

ASSESSMENT OF CONSTRAINTS TO COCOYAM CONSUMPTION IN SELECTED COMMUNITIES OF ENUGU STATE, NIGERIA

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ABSTRACT

The study assessed constraints to cocoyam consumption in selected communities in Enugu State, Nigeria. A total of 80 cocoyam consumers were interviewed for the purpose of eliciting information. Cocoyam consumers were of low economic status with a greater proportion (38.7%) of them earning between #0.00 to #9,999.00 per month. About 63.0% of the respondent consumed 6 – 10 kg of cocoyam chips (Achicha) while 11 – 15 kg and 16 – 20 kg were consumed by 6.3% and 2.5% of the respondents, respectively. Only about 5% and 1.2% of the respondents made use of 1 – 5kg and 6 – 10kg of cocoyam flour respectively per month. In the communities, respondents expressed both positive and negative attitudes towards cocoyam but more of positive attitude than negative attitude. The major constraints to consumption of cocoyam are traceable to scarcity of the products which are caused among other factors by low research interest to boost production and increase disease outbreaks as a result of climate change. Some strategies suggested that could promote consumption of cocoyam were improving the storability of cocoyam to ensure its availability ($\bar{x} = 3.67$) and subsidizing the production of cocoyam ($\bar{x} = 3.64$). The study concluded among other things that cocoyam was culturally accepted and not regarded as poor man's food in the communities.

KEYWORDS: Assessment, Cocoyam, Constraints, Cocoyam Consumers, Enugu State

INTRODUCTION

Cocoyam (*colocasia* and *xanthosoma spp*) is a stem tuber and herbaceous perennial plant belonging to the Araceae family and constitutes one of the six most important roots and tuber crops world-wide. It is also a nutritious root vegetable plant that is eaten in many different cultures around the world (Nwagbo, 2011; Jennings, 1987 in Ndabikunze, Talwana, Mongi, Issa-Zacharia et al 2011).

Cocoyam is used mainly for human food. It is commonly grown amongst small scale farmers who operate within the subsistence economy. In the past, it is regarded as a lowly important crop which cultivation and consumption lay within the less privileged farmers (www.ics-nigeria.org). It ranks third in importance after yam and cassava in extent of production among the root and tuber crops of economic value in Nigeria (FAO, 2006) and is in direct competition with cassava and yam as food (Nwagbo *et al.*, 1987 in Okoye, Onyenweaku and Asumugha 2009).

Cocoyam is a traditional crop that is cultivated and consumed in Enugu state, Nigeria. It is generally regarded as women's crop but it is consumed by all (men, women and children) in the state. Unfortunately, according to Governor Rauf Aregbesola of Osun State, Nigeria, contrary to popular but uninformed belief, research has shown that

cocoyam is one of the most nutritious tubers for human consumption. The governor stated that findings had revealed that cocoyam remains an indispensable but yet neglected food crop, especially for predominantly malnourished households in the country (<http://www.vanguardngr.com/2012/05/o...based-formula/> Retrieved 9th Aug, 2012).

The nutritive value of cocoyam can be found in many research studies. Like many plants of the Araceae family, cocoyam grows from the fleshy corm (tuber) that can be boiled, baked or mashed into a meal and used as staple food or snack. The corms supply easily digestible starch and are known to contain substantial amounts of protein, vitamin C, thiamine, riboflavin, niacin and significant amounts of dietary fiber (Niba, 2003). Leaves of taro (*Colocasia*) are cooked and eaten as vegetable. They contain β -carotene, iron and folic acid, which protect against anaemia (FAO, 1990; Sukamoto, 2003), and are important source of proteins and vitamins. The main nutrient supplied by cocoyam, as with other roots and tubers, is dietary energy provided by the carbohydrates (Jirarat, Sukruedee and Pasawadee, 2006).

Furthermore, cocoyam is believed to be generally good for the body and has some medicinal values. Consumption of micronutrient rich foods such as cocoyam is important for building a strong immune system that help the body to utilize protein, carbohydrates and other nutrients. The adult daily requirements for these nutrient are: Ca, 700 mg; Fe, 13 to 16 mg; Mg, 13 mg; K, 1 to 2 mg; and Na, 6 g (Longman, 2006). According to Nwagbo (2011), taro (*Colocasia*) contains some calcium, vitamin C, vitamin E and B vitamins, as well as magnesium, manganese, copper and fiber. The roles of fiber in the body are well known. Fiber aids in digestive process, makes elimination of stool easy and also helps in cancer prevention.

Cocoyam flour can be used for the preparation of soups, biscuits, bread, beverages, and puddings. Other uses of cocoyam include: (i) Cormels are peeled, cut into necessary pieces then fry and eat; boil and eat; or boil to pound like pounded yam.

- Cocoyam flour is made from dried cormels, and can be used for confectionary.
- The broad leaves are equally used for wrapping purposes for example kolanut, bitter-cola (orogbo) etc (www.ics-nigeria.org)

In spite of the numerous advantages associated with consumption of cocoyam, research and development of root and tuber crops in general, and cocoyam in particular, has been neglected because only 10% of the world populations, mainly living in the developing tropical countries, use root and tuber crops as staple foods. Despite their nutritional composition, the potential for the development of value added cocoyam products have not been investigated (Palapala, Talwana, Nandi, Sereme and Ndabikunze, 2005). Again, Onyenweaku and Ezeh (1987) in Okoye, Onyenweaku and Asumugha (2009) state that production of cocoyam has not been given priority attention in many countries probably because of its inability to earn foreign exchange and its unacceptability by the high income countries for both consumption and other purposes.

Cocoyam as traditional crop is no doubt being consumed in different parts of Nigeria particularly in Enugu State but it is generally regarded as poor man's food and not consumed by some category of people. Also, the events of climate change and low research interest in production of the crop may be affecting the consumption. Based on field experience, there are cases of diseases attacking cocoyam presently. The cultivation of cocoyam is declining (Onyenweaku and Eze, 1987 in Okoye, Onyenweaku and Asumugha, 2009; Zuhair and Hunter, 2000), while most of what is produced is

consumed locally (Mbanaso and Enyinnaya, 1989 in Okoye, Onyenweaku and Asumugha, 2009). On the basis of the foregoing, the study sought to: describe the socio-economic status of cocoyam consumers in selected communities; ascertain quantities/forms of cocoyam consumed in the communities; determine attitude of respondents towards cocoyam; determine constraints to cocoyam consumption; and ascertain strategies that can promote cocoyam consumption.

METHODOLOGY

The study was carried out in Enugu State, Nigeria. The state is in South-east Nigeria and is one of the 36 states that make up the Federal Republic of Nigeria. It derived its name from the word “Enu Ugwu” which means “the top of the hill”. Enugu is regarded as the oldest urban area in the Igbo speaking area of South-East of Nigeria. It is made up of 17 local government areas (LGAs).

According to the 2006 census, the state has a population of 3,275, 298 people. Enugu has well drained soil and good climate, sitting at about 223 meter (732 feet) above the sea level. The mean temperature is between 20 – 30°C with rainfall between 0.0098) and 2.18cu (Federal Republic of Nigeria Official Gazette, 2007). Economically, the state is predominantly rural and agrarian. The major crops are yam, cassava, cocoyam, rice, maize as well as variety of fruits and legumes. Small proportion of the population is engaged in manufacturing activities and these people are mostly located in Enugu, Oji River and Nsukka (Federal Republic of Nigeria Official Gazette, 2007).

The population of the study was all cocoyam consumers in selected communities of Enugu State. A multistage sampling technique was used in selecting the respondents for the study.

In the first stage, from three senatorial zones in the state, two were randomly selected namely: Enugu North and Enugu West senatorial zones. The second stage involves purposive selection of one L.G.A from each selected zone. In Enugu North senatorial zone, Nsukka LGA was selected while Oji River LGA was selected from Enugu West zone. In the third stage, two town communities were selected from each selected L.G.A. In Nsukka and Oji River LGAs, Edem and Okpuje and Inyi and Achi town communities were purposively selected respectively on the basis of their active involvement in cocoyam consumption. In the final stage, a list of 50 cocoyam consumers were compiled in each town community based on the existing villages/kindred's. From the list, 20 heads of households were randomly selected and interviewed giving a total of 80 respondents for the study. Data collected were analyzed using percentage and mean scores.

RESULTS AND DISCUSSIONS

Socio-economic Characteristics of the Respondents

Entries in Table 1 show that majority of the respondents were female (63.8%) while 36.2% were males. This finding confirms the general believe in the communities that cocoyam is a women's crop. Men even refuse to respond to the interview schedule by referring you to their wives. The average age of the respondents was 48.6. This implies that the respondents involved in consumption of cocoyam were in their active years and could meet cocoyam demand of their households. This is in line with FAO in Emodi (2008) definition of economic proportion of the population.

Table 1 shows that 23.8% of the respondents completed their primary school education, followed by 21.2% that completed their secondary school, 13.8% had no formal education and also 13.8% had OND/NCE while 8.8% acquired HND/First Degree certificate. This implies that majority (86.2%) of the respondents are literate and can access modern methods of the preparing cocoyam for consumption. A greater proportion (45%) of the cocoyam consumers belonged to

age grades in the communities. About 26% belonged to social club, 15% belonged to Neighbourhood watch while only 13% did not belong to any social organization. The implication of the finding is that cocoyam consumers are socially active and can help in promotion of cocoyam consumption in the communities.

Data in Table 1 show that greater proportion (33.8%) of the respondents had farming as their major occupation while 26.2% were engaged in trading/business. Also, 20.0% were civil servants, 10.0% were artisanship while 1.2% were not involved in any occupation. The implication of this finding is that consumption of cocoyam cut across all occupations.

Table 1 reveal that majority (62.5%) of the respondents had family size of 5-9 persons while 35% had 1-4 persons. Only 2.5% had size of 10-14 persons. This household size is fairly high that means more consumption of cocoyam in the communities. Table 1 reveals that a greater proportion (38.7%) of the cocoyam consumers earned between zero to N9,999.00 a month. About 34% earned between N10,000.00 to 19,999.00, while 21.2%, 3.8% and 2.5% earned between 20,000.00 – 29,999, 30,000 – 39,999 and 40,000 and above respectively. This finding reveals that there is high poverty rate in the rural communities and this can adversely affect consumption of cocoyam. This is in line with findings of World Bank (2007) in Enete and Amusa (2012) which state that between 1993 and 2003, the share of the population in extreme poverty (US \$1/day income) rose from 59 to 71 percent, and the share living in moderate poverty (US \$2/day income) rose from 85 to 92 percent.

Table 1: Percentage Distribution of Socioeconomic Characteristics of Respondents

Personal Characteristics	Freq. (F)	Percentage (%)	Mean (\bar{x})
Sex			
Male	29	36.2	
Female	51	63.8	
Age			
20-30	10	12.5	
31- 40	14	17.5	
41-50	21	26.2	49.0
51-60	19	23.8	
61-70	13	16.2	
71-80	2	2.5	
81-90	1	1.2	
Marital Status			
Single	7	8.8	
Married	53	66.2	
Divorced	2	2.5	
Widowed	18	22.5	
Religion			
Christianity	76	95.0	
Islam	1	1.2	
Traditional	3	3.8	
Educational Qualification			
No formal education	11	13.8	
Primary school attempted	8	10.0	
Primary school completed	19	23.8	
Secondary school attempted	7	8.8	
Secondary school completed	17	21.2	
OND/NCE	11	13.8	
HND/First Degree	7	8.8	
Household size			
1-4	28	35	

Table 1: Contd.,

5-9	50	62.5	1.66
10-14	2	2.5	
Occupation			
Farming	27	33.8	
Trading	21	26.2	
Civil servants	16	20.0	
Artisanship	8	10.0	
Estimated Monthly Income (₦)			
0.00-9,999.00	31	38.7	
10,000.00-19,999.00	27	33.8	1.56
20,000.00-29,999.00	17	21.2	
30,000.00-39,999.00	3	3.8	
40,000.00 and above	2	2.5	

Forms/quantities of Cocoyam Consumed/utilized during Cocoyam Season

Entries in Table 2 show various forms/quantities of cocoyam consumed/utilized during cocoyam season (period of harvest) by the respondents in the communities. The Table reveals that 90.0% of the respondents consumed 1 – 5 kg of boiled cocoyam every month while only 5% consumed 6 – 10 kg. On the other hand, 60% of the respondents consumed 1 – 5 kg of cocoyam in mixture with beans while 8.8% consumed 6 – 10 kg of the mixture.

In terms of quantity of cocoyam consumed as cocoyam fufu (pounded cocoyam), 65% of the respondents consumed 1 – 5 kg while 23.8% consumed 6 – 10 kg of cocoyam fufu. About 81% of respondents consumed 1 – 5 kg of cocoyam as cocoyam porridge while 3.8% consumed 6 – 10 kg of it. About 63.0% of the respondent consumed 6 – 10 kg of cocoyam chips (Achicha) while 11 – 15 kg and 16 – 20 kg were consumed by 6.3% and 2.5% of the respondents, respectively. Only about 5% and 1.2% of the respondents made use of 1 – 5kg and 6 – 10kg of cocoyam flour respectively per month.

About 9.0% of the respondents consume 1- 5 kg of cocoyam per month for medicinal purposes while only 6.3% consume 6 – 10 kg for the same purpose. Forty-five percent and 6.3% used 1 – 5 kg and 6 – 10 kg respectively as soup thickening while only 28.7% were using cocoyam leaves for soup making.

Consumption of mixture of cocoyam and beans is fairly good and should be encouraged because most people in rural areas eat unbalanced diets usually made up of carbohydrates. Cocoyam chips are popular in the communities and were used in preparing many different local cocoyam delicacies. This can be true because most of the respondents may not have come in contact with the new technology of preparing cocoyam flour used in making bread. In the research conducted by Mongi, Ndabikunze, Chove, Mamiro et al (2011), a similar proximate, sensory and baking quality comparable to 100% wheat bread was observed in 10% cocoyam-composite bread.

They stated that bread of good nutritional and sensory qualities could be produced from up to 10% cocoyam flour substitution in wheat flour. This kind of finding has the potential to promote the production and diversification of cocoyam consumption in Nigeria. Also, in view of medicinal importance of cocoyam, cocoyam consumers need to be educated by extension workers on the importance of nutritive value of cocoyam. Also, quantities of cocoyam consumed during the season or harvesting period were higher than the quantities consumed during the off season because of poor storability of cocoyam.

Table 2: Percentage Distribution of Forms/Quantities of Cocoyam Consumed/Utilized during Cocoyam Season

Forms/Quantities of Cocoyam Consumed/Utilized (Kg)	Frequency	Percentage
Boiled (Corn)		
None	4	5.0
1 – 5	72	90.0
6 – 10	4	5.00
Cocoyam Mixed with Beans		
None	25	31.2
1 – 5	48	60.0
6 – 10	7	8.8
Cocoyam Fufu		
None	9	11.2
1 – 5	52	65.0
6 – 10	19	23.8
Cocoyam Porridge		
None	12	15.0
1 – 5	65	81.2
6 – 10	3	3.8
Cocoyam Chips (Achicha)		
None	2	2.5
1 – 5	21	26.2
6 – 10	50	62.5
11 – 15	5	6.3
16 – 20	2	2.5
Cocoyam Used for Medicinal Purposes		
None	68	85.0
1 – 5	7	8.7
6 – 10	5	6.3
Cocoyam Use for Soup Thickening		
None	39	48.7
1 – 5	36	45.0
6 – 10	5	6.3
Cocoyam Leaves Used for Soup Making		
None	57	71.3
1-5	23	28.7

Attitude of Respondents towards Cocoyam

In Table 3, respondents expressed positive attitude to cocoyam by agreeing with the following favourable statements: Cocoyam is energy given food ($\bar{x} = 2.45$); culturally accepted ($\bar{x} = 2.11$) contains many nutrients ($\bar{x} = 1.99$); and cocoyam is a light food ($\bar{x} = 1.94$). Similarly, the respondents expressed positive attitude to cocoyam consumption by disagreeing with the following unfavourable statements: poor man's food ($\bar{x} = 0.37$); tasteless ($\bar{x} = 1.05$); not delicious ($\bar{x} = 1.17$) and cocoyam makes people weak ($\bar{x} = 1.26$).

On the other hand, the respondents expressed negative attitude to cocoyam by not agreeing with the following favourable statements: Cocoyam is cheaper to buy ($\bar{x} = 0.93$); easy to cook ($\bar{x} = 1.05$); tastes better than other staple crops ($\bar{x} = 1.09$); easy to produce ($\bar{x} = 1.29$); and always available ($\bar{x} = 1.30$). Also, respondents expressed negative attitude

towards cocoyam consumption by agreeing with the following unfavourable statements: costly to buy ($\bar{x} = 2.14$) and takes time to cook ($\bar{x} = 1.83$).

In the communities, respondents expressed both positive and negative attitudes towards cocoyam but more of positive attitude than negative attitude. For instance, consumers of cocoyam believe that it is both energy giving food and a light food, a quality that distinguishes it from other energy giving foods like yam and cassava. In addition, there was a positive attitude that cocoyam contains many nutrients. This finding is similar to that of Onayemi and Nwigwe (1987) and Lewu, Adebola and Afolayan (2009) in Mongi, Ndabikunze, Chove, Mamiro et al (2011) which states that cocoyam is rich in digestible starch and good quality protein, vitamin C, thiamine, riboflavin, niacin and high scores of proteins and essential amino acids.

Contrariwise, consumers of cocoyam expressed negative attitude to cocoyam as regards ease of cooking (it takes time to cook) probably when compared to other staple foods. However, not all the varieties of cocoyam take to cook and this attribute can be corrected through research.

Again, the negative attitude of cocoyam consumers in terms of production (not easy to produce) and high cost of purchase (not cheaper to buy) is also a challenge to researchers especially now that climate change is exacerbating the situation. Talwana, Serem, ndabikunze, Nandi et al (2009) in Mongi Ndabikunze, Chove, Mamiro et al (2011) confirm that in spite of the nutritional importance of cocoyam, it has not received any deliberate attention to address its research and development. It receives low research priority in all regional agricultural research centres and therefore, its contribution to food security and economy is underestimated.

Table 3: Mean Score Distribution of Respondent's Attitude towards Cocoyam Consumption

Favourable Statements	Mean (\bar{x})	Std. Deviation
Cocoyam is energy giving food	2.45	0.72
Easy to cook	1.05	0.93
Light food	1.94	0.91
Contains many nutrients	1.99	0.72
Taste better than other staple food	1.09	0.62
Cheaper to produce	1.21	1.13
Cheaper to buy	0.93	0.99
Always available	1.30	1.00
Easy to produce	1.29	0.90
Palatable	1.99	0.68
Culturally accepted	2.11	3.42
Unfavourable Statements		
Takes time to cook	1.83	0.92
Costly to buy	2.14	0.86
Poor man's food	0.37	0.71
Tasteless	1.05	0.72
Not delicious	1.17	0.72
Makes people weak	1.26	1.60

Constraints to Cocoyam Consumption

Table 4 reveals that all the variables were greater than cut-off mean score ($\bar{x} = 1.5$) which implies that the identified constraints in the interview schedule were major constraints to consumption of cocoyam. Some of the major constraints include: It irritates when not properly cooked ($\bar{x} = 2.29$). The product is seasonal ($\bar{x} = 2.19$); Poor storage

facilities ($\bar{x} = 2.11$); Poor access road for easy transportation ($\bar{x} = 2.07$); High cost of the products ($\bar{x} = 2.00$); and lack of interest of farmers in cocoyam production ($\bar{x} = 1.73$).

The major constraints to consumption of cocoyam are traceable to scarcity of the products which are caused among other factors by low research interest to boost production and increase disease outbreaks as a result of climate change. The standard deviations of the constraints that were less than 1, such as: it irritates when not properly cooked (std=0.86), some varieties are tasteless (std=0.88), high cost of the product (0.98), poor knowledge of its nutritive value (std=0.97), poor processing facilities (std=0.98), the product are seasonal (0.90), lack of interest of farmers in production (std=0.94) and the products are highly perishable (std=0.90) imply that the responses of the respondents based on the constraints to cocoyam consumption did not differ much from their mean scores and as reflect the actual situation. On the other hand, standard deviations of the constraints that were greater than 1.0, such as: it takes long time in cooking (std=1.01), poor access to good roads for easy transportation (std=1.06) and high loss in the field (std=1.04) mean that their responses differ from the mean scores and may not be a true reflection of the reality.

Table 4: Mean Score Distribution of Respondent's Constraints towards Consumption of Cocoyam

Constraints	Mean (\bar{x})	Std. (Standard Deviation)
It takes Long time to cook	1.74	1.01
It irritates when not properly cooked	2.29	0.86
Some are tasteless	1.56	0.88
High cost of the product	2.00	0.98
Poor knowledge of nutritive value	1.77	0.97
Poor processing facilities	1.90	0.98
The product are seasonal	2.19	0.90
Poor access road for easy transportation	2.07	1.06
Poor storage facilities	2.11	0.84
Lack of interest of farmers in production	1.73	0.94
The product are highly Perishable	1.84	0.90
High loss in field	1.88	1.04

Strategies that can Promote Cocoyam Consumption

Data in Table 5 highlight the strategies that can promote the consumption of cocoyam in Enugu state. Some of the strategies adduced by the respondents that can remove constraints to cocoyam consumption and promote its consumption include: improve the storability to ensure its availability (M= 3.67); subsidizing the production of cocoyam (M= 3.64); governmental/ non-governmental organizations driving promotion of nutritive value of cocoyam (M= 3.62); developing cheaper cocoyam processing machines in rural and urban areas (M= 3.51); developing cocoyam varieties that are delicious and nutritious (M= 3.40) and developing cocoyam based weaning bread (M= 3.24).

In Nigeria, the Osun State Government has introduced cocoyam-based nutrition in the state government's schools feeding programme tagged "O Meal" (<http://www.vanguardngr.com/2012/05/o...based-formula/> Retrieved 9th Aug, 2012). This action is likely going to encourage consumption of cocoyam in the state. Opportunities to promote and support the use of cocoyam can make a major contribution to the food security of countries in the cocoyam growing regions. The standard deviation of all the variables were less than 1 showing that their responses did not differ much from their mean scores and therefore a true reflection of what is required in promoting cocoyam consumption in rural communities.

Table 5: Strategies that Can Promote Cocoyam Consumption

Strategies	Mean	Std. Deviation
Governmental/ non-governmental organizations driving promotion of nutritive value of cocoyam	3.62*	0.56
Diversification of processing of cocoyam products	2.90*	0.90
Developing cocoyam based weaning bread.	3.24*	0.76
Developing cocoyam processing machines at cheaper rate in rural and urban areas.	3.51*	0.67
Developing cocoyam varieties that are delicious and nutritious.	3.40*	0.70
Subsidizing the production of cocoyam	3.64*	0.57
Including cocoyam to in official menu.	3.22*	0.76
Improve the storability to ensure its availability	3.67*	0.59

CONCLUSIONS/RECOMMENDATIONS

The following conclusions were drawn based on the findings of the study:

- Cocoyam consumers were of low economic status but socially active.
- Cocoyam was mainly consumed during the harvest period.
- Fairly large quantities of cocoyam were consumed in form of cocoyam chips (achicha).
- Less quantities of cocoyam were consumed as cocoyam flour and as vegetable.
- Consumers of cocoyam exhibited more positive attitude than negative attitude towards cocoyam.
- Cocoyam was culturally accepted and not regarded as poor man's food in the communities.

Based on the conclusion, the following recommendations were made:

- There is need to improve the value chain of cocoyam with a view to improving the quality and the price of the product.
- There should be an improvement in storability of cocoyam to ensure its availability in all seasons.
- The state government should subsidize the high cost of production of cocoyam to make it affordable to consumers.
- There should be encouragement and promotion of cocoyam flour substitution for human consumption.
- There should be improvement in research institute to find out improve varieties that are more delicious and nutritious to consumers.

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