



## **Analysis of the Social Barriers Constraining Increased Breadfruit Tree Cultivation in Southeast Nigeria**

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### **Author's contribution**

*The sole author designed, analysed, interpreted and prepared the manuscript.*

### **Article Information**

DOI: 10.9734/AJAEES/2018/44833

#### Editor(s):

(1) Dr. Golubkina Nadezhda Alexandrovna, Agrochemical Research Center, All-Russian Institute of Vegetable Breeding and Seeds Production, Moscow Region, Russia.

#### Reviewers:

- (1) Lawal Mohammad Anka, Nigeria.
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- (3) Adijah Mukabana Olubandwa, Egerton University, Kenya.

Complete Peer review History: <http://www.sciencedomain.org/review-history/27420>

**Original Research Article**

**Received 05 September 2018**  
**Accepted 10 November 2018**  
**Published 26 November 2018**

### **ABSTRACT**

The study analysed the social barriers constraining increased breadfruit (*Treculia africana*) planting in Southeast Nigeria. Data were collected through a structured questionnaire administered on 260 respondents selected through a simple random sampling process from 13 communities in Anambra and Enugu States of Southeast Nigeria. From the respondents, 4 in-depth interviews were conducted for more detailed information and verification of some answers in the questionnaire. Data were realised with descriptive statistics. The results reveal that significant proportion (52%) of the farmers had certain beliefs about the crop, but that the beliefs that the crop is not meant to be cultivated, planted by young people and others are unlikely to be significant reasons for its limited planting. The result, however, indicates that systems norm of free fruit head collection (32.14%) is likely to be a significant reason for the limited planting of the trees in the farm fields of some communities in the study area. The result suggests that the norm may be a barrier to using the crop for climate stress adaptation in those communities. The study, therefore, recommends that proactive measures such as holistic education and awareness programmes should be employed by change agencies to overcome breadfruit planting social barriers.

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**Keywords:** Breadfruit; social barriers; increased planting; resilience; Nigeria.

## 1. INTRODUCTION

Communities have ideas and beliefs [9]. The beliefs in communities are the things in nature accepted as being true based on the ideas of their members. Those ideas and beliefs are made manifest in the existing values. Values specify what people ought to do while norms are rules of behaviour that regulate people's behaviour [9]. In many cultures, values and norms are implicit and yet respected by the inhabitants of those cultural areas. The beliefs and norms existing in a cultural area sometimes have negative effects on the productivity of certain crop or animal species and or adoption of certain agricultural technologies. For example, in some communities of Ghana, maize cobs with variegated grains are unacceptable, prohibited or seen as a taboo by social custom [14]. The impact of such social customs may constitute barriers to farmers' use of the crop or animal species in building resilience. The effect may be more if a crop or animal species are not known or cultivated outside their native lands. It, therefore, becomes important to understand the impact which such social barriers could have on the planting of a typical nutritional and underutilised crop species.

Breadfruit tree is one of such nutritional and underutilised crop specie that needs to be studied about the beliefs and cultural norms of Igbos of Southern Nigeria for the following reasons: First, it is one of those important and underutilised crop species unknown outside their ecological zones [19]. Second, the crop is enlisted as an endangered species by many authors and researchers [10,13,17,19]. Finally, there is a lack of understanding about the reasons for the currently limited planting of the crop despite its values and numerous potential uses. Breadfruit referred is *Treculia africana*, in the crop family *Moraceae* and genus *Treculia* [20,1,7]. It is an important tree crop in Southeast Nigeria. "Ukwa" (Igbo name) is its most popular local name in Nigeria and West Africa more generally.

There are several studies and reports on this crop which show that the crop has important cultural values such as its use in ceremonies and reception of August visitors [21,4,6]; is generally accepted as high protein food within Nigeria and by Africans in other parts of the world such as in the United States of America and United

Kingdom [14,15]; generates considerable income and plays important roles in the livelihood activities of rural dwellers [2,18,17,13,1,5]. High prices and demand for the crop in rural and urban areas of Nigeria have been consistently reported over time [2,23,21,17,2]. Studies reveal that breadfruits have many potential by-products and uses [6]. The uses and potential values of breadfruit suggest that it is a good crop species for farmers to employ in building resilience and adaptation to climate stress.

The study reveals that there are more of the trees in home gardens of the farmers than in their farm fields of Southeast Nigerian [23]. Currently, no reason has been supplied on why more of the trees were in home gardens than in farm fields where there is more land space. Moreover, it is also reported that the trees are being felled because of the belief that it has the mystical power to kill [13], suggesting the need to examine the problem from the social barrier perspective. The result may reveal whether the belief is a significant reason why the crop is enlisted as an endangered species regardless of its uses and potential uses. Available research papers on breadfruit reveal that little or no research has been conducted on the sociology of its production, confirming the need to find out if there are cultural elements that may be limiting wide cultivation of the crop. Such cultural elements to be investigated are farmers' beliefs and systems norms.

The problem is that it is uncertain whether beliefs and systems norms are significant contributory reasons for the observed limited planting of breadfruit trees. This is because in a study of "barriers to and drivers of the adoption of energy crops by Swedish farmers", it was revealed that factors that are related to values are as considerable as the economic factors [12]. Furthermore, in a study conducted at three Nebraska countries (Otoe, Seward and Fillmore) for "understanding farmers' forecast use from their beliefs, values, social norms and perceived obstacles", it was found that social influences are statistically significant at above 95% confidence level [10]. They affirmed that farmers have the tendency to abide to their existing social norms. Another report affirmed that farmers in some communities of Ghana tag twin bunch plantain a taboo and as a result do not adopt the variety [3].

The other problem is that there is an insufficient explanation to the preponderance of more

breadfruit trees in home gardens of the farmers of Southeast Nigeria than in their farm fields as stated above. This also points to the need to find out the basic beliefs and systems norms on breadfruit tree planting in Igbo tradition. This may reveal whether these cultural elements are significant contributory reasons for its observed limited cultivation. It may also help to explain the reason why more breadfruit trees were found to be in home gardens than in farm fields where there is more land. The result may help to indicate the cultural element that may be addressed for successful adaptation policies on the crop. In consequence, the following questions were examined: Do farmers differ in their breadfruit tree planting beliefs in the study area? What types of beliefs do farmers have on breadfruit? Are systems norms significant contributory reasons for the limited planting of breadfruit trees? The broad objective of this study is to evaluate farmers' breadfruit beliefs and systems norms in Southeast Nigeria. The specific objectives are to: Examine farmers' differences in breadfruit beliefs. Evaluate the beliefs farmers have about breadfruit, identify and assess the systems norm that is against increasing breadfruit planting.

## 2. METHODOLOGY

### 2.1 Study Area

The study covered 16 communities taken from two states (Anambra and Enugu) which are part of the five states that constitute the Southeast geopolitical zone of Nigeria. The other states are Imo, Abia and Ebonyi. The region is located within longitude  $5^{\circ} 30'$  and  $9^{\circ} 30'$  and latitude  $4^{\circ} 30'$  and  $7^{\circ} 00'$  N [8]. The region has a land area of 75,488 km<sup>2</sup>.

Southeast zone is within the tropical rainforest region with two main seasons and means the maximum temperature of 27°C [11]. The zone is majorly occupied by the Igbos. Under normal conditions, the agricultural rainy season spans from mid-March to mid-October while the dry season runs from mid-October to mid-March. However, there can be at least one rain in each of the dry months. The vegetation of Southeast Nigeria is evergreen with many tree species and crops among which are Palm trees, breadfruit, coconuts, oranges, pears, mangoes and guava. The climate of this zone is suitable for growth and adaptation of many crop species. *Artocarpus atilis* (Breadfruit species) is one of such tree crops adopted and grown in the zone.

**Table 1. Distribution of the communities used for the survey questionnaire**

State/ LGA	Community	Number of farmers
<b>Anambra State</b>		
Awka South	Amawbia	20
Dunukofia	Umunachi	20
Orumba	Oko	20
Nnewi North	Ukpor	20
Anambra East	Igbariam	20
Anambra East	Nando	20
Anambra East	Aguleri	20
<b>Enugu State</b>		
Udi	Udi	20
Ezeagu	Obinofia	20
	Ndiuno	
Igboeze North	Umuozzi	20
Udenu	Orba	20
Nsukka	Nguru	20
Nsukka	Edem-Ani	20
<b>Total</b>		<b>260</b>

Source, Field Survey, 2014

### 2.2 Data Collection

A questionnaire was developed, pre-tested and used for the study. The questionnaire included questions on farmers' breadfruit beliefs, type of farmers beliefs on breadfruit and on systems norm on breadfruit. The questionnaire used a five-point Likert scale (1-5) for some questions. The five-point Likert type scales used were: not true (1), of some truth (2) moderate truth (T= 3), Very true (T= 4), extremely true (5). The Likert scale values were expressed in percentage. This was useful in understanding the levels of importance which the respondents attached to each of the issues. The questionnaire was pre-tested on 20 respondents who were purposely selected from two communities of the study area. Minor changes were made to some questions following this. The pre-tests added value to the main study questionnaire and contributed to its validity and reliability. The survey questionnaire was used to collect information on whether the farmers' had beliefs on the BF, existing types of beliefs on breadfruit, farmers and prevalent systems norm on breadfruit. In addition, 3 in-depth interviews were conducted with selected farmers on their breadfruit beliefs. The beliefs tested on the questionnaire were farmers believe that breadfruit: has: power to kill someone whose hands are unclean, power to kill, kills by accident, power to send out evil forces, believe that whoever plants breadfruit tree may die before it gets to its gestation period,

and that breadfruit is not: to be planted by young persons, meant for planting, planted in large number (few of the trees should be planted in an area).

### **2.3 Sampling Method**

The study aimed to understand whether there are beliefs and systems norms on breadfruit and to understand whether farmers' beliefs and norms are serious constraints to increasing planting of the crop. From each of those communities listed in Table 1, 20 farmers were selected and interviewed using the survey questionnaire and trained enumerators. Three stages were involved in sample selection for the survey questionnaire. In stage one, 5 LGAs were selected from each of Anambra and Enugu States. In stage two, 1 community was also selected from each of the LGAs with the exception of Nsukka where 2 communities were selected and Anambra LGA were three communities were selected. The LGAs and the communities were deliberately selected because Agricultural Development Programme (ADP) staff that helped in the research was interested in assisting in the communities. Two communities were selected from Nsukka LGA because of the reason that was given earlier. Also, it is a model LGA which is likely to be a good representative of most of the other LGAs and because it contains one of the biggest breadfruit markets compared with other LGAs selected from Enugu State. Through purposive sampling, Udi, Obinofia Ndiuno, Nguru, Edem Ani, Umuozzi and Orba communities were sampled from Enugu State as shown in Table 1. Three communities were selected from Anambra East LGA for four major reasons. First, it is an important LGA made up of agricultural communities. Second, the LGA contains the Igbariam farm settlement established by the Eastern Nigerian regional government of the 1960s and new breadfruit was found to have been adopted in the farm settlement. Third, the LGA contains two important agricultural product markets. Fourth, the LGA contains riverside communities and there is the need to include one of such communities for an understanding of breadfruit production situation in such communities. Using the same process, Amawbia, Umunachi, Oko, Ukpokor, Igbariam, Aguleri and Nando were also purposively selected from Anambra State as shown in Table 1. In stage three, 20 farmers from each of the 13 communities drawn from the 10 LGAs of the two states were selected through

a simple random sampling method and interviewed using the survey questionnaire and trained enumerators. This gave a total of 260 respondents for the questionnaire survey. From the respondents, three in-depth interviews were conducted for more detailed information on farmers' beliefs on the crop.

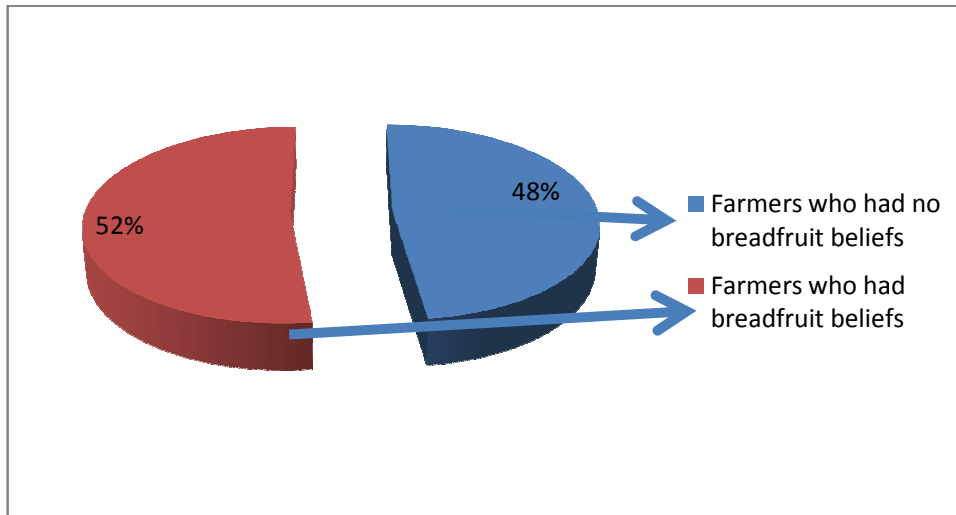
### **2.4 Data Analysis**

The data collected were summarised, presented in a Tables and figures. The objectives 1, 2 and 3 were analysed using basic descriptive statistics such as percentages, Tables and figures.

## **3. RESULTS AND DISCUSSION**

### **3.1 Breadfruit and Farmers' Beliefs**

The result in Fig. 1 shows that 52% of the farmers had beliefs on breadfruit while 48% had no belief in the crop. The result reveals that farmers are segregated in breadfruit beliefs. The belief types referred are those that are related to breadfruit planting as given in Table 2. Those who had no beliefs are the farmers who had no beliefs that are related to breadfruit planting but see it as a normal tree crop that can be planted by any person. The result indicates that a significant proportion of the farmers had beliefs on breadfruit. The result is understandable because it is known that among the Igbos of Nigeria, socio-cultural norms exist which bind the members of the families, village and town communities and influence the behaviour of the people [16]. This shows that the finding of this study is useful and relates to the existing socio-cultural literature of the study area. It is also noted that the traditional food system includes the socio-cultural meaning of food, agricultural products and gender division of household labour [21]. In the region, it is further known that meanings, morals and proverbs are attached to different animals such as lion, tiger, ram, and even tortoise [16]. For example, the ram is believed among the Igbos to be a symbol of endurance [16] and an object for showing appreciation to a great person for doing a great thing or surmounting a big obstacle. Similarly, tree products and leaves are also noted to have social significance. A typical example is kola nuts which are in the region used in various ways such as in prayers, ceremonies and rituals [21].



**Fig. 1. Percentage distribution of farmers on breadfruit beliefs**

In consideration of the above, the result indicates that there is the need to understand what the farmers' beliefs on the crop are about. This is because the result will reveal whether the farmers are different in their breadfruit beliefs. This is investigated in section 3.2.

### 3.2 Types of Farmers' Beliefs on Breadfruit

The result shows that majority of the respondents (54.27) believed that breadfruit does not kill someone whose hands are clean. On all other beliefs listed in Table 2, the majority of the farmers on an average of 84.22% disagreed on those beliefs.

Concerning breadfruit in home garden killing someone, a farmer in an in-depth interview (II) held at Nando (ND) stated this way, "No man would be glad to have his breadfruit kill some in his compound whether his hand is clean or not. This is one of the reasons why we do not plant breadfruit trees in front of the compound, but at backyard" (II: ND/21/02/14). In Igbo culture, someone who is said not to have a clean hand is a person who is alleged to have committed sacrilege against the earth (what the earth forbids) such as shedding of innocent blood or any other abominable things. Similarly, someone whose hands are clean is a person who has not done those abominable things. The response of the interviewee is understandable and reveals the main reason why farmers in the study area mostly plant breadfruit trees at the backyard (Nkpuke) or in the home garden, but not around

the front yard (obi). This is understandable because in a review of the Igbo cultural and religious worldview, it is reported that obi in Igbo culture is normally located in the public section of the compound and set apart from that of the women which is the home's private section [16]. So it is considered to plant breadfruit trees at the backyard than around the public section of the compound where visitors are normally received. The breadfruit variety *var. africana* has large fruit heads and one can get killed by a big ripe fruit falling on his or her head. So, the decision to have it planted at the backyard is to avoid accidental killing, injuring or terrorising of the stranger within the compound irrespective of whether his or her hands are clean or not.

In another in-depth interview held at Igbariam (IGB), an old farmer talked about breadfruit and its location in a compound with a reason. In his words, he said, "There are reasons why some trees are in Igbo land located at certain places in a compound. We plant 'Ogbu' tree in front of the compound and breadfruit tree at the backyard. We believe that both trees scare away evil forces coming from the directions" (II: IGB/22/01/13). In another in-depth interview at Aguleri (AG), a farmer revealed that some Igbo farmers plant breadfruit trees in their home gardens because of their belief that it serves as natural thunder protector (II: AG/06/03/14), suggesting that it could be among the reasons why more of the trees were found to be in home gardens of the region than in farm fields [23]. The responses of the interviewees suggest that they believe that the breadfruit tree has the mystical power to

scare away some spiritual agents that can cause misfortune. The responses are in line with Igbo beliefs. This is because [16] reported that they believe that misfortunes can be caused by unseen spiritual agents who they need to ward off in various ways to solve the problem.

The result reveals that there may be factors that are encouraging and or discourage breadfruit planting in the study area, but that majority of the farmers were against the discouraging ones. The implication of the result is that breadfruit beliefs existing in the communities are not likely to be major factors constraining its increasing planting or low adoption of its new varieties. The result also implies that belief about breadfruit is unlikely to be a major reason why its trees are reported to be felled in the study area. The result is in disagreement with Nuga and Ofodile [13] who in a study of the potentials of *Treculia africana* reported that breadfruit trees in the study area were being felled because of the beliefs that it had the mystical power to kill someone. The result is in agreement with the findings of Umeh [23] who reported that a larger proportion of breadfruit trees are in home gardens of the people of Southeastern Nigeria than in farm fields.

The result agrees that system norms can be a barrier to diffusion of innovation, but not to the extent of being a reason why breadfruit trees in South Eastern Nigeria are being felled as reported by Nuga and Ofodile [13]. The result which disagrees with Nuga and Ofodile [13] is as

expected because it is difficult to believe that breadfruit which has for centuries been an important traditional staple food tree crop in compound gardens of the people of South Eastern Nigeria especially in Anambra state will have to be massively exterminated now that it has emerged a cash crop as evidenced in the work of several authors who include (4, 6, 7, 15]. Again, a larger proportion of the existing breadfruit trees are reported to be in home gardens of the people of Southeast Nigeria than in the farms outside the home [23]. Moreover, breadfruit was identified as one of the tree crops that exist in compound farms of the people of South Eastern Nigeria and which are contributing to the food, livestock fodder, soil improvement, medicine, symbolic uses and cash income of the farm families [22].

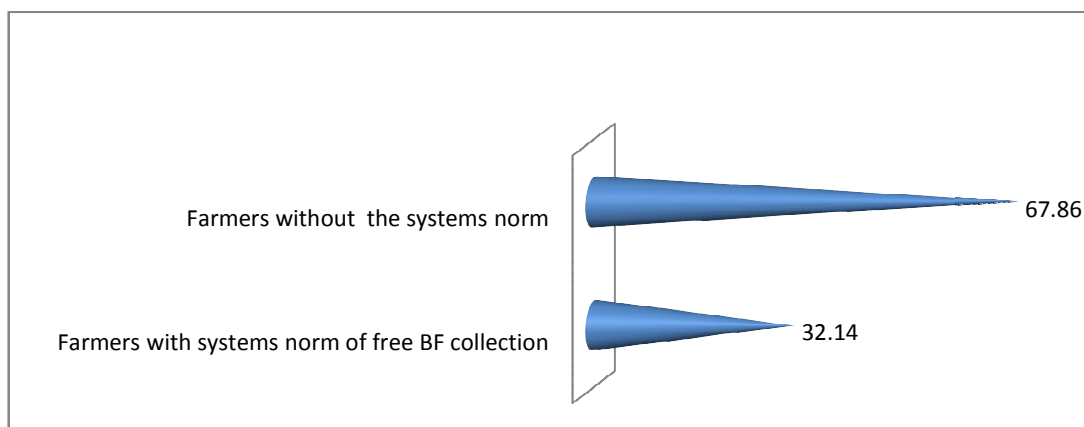
### 3.3 Breadfruit and Systems Norms

The sections 3.2 investigated farmers and breadfruit beliefs and found that there are many different beliefs on breadfruit, but that they are unlikely to be major constraints to its increasing planting. This section seeks to understand farmers and systems norm on breadfruit. The result may reveal one of the reasons why more of the trees were found to be in home gardens than in farm fields where there is more land space. The farmers indicated whether free breadfruit collection in their farm fields is a systems norm of their community or not. The result presented in Fig. 2 shows that 67.86% of

**Table 2. Percentage distribution of the existing breadfruit beliefs in Southeast Nigeria**

<b>Breadfruit beliefs</b>	<b>Total Re(n)</b>	<b>Not true(1)</b>	<b>of some little T (2)</b>	<b>moderate T (3)</b>	<b>Very T (4)</b>	<b>extremely true(5)</b>	<b>Total % of T levels (2-5)</b>
Power to send out evil forces	223	45.74	3.59	5.83	6.28	38.57	54.27
Who plants BF may die	219	80.37	9.59	3.20	5.02	1.83	19.64
Has Power to kill someone	218	89.91	5.05	2.75	2.29	0.00	10.09
Kills by accident	220	75.45	11.36	7.73	3.64	1.82	24.55
	220	87.73	5.00	3.18	2.27	1.82	12.27
Not planted by young	219	89.50	4.57	2.74	1.83	1.37	10.51
Not meant for Planting	220	84.55	6.36	4.55	3.18	1.36	15.45
Few to be planted	217	82.03	5.99	6.91	1.84	3.23	17.97

Source: Field Survey, 2014. Key: 1, 2, 3, 4, 5 are 5 point Likert type scales in percentage, T = Truth/True, Re = Responses



**Fig. 2. Percentage distribution of farmers on systems norm of breadfruit collection (n=252)**

the farmers do not practice free breadfruit collection while 32.14% do that. The result indicates that the systems norm is biased against breadfruit trees in farm fields and can be more significant in communities with such a behaviour pattern. The result also indicates that the systems norm might be one of the reasons why more of the breadfruit trees were found to be in the home gardens than in farm field [23]. The implication is that free breadfruit head collection (FREBHEC) from trees in farm fields can be a barrier to increased planting of the crop in farm fields of those communities who practice it. FREBHEC is a systems norm that allows people to collect ripe breadfruit heads after their natural fall from any of the trees in farm fields without the person being regarded as a thief by the owner. The result is in agreement with the findings of Rogers [24] and Veen [25] who reported that norms or established behaviour patterns of the members of a social system could be a barrier to change or diffusion of innovation. The result advanced by finding a practical example of what Rogers [24] and Veen [25] reported.

#### 4. CONCLUSIONS AND RECOMMENDATIONS

The study found that there are negative and positive beliefs around breadfruit planting in the study area, but that the negative beliefs are unlikely to be major reasons for the limited planting of the crop. The study, however, reveals that the systems norm of “free fruit head collection” is likely to be a significant reason for the limited planting of the trees in the farm fields of some communities in the region. The study concludes that breadfruit beliefs are not significant reasons why the trees are being felled,

but that the systems norm of its free fruit head collection is a significant barrier to increased planting of the trees in farm fields of some rural communities.

The study recommends that increased planting of the crop should be promoted for farmers’ adaptation to climate stress in Nigeria and in countries with favourable climatic conditions for its cultivation. The study also recommends that proactive measures such as holistic education and awareness programmes be adopted by change agencies to overcome the negative social barriers against increasing planting of the crop in farm fields of the village or town communities with the systems norm of free collection of the fruit heads.

#### ACKNOWLEDGEMENTS

This work was funded, in part (Scholarship) by the Nigerian Tertiary Education Trust Fund and in part (Study leave) by Chukwuemeka Odumegwu Ojukwu University, Nigeria. The author is grateful for these.

#### COMPETING INTERESTS

Author has declared that no competing interests exist.

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