# NUTRITIONAL IMPACT OF FOOD POLICIES: EXPERIENCES FROM ANTIGUA AND BARBUDA, AND ST. VINCENT AND THE GRENADINES*

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## INTRODUCTION

Food is the prime economic necessity. Perhaps the most important aspect of our daily lives is that relating to the procurement and consumption of food. The nutrients required by the human body for energy, growth and development, and the maintenance of good health are derived from food. Food production is an organised process in which producers manage labour, capital and land and water resources to produce a wide array of foodstuffs of plant and animal origin. All these are scarce resources which are traded in the market place at a price. The prices established in these markets have a major role in determining incomes of the suppliers and the ability of these suppliers to purchase the goods and services they require. Similarly, food producers' income is heavily dependent on the prices received for their products relative to the prices paid for inputs into the production process. Where input costs are high relative to product prices, the market system dictates that production will be curtailed to force prices upward. While high prices enhance the income of producers, they have a negative impact on the ability of consumers to obtain food and this in turn may adversely affect their nutritional status.

The marketing system plays a key role in determining the prices of inputs and the use of these inputs in the production process and thus the level of production. Production levels influence product prices and consumers ability to purchase. Production and consumption are thus regulated through a complex series of markets.

A market is simply the context in which voluntary exchange of goods and services takes place among individuals or groups within private enterprise economies.[1] Market transactions usually involve the transfer of goods and/or services for the payment of a sum of money agreed upon by both buyer and seller. Markets operate within a legal framework. However, though laws constrain markets and indeed prohibit some, they cannot force them out of existence, a fact to which the traffic in drugs and the sale of foodstuffs above controlled price levels testify.

Markets are classified on the basis of numbers of buyers and sellers, the nature of the products, the degree of information flows,

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*Basic reference: Markets, prices and nutrition.

1 Kelvin Lancaster: Introduction to Modern Micro-economics. Chicago: Rand McNally & Co., 1969.

and the ease of entry and exit to and from the market. A market in which (a) there is a free flow of factual information; (b) products are similar; (c) buyers and sellers are many and free to enter and leave the production/distribution system, is described as a perfect market. In such a market the interplay of supply and demand forces determines a price which is reasonable to both producers and consumers. In other words, the existence of a perfect market ensures that no one is made worse off by any transaction on the market. However, in the real world, most, if not all of the conditions of a perfect market are violated. Demand, supply, and price manipulations are frequent and lead to certain undesirable development consequences. Perhaps the most significant of these is the inequity in the distribution of resources, goods and services manifested by poverty, malnutrition, poor health, and low productivity among certain segments of the society -- the greater the inequality, the more severe the manifestation.

Aware of the imperfections of the food marketing system and of the need to provide consumers with cheap staples, governments in the region have enacted price control legislation empowering Ministers responsible for food marketing to set maximum prices or percentage mark-ups for selected foodstuffs. Further, through agricultural marketing agencies, some governments have attempted to regulate the marketing of locally-produced and imported foodstuffs. Subsidies in one form or another have been provided to farmers in an attempt to stimulate production and thus ensure abundant food supplies at low cost. Other intervention strategies have included: (a) the direct importation of basic foods; (b) the regulation of food imports, duties and taxes; and (c) the establishment of minimum guaranteed prices as well as contractual arrangements with farmers by State-controlled marketing agencies.

The policies and practices of governments change the relationships within the marketing system with respect to demand and supply influences. The problem is that policies and practices adopted by governments, though well-intentioned, may have negative effects. For example, price controls to maintain low prices for low income persons, applied by government agencies, might be so low as to eliminate any surplus over cost to marketers, thereby leading to scarcity of foodstuffs and illicit market operations which could have serious nutritional consequences for the poor. Further, price controls applied to certain agricultural products may act as a disincentive to production, thus reducing the total food supply.

This paper highlights some aspects of a study which sought to evaluate the impact of food price and subsidy policies and trade regimes on food production, marketing, and food consumption and nutrition. A better understanding of the ways in which food policies and practices affect various constituents in the food system provides a basis for modifying current programmes or introducing new ones to improve the overall performance of the system. The study analysed the total food system in two small Caribbean States - Antigua and Barbuda, and St. Vincent and the Grenadines - with particular emphasis on the production, marketing, and food consumption and nutrition sub-systems. These two countries have a common history of colonialism and similarities in food prices and subsidy policies but display marked differences in resource endowment and use. The wet, fertile, volcanic soils in St. Vincent contrast with the arid, clayey, calcareous soils

of lower fertility in Antigua. St. Vincent has a greater potential for rainfed agriculture which dominates the economy, while tourism dominates the Antiguan economy.

## METHODOLOGY

The type, rationale and scope of food policies and practices were gleaned from Budget Speeches, Acts of Parliament and supporting documents from relevant Ministries

An analysis of food production, imports, and long term food price movements was undertaken using time series data. Using pre-tested questionnaires, national surveys were conducted covering a random sample of 299 households in Antigua and 286 in St. Vincent. The surveys' respondents included farmers, fishermen, butchers, vendors/ traffickers, importers/wholesalers, supermarkets, food shops, and random consumers. The data permitted the following analyses:

(a) a supply response by farmers relating production of selected crops to costs of various inputs, and acreage planted;

(b) farmers' and fishermen's knowledge of, and participation in, subsidy schemes, their degree of satisfaction with the pricing systems for their products and inputs, their perception of agricultural problems and solutions, and farm household incomes in relation to other households;

(c) an analysis of market channels, structure, conduct, and performance for selected foods;

(d) individuals caloric and protein intake in relation to household income per capita, individual food expenditure, family size, sex of head of household, educational status of head of household, sex, age, weight, and height of individual.

Food consumption and anthropometric data were collected from a member of each household. The individual provided information on the quantity, kind, form, and method of preparation of food consumed over a 24-hour period. Quantities were converted to energy and protein using the publication "Food Composition Tables for Use in the English-speaking Caribbean" compiled by CFNI.

Per capita household income was calculated by dividing total monthly household income by household size.

Heights and are circumference were measured using the Nivotoise Portable Height Measure and weights were recorded using a field type survey scale by CMS Weighing Equipment Limited, 18 Camden High Street, London, NW1.

The results of the analyses, and their implications, formed the basis for presenting alternative policy options for improving the food and nutrition situation.

## REVIEW OF FOOD POLICIES AND PROGRAMMES

The food policies and programmes in Antigua and Barbuda and St. Vincent and the Grenadines showed marked similarities. Successive Budget Speeches in these countries emphasised the need for increased food self-sufficiency and the implementation of programmes aimed at protecting or stimulating local production. Producers' subsidies include credit below commercial interest rates, duty-free and tax concessions on selected production inputs, and the provision of planting material and various services at subsidized prices. Other incentives include the imposition of duties, taxes and quantitative

restrictions on competing imports.

Both countries have established Agricultural Marketing Corporations charged with improving all aspects of agricultural marketing and importing certain basic commodities. The Corporations operate supermarkets in an effort to provide consumers with foodstuffs at reasonable prices.

A dual pricing system is maintained in both countries - price control on selected foodstuffs and free market pricing on others. The institution of price controls dates back to the 'fifties' and was designed to enable low income persons to purchase basic food items for balanced diets at reasonable cost. Two basic methods of price controls are applied. In the first, a specific maximum dollar level is applied to local products under price control. In the second case, that of imported products, a variable percentage mark-up over landed cost is allowed at the wholesale and retail levels, depending on the product. For example, in Antigua and Barbuda, imported items (frozen or chilled) are allowed 12.5 per cent mark-up for wholesale purposes and 10 per cent for retail purposes, except meat (frozen or chilled) which is allowed 15 per cent and 22.5 per cent at wholesale and retail levels respectively. In St. Vincent and the Grenadines, the maximum wholesale price for imported food ranges from 7 1/2 to 17 per cent over landed cost, while at the retail level the maximum allowable mark-up ranges from 11 1/2 to 20 per cent. In some instances there is a basic change in a fixed amount to the landed cost before the percentage mark-up is applied. The difference between areas ranges from 1/2 to 1 1/2 cents per pound.

Both countries conduct supplementary feeding programmes for at-risk mothers and children. The food, consisting of wheat flour, milk and margarine is provided by the World Food Programme and distributed by the governments through Child Welfare Clinics.

The particular programmes of thes countries during the past 15 to 20 years are highlighted.

Antigua and Barbuda:

In 1971 the livestock industry development programmes aimed at reducing the quantity of imported meat. Funds were allocated to develop communal grazing areas, and to assist farmers to clear and fence grazing lands and construct pens and sheds for goats.

In 1973 a diversification programme was initiated to create employment for displaced sugar workers after the closure of the sugar factory in 1971, and to produce large quantities of food which were then being imported. Several institutions were created to facilitate this programme.

The Agricultural Development Corporation (ADC) was established in 1973 with the following objectives:

(a) to prepare, implement, and administer agricultural development schemes;
(b) to engage in direct production;
(c) to provide mechanical services to farmers.

The Central Marketing Corporation (CMC) was also established in 1973 to control, rationalize, and coordinate all aspects of agricultural marketing. The Corporation was requested to import basic food items to stabilize consumers' prices. In 1974 the Antigua and Barbuda Development Bank was established to provide credit to farmers and fishermen.

An intensified soil conservation programme in1974 repaired damages caused by Hurricane Christine. A pond clearing programme provided water for irrigation. In 1975 all agricultural enterprises were exempted from paying income tax.

Import substitution was a major policy enunciated in the 1975 Budget Speech, which stated, "the development of local industries and investment in agriculture .. will promote greater level of import substitution".[1] Elaborating on this objective, the Budget Speech continued: "Government will pursue policies to protect industries by imposing higher levels of duties and taxes or imposing quantitative restrictions on those goods which offer competition".[2]

A new government came into being in 1976 but the policy goal of improved food self-sufficiency was maintained. Farmers and fishermen received duty free concession on vehicles, machinery, and equipment engaged in agricultural enterprises. Loans were made more easily available to small farmers who qualified for assistance. Government announced limitation on imports of whole chicken to provide protection to the local poultry industry, and promised encouragement for the establishment of a poultry feed plant; but lifted the ban on chicken legs, backs, necks, and breast.

In order to provide consumers with a wide range of low-priced essential commodities, government introduced a more comprehensive price control mechanism, abolished the preferential tariff system, and established a supermarket at the CMC in 1978. A central distribution facility for local fish was open in 1978. Government expanded its herd at Paynters and Olivers as well as the milk programme designed to provide school children with a glass of milk daily.

In 1980, the Government announced a small farmers' crop insurance scheme. The scheme has not yet been implemented.

In 1982, the Ministry of Agriculture, Lands and Fisheries, drafted a comprehensive Agricultural Policy. In the same year the National Nutrition Committee formulated a National Food and Nutrition Policy which was adopted by Cabinet in 1984. The Government has since also adopted the Regional Food and Nutrition Strategy. These policies must now be translated into action plans.

St. Vincent and the Grenadines

In 1967, the Chief Minister lamented the fact that the value of exports ($6.0m) was less than half the value of imports (of which imports of food and beverages constituted 34.3 per cent) and the need to reduce dependence on imported food was emphasised. A licensing system was announced restricting the importation of all starches and peanuts, as well as peas, cabbages, carrots, pepper sauce, and ice cream. Concern over malnutrition and gastroenteritis in infants led to advocating the removal of import duty on skimmed milk, along with price control to ensure that the remission of the duty went to the consumer. The establishment of an Agricultural Cooperative Bank was also announced.

The 1968 Budget Address focused on the diversification of the

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1 Government of Antigua and Barbuda: Budget Speech. St. John's: Government Printery, 1975, p.3.

2 Ibid.

agricultural sector and the establishment of a baby food industry based on arrowroot. Peanut development was emphasized as a means of increasing the export of non-traditional crops. A two-way trade in rice and sugar from Guyana, and peanuts from St. Vincent through the St. Vincent Marketing Board, was highlighted, in keeping with the Agricultural Marketing Protocol.

The establishment of the Agricultural Cooperative Bank with loan capital of $20m was announced, to provide funds at more favourable rates of interest than commercial banks while adhering to sound business principles. Funds would be provided to fishermen so that they could sell their catch at reasonable prices to consumers.

The 1971 Throne Speech made reference to the provision of funds for the purchase of equipment to assist farmers in disease and weed control.

Although there was a change of government, the policy of diversification was restated in 1971 and 1973. The 1973 Budget Address states: "Diversification of our agriculture through the promotion of vegetable and rootcrop production for supply to local, regional, and extra-regional markets continues to be an important objective."1

Other policy issues included the widening of the range of commodities under the minimum guaranteed price system, and a livestock development project involving:

(a) relocation of the milk processing plant;
(b) import substitution in pork;
(c) meat processing; and
(d) livestock feed manufacture based on Comfith - utilization of derinded sugarcane pith.

A land reform programme was also mentioned in the Throne Speech.

In 1973 the Government successfully negotiated a grant from the United Kingdom in the form of fertilizers, weedicides, nematocides, and equipment valued at $508,800. These inputs were supplied to banana growers at subsidised prices. Another grant of $600,000 from the British Development Division in the Caribbean was allocated to the Banana Rehabilitation and Replanting Scheme. The Scheme was aimed at upgrading fruit quality and increasing productivity.[1]

The Government has from time to time enacted price control legislation to maintain low and stable prices of certain commodities in the interest of consumers -a practice dating back to the fifties. In 1975 the Price and Distribution of Goods Act (No.33) of 1975 was passed and Price Control officers were given power to requisition and distribute essential foodstuffs if the need arose. The Act was designed to prevent hoarding. Some traders hoard large quantities of basic food items in anticipation of a price increase, after which these commodities would return to the market.

The St. Vincent Marketing Board, which was in existence since 1959, was reorganized into the St. Vincent Marketing Corporation by Act No.26 of 1975, charged with improving the growing and marketing of produce and the importation of certain commodities.

Since its inception the Marketing Corporation has been the sole

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1 Government of St. Vincent and the Grenadines: Budget Address. Kingstown: Government Printery, 1974, p.3.

2 Ibid.

importer of rice and sugar for resale to traders. In 1977 the Corporation established a supermarket to give consumers a better pricing deal without competing unduly with other supermarkets in the private sector.

By 1978/79 Government initiated the resuscitation of the sugar industry through a government contribution of $2.8m, and loans of $1.0m from Trinidad and Tobago, and $8.1m from the Caribbean Development Bank (CDB). Another project - the Diamond Dairy Project, estimated to cost $14.0m with support from CDB of $2.7m, was announced. Other projects included conservation, artificial insemination, and fisheries and development.

The Diamond Dairy Project was designed "to stimulate local production of fresh milk and to augment it with reconstituted milk solids for supplying the needs of consumers in St. Vincent." "This substitution", the Budget Address continued, "will improve the health and nutritional standards of small babies and infants, especially as more people in the lower income group and rural sections of the community will be able to utilize the low cost locally-produced food."[1]

## PRODUCTION LEVELS AND SUPPLY RESPONSE

Small acreages planted and low yields contributed to the low levels of crop production in Antigua and St. Vincent (Table 1). Acreage planted and yields were generally higher in St. Vincent, thus contributing to a higher level of self-sufficiency.

A supply response analysis, relating production to acreage planted and various input costs and using a double log specification, showed a strong positive association between production and acreage planted for all selected crops. Other things being equal, production should increase proportionately with acreage. The high production elasticities with respect to acreage for most crops make land availability a crucial factor in the production system (Table 2).

Average farm size in Antigua was 2.7 acres and 94 per cent of the farms were rented. In St. Vincent, average farm size was higher, as was farm ownership - 56 per cent.

Another issue in Antigua was the impact of inputs, which varied from one crop to another. In sweet potatoes, land preparation, planting operations and fertilizer use were all positively associated with production. Better weed control would increase total production. In the case of carrots and tomatoes, increased fertilizer use is not likely to affect production positively, other things being equal. The analysis thus suggests that particular attention should be paid to land availability (all crops), land preparation and planting operations, (sweet potatoes and cabbage), and fertilizer use (sweet potatoes).

In St. Vincent only acreage planted showed any significance in explaining total production in yams and dasheen. All other coefficients, as well as acreage planted to sweet potatoes, were insignificant. It would appear that farmers' use of inputs was optimal. In addition, the soils of St. Vincent are very fertile and recent volcanic activity has undoubtedly increased their mineral

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1 Government of St. Vincent and the Grenadines: Budget Address. Kingstown: Government Printery, 1978, p.3.

TABLE 1: Crop Frequency in Sample, Acreage Planted and Production Antigua/Barbuda and St. Vincent and the Grenadines, 1984

| Crop | Antigua | | | St. Vincent | | |
|---|---|---|---|---|---|---|
| | Crop frequency no. of farms | Acreage planted | Pro-duction (lbs.) | Crop frequency no. of farms | Acreage planted | Pro-duction (lbs.) |
| Sweet potatoes | 63 | 0.48 (.41) | 807 (103) | 34 | 0.66 (0.13) | 1,434 (326) |
| Green bananas | 32 | 0.55 (0.10) | 1,062 (309) | 39 | 2.46 (0.87) | 13,955 (3417) |
| Plantains | 3 | 0.25 (0.0) | 1,083 (469) | 22 | 0.80 (0.15) | 4,579 (2,035) |
| Yams | 38 | 0.35 (0.33) | 417 (78) | 26 | 0.34 (0.66) | 645 (204) |
| Cassava | 36 | 0.27 (0.02) | 483 (81) | 8 | 0.21 (0.52) | 714 (251) |
| Eddoes | 15 | 0.28 (0.05) | 270 (117) | 19 | 0.72 (0.16) | 2,116 (462) |
| Dasheen | na | na | na | 23 | 0.76 (0.30) | 1,421 (457) |
| Carrots | 40 | 0.53 (0.07) | 1,701 (318) | 14 | 0.30 (0.06) | 558 (237) |
| Tomatoes | 44 | 0.56 (0.08) | 1,507 (295) | 7 | 0.20 (0.55) | 110 (35) |
| Cabbages | 24 | 0.49 (0.13) | 1,198 (371) | 8 | 0.39 (0.88) | 110 (46) |

na = Not applicable
Source: Survey data.

content. The high level of fertilizer usage suggested by the data may be creating chemical imbalances, however, thus negating positive effects on production. Land availability appears crucial to increase food production.

Subsidy Knowledge and Participation:

Antigua and Barbuda:

Despite the fact that many subsidies are offered by the State, farmers' knowledge of these and their participation in subsidy schemes are very low. The subsidies that are well known are cultivation services, credit facilities, and duty free concession on tractors and inputs. However, only cultivation services were participated in to any great extent. The duty free concession on boats and engines was fairly well known and participation fairly high among fishermen (Table 3). There were only few responses regarding positive production increase.

St. Vincent and the Grenadines:

As in Antigua and Barbuda, knowledge of subsidies and participation in them by farmers and fishermen in St. Vincent and the Grenadines were low. The subsidy schemes that were well known included

Table 2. Supply response analysis: regression coefficients and other statistical properties for selected crops - Antigua and St. Vincent, 1984

| Crop by country (No. of obs.) | Constant term | Log cost fertilizer | Log cost weed control | Log cost planting | Log cost land preparation | Log acreage | $R^2$ | F |
|---|---|---|---|---|---|---|---|---|
| Antigua | | | | | | | | |
| Sweet potatoes | -21.816 | 0.176 | -0.553 | 1.069 | 9.760 | 2.381 | .64 | 20.24 |
| (62) | | (0.063) | (0.409) | (0.419) | (1.535) | (0.518) | | |
| Carrots | 2.538 | 0.008 | 0.995 | -1.048 | - | 3.372 | .62 | 14.10 |
| (40) | | (0.069) | (0.447) | (0.443) | | (0.502) | | |
| Tomatoes | 13.891 | -0.128 | -0.479 | -4.105 | - | 3.772 | .44 | 7.76 |
| (44) | | (0.871) | (0.303) | (1.514) | | (0.805) | | |
| Cabbages | 15.636 | 3.926 | -1.781 | -7.318 | - | 1.052 | .36 | 2.57 |
| (23) | | (1.519) | (2.195) | (4.366) | | (1.341) | | |
| St. Vincent | | | | | | | | |
| Sweet potatoes | 2.739 | 0.008 | -0.197 | 0.664 | -0.493 | 1.364 | .19 | 1.18 |
| (32) | | (0.282) | (0.371) | (0.436) | (0.431) | (1.244) | | |
| Yams | 2.0(; | 0.70 | -0.176 | -0:015 | - | 4.542 | .39 | 2.60 |
| (21) | | (0.219) | (0.349) | (0.261) | | (1.542) | | |
| Dasheen | 2.381 | 0.060 | -0.142 | 0.045 | 0.184 | 1.855 | .63 | 5.43 |
| (22) | | (0.149) | (0.209) | (0.120) | (0.179) | (0.408) | | |

Basic function: Log TP = f(log $X_{1...n}$) where TP is total production and $X_{1...n}$ are various input costs as specified.

Source: Based on survey data.

TABLE 3: Fishermen and Farmers' Knowledge of and Participation in Subsidies; Antigua and Barbuda and St. Vincent and the Grenadines, 1984

| Type of Subsidies | Antigua | | | | | | St. Vincent | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fishermen | | | Farmers | | | Fishermen | | | Farmers | | |
| | A | B | C | A | B | C | A | B | C | A | B | C |
| Credit facilities with the agricultural and cooperative bank | 24 | 9 | 1 | 69 | 16 | 10 | 19 | 2 | 2 | 52 | 6 | 5 |
| Storage facilities for fish | 12 | 1 | 1 | 0 | 0 | 0 | 5 | 2 | 0 | 0 | 0 | 0 |
| Duty free concession on boats and engines | 36 | 23 | 7 | 1 | 0 | 0 | 6 | 3 | 3 | 0 | 0 | 0 |
| Duty free concession on animal feed | 1 | 0 | 0 | 1 | 0 | 0 | na | na | na | na | na | na |
| Duty free concession on tractors and inputs | 2 | 0 | 0 | 52 | 9 | 5 | na | na | na | na | na | na |
| Ice at subsidised price | 31 | 11 | 4 | 0 | 9 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| Animal health/ veterinary services | 1 | 0 | 0 | 11 | 7 | 1 | 0 | 0 | 0 | 10 | 1 | 1 |
| Planting material (seeds, seedlings, fruit trees) | 0 | 0 | 0 | 25 | 8 | 1 | 1 | 0 | 0 | 45 | 15 | 14 |
| Cultivation services | 2 | 2 | 0 | 75 | 59 | 10 | 0 | 0 | 0 | 14 | 4 | 2 |
| Soil conservation services | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 16 | 2 | 1 |
| Stud facilities/artificial insemination | na | na | na | na | na | na | 0 | 0 | 0 | 10 | 1 | 1 |
| Animal revolving scheme | na | na | na | na | na | na | 0 | 0 | 0 | 5 | 1 | 1 |

A=know; B=participate in; C=increased production;
na= not applicable. Numbers represent farmers/fishermen response.
Source: Survey data.

credit facilities at reduced rates of interest, subsidy on provision of planting material, and, to a lesser extent, soil conservation services and cultivation services (Table 3). Participation in the planting material subsidy scheme was highest and positive production

increases were attributed to the scheme.

Food Imports:

The failure of the agricultural sector in Antigua and Barbuda and to a lesser extent St.. Vincent and the Grenadines, has necessitated the importation of the bulk of the food supply. In Antigua and Barbuda approximately 82 per cent of the energy, 70 per cent of the protein, and 78 per cent of the fat are imported. The corresponding percentage for St. Vincent and the Grenadines were 49, 64 and 37.[1] This high importation has made a heavy demand on scarce foreign exchange.

In St. Vincent and the Grenadines, an analysis of time series data 1970-82 relating food imports (F1), to domestic exports (DOMEX), food exports (FEX), and remittances from abroad (RE), yielded good fits with a semilog specification on food imports as indicated in the following equations:

$$\text{Log F1} = \underset{}{0.690} + \underset{(0.024)}{0.113}\ \text{RE} + \underset{(0.003)}{0.018}\ \text{FEX} - \underset{(0.002)}{0.003}\ \text{DOMEX} \qquad (1.1)$$

$N = 13 \quad R_2 = .96 \quad F = 69.31 \quad S.E.E. = 0.07$

$$\text{Log F1} = \underset{}{0.712} + \underset{(0.026)}{0.109}\ \text{RE} + \underset{(0.001)}{0.013}\ \text{FEX} \qquad (1.2)$$

$N = 13 \quad R_2 = .94 \quad F = 81.23 \quad S.E.E. = 0.08$

A double log specification of the model showed only the food export coefficient as being significant (Equation 1.3).

$$\text{Log F1} = \underset{}{0.461} - \underset{(0.210)}{0.020}\ \log \text{RE} + \underset{(0.326)}{0.806}\ \log \text{FEX} - \underset{(0.290)}{0.101}\ \log \text{DOMEX} \qquad (1.3)$$

$N = 13 \quad R_2 = .93 \quad F = 42.14 \quad S.E.E = 0.09$

The high significance of the food export variable reflects the dominance of food exports (bananas) in the total domestic export package. Any variability in export earnings from the banana industry would impact on food imports more strongly than other export industries.

MARKETS AND PRICES

The main channels of distribution of imported foods from importers/wholesalers to consumers were supermarkets and food shops. Locally produced foods went mainly from farmers to consumers, with vendors, supermarkets and the central marketing agencies playing lesser roles.

Few firms dominated the import/wholesale and supermarket retail sectors (Table 4). The small size of the economy makes domination by a few firms easily achievable, but extreme dominance should be disallowed. In this connection, the direct participation by the Government in the marketing process has increased competition in the distributive sector. However, except for a few products, government's

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1 Provisional Food Balance Sheet Estimates supplied by FAO.

Table 4. Concentration in the food distributive sectors by cumulative percentage sales by number of firms, Antigua and St. Vincent 1984

| No. of firms | Cumulative percentage sales by type of firm: Antigua | | | | St. Vincent | | | |
|---|---|---|---|---|---|---|---|---|
| | Vendors/ traffickers | Importers/ wholesalers | Supermarkets | Food shops | Vendors/ traffickers | Importers/ wholesalers | Supermarkets | Food shops |
| 1 | 9.2 | 29.7 | 49.5 | 12.4 | 17.3 | 48.2 | 69.8 | 12.3 |
| 2 | 17.2 | 53.5 | 68.2 | 19.4 | 33.0 | 85.7 | 82.8 | 17.3 |
| 3 | 24.7 | 66.3 | 79.9 | 25.5 | 44.6 | 94.1 | 88.4 | 21.3 |
| 4 | 29.5 | 78.9 | 84.9 | 31.2 | 55.7 | 99.1 | 93.6 | 24.9 |
| 5 | 34.1 | 88.4 | 89.6 | 35.6 | 64.9 | 100.0 | 97.9 | 28.3 |
| 6 | 38.1 | 93.8 | 94.2 | 39.9 | 69.3 | - | 100.0 | 31.6 |
| 7 | 41.8 | 97.2 | 98.0 | 43.3 | 73.3 | - | - | 34.9 |
| 8 | 45.4 | 99.9 | 99.1 | 46.6 | 77.4 | - | - | 37.9 |
| 9 | 49.0 | - | 100,0 | 49.2 | 80.6 | - | - | 40.9 |
| 10 | 52.4 | - | - | 51.8 | 83.6 | - | - | 43.9 |

Table 5. Prices of economical sources of energy and protein for selected food groups, Antigua and Barbuda, 1970-1982

| Product | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | Overall average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Cents per pound | | | | | | | | | | | | | Percent |
| Staples | | | | | | | | | | | | | | |
| *Cornmeal | 16 | - | - | 23 | 33 | 36 | - | 49 | 41 | - | - | - | - | 12 |
| *Wheat flour | 13 | - | - | 21 | 38 | 37 | - | - | 40 | - | 64 | 57 | - | 15 |
| Rice | 21 | 32 | 34 | - | 85 | 75 | 80 | 70 | 70 | 84 | 128 | 83 | 134 | 19.5 |
| *Sugar | 20 | 20 | 30 | 50 | 65 | 108 | 86 | 68 | 62 | 68 | 126 | 158 | 87 | 22.0 |
| Legumes | 46 | - | - | 08 | 84 | 85 | - | 141 | 145 | - | 154 | 203 | - | 16.3 |
| Foods from animals | | | | | | | | | | | | | | |
| Beef (local) | 100 | 100 | 100 | 100 | 150 | 150 | 250 | 192 | 200 | 212 | 200 | 250 | 250 | 9.1 |
| Fresh fish | 30 | 40 | 40 | 60 | 100 | 100 | 100 | 100 | 100 | 125 | 150 | 200 | 225 | 20.1 |
| Chicken (B.N.W.) | 36 | 40 | 50 | 60 | 58 | 88 | 87 | 79 | 77 | 106 | 111 | 109 | 115 | 11.3 |
| Cheese | 120 | 160 | 200 | 240 | 320 | 320 | 400 | 460 | 413 | 439 | 587 | 571 | 555 | 14.7 |
| Fats and oils | | | | | | | | | | | | | | |
| Cooking oil | 37 | 56 | 56 | 60 | 112 | 147 | 116 | 122 | 110 | 98 | 151 | 243 | 198 | 18.8 |
| Margarine | 65 | 65 | 70 | 85 | 127 | 156 | 151 | 188 | 237 | 243 | 292 | 245 | 293 | 14.6 |

Source: Statistical Division, Average Prices for Cost of Living Index Calculations; *Trade Reports

Table 6- Prices of economical sources of energy and protein for selected food groups, St. Vincent and the Grenadines, 1970-1982

| Product | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | Overall average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Cents per pound | | | | | | | | | | | | | Percent |
| **Staples** | | | | | | | | | | | | | | |
| Wheat flour | 17 | 18 | 20 | 20 | 51 | 51 | 55 | 57 | 45 | 50 | 51 | 60 | 60 | 16.0 |
| Cornmeal | 19 | 22 | 22 | 20 | 42 | 50 | 68 | 68 | 65 | 68 | 85 | 95 | 99 | 17.8 |
| Rice | 19 | 20 | 21 | 23 | 42 | 56 | 60 | 60 | 64 | 64 | 69 | 85 | 97 | 15.0 |
| Sweet potatoes | 07 | 08 | 08 | 08 | 14 | 20 | 20 | 20 | 20 | 25 | 30 | 40 | 70 | 23.6 |
| Bread-fruit | 16 | 08 | 08 | 08 | 25 | 06 | 07 | 15 | 12 | 15 | 25 | 20 | 20 | 27.7 |
| **Legumes** | | | | | | | | | | | | | | |
| Dry peas | 04 | 02 | 02 | 02 | 06 | 81 | 95 | 1.08 | 1.25 | 1.36 | 1.38 | 1.43 | 1.47 | 13.3 |
| **Fats and oils** | | | | | | | | | | | | | | |
| Margarine | 75 | 81 | 87 | 98 | 1.56 | 1.82 | 1.71 | 2.18 | 2.61 | 2.80 | 3.30 | 3.28 | 3.27 | 14.4 |
| Cooking oil | 51 | 52 | 53 | 53 | 57 | 73 | 89 | 90 | 1.01 | 1.25 | 1.53 | 1.57 | 1.79 | 11.4 |
| **Foods from animals** | | | | | | | | | | | | | | |
| Chicken (B & N) | 42 | 46 | 42 | 56 | 68 | 58 | 75 | 67 | 63 | 94 | 87 | 94 | 1.03 | 9.5 |
| Salt beef | 85 | 1.10 | 1.20 | 1.20 | 1.20 | 2.00 | 2.25 | 2.25 | 2.25 | 2.80 | 2.80 | 3.50 | - | 12.8 |
| Deep sea fish | 55 | 60 | 70 | 75 | 90 | 90 | 1.25 | 1.35 | 1.40 | 1.50 | 2.00 | 2.00 | 2.00 | 12.1 |
| Condensed milk | 44 | 45 | 55 | 57 | 76 | 90 | 1.12 | 1.00 | 1.02 | 1.05 | 1.22 | 1.72 | 1.73 | 13.0 |
| Cheese | 1.10 | 1.20 | 1.15 | 1.45 | 2.18 | 2.60 | 3.08 | 3.23 | 3.23 | 4.47 | 4.54 | 5.88 | 6.62 | 14.3 |

Source: Statistical Division. Average Prices for Cost of Living Index Calculations.

participation has remained relatively low in the handling of farmers' produce. This is understandable since the almost perfect conditions existing in the market for farmers' produce result in farmers and consumers facing the best possible prices.

Long term food price inflation averaged 11.8 per cent in Antigua and Barbuda (1975-82) and 14.0 per cent in St. Vincent and the Grenadines (1969-84). Price increases for economical sources of energy and protein were generally high - 9 to 23 per cent (Tables 5 & 6). Price controls did not reduce inflation.

## FOOD CONSUMPTION AND NUTRITIONAL STATUS

Energy intakes were generally high in Antigua but low in St. Vincent. Protein intakes were well above requirements, moreso for Antigua (Table 7). Highly refined carbohydrate in the form of bread, sugar and fat, were the main contributors to energy. Fish and bread were the main sources of protein (Table 8).

Both individual caloric intake (ICI) and individual protein intake (IPI) were positively associated with individual food

TABLE 7: Energy and Protein Adequacy Levels; Antigua/Barbuda and St. Vincent and the Grenadines, 1984

| | Energy | | | Protein | | |
|---|---|---|---|---|---|---|
| | (percent) | | | | | |
| | < 80 | 80-120 | > 120 | < 80 | 80-120 | > 120 |
| Antigua: | | | | | | |
| Farmers | 9 | 36 | 33 | 0 | 4 | 74 |
| Fishermen | 7 | 19 | 13 | 0 | 6 | 32 |
| Traffickers | 4 | 8 | 14 | 0 | 0 | 26 |
| Consumers | 11 | 16 | 24 | 0 | 4 | 47 |
| Importers/ wholesalers | 3 | 2 | 3 | 1 | 3 | 4 |
| Supermarkets | 1 | 2 | 5 | 0 | 0 | 8 |
| Grocers | 13 | 17 | 22 | 1 | 4 | 47 |
| Butchers | 2 | 4 | 6 | 0 | 1 | 11 |
| Overall | 50 | 104 | 120 | 2 | 22 | 249 |
| St. Vincent: | | | | | | |
| Farmers | 15 | 35 | 23 | 2 | 5 | 66 |
| Fishermen | 9 | 17 | 7 | 1 | 3 | 29 |
| Traffickers | 9 | 8 | 4 | 1 | 4 | 16 |
| Consumers | 22 | 17 | 9 | 4 | | 37 |
| Importers/ wholesalers | 2 | 1 | 0 | 0 | 1 | 2 |
| Supermarkets | 3 | 2 | 1 | 1 | 1 | 4 |
| Grocers | 16 | 17 | 15 | 4 | 7 | 37 |
| Butchers | 5 | 3 | 2 | 0 | 2 | 8 |
| Overall | 81 | 100 | 61 | 13 | 30 | 199 |

TABLE 8: Most Important Foods by Energy and Protein Consumed, Antigua and Barbuda and St. Vincent and the Grenadines, 1984

| Foodstuff | Energy kilocalories x 1000 | Rank | Protein x 100g | Rank |
|---|---|---|---|---|
| Antigua: | | | | |
| Bread | 117.3 | 1 | 37.9 | 2 |
| Margarine | 44.9 | 2 | - | - |
| Fish | 43.0 | 3 | 59.5 | 1 |
| Sugar | 42.1 | 4 | - | - |
| Edible oil | 34.3 | 5 | - | - |
| Rice | 32.3 | 6 | - | - |
| Wheat flour | 30.0 | 7 | 4.9 | 12 |
| Macaroni | 28.4 | 8 | 9.6 | 8 |
| Butter | 21.9 | 9 | - | - |
| Saltfish | 21.7 | 10 | 32.6 | 3 |
| Evaporated milk | 21.3 | 11 | 10.8 | 6 |
| Chicken wings | 20.3 | 12 | 25.7 | 4 |
| Sausage, links | 15.7 | 13 | 2.9 | 15 |
| Beef | 15.4 | 14 | 12.8 | 5 |
| Cheese | 14.5 | 15 | 9.4 | 9 |
| Eggs | 11.4 | 16 | 9.1 | 10 |
| Cornmeal | 9.1 | 17 | - | - |
| St. Vincent: | | | | |
| Bread | 99.9 | 1 | 32.3 | 1 |
| Sugar | 60.5 | 2 | - | - |
| Rice | 33.8 | 3 | 5.9 | 13 |
| Whole milk | 32.4 | 4 | 16.7 | 5 |
| Edible oil | 29.1 | 5 | - | - |
| Dry peas | 25.6 | 6 | 8.3 | 9 |
| Wheat flour | 19.7 | 7 | 6.9 | 10 |
| Fish | 17.4 | 8 | 24.1 | 2 |
| Chicken wings | 16.0 | 9 | 20.3 | 3 |
| Chocolate drink | 15.9 | 10 | 3.4 | 16 |
| Butter | 14.0 | 11 | - | - |
| Margarine | 12.9 | 12 | - | - |
| Orange juice | 12.0 | 13 | 1.6 | 20 |
| Chicken (wing & back) | 11.5 | 14 | 11.9 | 7 |
| Eggs | 11.1 | 15 | 8.8 | 8 |
| Saltfish | 10.6 | 16 | 16.0 | 6 |
| Cheese | 9.9 | 17 | 6.4 | 12 |

Source: Survey data.

expenditure (IFE) as indicated by the following equations:

Antigua and Barbuda:

$$\text{Log ICI} = 1.999 + 0.499 \log \text{IFE} + e \qquad (1.4)$$
$$(0.040)$$
$$N = 256 \quad R^2 = .38 \quad \text{S.E.E.} = 0.126 \quad F = 153.54$$

$$\text{Log IPI} = 0.498 + 0.538 \log \text{IFE} + e \qquad (1.5)$$
$$(0.048)$$
$$N = 256 \quad R^2 = .33 \quad \text{S.E.E.} = 0.150 \quad F = 125.92$$

St. Vincent and the Grenadines:

$$\text{Log ICI} = 2.043 + 0.481 \log \text{IFE} \qquad (1.6)$$
$$(0.043)$$
$$N = 204 \quad R^2 = .38 \quad \text{S.E.E.} = 0.143 \quad F = 125.31$$

$$\text{Log IPI} = 0.117 + 0.667 \log \text{IFE} \qquad (1.7)$$
$$(0.060)$$
$$N = 204 \quad R^2 = .38 \quad \text{S.E.E.} = 0.201 \quad F = 122.90$$

The results indicate individual food expenditure elasticity with respect to caloric intake of 0.5 for Antigua and Barbuda and St. Vincent and the Grenadines and 0.5 and 0.7 with respect to protein intake for Antigua and Barbuda and St. Vincent and the Grenadines respectively.

In Antigua, protein intakes were significantly higher among males than females. No difference was observed with respect to caloric intake. In St. Vincent no differences were observed.

Obesity, especially among adult females, was a serious problem, far more so in Antigua than in St. Vincent (Table 9).

TABLE 9: Weight for Height Status of Individuals in Sample, Antigua and Barbuda and St. Vincent and the Grenadines, 1984

| | Percent | | | |
|---|---|---|---|---|
| | 80 | 80-120 | 120 | Unknown |
| Antigua: | | | | |
| Male 0-5 | 0 | 0 | 0 | 0 |
| Female 0-5 | 0 | 0 | 1 | 0 |
| Male 6-18 | 0 | 3 | 5 | 0 |
| Female 6-18 | 0 | 14 | 7 | 1 |
| Male 19+ | 3 | 91 | 58 | 7 |
| Female 19+ | 0 | 44 | 41 | 5 |
| St. Vincent: | | | | |
| Male 0-5 | 2 | 5 | 0 | 0 |
| Female 0-5 | 0 | 5 | 0 | 0 |
| Male 6-18 | 6 | 25 | 2 | 0 |
| Female 6-18 | 1 | 22 | 8 | 1 |
| Male 19+ | 7 | 87 | 16 | 3 |
| Female 19+ | 3 | 41 | 30 | 3 |

Infant mortality and undernutrition among children under five years have declined during the last two decades. Protein-energy malnutrition, however, continue to exist in pockets in Antigua and Barbuda and even more so in St. Vincent and the Grenadines. At the same time obesity is on the increase in the under fives.

POLICY OPTIONS

The analysis points to the following policy options.

The small size of the farming units and the high percentage of farm rentals or leases highlight the need for a comprehensive policy on land reform. A decision must be made regarding the establishment of viable family farms for full time farmers as opposed to a system of part-time farmers or large corporate enterprises. Any of these options will modify governments' role as large landowners.

The low level of knowledge of and participation in input subsidy schemes indicate a need for more aggressive information dissemination activities on the part of the agricultural administration. Farmers must be educated about these schemes as well as about the appropriate use of subsidized inputs.

Remedying the problem of agricultural stagnation in these countries calls for the adoption of measures to provide protection for investors in farming. An appropriate tax levied on competing imports would improve the competitiveness of local farmers, as would a devaluation of the East Caribbean dollar. Investments in water supply and management for irrigation would enhance Antigua's potential to produce food for local consumption and the tourist sector. Improved marketing arrangements in St. Vincent would broaden the local and export crop base away from banana monoculture.

The legacy of price control which was instituted during the colonial era remains a politically sensitive issue. The abolition of price control on local products would encourage investments in this sector, while a fixed dollar mark-up based on realistic costs applied to imports would avert escalation in imported inflation, given the high concentration in the import/wholesale sector. Increased surveillance and prosecution of violators would enhance the effectiveness of price controls.

The involvement of State controlled marketing agencies in the import and supermarket retail sectors was effective in moderating prices and margins. Their position in handling farmers' produce, however, was relatively weak, except in the case of a few products. The impact of a policy for direct involvement in the distributive sector could be greater if the Corporation competed more directly within the food import sector on a wider range of foodstuffs, while maintaining close cooperation with the farm production and distribution sector for local foods. Such a policy would put the Corporation on a stronger financial footing.

The high prevalence of obesity among some segments of the adult population and undernutrition in others, signal a need for nutrition education designed to improve diets. Assistance could be given to selected households in the form of food stamps, direct income payments or supplementary foods. The cost of these programmes could be met from the taxes levied on imports.

A food stamp programme targeted to needy cases and specific products could be effective in improving eating habits and nutritional status. Where the products are essentially locally produced, a

stronger demand for these products would be created. The nutritional benefits from direct income payments depend on the proportion of income used for food purchases. The low responsiveness of caloric intake of food expenditure supports the view that direct food subsidies would have greater inpact than cash income. Supplementary foods based on local products would stimulate demand, encourage investments in agriculture and create employment. Implementation of these options should improve the distribution system and the food and nutrition situation.