

## A new Botanic Garden for St. Kitts-Nevis

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The Caribbean insular region consists of all the islands of the Greater Antilles, the Lesser Antilles, the Bahamas, Turk and Caicos, Cayman Islands and the southern off-shore islands (Aruba, Curacao, Bonaire and Trinidad-Tobago). They are all characterized by spectacular land and seascapes, as well as diverse flora and fauna.

The European influence, over 500 years, was the cause of the enormous exploitation of forests for lumber, firewood, agriculture and mineral extraction. The islands were stolen from the aboriginal inhabitants, and furthermore colonized and settled by Africans and Asians (brought to substitute the working force of the almost all killed Amerindians), as well as the European descendents.

The total area of this complex of islands is about 240 000 km<sup>2</sup>, and the number of vascular plants is over 13 000 species. The Caribbean is considered as an important "hotspot" of the world, because of the richness of its flora besides the high rate of destruction of the original ecosystems, impacted by agriculture, deforestation, tourism resorts facilities, industry and growth of the population.

In this context, St. Kitts Island has suffered the same negative impacts. As all the small insular ecosystems, they are very fragile if compared to continental ones. The conservation of natural resources as water, soil and forest cover becomes an imperative concern to guarantee the sustainable human well - being.

The whole flora of the Lesser Antilles was studied and published by the late Dr. Richard Howard, from Harvard University, USA, in six volumes (1974 - 1989). From that thoroughly study, it is known that St. Kitts island flora of vascular plants amounts to 731 species, of which 533 are indigenous and 69 naturalized; the rest are cultivated species. Only one species of fern has been reported as endemic. The area covered by natural forests in 1980 amounted to 5,000 ha of broadleaved forests, representing 19.2% of the total area of the island.

On the other hand, water preservation and wise utilization is highly prioritized in the country, taking into account the growth of the economy (mainly tourism) and the population, as well as the small geographic extension of the island.

Having in mind the actual global warming and its resultant climatic change, the importance of conserving such an

important, first order resource as water - for all living organisms- becomes highlighted. Small Island ecosystems are the most threatened ones, as the rise of level of the sea can be a great disaster for all living forms including humans. Therefore, the safe and wise use of the aquifer of Basseterre has been in the first line of concern of the St. Kitts and Nevis Minister of Finance, Development and Planning.

In July 2003 a technical team from TERRAFORMA LTD. prepared for the above-mentioned Ministry, a concept document for the proposed Liamuiga Park in Basseterre, St. Kitts.

Later on, and mainly based on the Concept document cited above, Mr. Patrick Williams, Senior Physical Planning Officer and his technical team, prepared a new design for the Park, and produced a Demonstration Project Paper entitled "Rehabilitation and management of the Basseterre Valley as a protection measure for the underlying aquifer", presented to the Global Environmental Fund (GEF) for partial financial support. The main objective was "...to demonstrate the proper management and protection of a critical aquifer and well-field through a parallel process of: A. Mitigation of threats from contaminants, B. On-the-ground protection, and C. improved user-resource management". The project included a botanical garden or park.

Due to diverse factors related to economic development, and the use of pesticides and chemicals in agriculture, the impact over the quality of underground water has been unprecedented. Therefore, the Government is seeking the way to ensure the long-term sustainability of this vital resource.

In March of 2007, the Prime Minister of St. Kitts and Nevis, Hon. Dr. Denzil L. Douglas visited Cuba, and made a promenade to the National Botanic Garden. During that visit, the Prime Minister asked our collaboration in the planning and development of a botanic garden in St. Kitts.

### General ideas for a botanic garden

There are many kinds of botanic gardens, but all share the conditions to be public exhibitions of conveniently named, documented plant collections, with the purposes of education, research and conservation.

The Caribbean was the place in which Europeans (British) founded the first botanic garden in the new world. It was in St. Vincent Island, in 1765. At the end of the XIX century, the economic importance of colonial botanic gardens in Caribbean islands diminished, as such activity was taken by the newly founded botanical stations, devoted to agronomic problems as experimentation, improvement and propagation of useful plants, as well as to inventory the economic potential of local floras.

Today, a group of Caribbean botanic gardens (not confined to islands but comprising the entire Caribbean basin including the coastal and peninsular territories) have been united in the goal of conserving Caribbean plant biodiversity, the "Caribbean Botanic Gardens for Conservation". So, a framework for contacts and advice is today present to help start and develop botanic gardens in the region, and to create new ones.

#### Outlines of the new Botanic Garden

The selected area is a field of sugar cane of about 200 ha. located over the aquifer of Basseterre Valley. The soils of the island are mainly of volcanic origin. In the Basseterre valley, sandy-loam, fertile and well drained soils are present.

Concerning the rainfall monthly average in St. Kitts during the years 2000 to 2004 (1110.1 mm), it is lesser than the long term mean value (1399.8 mm). On the other hand, the pan-evaporation rates are much bigger (172.3 mm) than the monthly rainfall average (86.0 mm) for the year 2004.

Having thoroughly revised the preliminary ideas for the conceptual basis of the park and its associated botanic garden, and the layout of the main areas that it will include, we will refer to the botanical aspects of the project, and will propose the contents of all the considered botanic areas of the project.

A proposition of Mission Statement for such institution should be "*to preserve the underground water of Basseterre valley by means of the sustainable management of soil and vegetation cover, developing low-impact active and passive recreational and cultural resorts, a collection of unique plants of national ornamental, horticultural, medicinal value, a native flora representation, as well as the plants that are part of the national heritage and history, conceived to educate the new generations to spread water-care good practices and plant knowledge and to understand its importance to humanity.*"

In all possible cases, we have maintained the contents previously proposed, although some changes have been made in the designation or content of some areas.

1. Main Entrance and Visitor's Center. Including parking area and payment, educational and administrative offices

as well as public toilets.

2. Orchid and Bromeliad House.

3. Butterflies House.

4. Ancestral Garden. A collection of historical and heritage important plants used by Amerindians and African slaves.

5. Water Fountain.

6. Herbal Garden. A collection of medicinal plants used by people.

7. Farmer's market for Traditional Medicine.

8. Demonstration of Organic Agriculture.

9. Bamboo Walk. An impressive planting of Bamboo.

10. Open Air Concert Area.

11. Car Parking.

12. Cacti and Succulent Garden.

13. Ornamental Collection.

14. Arboretum.

15. Waterfalls.

16. Canal (stream).

17. Pond with aquatic plants.

18. Fern and Cycad Gully.

19. Reserved cane field for exhibition.

20. Palm Collection.

27. Fruit tree Collection.

28. Nursery and Horticultural facilities.

#### The importance of environmental education

In order to fulfill the mission of the Liamuiga Botanical Park, a strategy and program of environmental education is very important. It should be well designed and planned, and have the right personnel to conduct it.

The expected change in the behavior of citizens concerning water care and wise use will be the final objective of any environmental education program. Those programs should be flexible enough and friendly to people, taking into consideration the historical and cultural values and traditions.

There are diverse forms of achieving this goal. Botanic garden does have to play an important role in the implementation of informal and formal educational programs directed to the community.

There are several contents that can be understood in a botanic garden: gardening, horticulture, protection of soils and plants, relationship between water and plants, etc. that can help develop a better standards of life (both material and spiritual) and behavior of the citizens in a community concerning water care.

The sign system of the whole Park and principally the botanic garden must help interpretation of plant collections in relation to water, linking the visitor to the content of it, and allowing that the informal education message will be transmitted.

It is also necessary to reach the capacity building of the staff, taking into account the mission of the garden. In the same sense, it is necessary to train people conveniently in the best practices of using of water, protecting soils and conserving plants, as well as to have a direct involvement in monitoring the water quality.

Formal education is also developed in the botanic gardens as main centres of environmental education contained in the school programs. All educational authorities should be involved in accomplishing such goals.

#### REFERENCES

Howard, R. 1974-1989. Flora of the Lesser Antilles: Leeward and Windward Islands. 6 volumes. *Arnold Arboretum*, Harvard University, USA.

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