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**CARIBBEAN
FOOD
CROPS SOCIETY**

39

**Thirty Ninth
Annual Meeting 2003**

Grenada

Vol. XXXIX

Number 2

DETERMINING PER CAPITA CONSUMPTION OF SWEET POTATO (*IPOMOEA BATATAS*) FOR ADULTS IN ST. VINCENT & THE GRENADINES

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ABSTRACT: The generalization that the consumption of “Roots and Tubers” (R&T) is on the decline in the Caribbean is widespread. However, little data exist for the empirical testing of this generalization. This study reports the findings from a survey on the consumption of sweet potato in St. Vincent and the Grenadines in January 2003. A 76 percent response rate generated a sample size of 227 that permitted the estimation of the adult annual per capita consumption of 29.03 lb. The hypothesis that urban people consume less R&T than rural people was tested. Of the 227 respondents that permitted the calculation of the annual per capita consumption, 204 permitted the distinction between rural and urban to be made. The annual per capita sweet potato consumption was estimated at 28.22 lb and 34.03 lb for the rural and urban sub-samples, respectively. No statistical support was found in this study for the notion that urban dwellers consumed fewer sweet potatoes than rural consumers.

INTRODUCTION

The importance of the ‘Roots & Tubers’ (R&T) in the world’s food system cannot be overlooked. Individually, cassava, potato, sweet potato, and yam rank among the most important food crops worldwide and, in terms of annual volume of production, cassava, potato, and sweet potato rank among the top 10 food crops produced in developing countries (IFPRI/CIP, 2000). Production and use of R&T tend to be concentrated in countries with lower per capita incomes, where they are a major source of food and nutrition.

The advent of new food production technologies, increasing living standards, and changing lifestyles have had a tremendous impact on the production and consumption of the R&T. Durrant (1987) stated: “Generally, the production and consumption of indigenous root crops have been declining over the last two decades and this trend has been ascribed to a wide variety of factors. Among these factors, the most important would seem to relate to the limited forms in which roots crops may be consumed –given the low levels of processing technology. In addition, there is the relative inconvenience involved in the preparation of these foods when compared with other high-energy staples such as rice and wheat flour”.

In the Caribbean region there is a general absence of consumption figures for R&T making it difficult to confirm if whether consumption is indeed decreasing or actually increasing. Efforts have been made to determine consumption figures (Stewart, 2001) based on the following method of calculation:

$$\text{Consumption} = \frac{(\text{production} + \text{imports}) - \text{exports}}{\text{Population size}} = \text{per capita consumption}$$

However, an understanding of the production system and to a lesser extent the marketing system for the R&T in the region will establish how unreliable an estimate from this method could be.

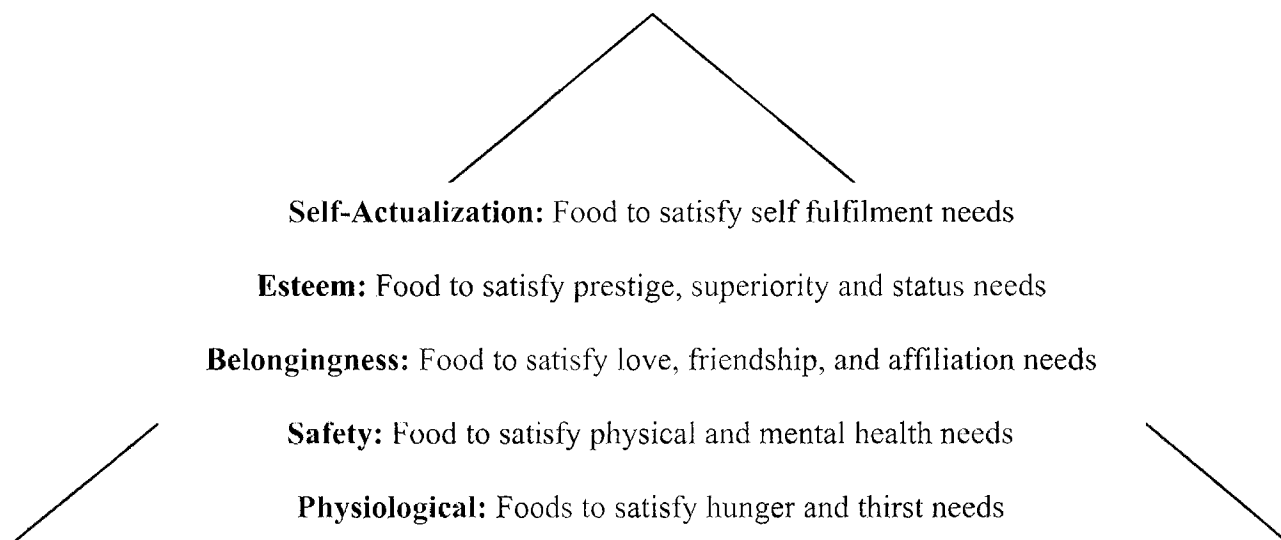
Contemporary consumption theory suggests that as income increases there is a shift from meeting basic quantity requirements in the diet to attributes such as quality. Generally, food consumption at lower income levels is first and foremost motivated to satisfy basic physiological needs for food in the context of traditional food preferences of culture. At higher income levels, as is enjoyed by a fair percentage of Caribbean society today, food consumption is motivated by needs high in the pyramid, such as food safety, status etc., as is illustrated in Figure 1. R&T are an excellent source of calorie intake.

In the last few years there has been an intense debate on the response of nutrition intake to rising incomes. Subramanian (2001) stated: "It was conventionally believed that as income rises households switch to higher valued foods not necessarily with higher calorie content. However, this effect is likely to operate more strongly at higher income levels, so that at low incomes we expect calorie consumption to respond positively to income. This view has been challenged suggesting that even among the very poor, as incomes rise households mostly purchase additional taste."

Also suggested by contemporary consumption theory is that consumption patterns of rural and urban folks are different. It is generally believed that rural folks tend to consume larger quantities of R&T than urban dwellers. Support for this view hinges on the fact that urban folks tend to have higher incomes than rural dwellers and, as such, their income elasticity of demand for calories is generally lower than that of rural dwellers.

R&T have been recognized to be of paramount importance for the Caribbean. Of particular interest is sweet potato. It has great potential to contribute to regional food security. The CFNI has identified it as a food source, which can positively reduce the incidences of obesity and the associated diseases such as diabetes and heart diseases. It is also a significant income earner for small farmers in at least 4 CARICOM Countries - Jamaica, St. Vincent & the Grenadines, St Kitts & Nevis, and Barbados. Recently, the product has taken on added dimensions, with a percentage of the production being exported and some being processed into a variety of products such as sweet potato chips, French fries, puddings, etc.

Figure 1. Maslow's Hierarchy of Needs and Food as a Source of Satisfaction.



For the purpose of this study St Vincent & the Grenadines has been chosen for the first case study. Review of the literature on the production, consumption and utilization of roots and tubers readily reveals the following:

- There is no recent information on the per capita consumption of these crops;
- Cost of production information is not readily available and, where available, in many cases the retail price bears little relation to the cost of production;
- Production is primarily on very small holdings under rain-fed conditions and as such is dependent on the vagaries of the weather;
- Production is not targeted to any specific user/market;
- The application of modern postharvest handling techniques is not widely utilized; consequently, gluts and shortage are often commonplace and the resultant price fluctuations.

The impact of globalization and trade liberalization on small-island states like St. Vincent has been widely documented in the development, economic and agricultural economics literature. It is now generally accepted that these processes offer both opportunities and threats to the small-island states. Of particular interest to many governments and NGOs in the CARICOM region in recent times is the issue of food security and the ability of their agricultural sectors to produce products competitively. Today, many food security policy analysts would agree that unravelling the linkages along the food availability – nutrition pathway is no easy challenge. However, many developmentalists are suggesting that increasing the efficiency and profitability of the R&T industry in developing countries, such as St. Vincent, could have tremendous impact on the economy, health and nutrition, employment generation for the rural poor, etc.

The success of the sweet potato industry in St. Vincent will rely on a carefully choreographed supply chain in a dance of difficult steps. Careful and detailed communication and co-ordination between the numerous farmers/producers, local retailers and exporters and the local processors will be a must before any improvement in the performance of the R&T sector in St. Vincent can be observed. Information on various aspects of the R&T sector upon which decisions can be made would be of paramount importance. This study attempts to provide one piece of the information in the complex sweet potato chain in St. Vincent.

The objectives of this study were:

- To conduct a survey to collect primary data on the per capita consumption of sweet potato;
- To estimate the per capita consumption of fresh sweet potato for adults in St. Vincent;
- To test whether there is any significant difference between the consumption of rural and urban dwellers.

APPROACH AND METHODOLOGY

The distinction between urban and rural is largely based on the predominant activity of the area, and not on distance removed from modernization. For purposes of this study rural is defined as areas where most of the activity and employment was linked to agriculture. Urban on the other hand was defined as those areas where less than thirty percent of the employment was

directly related to agriculture. As a result of this definition the primary urban area was classified, as the coastal area between Campden Park and Prospect, whereas towns such as Sandy Bay, Georgetown, Layou and Fancy were considered rural (Figure 2).

The methodology employed in this study was as follows:

1. Review of secondary information on the production, consumption and utilization of sweet potato in St. Vincent in particular, and worldwide with relevance to the CARICOM region;
2. The development and administration of questionnaire to estimate the per capita consumption of sweet potato in St. Vincent;
3. Discussions with key industry players and officials from the Ministries of Agriculture and Trade with regards to sweet potato production, consumption and processing.

The per capita consumption questionnaire was administered to adults on mainland St. Vincent in January 2003. A total of 300 questionnaires were delivered to a random selection of workplaces, such as, banks, public service offices, telecommunication offices, factories and other places that were thought strategic to collect information from a wide cross section of the population. These businesses or organizations were scattered across the island, in both rural and urban areas.

The primary data collected was analyzed by using the statistical package 'SPSS' and consisted mainly of descriptive statistics, such as means and modes and cross tabulations.



Figure 2. Classification of rural (white) and urban (grey) areas in St Vincent.

RESULTS AND DISCUSSION

Of 300 questionnaires distributed, a total of 264 were returned, a response rate of 88%. However, only 227 respondents completed the information permitting the calculation of the per capita consumption for sweet potato. Further, of the 227 questionnaires that were used to calculate the consumption level, only 204 permitted the distinction of urban and rural to be made and these were equally represented, that is, 102 rural and 102 urban respondents.

Table 1 shows the distribution of the sample based on the frequency of consumption of sweet potato categories offered by respondents, the proportion of respondents in each category and the average quantity consumed in pounds. As can be seen in this table the majority of the sample reported eating sweet potato occasionally (defined as four or so times per year). Daily consumption of sweet potato was reported only for approximately 3% of the sample.

Table 1. Distribution of sample based on frequency of sweet potato consumption and the average quantity consumed per category (N=227).

Frequency of consumption	Proportion of respondents (P_i)	Average quantity consumed in pounds (C_i)	Annual conversion factor (R_i)
Daily	0.0308	0.55	365
Once per week	0.2423	0.39	52
Twice per week	0.2026	0.41	104
Three times per week	0.1366	0.39	156
Fortnightly	0.0881	0.33	26
Once per month	0.0529	0.32	12
Occasionally	0.2467	0.30	4

The following formula was then used to calculate the annual per capita consumption for the sample:

$$\text{Annual per capita consumption} = \sum_{i=1}^7 P_i R_i C_i$$

Annual per capita consumption = 29.03 lb of sweet potato

Tables 2 and 3 show the distribution of the urban and rural sub-samples respectively, and the average consumption quantities in the various categories. The largest percentage of urban consumers of sweet potato is that of occasional consumers, whereas rural consumers are consuming sweet potato once per week. Within a week 63.73 percent of the rural sub-sample recorded consuming sweet potato while for the urban sample the corresponding figure was 61.77 percent. This result tends to suggest support for the notion that the rural dwellers would consume the R&T more frequently than their urban counterparts. However, the underlying proportions are not significantly different ($p = 0.772$).

The rural sub-sample average consumption level was higher than that of the urban sub-sample; however, the numerical difference was only 0.03 lb. The following hypotheses were tested using a Paired T-test:

$$H_0: \mu_U = \mu_R$$

$$H_a: \mu_U < \mu_R$$

Where: μ_U = Mean urban consumption
 μ_R = Mean rural consumption

With a P-value of 0.615 the alternative hypothesis which stated that the mean urban consumption was less than the mean rural consumption was rejected.

Table 2. Urban sub-sample distribution and the average quantity consumed per category (N=102).

Frequency of consumption	Number of rural respondents	Percentage of sample	Average quantity consumed in pounds
Daily	4	3.92	0.75
Once per week	20	19.61	0.36
Twice per week	21	20.59	0.38
Three times per week	18	17.65	0.37
Fortnightly	13	12.75	0.34
Once per month	2	1.96	0.25
Occasionally	24	23.53	0.28

Table 3. Rural sub-sample distribution and the average quantity consumed per category (N=102).

Frequency of consumption	Number of rural respondents	Percentage of sample	Average quantity consumed in pounds
Daily	3	2.94	0.29
Once per week	28	27.45	0.41
Twice per week	21	20.59	0.46
Three times per week	13	12.75	0.42
Fortnightly	4	3.92	0.31
Once per month	9	8.82	0.35
Occasionally	24	23.53	0.33

CONCLUSION

Based on this study, the annual per capita consumption of sweet potato is estimated to be approximately 29 lb. It must be remembered, however, that the focus of the study was on adults and there is a notion that younger people are eating less R&T than adults. No statistical support was found for the view that rural dwellers on average consume larger quantities of R&T, specifically sweet potato, than urban dwellers.

The changes in consumer food behavior have a number of implications for research; however, testing some of the conventional notions requires some baseline information for meaningful comparisons to be made. Despite the methodological limitations that might be identified with this study, it attempted to provide one bit of the baseline information on sweet potato. As was revealed in this study, the conventional notion that urban dwellers consume less sweet potato than rural dwellers found no statistical support. Investigating the impact of traditional demographic factors in explaining the consumption of sweet potato in the Caribbean offers an exciting area of research with a lot of practical applications to our agribusiness sector.

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