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## IMPACT OF BANANA CULTIVATION ON WATERSHEDS IN THE WINDWARD ISLANDS

by

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The growing of bananas for export in the Windward Islands may be said to have started in 1925 when Swift Banana Company, a subsidiary of the United Fruit Company acquired lands in St. Lucia for the cultivation of the crop. Small farmers were also encouraged to grow the crop. However, the venture was short-lived, as the prevalent variety was destroyed by Panama disease and the company was quickly liquidated.

Another attempt was made in 1933 when a Canadian Company offered a fixed five-year contract for the purchase of all bananas that were delivered to the wharves in acceptable condition. The Banana Association was formed to purchase fruit from growers for sale to the company. This contract was entered into for the five-year period 1939 to 1945; but as the volume increased the dreaded Panama disease struck again.

In 1948, Antilles Products Limited offered a 15 year contract to purchase one million stems of bananas. The Colonial Office provided the technical support for the development of the industry. Their recommendation suggested a change from a statutory body to a farmer's association to be operated as a purely commercial venture. By 1953 the Banana Growers' Association functioned as a commercial company with an elected Board of Directors. Membership

was open to any grower with a minimum of thirty banana plants.

At the outset, the Association consisted mainly of large growers because of their ability to supply a considerable proportion of the required fruit and conduct the business of the Association. In a relatively short period, a large number of middle and small-scale operators were attracted to the industry. With the decline of the sugar industry in the 1950's due to a depression in world markets, the conditions for the expansion of banana production were enhanced. With the expansion of banana production in the Windward Islands, the need for a sub-regional association encompassing the four territories was recognized.

In 1958, the Windward Islands Banana Association (WINBAN) was formed with three major objectives: (i) to negotiate the price of bananas with the buying company; (ii) to maintain an insurance scheme, and (iii) to purchase fertilizer in bulk. At that time, Geest Industries of the UK was the sole buyer of Windward Island bananas. After over thirty years of operation, Geest ended their association with banana operation in the Windward Islands and put the business up for sale. At that time there emerged a serious threat of the industry being taken over by a large multilateral

company from the USA. In response, the Windward Islands formed a company, Windward Islands Banana Development and Exporting Company (WIBDECO), which were to assume, among other functions, a role in the marketing of fruit. WIBDECO was registered in March 1994. Soon after, WIBDECO purchased the operations of Geest in both the UK and the Windward Islands through a joint venture arrangement with Fyffes.

## IMPORTANCE OF BANANAS TO THE WINDWARD ISLANDS

The Banana Industry has played a significant role in the economies of Caribbean banana exporting countries contributing to foreign exchange earnings, employment, savings and government revenues. A measure of the relative importance of the Banana industry to the economies of Caribbean countries is its contribution to Gross Domestic Product (GDP) (Table 1).

**Table 1. Banana Export as a percent of GDP - 1993**

Country	Total GDP US\$ mn	Banana Exports US\$ mn	Banana Exports as a % of GDP
Belize	443.6	14.2	3.2
Jamaica	2745.3	35.9	1.3
Dominica	177.0	24.2	13.7
Grenada	221.7	1.8	0.8
St. Lucia	414.0	50.7	12.3
St. Vincent	255.6	23.3	9.1
Total	4257.2	150.1	3.5

Source: Technological Modernization of the Banana Industry in the Caribbean, IICA, 1996

Overall banana exports, in 1993, accounted for 3.5 percent of total GDP of Caribbean exporting countries, with the contributions varying from a low of 0.8% in Grenada to a high of 13.7 percent in Dominica.

In general, it shows that the smaller Windward Islands, with the exception of Grenada, are highly dependent on banana for export earnings. About 50 percent of the volume of fruit exported comes from the island of St. Lucia. In 1988, St. Lucia exported a record 127,000 tons of fruit to the UK.

## NATURE OF THE PHYSICAL ENVIRONMENT OF THE WATERSHED

The Windward Islands are comprised of islands of relatively recent volcanic origin. The general topography is mountainous with a central mountain ridge rising in the center of the islands and offset spurs running down to the coasts on either side.

The climate of the island is modified by oceanic influences. The main feature is uniformly high temperatures all the year round mitigated by the north-east trade winds which intensifies into hurricanes during the period June to November, with

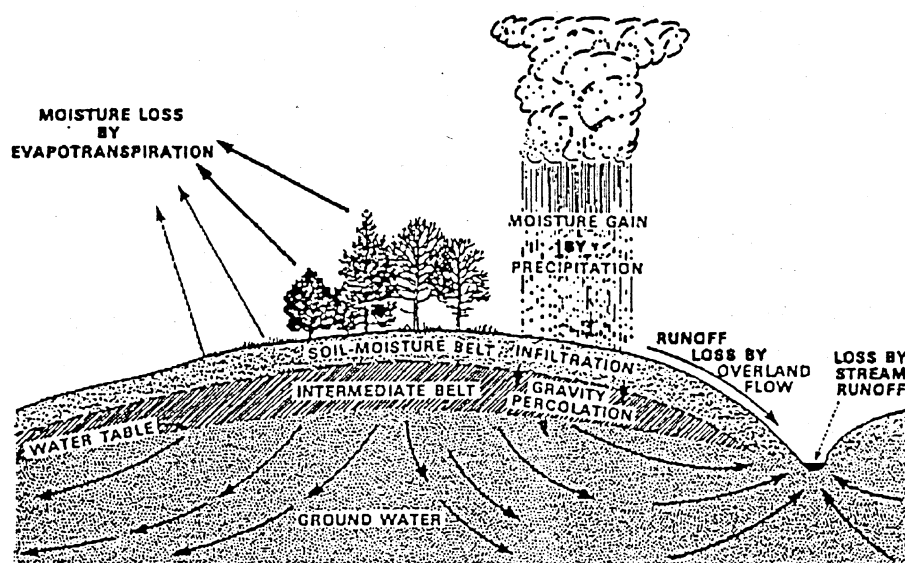
accompanying devastating winds and torrential rains. The rainfall increases with altitude leading to a concentric distribution pattern where rainfall is high in the center of the island and low on the coastal areas. Soil erosion is a major problem in these islands where steep youthful topography predominates and rainfall exceeds 3700 mm in the interior.

In the context of the Windward Islands, a watershed can be defined as "a physical unit of land bounded entirely by mountain ridges and the shoreline and having a distinct hydrologic character". Under natural conditions tropical ecosystems within the watersheds attain a delicate balance of activities that involve plants, animals and microorganism. Such biological activity promotes unique plant associations, the

evolution of erodable soils and sustainable biodiversity. The cycling of nutrients and energy flow maintains balance in the system.

The Hydrological Cycle is the critical factor in the process that influences energy and mass flow within the catchment. Water moves within a closed cycle of global dimensions. The largest reservoirs of water are the oceans and polar ice caps. Water is transferred from these reserves via the atmosphere to the terrestrial ecosystem. Within the terrestrial ecosystem, water moves through the soil profile (soil moisture belt) to the ground water zone and may subsequently move into surface water such as lakes, rivers or streams. Alternatively, water may run across the land surface by overland flow to lakes or streams. These processes are illustrated in Figure 1.

Figure 1: Detailed representation of the hydrologic cycle



Soil plays an important role as a buffer in the hydrologic cycle. Water is retained against gravitational forces to provide a base for biological activity. Problems will occur when the cycle and associated process are disrupted. The intensive cultivation of bananas in the Windward islands caused severe disruption in the cycle and has resulted in significant degradation of watersheds.

### CHARACTERISTICS OF THE "BANANA CULTURE"

There are some features of the "banana growing culture" that attract participants and propagate the kind of destructive impacts seen recently, and include the following:

- Banana is a crop that is relatively easy to grow, has few serious pests and diseases, and recovers quickly after disasters like hurricanes;
- Excellent marketing and transportation arrangements for export of fruit;
- Very attractive to the small farmer because of the excellent cash flow associated with that crop;
- Bananas require direct sunlight and as a result encourage substantial and indiscriminate tree clearing;
- The banana plant is shallow rooting and does not encourage soil binding;
- Low dry matter content of plant results in marginal amounts of organic matter returned to the soil;
- Removal with the fruit, of high quantities of nutrients from the farm system;
- The invasion of steep lands by the large number of small farms;
- Widespread use of large amounts of agro-chemical particularly herbicides;

- Sub-optimal crop husbandry practices leading to mining of soil nutrients and consequent soil degradation;
- Poorly designed drainage systems and farm/feeder roads, a consequence of poor planning, insecure ownership arrangements, particularly where several persons farm on a contiguous parcel of land;
- Rapid and uncontrolled expansion of housing within watersheds-, a direct result of improved incomes.

### IMPACT OF BANANA CULTIVATION ON THE WATERSHED

The impact of banana cultivation on the watershed in the Windward Islands covers the whole spectrum of influences on the social, economic, and physical environment. The focus here shall be on the physical environment.

The loss of biodiversity is an important effect of banana cultivation as a significant amount of forest lands were cleared to accommodate the crop. A number of endemic plant and animal species have disappeared as a result. The production of other traditional export crops such as cocoa, coconuts and coffee has virtually ceased in some of the islands, while the introduction of new plant crops has not met with success.

The loss of deep rooting plants and disruption in the nutrient cycling process have resulted in impoverished soils that lack nutrients and are prone to drought conditions. The continued production of bananas has to depend on the importation of large amounts of fertilizers and agro-chemicals which eventually lead to further degradation - soil acidity, pesticide residue

build up in soil and water, and pesticide resistant pest and diseases

There is also greater exposure of soil to raindrop impact due to the weed-free husbandry being promoted in banana cultivation. The resultant erosion, particularly during periods, of torrential rains, causes serious siltation of water courses and consequent flooding in low lying areas

There is also the serious loss of soil organic matter that leads to loss in soil structure and consequent reduction in percolation of water into the soil. The resultant excessive run-off of water further exacerbates the problem of soil erosion. The net result is a loss of valuable topsoil and a progressive reduction in productive capacity of banana farms, particularly on the hillsides

Another major impact is the drastic reduction in the volume of water in the rivers. Base flow in some of the larger river courses has been reduced to a trickle in the dry season: This will affect the process of technological modernization of the banana industry as the adoption of irrigation technology may become impractical.

### **ISSUES/FACTORS THAT INFLUENCE THE PROBLEMS OF BANANA PRODUCTION IN WATERSHEDS**

- Unresolved land tenure situation which lends itself to the fragmentation of land and encourages the production of short term crops such as bananas and the consequent problems of poor drainage systems, soil erosion, and a reluctance on the part of such farmers to diversify.

- Perception of a lack of profitability in non-banana agriculture, the majority of banana farmers do not keep records and are therefore unable to assess the profitability of banana enterprise.
- Lack of appropriate legislation to ensure watershed protection. In the case where private ownership of lands obtains, there must be regulations to ensure that sustainable utilization is practised.
- Population pressure that forces fragile lands into inappropriate use.
- Need to pursue economic diversification as a deliberate strategy to relieve pressure on the limited land resource.

### **WATERSHED MANAGEMENT CONSIDERATIONS FOR SUSTAINABLE DEVELOPMENT**

The following need to be considered if developments within the watershed of these small islands are to be sustainable:

- The development of a Comprehensive Land-Use Policy (Development of Land Information System as a planning tool; crop zoning; appropriate legislation, establishment of protected areas, establishment of tree lines, etc.) to guide orderly utilization of resources within watersheds.
- The implementation of a restoration and rehabilitation programme for degraded catchments that employs: cost effective engineering measures such as drainage, gully stabilization, farm road redesign; and cultural practices such as tree planting, vetiver grass barriers, mulching, etc.
- Public education and information dissemination.

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