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OF TROPICAL CROPS

Title: Alternatives to Sugar-Cane in St. Kitts: Competitiveness Studies of Four Crops in
St. Kitts/Nevis

Authors: Edwards, Alistair¹ and Jacque, Andrew²

1. Marketing Officer, Department of Agriculture, St. Kitts/Nevis
2. Agricultural Economist, Ministry of Agriculture, Land and Marine Affairs, Trinidad and Tobago

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ALTERNATIVES TO SUGAR CANE IN ST. KITTS: COMPETITIVENESS STUDIES OF 4 CROPS IN ST. KITTS/NEVIS

Edwards, Alistair

Marketing Officer

Department of Agriculture, St. Kitts /Nevis

Jacque, Andrew

Agricultural Economist

Ministry of Agriculture, Land and Marine Resources, Trinidad and Tobago.

ABSTRACT

The sugar industry in the island of St. Kitts came to a close in 2005 and so too did a long period of monoculture and possibly a culture and lifestyle of a people that affectionately refer to their country as Sugar City. Sugar was cultivated on approximately 4,500 hectares and there is now a dire need for replacement commodities that fit within the social, economic and environmental landscape of the country. Sugar cane cultivation and sugar production provided good-paying jobs and was the main source of income for many households. The crop provided a high degree of soil conservation and was a boon to the tourism industry. In addition, sugar was a substantial source of foreign exchange and provided some diversification to a tourism dependent economy.

In selecting alternatives to sugar, the social, economic and environmental considerations must take into account the issues presented by globalization and trade liberalization. The Government has started the process by approving an externally funded Stevia project and announcing plans for methanol production and co-generation of electricity from sugarcane. However, attention also is being drawn to some non-sugar commodities that were grown in St. Kitts on a small scale during the sugar dominant period. It is felt that these may be competitive on the international market thereby providing employment and foreign exchange, while catering to the needs of the rural population.

This research aims to assess four of the non-sugar agricultural commodities, for which there is cost of production data to determine profitability, international competitiveness and comparative advantage. The research also will aim to provide policy recommendations towards a more conducive environment for the identified competitive commodities. The main hypothesis of this research is that commodities of (i) Pumpkin, (ii) Peanut (iii) Sweet Potato and (iv) Onion grown in St. Kitts/Nevis conditions are internationally competitive and present good diversification alternatives to sugar.

The main research tool was the Policy Analysis Matrix (PAM). This was used to assess the four commodities for international competitiveness and comparative advantage. The research also involved the collection of secondary and primary data to input into the matrix and determine the relative importance of these four commodities in St. Kitts.

The results of the assessment show that all four commodities are profitable, competitive and have comparative advantage. These characters are highest for the export commodities of Pumpkin and sweet potato and lowest for the import-competing products of onion and peanuts. The level of government support to gross farm revenues is 4% for pumpkin and sweet potato, 3% for peanuts and 12% for onions. Referencing the level of value-added to per-capita GDP indicates that peanuts are not an attractive diversification alternative. Policy recommendations are for an expansion of the production of the commodities of pumpkins, sweet potato and onions, together with efforts to reduce the impediments to market penetration.

Key words: Competitive commodities, profit, policy analysis matrix

BACKGROUND ON ST. KITTS/ NEVIS

Located at latitude 17 degrees 15 minutes north and longitude 62 degrees 40 minutes west is the twin island Federation of St. Kitts and Nevis. The two islands are separated by a Caribbean Sea channel that spans about 3 km. Both occupy a combined land mass of 269 sq. km with St. Kitts being the larger of the two accounting for 176 sq km.

St. Kitts and Nevis enjoys a tropical climate that is mainly served by the north east trade winds. Although rainfall varies from year to year the annual average rainfall is about 1300mm at lower elevation and 3000mm in the mountainous areas. The wettest period is from August/September to October/November with the driest period being from December to April. Several sharp, heavy but short showers are often experienced between April and June/July. It is important to note that the islands are in the hurricane zone and the hurricanes normally occur from June to December.

The soil types in St. Kitts are mostly loamy sands and sandy loams and are slightly acidic (ph 5.0- 6.5). In Nevis heavy clay predominates hence the soil there has a high water holding capacity while the soils on St. Kitts are more light and porous.

The island of St. Kitts is characterized by three central mountains of volcanic origin that reach a maximum height of 1155M above sea level. Nevis has one central mountain but both islands have gentle undulating plains starting at the foothills of the central mountains and ending at the coast. In general the soils are said to be fertile and suitable for agriculture.

The farming sector is dominated by farmers with small holdings of less than 2 acres. Farmers involved in livestock tend to be part-time while mixed farming is prevalent. Farms considered to be large, over 10 ha, are few.

1. INTRODUCTION

Sugarcane: The Monoculture for Over 100 Years.

Sugar production from sugarcane was the life blood of the St. Kitts and Nevis economy for many years. Communities and villages were developed in relation to the sugar estates that existed around the island with people seeking work on these estates then settling or building their homes close to where the estates were located.

Sugar from sugar cane was given a guaranteed market in the UK and hence sugar

was the major foreign exchange earner. A special Statutory body first called NACO then changed to SSMC (St. Kitts Sugar Manufacturing Company) was set up to manage the operations from field to factory and later export. For many year sugar made up 90% of our exports. It was the single most important employer and though the percentages decreased over the years, by 1992 it was still employing about 25% of the work force.

Since sugar cane occupied the prime agricultural land on St. Kitts, non sugar agriculture was restricted to the growing of crops in the resting period of cane fields and small scale production in ghuts and mountains where cane could not grow. Nevis on the other hand grew cotton, vegetables and root crops and was not bogged down by the plantation system. As a result, subsistence farming developed there at a greater level than on St. Kitts. Steady declines in the profitability of producing sugar led to an equally steady movement away (by the people) from Sugar Cane Production to the Tourism and Service Sector. Today, the Tourism and Service Sector is the mainstay of the economy.

The contribution of agriculture to GDP, which was closely linked to the sugar industry, declined from 17% in 1980 to 9% in 1989 and over the last 5 years below 5 %. In 2005 after building up a heavy debt burden on the St. Kitts/Nevis economy the sugar industry was closed making it necessary to accelerate the diversification programme that was instituted several years ago.

Diversification Efforts in St. Kitts/Nevis

Twenty years ago the government identified vegetable production as a part of its Diversification thrust with the aim of helping to reduce the spiraling food import bill. Hence a strategy of import substitution and self-sufficiency was adopted. Commercial and full - time farming which were relatively new were introduced to St. Kitts/Nevis. Farmers grew a range of crops including tomatoes, cabbages, sweet potatoes, carrots, peanuts and other root crops. Farms were generally rain-fed and hence production was uneven throughout the year with greater production in the first half of the year resulting in gluts while the converse prevailed in the latter half of the year. Farms were small with the majority less than one hectare. Sugar cane still occupied the prime lands while non-sugar farming increased in the foothills and mountains around the island.

Not much emphasis was placed on tree crop development with just one commercial farm

being developed on St. Kitts and a few private orchards on Nevis. The potential for expansion was noticeable as numerous fruit trees can be found scattered all around the islands. These include mango, breadfruit, breadnut and tamarind. Land tenure problems coupled with the long gestation period of tree crops and the annual threat of hurricane all contributed to hesitancy in the development of this sub-sector.

Livestock on the other hand has made small but significant strides. The main production being cattle, sheep, goats, pigs and poultry. Poultry (egg production) attained levels of self sufficiency while pork production has shown improvements due to improved feeding and housing. The success of the tick eradication programme in the 1990's led farmers to return to cattle production and as a result, the contribution to GDP by the livestock sub-sector over the period 1999 -2003 showed small increases.

Today diversification is not only used in agriculture as a movement away from sugar production but also in the economy that looks towards tourism as its main driving engine with agriculture and other industries as support to the main driving force.

With the recent closure of the sugar industry in St. Kitts, the identification of viable alternatives to keep those interested in agriculture on the land is of paramount importance. Further, there is concern on the food import bill that is hovering around EC\$84M (page 1, Agricultural Landscape After Sugar), with indications of further increasing. Hence any attempt to transform the agricultural landscape of St. Kitts should examine possibilities of reducing the food import bill. However, foreign exchange earners to replace losses from the absence of sugar exports should also be analyzed.

The government has made several announcements of plans concerning the use of sugar cane. The manufacture of ethanol, the co-generation of electricity and the development of a rum industry using the sugar cane are all options that are being explored. Apart from that a Stevia project was accepted in principle but very little progress has been made. Additionally, the government is under obligation to retrain the persons who were involved in the sugar cane production to enable them to seek employment in other sectors.

Today there is immense demand for the use of the 4500 hectares of land left by the closure of the sugar industry. This includes requests for land to develop:

- § Golf courses to complement the tourism industry.
- § Housing for residents and expatriates
- § Hotels and guest houses
- § Car racing and horse racing tracks
- § Government projects.

It is against this backdrop that this paper aims to provide policy recommendations after a thorough study.

2. POLICIES THAT AFFECT AGRICULTURE IN ST. KITTS

In the Agricultural sector a number of policies established by the Ministry of Agriculture serve to assist all types of farmers and farming activity.

- § Tractor services are provided by the government at a subsidized rate. Farmers utilize this service and save on their land preparation costs.
- § Upon recommendation from the Ministry of Agriculture, the Ministry of Trade prevents the major firms from importing commodities that are considered to be abundant in the local market. This serves to provide a protected market during periods of local harvest, so that farmers are free from external competition and thus enjoy higher prices.
- § Agricultural commodities coming into the country from regional origin are free from duty and taxes. Commodities that originate from outside of the region are subject to a customs tax of 6 %.

3. COMMODITIES OF INTEREST

This section of the paper examines the four commodities of interest, particularly with a view of providing information on the systems of production.

Sweet potato

Sweet potato is one of the rotational crops used by the sugar industry for many years. Fields that were "rested" from sugar production before fresh planting were "given out" to the workers for sweet potato production. As a result, today, the production technology is well known by many former SSMC workers and private farmers.

The crop is established from stem cuttings locally called "potato vines" or simply "vines". The main agronomic practice is weed control during crop growth, which varies from 3 to 5 months depending on the variety. Many varieties

have been established and are called according to the physical characteristics or growth pattern. For example the variety called three-months takes 3 months to mature. The 'pumpkin' variety has a yellow-orange flesh, a similar colour to the inside of the pumpkin. Others are known by skin colour or flesh colour.

Sweet potato is known to thrive under hot and dry conditions and hence farmers usually plant it during the hotter months of the year and rotate to the less hardy vegetables and food crops during the cooler months. It is also one of the crops grown during the hurricane season due to the fact that the tuber matures beneath the soil and suffer very little damage from strong winds. Domestically produced sweet potato enjoys dominance on the local market since it is not imported from the extra regional countries and imports from the Windwards are rare. As a result there are large variations in the market price of sweet potatoes depending on supply. At some periods sweet potato is sold for \$3.00 while at other times it fetches a price below \$1.00 per pound

Pumpkin

This crop is popular among small farmers on St. Kitts. Pumpkin is grown throughout the year and is known for hardiness ability to thrive and survive in dry and even weedy areas. In some ways pumpkin is considered as the "forgotten crop" since sometimes farmers plant and do not follow with the levels of management and agronomic practices accorded to other crops. The crop is established from seeds obtained from the previous crop and stored in ambient or refrigerated conditions.

The produce is highly acceptably among consumers who use it in a variety of ways – soups, salads and pancakes. It is important to note too that several sporadic shipments of pumpkin to nearby islands have been made and a demand for the St. Kitts pumpkin has been identified in these islands. Pumpkin is not imported.

Peanuts

Locally called "Pinda" Peanuts was the most popular rotational crop for sugar cane because it took only three months to mature (an ideal period of rest before planting fresh cane that would mature in the next season) and its nitrogen fixing qualities added to soil fertility. Estate workers were the ones to tend (weed, mould and spray) the crop in the Dull season (the period of time when there was no sugar cane harvesting). Eventually those who did

subsistence farming adopted the crop as a regular part of the farm plan especially during the dryer part of the year. The hardiness of the commodity gives it a long shelf life and so it is an attractive commodity to farmers who can store for long periods.

The commodity is used green (boiled) or dried (baked or parched). Demand increases at key points in the year such as in the festive periods of Christmas/ Carnival (December/ January) and cultural and community festivals in July/August. Peanuts in its raw green form is not imported however the various forms of processed nuts are imported mainly through supermarkets and shops from the USA in particular.

Onions

Onion was grown on the Sugar Estates for decades before being adopted by farmers. The Caribbean Agriculture Research and Development Institute (CARDI) and the Ministry of Agriculture have been involved in research and varietal trials leading to the identification and adaptation of several varieties of Dutch and Israeli origin to the local conditions.

The crop is usually planted in the wetter period of the year (November/December) and harvested in April/May. Lack of sufficient moisture at other times in the year limits it to a one crop per year cycle.

The greatest challenge facing the farmers involved in onion production has been weed control. Some farmers have mastered this and during a brief period of the year St. Kitts is self sufficient in onions.

The quality of the produce is comparable to imported varieties and thus farmers gain a fair share of the local market during harvest period of the commodity. Throughout the remainder of the year the country depends on imports to satisfy consumer demand.

In general farmers with these commodities market them in a variety of ways. Some sell directly to shops, supermarkets and hotels as well as in the open market. Some sell to middle men or "turn hand" who in turn move the produce. Added to that, the Marketing Unit at the Department of Agriculture serves as a Central Marketing Unit for produce going to the Marriott Hotel and in some cases assist in physically moving produce from farms to various points in the market chain.

4. OBJECTIVES

- i. To identify and evaluate four commodities that can be presented

- as alternatives to sugar cane production.
- ii. To determine international competitiveness, comparative advantage and attractiveness of these commodities
- iii. To provide policy recommendations on these commodities

5. DATA AND METHODOLOGY

The evaluation of diversification alternatives to the sugar industry, presented in this report, focused on four commodities already produced in St. Kitts and Nevis and for which cost of production and revenue data were compiled. The four commodities were: Onion, Sweet Potatoes, Peanuts and Pumpkins. These four commodities were evaluated within the framework of the Policy Analysis Matrix (PAM) to determine competitiveness and comparative advantage. Subsequently, the levels of annual value added were assessed against the per-capita GDP of the country in order to determine suitability as a diversification alternative in St. Kitts and Nevis.

The Policy Analysis Matrix (PAM) uses cost of production and revenue data for each commodity to create two budgets. One budget is priced in market/private prices and the other in economic prices. Both budgets separate cost items into traded and non-traded. The two budgets are compiled into the PAM. Differences between the two budgets are assumed to be due to the effects of policies. The information in the PAM allows easy calculation of the indicators of policy effects, such as the effective protection coefficient, and indicators of competitiveness and comparative advantage.

The process of economic pricing involves calculating economic import and export parity prices for tradable inputs and outputs, and shadow prices for non-traded items such as labour and transport. Standard methodology for arriving at economic parity prices involves using Cost Insurance and Freight (CIF) and Freight on Board (FOB) prices and the real exchange rate (RER) to derive parity prices inside the country. These parity prices exclude transfer payments such as taxes and subsidies.

The methodology for economic pricing used in this paper is guided by the availability of data. The calculation of import/export parity prices begins with the CIF/FOB data, which was obtained from the Customs Division of the Government. Information on the RER was not available and therefore the analysis in this paper uses the nominal exchange rate. Using

the nominal exchange rate (NER) rather than the Real Exchange Rate (RER) means that results largely ignore the effects of macro-economic policies. However, we take some comfort from the IMF International Financial Statistics which indicate that the Index of real effective exchange rate (REER) and the index of nominal effective exchange rate (NEER) have 2004 values that are comparable to the 1996 values. The 2 indices use a base year of 2000. Indeed our adapted methodology is more inclined towards the removal of transfer payments (taxes and subsidies) in the process of economic pricing.

The specific values used in the economic pricing are provided hereafter. In the case of onions economic price for the output was 90% of the private price; 94% in the case of peanuts; 100% in the case of sweet potatoes and pumpkins. For all commodities the economic and private prices were the same for labour operations and transportation; economic prices were 90% of private prices for imported inputs to account for the effects of import duties and taxes; the economic price of land preparation was 30% higher than the private price (which is subsidised); and for contracted operations such as planting and harvesting, economic prices are the same as private prices.

6. RESULTS AND DISCUSSION

The policy analysis matrices for the four commodities are presented in Tables 1 and 2, with pumpkin and sweet peppers presented in Table 1 and peanuts and onions in Table 2. Table 1 indicates that pumpkin farmers earn revenues of EC\$20,000 per acre with profits of EC\$17,667.50 when valued in market prices and \$17,544.50 when valued in economic prices. In the case of sweet potatoes there is a profit of \$12,120 on revenues of \$15,000 at market prices; for peanuts there were private profits of \$3,671 on revenues of \$7,500; and for onions there were private profits of \$10,690 on revenues of \$17,600.

Table 1: Policy Analysis Matrices for Pumpkin and Sweet Potatoes (EC\$ per acre)

	Pumpkin				Sweet Potato			
	Revenue	Costs		Profit	Revenue	Costs		Profit
		Traded	Non-Traded			Traded	Non-Traded	
Budget at Market Prices	20,000.00	625.00	1,707.50	17,667.50	15,000.00	875.00	2,005.00	12,120.00
Budget at Social Price	20,000.00	693.00	1,762.50	17,544.50	15,000.00	807.00	2,125.00	12,068.00
Divergences	0.00	-68.00	-55.00	123.00	0.00	68.00	-120.00	52.00

Table 2: Policy Analysis Matrices for Peanuts and Onions (EC\$ per acre)

	Peanuts				Onions			
	Revenue	Costs		Profit	Revenue	Costs		Profit
		Traded	Non-Traded			Traded	Non-Traded	
Budget at Market Prices	7,500.00	2,261.50	1,567.50	3,671.00	17,600.00	3,620.00	3,290.00	10,690.00
Budget at Social Price	7,050.00	2,154.60	1,597.50	3,297.90	15,840.00	3,423.00	3,320.00	9,097.00
Divergences	450.00	106.90	-30.00	373.10	1,760.00	197.00	-30.00	1,593.00

Table 3: Indicators of Policy Effects, Competitiveness and Comparative Advantage

Indicator	Pumpkin	Sweet Potato	Peanuts	Onions
Nominal Protection Coefficient (NPC)	1.00	1.00	1.06	1.11
Effective Protection Coefficient (EPC)	1.00	1.00	1.07	1.13
Producer Subsidy Equivalent (PSE)	0.01	0.00	0.05	0.09
Private Profitability (EC\$)	17667.50	12120.00	3671.00	10690.00
Social Profitability (EC\$)	17544.50	12068.00	3297.90	9097.00
Domestic Resource Cost (DRC)	0.09	0.15	0.33	0.27

The analysis indicates that all commodities are competitive and have comparative advantage. Competitiveness is assessed by positive private profits and indicates the capacity of the production system to generate positive results for farmers in the presence of the full range of policies. Comparative advantage is assessed through 2 indicators, economic profits and the domestic resource cost (DRC). Positive economic profits indicate comparative advantage, as does a DRC value of less than 1. Comparative advantage here indicates that the production system would still be profitable if all policies are removed. The strong DRC values (0.09 – 0.33) indicate that all four commodities possess comparative advantage.

The nominal protection coefficient (NPC) values for the four commodities range from 1.00 to 1.11 indicating that the effect of policies on the outputs is such that they provide positive protection to farmers (cases when NPC>1.00) or are neutral (when

NPC=1). The NPC value of 1.00 for pumpkin is significant because pumpkin, of the four, is the only one that is exported in significant quantities. The NPC values for onion and peanuts indicate that policies in effect (tariffs) allow the domestic price to be 6% higher in (the case of peanuts) than what would obtain if such policies were not in place. In the case of onions the effect is a 13% higher than farm gate price.

The effective protection coefficient (EPC) measures the impact of policies on value-added (revenue less traded costs). That the EPC values are the same or close to that of the NPC indicates that most of the effects of policies occur on the output, through tariffs.

The producer subsidy equivalent (PSE) measures the net contribution of policies to farm gate revenues. The PSE values in percentage terms range from 0% in the case of sweet potatoes to 9% in the case of onions. The values for pumpkin is 1%; 5% for peanuts. In the case of pumpkin and sweet potatoes the majority of the PSE

effects come from cost side due to policies of subsidies on land preparation. In the case of peanuts and onions the major contributor to the PSE is the revenue effects as a consequence of the tariffs on output.

These four commodities provide possibilities as diversification alternatives for St. Kitts and Nevis since each is internationally competitive and possesses comparative advantage. Possessing comparative advantage implies that the commodity would still be profitable if tariffs are lowered and other support measures are removed.

However, though a commodity may be internationally competitive and possess comparative advantage, this does not mean that it may be an attractive commodity to be produced in the country. This step requires that the commodity produces sufficient value-added to meet the needs of farm families. Thus we now subject the four commodities to an assessment against the per-capita GDP of St. Kitts and Nevis.

St. Kitts and Nevis had per capita GDP of EC\$25,850 in 2004 (IMF; International Financial Statistics). Per capita GDP is a measure of the average value added produced per person in St. Kitts and Nevis. Value added is the amount available for distribution to labour and other non-traded items and to entrepreneurship (profit). Value added is calculated, in the framework of the PAM, as revenue less traded costs or alternately as profits plus non-traded costs. Thus, it is possible to relate the value-added produced by a commodity to the per capita GDP.

In making the comparison of annual per-capita GDP and value-added produced by these four commodities we adjust the results in the PAMs to annual values by specifying the number of crops that can be grown in a year for each of these commodities. Additionally, we assume a value for the acreage a farmer can plant. In this analysis we project that each of the commodities can produce 2 crops per year under rain-fed conditions on a single piece of land. Further, we project that given the technology of production available; a farmer can plant, maintain and harvest 2 acre of land at a time.

Using value-added as profit + non-traded costs and then multiplying by 4 we calculate annual private profits per acre of

\$77,500 pumpkin, \$56,500 for sweet potato, \$20,954 for peanuts and \$55,920 for onions. Therefore, though the four commodities are internationally competitive and have comparative advantage, only pumpkins, sweet potatoes and onions are attractive as diversification alternatives in St. Kitts and Nevis. Peanuts is not an attractive alternative since the annual value added is less than that of per capita GDP. Farms of 1 acre and less will not be attractive for any of the commodities.

7. RECOMMENDATIONS

- § Increase the acreage under the 'attractive' commodities and seek export markets in the Northern Leewards and the wider region.
- § Provide the support that assists in market penetration in these countries.
- § Make provisions for these commodities to be produced for local market as well.

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