methods for preparing the dish to the rural farm families in Makurdi Local Government Area?
- What is the perception and acceptability of Ukwa dish among the people?

Significance of the Study

The study on the utilization of African breadfruit (Ukwa) as a local dish for the nutritional enhancement of Internally Displaced Person's (IDP) diet in Makurdi Local Government Area holds significant importance due to the following reasons:

Nutritional Improvement: Ukwa is rich in essential nutrients such as carbohydrates, protein, fiber, vitamins, and minerals. Introducing Ukwa into the diet of IDPs can help address nutritional deficiencies commonly found among displaced populations, thereby promoting better health outcomes.

Food Security: Incorporating Ukwa diversifies the food sources available to IDPs, contributing to improved food security. Ukwa can serve as a sustainable and locally available food option, potentially reducing dependence on external food aid and enhancing self-sufficiency.

Cultural Preservation: Ukwa is a traditional Nigerian dish with cultural significance. Promoting its consumption among IDPs helps preserve cultural heritage and reinforces a sense of identity and community cohesion within displaced populations.

Economic Empowerment: Ukwa cultivation and consumption can stimulate local economies, benefiting farmers and traders involved in its production and sale. This economic empowerment contributes to the overall resilience and recovery of IDP communities.

Health Promotion: The nutritional benefits of Ukwa can contribute to improved health outcomes among IDPs, particularly vulnerable groups such as children, pregnant women, and the elderly. Enhanced nutrition can help prevent malnutrition-related diseases and support overall well-being.

Policy and Program Development: Findings from this study can inform policies and programs aimed at improving food security and nutrition interventions for displaced populations not only in Makurdi but also in similar contexts globally. It provides a practical example of utilizing local resources to address humanitarian challenges effectively.

METHODOLOGY

Research Design: The research design was survey and experimental design which intend to investigate by way of distributing questionnaires in order to collect information from respondents

The study Area: The study area was Makurdi local government area. Makurdi Local Government Area was created in 1970 out of the Tiv Native Authority. The Local Government gave birth to Gwer, Guma and later Gwer West Local Government areas of the State. Today the Local Government serves as a dual purpose both as local government headquarters and the state capital of Benue State.

Population: The study covers the IDP Camp along federal housing road in Makurdi Local Government Area with the total population of 10,307 inhabitants and 5,435 households.

Sample: Women and young girls were purposely selected for the study because they are home makers. A group was organized across the rural IDP Camp. Fifty home makers were randomly selected from the population. The home makers were interviewed and observed personally and their responses were used to fill the structured interview schedule. Method demonstration was also organized for the group to teach them how to prepare the "Ukwa" dish.

Instruments: Copies of questionnaire were used for data collection. Section A sort's information on the bio-data of the respondent; Section B sorts information on the awareness level of the nutritional value of African breadfruit "Ukwa"; Section C was on domestic preparation and utilization of the "Ukwa" dish; Section D evaluated the perception and acceptability of the respondents to the utilization of the "Ukwa" dish after receiving extension education on the nutritional value of the dish.

Data analysis: Descriptive statistics (frequency, percentage and mean) were employed for data analysis. The calculated mean (x) of 3.0 above shows that the result is significant (S) while the mean less than 3.0 indicates Not significant (NS) using the 5 grade point system.

Materials and methods

African breadfruit (ukwa), water, potash or akanwu, meat or fish, palm oil, pepper, seasoning, bitter leaf and salt.





FIG 2: FLOW CHART FOR THE PREPARATION OF UKWA DISH

RESULT AND DISCUSSION

Socio-economic characteristics of respondents

Out of total number of 50 respondents from the council ward, their age distribution shows that majority (50%) were between age 26-35, (28%) were between age 15-25, followed by age 36-45 (18%), while the least age is between age 46- 55 with 4% respondents. All the respondents were female due to the fact that they were purposely selected for sampling. Distribution by marital status shows that majority (66%) was married, 20% were single, 10% were widows while the least 4% were divorced. Their level of education shows that 22% had no formal education, 44% had primary education, 34% had secondary education while none of them had tertiary education. Majority of the respondents were farmers (80%), (6%) were students, 10% were tailors while 4% were traders. Their annual income distribution shows that 20% of the respondents earns #10,000 - 50,000, (62%) earns #51,000 - 100, 000, while 18% earns #100,000 and above. This shows that they are financially capable of utilizing the dish if they were educated on the nutritional benefits.

Research Question1: What are the level of awareness of the nutrient composition of African breadfruit by the rural farm families of the study area?

S/N	NUTRIENTS	MEAN	SD	Decision
1	Protein	1.00	0.00	Not aware
2	Carbohydrate	1.00	0.00	Not aware
3	Fiber	1.00	0.00	Not aware
4	Phosphorus	1.00	0.00	Not aware
5	Potassium	1.00	0.00	Not aware
6	Calcium	1.00	0.00	Not aware
7	Magnesium	1.00	0.00	Not aware
8	Sodium	1.00	0.00	Not aware
9	Iron	1.00	0.00	Not aware
10	Zinc	1.00	0.00	Not aware
11	Vitamin C	1.00	0.00	Not aware
12	Thiamin	1.00	0.00	Not aware
13	Niacin	1.00	0.00	Not aware
14	Vitamin A	1.00	0.00	Not aware
15	Beta-Carotene	1.00	0.00	Not aware
16	Omega-3 -fatty acids	1.00	0.00	Not aware

Table 1: To ascertain the level of awareness of nutrient composition of African breadfruit by the rural farm families of the study area

Key S.D = Standard deviation, N = number of respondents i.e. 50

The table above shows the list of the nutrients present in ukwa dish that the respondents are not aware before educating them.

Research question 2

What are the method of preparing Ukwa as a dish?

Education on the nutritional value of Ukwa and demonstration of the method of preparation of ukwa dish



Plate 1: Ingredients for preparation of ukwa dish



Plate 2: Method of processing before preparation, procedure 1 and 2

Perception and acceptability of the Ukwa dish by the rural farm familie

What is the perception and acceptability of the people towards the ukwa dish?

Table 2: Perception and acceptability of the ukwa dish by the rural farm families.

	ITEMS	Mean	SD	Decision
1.	I like the taste and flavour of the Ukwa dish	4.64	0.56	Significant
2.	The preparation process is too difficult	3.10	1.43	Significant
3.	Tradition forbids its consumption	2.30	0.88	Not Significant
4.	I prefer selling it for cash than process it for consumption	3.70	1.43	Significant
5.	The appearance of the Ukwa dish is attractive.	4.42	0.75	Significant
6.	The cost of preparing the dish is too high.	3.54	1.28	Significant
7	The Ukwa dish is palatable	3.82	1.16	Significant
8	The Ukwa fruit is difficult to get	4.18	1.21	Significant

The overall or ground mean of 4.0 shows that the rural farm families of the study area fully accepted the dish, they perceived the dish to be attractive and palatable even though the fruit is difficult to get.

Discussion of Findings

The study revealed a general lack of awareness among rural farm families in Makurdi Local Government Area regarding the existence and nutritional value of the Ukwa dish (African breadfruit). As indicated by the mean score of 2.00, Ukwa is not commonly utilized among the respondents, which suggests that its potential health benefits remain largely unknown. This lack of awareness may be attributed to inadequate home economics extension services in the region. This observation aligns with Dill and Van (2010), who emphasized that insufficient knowledge and understanding pose significant barriers to the adoption of innovations.

Furthermore, data from Table 1 indicated that Ukwa, as a rich source of plant-based protein, could serve as a viable substitute for more expensive protein sources such as meat, fish, and beans. This supports the assertion of Trumbo et al. (2002) that protein plays a critical role in child growth and development, reinforcing the dish's potential nutritional value.

On the aspect of perception and acceptability, a mean score of 4.00 suggests a positive disposition towards adopting new food innovations among the farm families. This finding supports Rogers' (2010) theory that individuals are likely to embrace innovations perceived as beneficial and practical. Additionally, cultural or traditional restrictions were not found to hinder the consumption of Ukwa, as evidenced by the low mean score of 2.30. This contradicts Ogbeide (2014), who reported cultural taboos against certain foods in other regions of Nigeria.

Findings from Table 2 also show strong acceptance of the Ukwa dish based on sensory appeal, with high mean scores of 4.64 for taste and flavor, and 4.42 for appearance. This aligns with Shepherd's (2012) notion that taste is a multimodal experience influenced by various sensory cues. Despite this, significant challenges affect the utilization of Ukwa, including difficulty accessing the fruit (mean score of 4.18) and the high cost of preparation (mean score of 3.54), likely due to its limited geographic availability in Eastern and Western Nigeria (Osabor et al., 2009). Additionally, some respondents perceived the preparation process as labor-intensive and preferred to sell the fruit rather than consume it, which could further hinder its nutritional utilization.

Conclusion

The study concludes that rural farm families, particularly those residing in Internally Displaced Persons (IDP) camps in Makurdi Local Government Area, are largely unaware of the Ukwa dish and its associated nutritional benefits. The lack of utilization can be linked to limited access to the fruit and the absence of home economics extension services. Through this research, awareness was created regarding the existence, preparation, and health benefits of the Ukwa dish. The findings underscore the importance of promoting this nutrient-rich food, which can contribute significantly to dietary diversity, disease prevention, and overall health improvement among rural households. It is anticipated that the knowledge imparted during the study will inspire greater interest and utilization of Ukwa among homemakers in the area.

Recommendations

- 1. Promotion of Nutritional Education: Home economics educators and nutritionists should intensify efforts to educate rural families, particularly homemakers, on the health benefits of consuming Ukwa as a protein-rich, affordable alternative to more expensive protein sources.
- Improved Accessibility through Cultivation: Agricultural extension officers and researchers should introduce sustainable strategies for cultivating African breadfruit in the region. This will improve access, reduce cost, and encourage consistent usage of the dish among farm families.
- 3. Integration into Food Programs: Governmental and non-governmental organizations should consider integrating Ukwa into school feeding programs and rural nutrition initiatives to improve food security and enhance the nutritional status of vulnerable populations, particularly children and women.

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