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CULTURE AND FOOD SECURITY: A STUDY OF THE FACTORS INFLUENCING THE ENDANGERMENT AND DECLINE IN THE PRODUCTION AND UTILIZATION OF AERIAL YAM (DIOSCOREA BULBIFERA) AND COCOYAM (XANTHOSOMA SAGITTIFOLIUM) IN IMO STATE, NIGERIA.

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ABSTRACT

This interdisciplinary study explored factors responsible for the underutilization of two local food crops aerial yam and cocoyam in selected communities in Imo State, Nigeria. This is necessary, because there have been no scientific explanations for their neglect. Data for the study were obtained from Researchers'-Made-Questionnaire (RMQ) and Focus Group Discussions (FGD). The Focus Group Discussants were mainly Cultivators of the crops. A total of 1500 copies of the questionnaire, distributed to 64 randomly selected rural communities were retrieved. The questions were based on demographic and socio-cultural factors, and on people's perception of the nutritional and medicinal values of the crops. SPSS Version 20 was used for imputing data and analysis. Findings from the study showed that production and utilization of the two crops have actually declined. Six factors (low rating, low yield, hard to cook, fewer buyers, perceived low food value and storage problem) out of fourteen accounted for 64.3 %. Tradition, which placed the two crops as 'women's crops' further accounted for the decline. The study recommends among other measures sensitization of the farmers and general public on the nutritional and medicinal values of the crops.

KEYWORDS: *Culture, Food Security, Underproduction, Underutilization, Aerial Yam, Cocoyam, Food Crop*

INTRODUCTION

Food is the most basic need of man which sustains life. For this reason, societies develop systems of agriculture, as integral parts of their general culture, for the provision of their food needs. These systems are influenced by the social, economic, political and environmental peculiarities of the societies.

Before the advent of modern agriculture under colonialism in Nigeria, the constituent communities practiced varied forms of agriculture, according to their cultural circumstances and ecological conditions; although they were generally associated with:

- Subsistence agriculture
- Production of varieties of food crops that met their nutritional and health needs.

- Self-sufficiency in food production
- Sex- and age-based division of labour in their agricultural practices.

The common food crops of the communities included, root crops, cereals, fruits, vegetables and nuts. Under colonialism, and the concomitant social change, new values and modern agriculture were embraced by the communities. The era witnessed large scale production of new agricultural produce, epitomized, then, by the legendary ‘’ground-nut pyramids’’ in Northern Nigeria, abundant palm produce in the Southeast and massive cocoa production in Western Nigeria. In the sixties, these crops were the major export crops which accounted for over 80.0% of Nigeria’s foreign earnings (Aluko – Olohun, 1985). The gross neglect of agriculture, following the discovery of, and reliance on oil, as the new and major source of revenue for the country, signalled a nose-dive in agricultural production, with obvious negative implications for food security. Reflecting on this trend, the Central bank of Nigeria (CBN) (2005) reported that agricultural production, which contributed 90.0% of the Gross Domestic Product (GDP) before independence in 1960, declined with dismal contribution of 41.0% between 2001 and 2005. Between the seventies and eighties, Nigeria’s import bills on consumer goods, especially food items, rose from $7.5 billion to $13.6 billion (Ahmed, 1983). According to the CBN Governor, Emefiele,” Nigeria cut food imports, saved $21bn in 34 months” (2018, December 3 Punch Newspaper). Recently, Aljazeera television (2020, September 14) reported; “Floods, Food Shortages threaten to push Nigeria into Food Crisis”. The implication of the above is that, while the laudable effort of government is commendable, the problem is not yet over.

Statement of the Problem

By the seventies, the problem of food crisis and food insecurity had become a global one (Mohammed, Achen, Omisore, and Abdulzeadri, 2009 as cited by Kanu, 2012). Nigeria was identified at a World Food Summit as one of the 82 low – income–food–deficit countries (Mathew – Njoku, 2007). Among the factors identified in literature, as being responsible for this situation, are neglect of agriculture by various governments, socio-cultural constraints on food production, poverty and lack of credit facilities to farmers, crude farm implements, dearth of, and poor infrastructural facilities and climate change (Nwosu, 1999;Eze, 2002; Nwaru and Nnadozie, 2005; etc).

The dismal food situation in the country has been accentuated by the gradual disappearance of some one-time staple food, such as aerial yam (‘adu’) and cocoyam (‘’ede’’). In spite of their nutritional, medicinal and health values (Nzelu, 2006; Ikiriza et.al 2019), these two crops have been reported to suffer endangerment as a result of their under-production and under- utilization (Sanful, Oduro & Ettis; 2013). Yet, no scientific reasons have been adduced for the neglect and declining popularity of the two crops, especially in the area under study, nor have the food insecurity implications for the country at large been pointed out in literature.

Purpose of the Study

The main purpose or objective of this study, therefore, is to determine the factors responsible for the endangerment and decline in the production and utilization of Discorea bulfibera (‘’adu’’) and Xanthosoma sagittifolium (‘’ede’’) in some selected rural communities in Imo State, Nigeria.

SPECIFIC OBJECTIVES

The specific objectives of the study include to:

- Identify communities where the two food crops are grown in Imo state
- Ascertain the socio-cultural profile of the cultivators of the crops
- Compare the production and utilization of the crops in the past and present.
- Ascertain if their production and utilization are actually declining and, if so, the factors responsible for the decline
- Review the nutritional value of the food crops
- Determine the challenges faced by the cultivators of the food crops
- Recommend, based on the findings of the study, measures towards the revival of the production and utilization of the crops, with a view to increasing the number of varieties of local food items available to the people and, ultimately, enhancing food security in Imo State in particular and Nigeria at large.

The Research Questions

In realizing the above objectives, the study sought answers to the following questions:

- Which communities in Imo state grow and eat aerial yam and cocoyam?
- Were the two food crops produced and utilized more in the past or present?

  Are the production and utilization of the crops actually declining?

  If they are declining, what factors are responsible for the decline?
- Of what nutritional value are the crops?
- What challenges are faced by the cultivators of the crops?
- What measures can be taken to revive the production and utilization of the crops in order to mitigate food insecurity in Imo state, and in Nigeria at large?

BRIEF LITERATURE REVIEW

The nutritional and medicinal values of the two crops have been generally documented in literature (Sanful, et al. 2013; Afiukwa & Igwe 2015; Kayode, et al. 2017 and Boakye, et al. 2018). Other studies have shown that the food composition profile of these endangered food species (aerial yams and cocoyams) is by no means inferior to the more widely consumed root and tuber crops; Nzelu, 2006 (for cocoyams); Igyor et al. 2004 (for aerial yams). According to Nzelu, cocoyam carbohydrate is recommended as being better than that of cassava for diabetic patients. Similarly, Cocoyam flour has the added advantage that it is highly digestible, and so is used as an ingredient in baby foods (Sanni et al. 2009).

Dioscorea bulbifera preparations have been used for memory enhancement, anti-aging, constipation and fever (Odugbemi, 2008). It has also been used as an infusion to apply to cuts and sores due to its high composition of the tannin

that is used to hasten healing of wounds (Anona, Ezeabara, & Regina, 2018). The bulbil of D.bulbifera has also been known to contain saponin steroidal phytochemical called diosgenin, that possess anti-fertility activity (Shajeela, Mohan, Louis Jesudas, & Tresina Soris, 2011) in addition to many other medicinal uses, such as contraceptives, sexual vigour remedy and treatment of piles, dysentery, syphilis, ulcers, tuberculosis, leprosy, cough and diabetes. Ikiriza, et al. (2019) gave a summary of ethnomedicinal uses of D. bulbifera.

Additionally, D. bulbifera contains a higher nutritional value compared to other Dioscorea species, with the highest levels of calcium, magnesium, sodium and zinc, highest values of vitamins B1, B3 and C and highest protein content (Anona et al, 2018). Regrettably, despite the great medicinal application and nutritional value of D. bulbifera, food preference is largely given to the other yam species. Okeke, Eneobong, Uzuegbunam, Ozioko, & Kuhnlein (2008) noted that D. bulbifera has been left to the diabetic patients and people with other health conditions like obesity, since it is more nutritious and less sweet.

METHODOLOGY

This interdisciplinary study, carried out by researchers with backgrounds in Sociology, Food Science, Nutrition and Statistics, is a mixed and cross-sectional research. The study was focused on the three senatorial zones of Imo State, Nigeria. Data for the study were generated from Researchers'- Made- Questionnaire (RMQ) and Focus Group Discussions. The focus group discussants were mainly cultivators of the crops. Three sessions of focus group discussions, involving three different groups with five participants each, were carried out. A total of One thousand, five hundred (1500) copies of the questionnaire were distributed across sixty-four randomly selected rural communities out of six hundred and thirty-seven autonomous communities in the state, and returned. The questions were designed to elicit information from respondents on demographic and socio-cultural factors, such as gender, educational qualification, occupation and tradition; as well as on people's perception of the nutritional value of the crops, which as revealed in literature influence the production and consumption of the two crops. The numbers of responses to questions/items received varied among the respondents.

Multistage sampling technique was adopted, where, the first stage was "Local Government Areas" (20% of the LGAs), while 5 LGAs were selected with at least one from each zone). Purposive sampling technique was used to select the LGAs, based on the types of crops grown in the area. Within each selected LGA, 10% of the autonomous communities, giving a total of 64 autonomous communities, were selected. Finally, in each selected autonomous community, at least 20 experienced adults were selected. Table 1 shows the layout of the design

Table 1: Layout of the Design

ZONE	LGA	AUTO. COMM.	SAMPLE
OKIGWE	6(**1**)	154(15)	300
ORLU	12(**2**)	258(26)	520
OWERRI	9(**2**)	225(23)	460
Total	**27(5)**	**637(64)**	**1280**

Source: Field work (2020: June); values in brackets are the samples

To ensure data accuracy, quality and reliability, some Higher National Diploma students with experience in field surveys, were recruited as research assistants. Considering that the population of study was large, the sample size was determined using Cochran (1977) formula:

$$n = \left(\frac{Z_{\alpha}}{e}\right)^2 p(1-p)$$

Where;

n = sample size

e = desired level of precision (margin error)

p = proportion of population which has the attribute considered

Z = value of standard variate corresponding to α

Using α = 5%, e = 0.025 and p = 0.5 (Assuming that the respondents were equally likely to be aware or use the two crops since they were rural dwellers), we obtained n = 1500.

SPSS version 20 was employed in the analysis of the questionnaire. Tables, percentages, cross – tabulations and frequencies were generated, analyzed and interpreted.

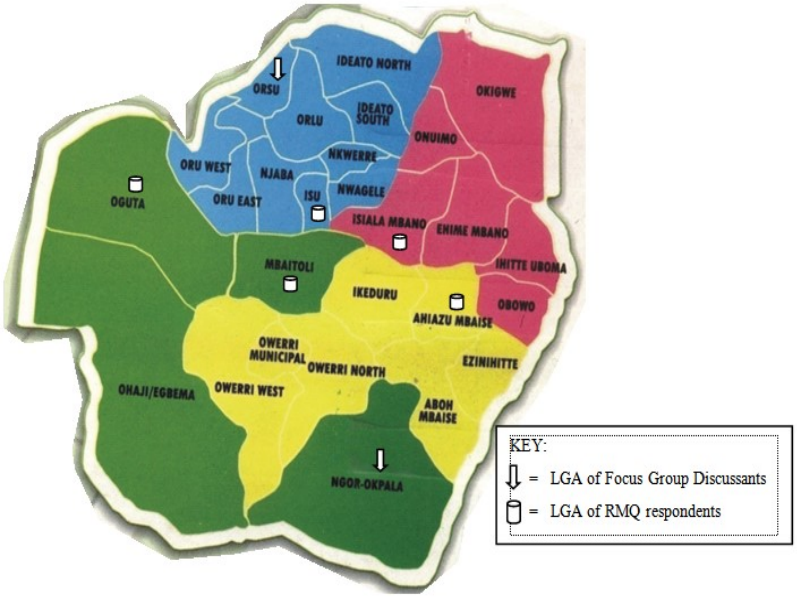

Figure 1: Map of Imo State, Nigeria, Showing the Local Government Areas under Study.

RESULTS AND ANALYSIS

The relevant socio-economic variables isolated for the study were mainly education and occupation as shown in Table 2 & 3

Table 2 shows that out of the total sample of 1500 respondents used, only 1338 (89.2%) responded to the item of education. The table reveals that respondents with first school leaving certificate were the highest with 434(28.90), followed by WASC/GCE holders with 304(20.30). Respondents with M.Sc. / M.A. and above were the least with a figure of 28(1.90). These results reflect the low educational profile of the rural communities under study.

As shown in Table 3, 'farming' had the highest number of respondents with 594(39.60 %); followed by 'trading' with 471(31.40 %); while 'others', comprising artisans, drivers etc, was the least, with a Figure of only 8 respondents(0.5 %). These results on occupation reflect the agrarian and low occupational profile of the communities. The relatively high populations of the farmer category and holders of first school leaving certificate or below (594 and 659 respectively) reflect the rural context of the study.

From the Local Government Areas studied, five communities (Umuemem Akabor, Oru, Umuchukwu, Eziome and Umueke Umuduru) were observed to grow the two crops more than others. Table 3 shows that out of the 1,500 participants used, only 1,073 and 1,462 responded respectively for aerial yam and cocoyam. It further indicates the 5 top producers of the two crops, with Oguta topping the list with 225 (21.00 %) respondents for aerial yam (adu) and Isiala Mbano topping the list with 318 (21.55 %) respondents for cocoyam (ede). Interestingly, the least producer, among the five, in aerial yam, Isiala Mbano, is the highest producer of cocoyam (ede) in the studied area.

On whether the production and utilization of the two crops were actually declining, Table 5 shows that out of a total of 1150 participants that responded to the item, in respect of aerial yam, 586(50.96 %) indicated that the crop was produced and utilized more in the past than at present, and 564 (49.0 %) responded in the negative. With regard to cocoyam, a total of 1433 participants responded to the item; out of which 1188 (82.90 %) indicated that the crop was produced and utilized more in the past than at present, while only 245(17.10 %) responded in the negative. Thus, for the two crops, the responses indicate that they were both produced and utilized more in the past than in the present.

Regarding factors responsible for the decline, a total of 14 factors were identified from the participants' responses, out of which six factors, represented (64.3%) as revealed in Figure 2. The six factors and their related numbers of respondents in a descending order, respectively, are ''low rating'' (13.30 %), ''low yield'' (12.60 %), ''hard to cook'' (11.20 %), ''fewer buyers/poor patronage'' (9.90 %), ''perceived low food value'' (8.90 %) and ''storage problem'' (8.40 %). The 8 remaining factors accounted for only 35.70 %. One fact that can be deduced from these findings, against the background of the analysis of the food value of the crops, is that the people were utilizing them without actually knowing or appreciating their nutritional values. Some participants, during the focus group discussion, said: "We eat them when we are hungry. We do not know what they do in the body". The low rating of the crops by the participants was corroborated by opinions expressed by the focus group discussants, who unanimously admitted that they were not sure of the nutritional values of the crops.

This finding also corroborates the view in literature, which associated utilization of the two crops with poor households in the rural communities (Nzelu, 2006). The low rating of aerial yam implies its low utilization, which Ayo, Ojo & Obike (2018) attributed to ignorance.

On the values placed on the crops, Figure 3 shows the percentages of respondents who liked the crops for their taste, medicinal, monetary and food values. With regard to adu, 58.8 % of the respondents liked it for its perceived medicinal value and 20.9 % for food value, while 42.3% liked ede for its food value. Thus, generally, the people placed more value on ede than on adu. This result agrees with opinions expressed by the focus group discussants, who indicated that a substantial population of the communities still consumed ede as a full meal; while adu, even with the higher medicinal value placed on it by the people, was consumed as a full meal by a negligible fraction of the studied population.

Table 2: Distribution of Respondents by Education

Highest Educational Qualification	Population	%
Less than FSLC	225	14.90
FSLC	434	28.90
WASC/GCE	304	20.30
ND/NCE	111	7.40
B.Sc./HND	236	15.70
M.Sc./MA and above	28	1.90
Total	**1,338**	

Table 3: Distribution of Respondents by Occupation.

Occupation	Population	%
Teaching	214	14.30
Farming	594	39.60
Trading	471	31.40
Public Service	199	13.30
Others	8	0.5
Total	**1486**	

Table 4: Distribution of Respondents by Local Government Areas and the Two Crops

L.G.As	Population of Respondents			
	Aerial Yam(adu)	%	Cocoyam (ede)	%
Oguta	225	21.00	209	15.66
Ahiazu Mbaise	175	16.3	169	11.56
Isu	175	16.3	175	11.97
Mbaitolu	163	15.20	175	11.97
Isiala Mbano	148	13.80	318	21.55
Total	**1,073**		**1,462**	

Table 5: Distribution of Respondents by Responses on Whether Or Not Production and Utilization Have Actually Declined

Utilization	Aerial Yam (adu)				Cocoyam (ede)			
	Yes	%	No	%	Yes	%	No	%
Past	586	50.96	564	49.0	1188	82.9	245	17.10
Present	66	5.7	1,084	94.3	894	62.40	539	37.60

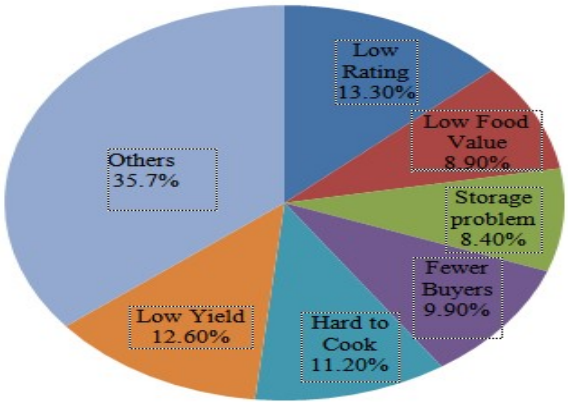

Figure 2: Distribution of Respondents by Factors Responsible for the Decline of the Two Crops.

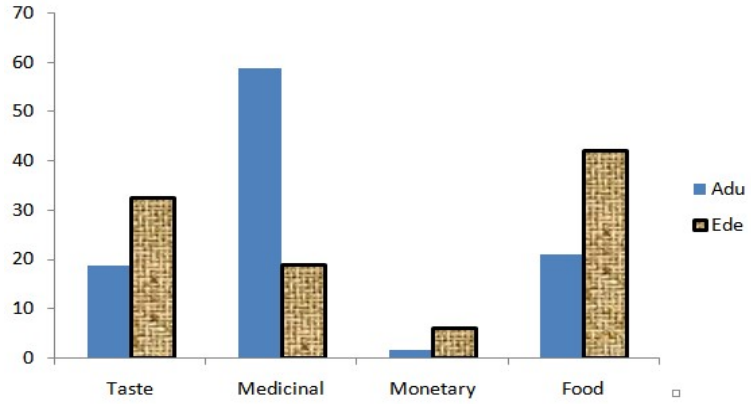

Figure 3: Distribution of Respondents based on Reasons for Choice of the Crop.

CONCLUSIONS

The study showed that the production and utilization of the two crops had actually declined. The reasons adduced for the decline ranged from ignorance of the nutritional and medicinal values of the crops to their low socio-economic values. In Igbo land, the two crops were regarded as 'women's crops' and yam as 'men's crop', even with the two crops having higher nutritional and medicinal values than yam. In addition, men, who excelled in yam production were honoured as 'Eze ji' (King of yam), while no recognitions were given to one that excelled in the two crops. Of the two crops, generally, the people place more value on 'ede' than on 'adu' which they speculated had some medicinal values. The implication is that, awareness should be created in the people, on the potential values of the two crops, in order to increase their production and utilization.

RECOMMENDATIONS

Based on the findings, the study recommends:

- Intensive sensitization of the farmers on the nutritional and medicinal values of the crops in order to revive the people's interest in the crops with a view to increasing their production and consumption.
- Public advocacy on the health value of the crops in order to stimulate increased patronage for the crops.
- Provision of credit facilities and other inputs to the farmers of the crops to enhance their yields and production.
- Provision of improved storage facilities to the farmers.

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