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Constraints to Increased Demand for African Breadfruit (Treculia africana) in Owerri Agricultural Zone of Imo State, Nigeria

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Abstract
The study aimed at providing information on the constraints to increased household demand for African Breadfruit (Treculia Africana) in Owerri Agricultural Zone of Imo State, Nigeria. A total of sixty respondents were used for the study. The objectives of the study were to identify the socio-economic characteristics of African breadfruit consumers in the study area, to determine the factors influencing household demand for African breadfruit and to identify the major constraints to increased demand for African breadfruit. One hypothesis was tested. Data was collected using a researcher-designed questionnaire. Descriptive statistics and multiple regression model were used for data analysis. Results showed that the mean age of breadfruit consumers was 42.9 years. Majority of the breadfruit consumers (58%) were civil servants as their major occupation and most (68%) of them engage in farming as their minor occupation. Age, household size, educational level, income level (household income) and price of substitute to breadfruit were significant and directly related to the household demand for African breadfruit. Most of the breadfruit consumers are constrained by much stress in preparing it and seasonality of the produce. It was recommended that youths should explore breadfruit production since majority of the breadfruit consumers fall within the active proportion of the labour force.
Keywords: Constraints, household demand, African breadfruit

1.0 Introduction

The African Breadfruit (*Treculia africana)* is produced by Treculia, a wild tropical evergreen tree and has immense potential as a nutritional source for man (Osabor, Ogar, Okafor & Egbung, 2009). This non-timber forest product is one of the oldest semi-wild tree species which has come under cultivation and/or protection in Imo State, Nigeria. Although they occur naturally in the wild, they are frequently or extensively found around human dwellings and in farmlands as a result of cultivation. The African breadfruit seeds (ABFS) are highly nutritious and constitute a cheap source of vitamins, minerals, proteins, carbohydrate and fats (Olapade & Umeonuora, 2014). The edible seeds are a valuable foodstuff among the Igbos in particular (Uluocha, Udeagha, Udofia & Duruigbo, 2016). The breadfruit is a staple crop in many parts of Nigeria. Its food value and market potentials have been reported (Ugwu & Oranye, 2006). The edible seeds are ground into powder and have been found to have bread making properties and could be used for pastries, weaning foods, breakfast cereals, alcohol, wood production and beverages (Okafor, 1993; Uluocha et al., 2016). According to Osabor et al. (2009), African breadfruit seed (dry mass basis) contains 73% carbohydrates, 12.5% crude protein, 4.2% fat, 2.3% ash, 1.6% fibre and 8% moisture. Nwabueze (2006) noted that as days of storage increase, the carbohydrate content decreases while the moisture content increases thereby adding to the deterioration rate.

Households are consumption as well as production units in which market goods and household resources are combined in a household technology to produce good which are then consumed in combinations that generate maximum utility for the household. Some of the factors influencing the household demand for African breadfruit include price of the commodity, taste and preference, income level, seasonality and age of consumers (Stanlake & Grant, 1999). Okafor (1993) found that the constraints to increased demand for breadfruit are processing, bio-deterioration and high cost. The potential contributions to the food basket which are essential for ensuring a balanced diet for the local inhabitants are not fully realized because of many constraints. Okafor, Ejiofor and Okolo (1996) noted that African breadfruit products are indispensable to rural people for regular or supplementary food supply and as sources of cash income. However, scientific investigations into improved use and conservation of this fruit tree have been inadequate. Despite the dietary and economic importance of African breadfruit, it has remained an under-utilised specie till now and its potentials remain under-exploited (Olapade & Umeonuora, 2014; Nuga & Ofodile, 2010). Addressing the challenges and promotion of widespread planting and consumption of African breadfruit is expedient (Muojekwu, Ugwumba & Chidebelu, 2017). Being one of the neglected tree crops in Nigeria, literature is scanty on the constraints to its increased demand by households. The main producers of African breadfruit are the small scale farmers and many factors constrain their increased production of breadfruit to meet household demand, and the required empirical information on these factors is

limited. Hence, the need for this study. The following research questions guided the study: What are the socio-economic characteristics of African breadfruit consumers in the study area? What factors influence household demand for African breadfruit? What are the major constraints to increased demand for African breadfruit by households in the study area?

2.0 Objectives of the Study

The specific objectives of the study were to:

1. identify the socio-economic characteristics of African breadfruit consumers in the study area;
2. determine the factors influencing household demand for African breadfruit and
3. identify the major constraints to increased demand for African breadfruit.

2.1 Hypothesis of the Study

One null hypothesis was tested in the study.

Ho: Household demand for African breadfruit is not significantly influenced by their socio-economic characteristics.

3.0 Method

The study was conducted in Owerri Agricultural Zone of Imo State, Nigeria. Owerri Agricultural Zone is one of the three Agricultural Zones in Imo State. The study adopted a descriptive survey design. Multi-stage random sampling technique was used for sample selection. The study was carried out in four Local Government Areas (LGAs) out of the eleven (11) LGAs in the study area. The LGAs are Ohaji/Egbema, Ngor Okpala, Ikeduru and Ezinihitte Mbaise. Sixty (60) household heads formed the sample of the study. A researcher-developed questionnaire comprising of 33 items was validated by three experts and used for data collection. A pre-test was conducted to improve the reliability of the questionnaire used for the study. Data were analysed using frequency distribution, percentages and multiple regression model.

3.1 Model Specification

Multiple Regression Model

The multiple regression model is specified implicitly as follows:

$Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, e)$

Where: Y = Household demand for African breadfruit (kg/month)

X_1 = Sex (male = 1, female = 0)
X_2 = Age (years)
X_3 = Occupation (farmer =1, artisan =2, civil servant =3, trader =4)
X_4 = Household size (number of persons)
X_5 = Price of African breadfruit (₦)
X_6 = Educational level (number of years spent in school)
X_7 = Income level (₦)
X_8 = Price of substitute (₦)
e = Error term

Four functional forms of the model were tried: linear, exponential, double-log and semi-log. The functional form that best fitted the regression line in conformity with the economic, statistical and econometric criteria was selected as the lead equation.

4.0 Results and Discussion

Objective 1: Socio-economic characteristics of African breadfruit consumers

The socio-economic characteristics of the respondents such as sex, marital status, age, educational level, occupation and household size were considered. Results obtained are shown in Table 1.

Table 1: Percentage distribution of Socio-economic characteristics of African breadfruit consumers

Socio-economic Characteristics		Frequency	Percentage (%)
Sex	Male	32	53
	Female	28	47
Marital Status	Married	49	82
	Single	11	18
Age	≤ 30	4	7
	31-40	19	32
$\overline{X}$ **= 42.9 years**	41-50	23	38
	51-60	12	20
	61 -70	2	3
Educational level	1-5	4	7
	6-10	11	18
$\overline{X}$ **= 12.9 years**	11-15	27	45
	16-20	18	30
Major Occupation	Farmer	22	37
	Artisan	1	2
	Civil servant	35	58
	Trader	2	3
Minor Occupation	Farmer	41	68
	Artisan	9	15
	Civil servant	3	5
	Trader	7	12
Household size	1-5	14	23
	6-10	37	62
$\overline{X}$ **= 8 persons**	11-15	6	10
	16-20	2	3
	21-25	1	2

Cultural role of breadfruit, non-food uses and acquisition of breadfruit tree are shown in Tables 2 and 3.

Table 2: Distribution of breadfruit consumers according to the use of breadfruit for culture and non-food purposes

ITEMS		Frequency	Percentage
Acquisition Pattern	Grand father	15	25
	Grand mother	16	27
	Father	9	15
	Mother	8	13
	Self	7	12
	Spouse	5	8
Cultural Role of Breadfruit	Festival periods	26	43
	Entertainment	15	25
	Heritage	5	8
	Sacrifice at tree	3	5
	Drugs and herbal medicine	8	14
	Prestige	3	5
Non-food uses of breadfruit	Animal feeding	26	41
	Medicine	21	33
	Roofing houses	8	13
	Furniture	5	8

Table 2 shows that most of the breadfruit trees in the study area were inherited. The breadfruit consumers use breadfruit for various purposes. However, the study noted that these roles are barely exploited in the study area. The low percentage score for entertainment (25%) agrees with the opinion of Nuga & Ofodile (2010) that a yearly trade fair '*Ukwa fair*' should be organized to further create awareness about the potentials of the species. The non-food uses of breadfruit for roofing houses and furniture making has been pointed out by Agbogidi and Onomerogor (2008).

Table 3: Distribution of breadfruit consumers according to where breadfruit is obtained for consumption, breadfruit tree location and forms of preparing breadfruit.

ITEMS		Frequency*	Percentage
Where Breadfruit is obtained	In the wild	4	6
	Planted	51	75
	Purchase	13	19
Breadfruit Tree Location	Compound farm	35	55
	Outlying farm	28	45
	Plantation	0	0
Forms of preparing breadfruit	Fried	23	29
	Boiled alone	30	37
	Boiled and eaten with other food items	27	34

* Multiple responses were recorded

The result shows that majority of breadfruit trees in the study area are planted. The study also revealed that there is no breadfruit plantation. Most of the breadfruit consumers prefer boiled breadfruit to fried one.

Objective 2: Determine the socio-economic factors influencing household demand for African breadfruit

To determine the socio-economic factors influencing household demand for breadfruit, the variables were analysed and tested by fitting the multiple regression model to the data. The results obtained in four functional forms are presented in Table 4.

Table 4: Socio-economic factors influencing household demand for African breadfruit

Explanatory Variables	Linear Function	Semi-log Function	Double-log Function	Exponential Function
Sex (X_1)	4.0528 (1.0435)	3.9144 (1.2983)	0.0982 (1.0948)	0.0064 (1.0847)
Age (X_2)	5.1987 (1.0435)	2.7295 (1.242)	0.0658 (3.0323)**	0.0048 (1.2308)
Occupation (X_3)	6.1153 (1.0517)	1.7125 (1.3952)	0.0377 (1.8038)	0.0081 (-3.8571)**
Household Size (X_4)	3.5295 (1.2499)	3.0911 (4.8717)**	0.0911 (2.5518)*	0.0092 (1.1084)
Price of Breadfruit (X_5)	7.0983 (3.4772)**	4.9611 (-4.8933)**	0.0759 (-3.4977)**	0.0067 (1.3137)
Educational Level (X_6)	6.2913 (2.0226)*	4.6613 (1.1686)	0.0658 (3.0605)**	0.0082 (3.5652)**
Income Level (X_7)	7.5093 (4.1387)**	2.1738 (1.1083)	0.0633 (4.9843)**	0.0059 (4.5385)**
Price of Substitute (X_8)	10.3087 (1.1436)	3.8213 (1.2318)	0.0552 (4.8849)**	0.0046 (4.1818)**
Constant	229.4026	188.3017	94.3303	83.5209
R^2	0.5039	0.4108	0.7512	0.5394
Std Error	18.2603	15.2943	0.0429	0.1792
F-Value	6.4936**	4.2792**	19.1633**	7.2201**
Sample Size	60	60	60	60

Figures in parenthesis are the t-ratio
*** = t-ratio significant at 5%**
**** = t and f-ratios significant at 1%**

The lead equation was selected based on the functional form that produced the highest value of coefficient of multiple determination (R^2), lowest standard error of Y estimate, highest number of significant variables (at 1% and 5%) and highest F-value. Hence, the double-log functional form was chosen as the lead equation for the discussion. The coefficient of multiple determination (R^2) as shown in table 4 is 0.7512. This implies that 75% of the variation in factors influencing household demand for African breadfruit was accounted for by the joint action of the explanatory (independent) variables included in the model.

Variables such as age (X_2), price of breadfruit (X_5), educational level (X_6), income level (X_7) and price of substitute (X_8) were significant at 1% while household size (X_4) was significant at 5%, implying that these variables are important factors affecting the household demand for breadfruit in the study area. This result implies that advancement in age, increase in household size, higher level of education, higher income level and increase in price of substitute will increase the household demand for African breadfruit while increase in price of breadfruit will lead to a decrease in household demand for it. This is in line with the findings of Stanlake and Grant (1999). The coefficients of sex (X_1) and occupation (X_3) were not significant at any level of probability which implies that they do not have any influence on household demand for African breadfruit.

Hypothesis Testing: Household demand for African breadfruit is not significantly influenced by their socio-economic characteristics.

The null hypothesis is rejected for the reason that six variables (X_2, X_4, X_5, X_6, X_7, X_8) included in the model were significant at 1% and 5% levels of probability.

Objective 3: Identify the major constraints to increased demand for African breadfruit.

The distribution of breadfruit consumers according to major constraints to increased demand for African breadfruit is shown in Table 5.

Table 5: Major constraints to increased demand for African breadfruit.

Major Constraints	Frequency*	Percentage
Much stress in processing it	27	32
Seasonality	19	22
High market price	25	29
Poor storage method	8	9

***Multiple responses were recorded**

Table 5 shows that majority (32%) of the breadfruit consumers are constrained by much stress in breadfruit processing it, thereby limiting their demand. Twenty-nine (29) percent of them have the constraint of high market price while 22% and 9% are constrained by seasonality and poor storage method respectively. This is in line with the findings of Okafor (1993) who noted that processing, bio-deterioration and high cost are constraints to increased household demand for African breadfruit. This reveals that the breadfruit consumers have a lot of constraints to increasing the demand for breadfruit despite their quest to keep consuming it.

5.0 CONCLUSION AND RECOMMENDATIONS

African breadfruit has great potentials of enhancing rural food security. Therefore, it is necessary to promote increased demand for this highly valued tree crop. The study examined the constraints to increased household demand for African breadfruit in Owerri Agricultural Zone of Imo State, Nigeria. The declining African breadfruit output in Nigeria calls for more studies and policy recommendations towards increasing breadfruit production and marketing in order to meet the pressing household demand. More young farmers should delve into breadfruit production since the majority of breadfruit consumers fall within the active proportion the labour force. Farmers and breadfruit marketers should acquire processing machines in order to reduce the stress of breadfruit processing. There is need to promote awareness on early maturing, dwarf varieties of Treculia Africana which will encourage its cultivation by more farmers who fear death by fruit fall and thereby reducing its market price. The government should promote the use of breadfruit by animal feed industries for feed production. Government should establish African breadfruit programs in order to encourage African breadfruit producers and ensure the continued existence of this tree that is near extinction.

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