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## ***Consumption Patterns of Roots and Tubers in St. Vincent and the Grenadines***

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### ***Abstract***

*The generalization that the consumption of indigenous root crops is on the decline in the Caribbean is widespread. However, in the absence of baseline data empirically testing this generalization is difficult. This study attempts to use the food balance sheet approach to look at the consumption of the commonly grown root crops-Dasheen, Tannia, Eddo, Sweet Potato and Yam-in St. Vincent and the Grenadines over the period 1997 to 2003. Using the simple trend analysis technique no support for the generalization was found. On the contrary, over the period there was an upward trend in the availability of the root crops for consumption.*

*The suggestion that younger people consume fewer root crops than older people was also tested, by dividing the respondents into two groups, under 45 years and over 46 years old. A Chi-Square-Value of 0.167 was obtained which suggests that there is no dependence between age and the consumption of the root crops.*

*The study also identified some of the key attributes considered in the consumption and purchase decision of the root crops and how the respondents ranked them in comparison to other starchy foods such as Rice, Irish Potato and Wheat/bread.*

*It is recommended that the production and consumption of the root crops should be promoted in the Region as on means of reducing the Region's dependency on imported carbohydrates. However, the nutritional benefits that can be derived from their consumption must be clearly identified and where possible every effort must be made to add value to the raw commodities.*

**Key Words:**      *Root crop production, consumption and exports, St Vincent and the Grenadines*

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## INTRODUCTION

The declining contribution of agriculture to the Gross Domestic Product (GDP) of many of the Caribbean economies in the recent past has been the concern of many. Figure 1 illustrates the contribution of agriculture to GDP to the economy of St. Vincent and the Grenadines for the period 1993 – 2003 as a percentage. As can be inferred from the graph since 1996 agriculture's contribution has been less than 12%, and continues to show a declining trend. Compounded by the effects of trade liberalization and globalization the issue of the Region's food security has been brought to the fore.

Traditionally root crops have been a major source of carbohydrates in the diets of the Region's people. In the world's food system individually, cassava, potato, sweet potato and yam rank among the most important food crops and, in terms of annual volume of production cassava, potato and sweet potato rank among the top 10 food crops produced in developing countries (Scott et al. 2000). The advent of new food production technologies, increasing living standards and changing lifestyles have been identified as major contributors to the suggested decline in the production and consumption of the roots and tubers (R&T).

Nigel Durrant (1989) 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 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"*.

More recently, Ballayram et al (2003), stated *"The Caribbean and other developing countries are in a rapid transition in terms of patterns and levels of physical activity, dietary structure..."*

They continued *"The nutritional transition is characterized by a shift away from diets based on locally grown indigenous staples (grains, starchy roots)..., to diets that are more varied and energy-dense..."*

In the absence of consumption figures for the R&T in the Region for the last few decades it is difficult to confirm if consumption is actually increasing or decreasing.

This study attempts to identify some of the major attributes related to the consumption of R&T, of a sample of consumers from St. Vincent. It also examines the suggestion that the consumption of the traditional root crops is declining and compares the consumption with other forms of carbohydrates namely rice, white potato and bread/biscuits. Finally, an attempt is made to see if there is a difference in the consumption of the R&T between persons under and over 45 years old.

## THEORETICAL FRAMEWORK

This section provides a simple theoretical framework for this study and is based on the theory of household demand or consumption. The consumer (or household)

in the traditional theory is assumed to face an assortment of goods that are relevant to him/her.

The consumer is able to rank bundles of these goods in orders of preference. The goal of the consumer in choosing among these ordered bundles is to maximize his/her utility, subject to a constraint of the budget or amount of money that is available to the consumer to purchase these bundles. This utility is a function of the types and amount of these goods consumed in the bundle. Changes in tastes over time for example can change the types of goods included in each bundle.

The demand function for any one good in the bundles can be derived from an analysis of the conditions for this utility maximization.

The traditional theory of consumer behaviour has two disadvantages. One is that the consumer is assumed to consider all goods relevant to him/her when making any consumption decision and the second is that this theory does not seem to conform entirely to the ideas of behavioral scientists like psychologists as to how humans behave. To these scientists human behaviour is always directed to the achievement of specific goals.

The new theory of consumer behaviour (Lancaster, 1966; Knudsen and Scandizzo, 1982) seeks to overcome these disadvantages of the traditional theory. In this new theory, the consumer is assumed to derive utility by the obtaining certain needs. These needs are thus expected to be satisfied by the consumption of goods and so the goods can be expressed in terms of the attributes or characteristics that they are expected to possess.

Thus the utility of the consumer is a function of the attributes of the goods themselves.

For example:  $U = f(X_1, \dots, X_n)$  where for example  $X_1$  could be taste,  $X_2$  ease of cooking,  $X_3$  nutrient content, etc. Thus for example the consumer could be deciding which of  $m$  root crops to buy say in a market place. The total content of attribute  $X_j$  the  $m$  root crops (goods) is a function of the quantities of root crops consumed so that  $X_j = F_j(Q_1, \dots, Q_m)$   $j = 1, \dots, n$

With the budget constraint  $M$ , for root crops in terms of the quantities of the root crops  $Q_i$ 's and their prices, it can be easily shown that the conditions for utility maximization remain essentially similar to those of the traditional theory. These conditions require that the ratios of the marginal utility of all the root crop to their prices be equal. In other words  $MU(Q_i)/P_i$   $i = 1, \dots, m$  be equal for all  $i$ . However in the case of this theory the Marginal utility of  $Q_i$  is the sum of the contributions to utility of each marginal change in all the attributes of  $Q_i$  weighted by the contribution to each characteristic by the marginal change in the good  $Q_i$  itself.

Thus this theory allows us to consider and describe the characteristics that motivate the purchase of one root crop over another and is the underlying theoretical framework for this study.

## METHODOLOGY

The methodology employed in this study is as follows:

- (a) Review of secondary data on the production and exportation of the

traditional root crops in St. Vincent and the Grenadines;

- (b) The development and administration of questionnaires to identify the major attributes driving the consumption of R&T in St. Vincent and to determine whether there was a difference in consumption pattern between respondents under 45 years of age and respondents who were 46 years and over.

A total of 300 consumption questionnaires were administered to adults on mainland St. Vincent in January 2003. The sample comprised of individuals from a wide cross section of the population, some worked in banks, public service offices, telecommunication offices, factories, farmers, housewives, unemployed persons and other places that were thought strategic to collect information. These businesses or organizations were scattered across the island, in both rural and urban areas.

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

In the next section a brief description of the production and exportation of some of the commonly grown root crops in St. Vincent is presented. Thereafter the analysis and empirical results of the study are presented, followed by a brief conclusion and recommendation.

### **Production and Export of selected root crops in St. Vincent**

Traditionally, St. Vincent has been recognized in the Caribbean as one of the better producers of root crops. A large percent of the root crops is normally produced by small farmers for domestic consumption and both regional and extra-regional trade. With the disappearance of preferential banana marketing arrangements in the United Kingdom, some attempts have been made to earn more foreign exchange by the exportation of root crops.

Table 1 shows the annual quantity produced (kg) of a selected number of root crops regularly grown in St. Vincent for the period 1997 – 2003. On a volume basis the top three root crops produced during the period were eddo, dasheen and yams, with eddo representing 31.21% of the total volume produced for the period. Production volumes fluctuated over the period with the highest annual production being in 1998.

On closer examination of the data presented in Table 1, sweet potato and yams displayed a declining trend, while eddo and dasheen production showed an upward trend. Tannia production for the period was constant. However, the overall production of the root crops for the period appeared to be constant as is shown in figure 2.

Table 2 depicts the export figures for the root crops under examination for the period 1997 – 2003. For the period the highest combined export volume was in 2000 and the lowest in 2001. On a volume basis

dasheen was the root crop most exported over the period while tannia was the least exported. Figure 3 illustrates the total volume of the selected root crops exported for the period 1997-2003. Exports displayed a declining trend for the period.

If we assume:

- (1) *Root crops available for consumption = Production – Exports*
- (2) *Population between 1997 – 2003 is constant*

Then based on the data provided in Tables 1 and 2 some indication of the consumption of the root crops can be easily obtained for the 1997 to 2003 period. Figure 4 illustrates the graph and trendline for consumption for the root crops under examination for the period. As the trendline suggests there was an upward trend during the period.

### EMPIRICAL RESULTS

Of 300 questionnaires distributed a total of 264 were returned which results in a response rate of 88%. Of the root crops under examination sweet potato was the one consumed by the highest percent of respondents, 93%. However, the other regular carbohydrates, that is, rice and white potato were consumed by a larger percentage of the respondents. Table 3 illustrates the various percentages consuming the different foods.

Respondents were asked to rank nine common carbohydrate foods, 1 being most desired and 9 least. The results are displayed in Table 4 as weighted scores. As is shown in Table 4 rice was ranked 1 with a

weighted score of 3.34, followed by sweet potato. Of the traditional root crops the respondents also selected dasheen and eddo among the top five foods. It should be noted here that cassava was ranked least desired among the foods.

Respondents were then asked to indicate from a list of attributes the one they thought most important in the consideration of the consumption of the various foods. Table 5 illustrates the results. As is suggested in this table, food safety, nutrient content and availability are the three most frequently selected attributes. Ease of cooking, which was included in the list of attributes to capture the convenience aspect of consuming the foods, was only considered most important by 36% of the respondents. Habit/tradition was the attribute selected as most important by the smallest percent of the respondents.

Table 6 presents the weighted scores of the respondents ranking of the attributes in Table 5 on an individual food basis. As is observed in the table for the foods being examined the weighted scores for the food safety attribute are very close, ranging from 1.44 to 1.48. This result is supporting being selected by the largest percent of respondents as shown in Table 5. Also, Table 6 illustrates that habit/tradition is not considered to be a very important attribute for any of the individual foods in the consumption decision given the weighted scores obtained.

Table 7 attempts to capture the respondents' opinions on additional attributes that might influence their consumption of the root crops, based on factors considered when purchasing the root crops. As is observed in this table the level

of cleanliness appears to be the most important attribute considered in the purchase decision. Size and shape do not appear to be critically important attributes, as is shown by the high weighted scores obtained for all the root crops in Table 7.

The declining consumption of the root crops is often attributed to the younger people eating less than the older folks as well as an increasing level of health consciousness. However, recently there has been some evidence suggesting that some root crops have functional food characteristics and as such may be beneficial to persons with diseases such as night blindness. The respondents were divided into two groups, persons 45 years and under and persons 46 years and older, and the percentages of each group consuming all the root crops were compared. The results are presented in Table 8.

As is observed in Table 8, the percentages of respondents that eat all the root crops are very similar for both age groups. A Chi-Value of 0.167 was obtained, which suggests there is no significant difference in consumption pattern between the two age groups.

## CONCLUSIONS

The generalization that the consumption of the traditional root crops is declining was examined using very basic analytical techniques and does not appear to hold in the case of St. Vincent and the Grenadines. On the contrary, for the period 1997 – 2003 the root crops availability for consumption showed an upward trend. Also, no statistical

difference was found between the percentages consuming the various root crops when the sample was divided into two age groups, 45 years and under and 46 years and over.

While Ballayram et al (2003) and others have expressed concerns about the impact of globalization and economic reforms on the dietary changes of Caribbean people, for the case of St Vincent and the Grenadines, there does not appear to be much of a threat. The study found that there was no *...rapid displacing of these traditional diets....* in St Vincent and the Grenadines, since consumption of the traditional root crops showed an upward trend for the period reviewed.

The study also found that food safety and nutrient content are attributes of importance in the consumption of roots and tubers in St Vincent and the Grenadines. From a marketing perspective, cleanliness and extent of mechanical damage are factors that also contribute to the purchasing decisions of these crops. However, size and shape do not appear to be critical factors in the purchasing decision of the root crops.

The authors recommend therefore that studies of a similar nature, but more rigorous, be carried out for countries in the region that grow roots and tubers. It is suggested that production in these countries should be encouraged with the accompanying increase in value-added activities as well as in intra-regional trade. In this way, the region's dependency on imported carbohydrate foods could be reduced and at the same time, the whole issue of the region's food security could be addressed.

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Table 1: Selected root crop production in St. Vincent 1997 – 2003 (KGS)

Crops	1997	1998	1999	2000	2001	2002	2003	Total
Dasheen	1377273	3054545	2502727	2636364	1954545	2636364	2489091	16650909
S. Potato	1272727	2254545	2318182	1781818	1318182	1792727	1136364	11874545
Eddo	2590000	3100000	3094091	3272727	2772727	3181818	2790909	20802272
Tannia	595455	614091	772727	709091	568182	645455	636364	4541365
Yams	2072727	1925000	1727273	1781818	1454545	1863636	1954545	12779544
Total	7908182	10948181	10415000	10181818	8068181	10120000	9007273	66648635

Source: Ministry of Agriculture, St Vincent and the Grenadines



**Table 2: Selected root crop exports for St. Vincent 1997 – 2003 (KGS)**

Crops	1997	1998	1999	2000	2001	2002	2003	Total
Dasheen	1239235	1479013	1621125	2137331	1258909	2154775	2112303	12002691
S. Potato	1046101	1527097	1577024	1563211	622840	724869	430647	7491789
Eddo	1500553	1626264	1365900	1696212	1217179	1063726	1160245	9630079
Tannia	175542	160251	157670	215456	169776	244039	252523	1375257
Yams	349636	363564	320105	428049	372189	249742	283896	2367181
Total	4311067	5156189	5041824	6040259	3640893	4437151	4239614	32866997

Source: Ministry of Agriculture, St Vincent and the Grenadines

**Table 3: Percentage of respondents consuming the various root crops and selected other starchy foods**

Foods	Percent of respondents
Dasheen	84
Sweet Potato	93
Eddo	85
Tannia	77
Yams	86
Rice	97
Wheat (bread/biscuit)	91
White/Irish Potato	94

**Table 4: Weighted scores of respondents ranking the various foods as most desired**

Foods	Weighted score of rankings
Rice	3.34
Sweet Potato	3.89
Wheat/bread	4.11
Dasheen	4.18
Eddo	4.52
Yam	4.56
White Potato	5.01
Tannia	5.36
Cassava	7.13

**Table 5: Percentage of respondents ranking the various attributes as most important in their consumption decision**

Most important attributes in food consumption decision	Percent of respondents
Price	40
Nutrient content	61
Ease of cooking	36
Food safety	72
Habit/tradition	28
Availability	43

**Table 6: Weighted Scores of Attributes Considered Important in what is Eaten**

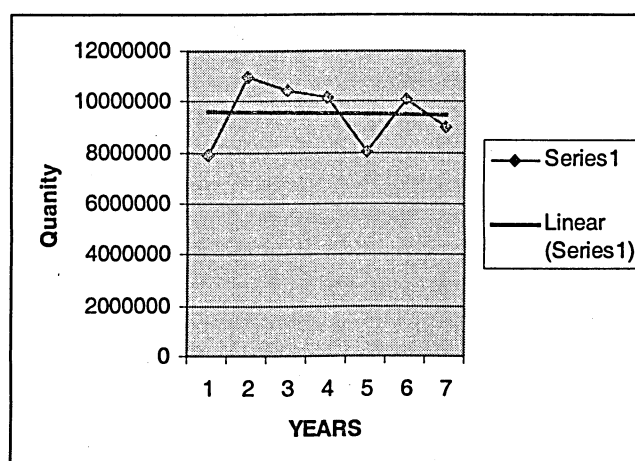
Foods	Price	Nutrient Content	Ease of cooking	Food safety	Habit	Availability
Dasheen	2.19	1.56	2.27	1.44	2.45	2.07
S. Potato	2.23	1.56	2.23	1.44	2.48	2.11
Tannia	2.17	1.52	2.26	1.48	2.14	2.01
Yam	2.22	1.55	2.24	1.45	2.40	2.03
Eddo	2.20	2.20	2.23	1.45	2.45	2.08
Rice	2.22	1.56	2.23	1.46	2.45	2.12
Wheat	2.20	1.57	2.25	1.46	2.45	2.16
W. Potato	2.18	1.56	2.22	1.45	2.46	2.10

**Table 7: Weighted Scores on Additional Attributes Considered Important In the Purchase Decision of Root Crops**

Foods	Size	Cleanliness	Extent of Mechanical Damage	Stage of Maturity	Shape
Dasheen	2.48	1.34	1.53	1.56	3.35
S. Potato	2.42	1.34	1.53	1.60	3.33
Tannia	2.42	1.30	1.55	1.60	3.32
Yam	2.46	1.33	1.52	1.57	3.33
Eddo	2.44	1.31	1.58	1.63	3.38

**Table 8: Percent of respondents in each of the two age groups consuming all the root crops versus those not consuming all**

	45 years and under	46 years and over
% Not Consuming all the root crops	37.09	34.00
% Consuming all the root crops	62.91	66.00
Total respondents in each group	213	50



**Figure 1: Agriculture's percent contribution to GDP 1993 – 2003  
St. Vincent & the Grenadines**

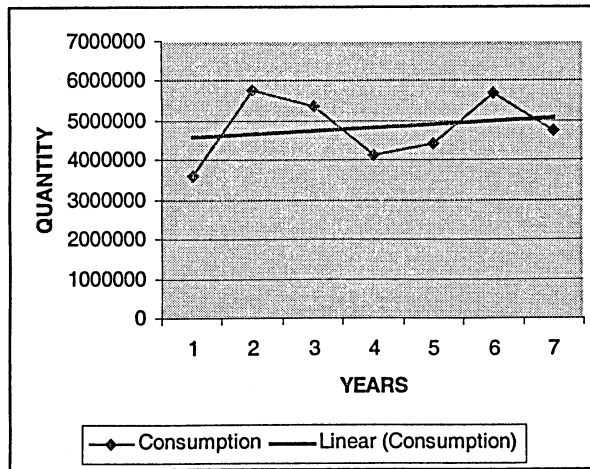


Figure 2: Total production of the selected root crops 1997 – 2003  
St. Vincent & the Grenadines

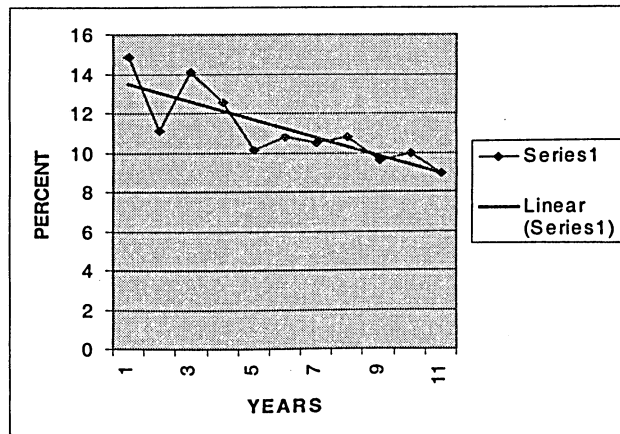


Figure 3: Total exports for selected root crops 1997 – 2003  
St. Vincent and the Grenadines

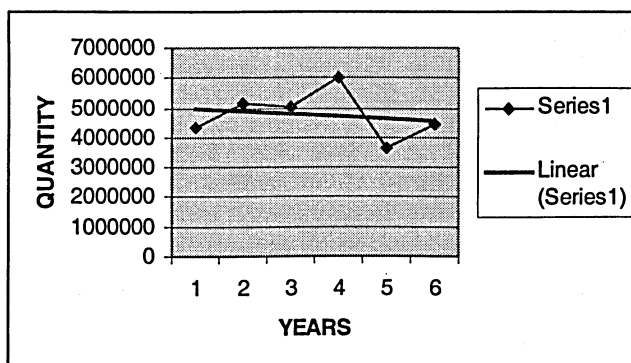


Figure 4: Root crop consumption 1997 – 2003 St. Vincent & the Grenadines based on assumption consumption = production- exports