

Barbados

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GENERAL INFORMATION

Barbados is the most easterly of Caribbean islands. It has a land area of 430 sq. km. The 1990 census reported 260 491 inhabitants, with a population density of 605 residents per km², making Barbados the most densely populated of the Caribbean islands. The population growth rate is 0.27% per annum. The rural population accounts for 52% of the total population.

Annual rainfall ranges between 1140 and 2150 mm/yr (Figure 1), with a mean annual rainfall of 1422 mm/yr. Evapotranspiration is estimated at 1540 mm/yr and renewable water resources at 82 km³/yr.

Agriculture accounted for 4% of GDP in 1997 and employed 5.1% of the labour force. The main agricultural outputs are sugar, vegetables, cotton, cut flowers, bananas, sheep, chicken and pork.

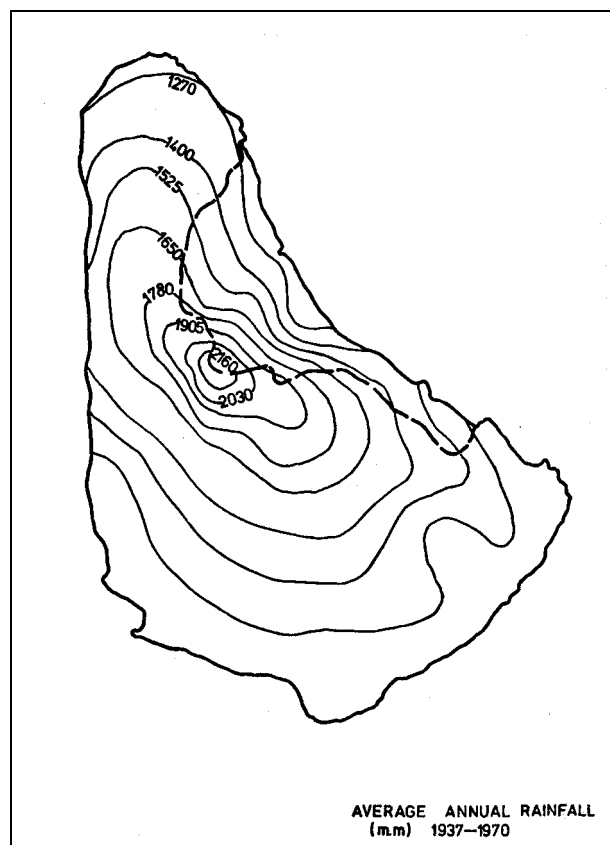


Figure 1. Rainfall in Barbados

INSTITUTIONAL ARRANGEMENTS

Institutional arrangements for land, water and plant nutrient resources are presented in Table1 below.

Table 1: Institutional Responsibilities of Land, Water and Plant Nutrition Resources Management

INSTITUTION		RESPONSIBILITY
Town and Country Planning Department		Overall responsibility for development applications guided by the Physical Development Plan
Ministry of Agriculture and Rural Development	Crops Section	Food crops and floriculture. Plant/foodstuff Quarantine at air & sea ports
	Fisheries Division	Fisheries resources
	Soil Conservation Unit	Scotland District conservation Landslide and erosion mitigation Forestry
	Meteorological Department	Meteorological forecasting
	Analytical Services Lab.	Soil, plant, water analysis
	Pesticide Control Board	Agrochemical import certification
	Quarantine Unit	Sanitary and phytosanitary certification
	Land and Water Use Unit	Hydrology and Agromet data Irrigation extension and agronomy
	Extension section	Crop husbandry advice and extension
Ministry of the Environment, Energy and Natural Resources	Environmental Unit	Environmental policy and international treaties Environmental education
	Coastal Zone Management Unit	Coastal area management
	National Conservation Commission	Parks and beaches Marine Museum Underwater Park Caves of Barbados
	Energy Division	Mined resources and energy
Ministry of Health	Environmental Engineering Division	Water quality Hazardous waste disposal
	Solid Waste Unit	Landfills and solid waste disposal
Barbados Water Authority		Assessment, development, management, licensing of island's water resources. Potable Water Supply Bridgetown Sewage Treatment Plant
Barbados Agricultural Development and Marketing Corporation		Government irrigation water supply schemes
Barbados Agricultural Management Company		Manages Sugar lands for Government
Lands and Surveys Department		Cartography, map production
Educational institutions	Barbados Community College	Associate degree in Agriculture
	SJP Polytechnic	
	Caribbean institute for Meteorology and Hydrology	Certificates in meteorology and hydrology
OTHER: Barbados Agricultural Society, FAO, IICA, CARDI, etc		

HOT SPOTS

Cultivated lands are increasingly being lost to non-agricultural uses, particularly in the tourism sector for the establishment of golf courses and in the housing sector. Between 1992 and 1997 the extent of cultivated land was reduced from 22 472 ha to 17 000 ha.

Pollution is also an area of concern, especially groundwater and near-shore pollution.

Water is inefficiently used in the area of water resources management and the potable water delivery system is also inefficient. A significant number of small farmers are dependent on potable water supply for irrigation. A 1997 Water Resources Study suggests that as much as 60% of water in the potable water supply is unaccounted for. There are ongoing efforts to reduce this level by at least 30%. A draft Policy Framework for Water Resources Development and Management was accepted in 1997, but key components have not yet been implemented.

Area Development Plan proposals for the agricultural sector were made in 1999 but they have not yet been accepted by Government.

In the area of plant nutrition management, very little soil and plant nutrient testing is carried out, nor are there attempts to optimize fertiliser application. Generally, agricultural research is inadequately applied in the areas of plant nutrition, irrigation agronomy and water use. There is also inadequate knowledge of soil infiltration rates and water storage capacities.

Other issues include a municipal landfill to be operated in the proposed Scotland District National Park and inadequate training in GIS modeling and analysis tools.

BRIGHT SPOTS

The bright spots include:

- The establishment of a national Geographic Information System, with contributions from all key Government departments
- The implementation of the Groundwater Protection Zones policy, in 1963, to prevent bacterial contamination of groundwater supply.
- The Bridgetown sewerage system became operational and the South coast system is currently under construction. The West coast system is planned for 2004 to reduce impact on the near-shore marine environment.

To address the problems of inefficient water use, leaks and unaccounted-for water, the Government has launched a number of public awareness/sensitisation initiatives to encourage use of water saving devices. A potable water tariff structure adjustment and a leak detection and mains replacement programme are also planned. There will also be universal metering.

A desalination plant became operational in 1999 to augment the potable water supply and mitigate against impact of drought.

- Other noteworthy initiatives include:
 - The proposal of a Code of Agricultural Practices to address potential pollution problems attributed to pesticides, herbicides and fertilizer use in agriculture
 - The implementation of a Land for the Landless Farmers project to provide land for small farmer production
 - Women involved at all levels of agriculture from labour to manager and owner

- The mapping and prioritisation of landslide- and erosion-prone areas in Scotland District GIS, and
- The establishment of the Ministry of Agriculture Web Page

CHALLENGES

The main challenge in the area of land resources management is the threat to food security caused by the reduction of available arable land for agriculture. This reduction is due to increased demand for housing.

For water resources management, the challenge is insufficient water for agriculture, as there is increased competition from other sectors in terms of price, quantity and quality. Optimising water use efficiency in agriculture is therefore a major challenge. The establishment of Water Resources Authority to assume regulatory and assessment functions, thereby enabling the Barbados Water Authority to concentrate on potable water supply and sewerage systems operation, is another challenge.

In the agricultural sector, the loss of the preferential markets for sugar will result in a reduction of foreign exchange earnings for the country. Moreover, replacement of the sugar crop could result in reduced protection against erosion. The challenge is therefore to develop new markets for agricultural produce for export and to promote linkages with the tourism industry.

As more tourists visit the island the challenge is to determine the carrying capacity of the key attractions, nature trails, beaches and the near-shore environment. Sewerage and other waste disposal systems must also be able to handle the considerable amounts of waste generated by increasing numbers of tourists visiting the island. There are also implications for maintaining acceptable groundwater quality.

With the removal of trade barriers, the importation of produce which possibly carries new pests and diseases is also a threat and the challenge is for the quarantine unit and the government analytical services laboratory to detect them and prevent their entry.

The establishment a of Code of Agricultural Practices is seen as another challenge.

DATA AVAILABILITY

The following data are readily available:

- Land use data (from aerial photos, field verification, census)
- Water resources (assessment 1978 & 1998, total rainfall +100 yrs, rainfall intensity, hydrology & agro-meteorology)
- Crops (aerial photos, field verification, census)
- Protocol for Access to Digital/GIS Data

Table 2 shows the types of data collected by various institutions in Barbados, and the institutions with a GIS capacity.

Table 2: Types of data collected by various institutions in Barbados and their GIS capability

PARAMETER MONITORED	Land and Water Use Unit	Soil Conservation Unit	Meteorological Department	Barbados Agric. Dev. & Marketing Cooperation	Barbados Agricultural Management Company	Barbados Water Authority	Coastal Zone Management Unit	Environmental Eng. Div.	Caribbean Institute for Hydrology & Meteorology	Private plantations	Environmental Unit	Town and Country Planning Department
Rainfall Total	✓	✓	✓		✓	✓			✓	✓		
Rainfall Intensity		✓							✓			
Wind Speed	✓		✓						✓			
Sunshine									✓			
Temperature and Humidity	✓		✓						✓			
Evaporation	✓	✓							✓			
Ground Water Abstraction	✓	✓		✓		✓						
Ground Water Quality	✓	✓		✓		✓		✓				
Spring/Stream Flow Rate		✓										
Spring/Stream Water Quality		✓					✓					
Established GIS		✓				✓	✓				✓	✓