Executive Summary

Introduction

Jamaica became a Party to the United Nations Framework Convention on Climate Change (UNFCCC) in January 1995. In keeping with its obligations under the Convention the Initial National Communications of Jamaica for 1994 was prepared. Funds from the Global Environmental Facility (GEF) were provided through the United Nations Development Programme (UNDP)

This National Communications has been prepared in accordance with decision 10/CP.2, 12/CP.4 and Articles 4 and 12 of the Convention of the UNFCCC.

The greenhouse gas inventory and removal by "sinks" has been prepared using the Intergovernmental Panel on Climate Change, (IPCC) 1996 Revised Guidelines for National Greenhouse Gas Inventories.

National Circumstances

Jamaica is an island in the Caribbean Sea with a total landmass of 10,991 square kilometres. The island is centered on latitude 18°15' N and longitude 77°20' W. Jamaica is approximately 145 kilometres south of the island of Cuba.

Jamaica is elongated along west-northwest to east-northeast alignment, roughly 230 kilometres long and 80 kilometres wide at its broadest point. The island's exclusive economic zone is approximately 25 times the size of its landmass. Jamaica has several rugged mountain ranges, with the highest point, the Blue Mountain Peak, soaring over 2,256 metres (7,402 feet). About sixty percent of the island's bedrock is white limestone; twenty five percent is volcanic and cretaceous, ten percent alluvial and five percent yellow limestone. More than 120 rivers flow from the mountains to the coast. There are fourteen parishes in Jamaica, with Kingston being the capital of the country. The coastline is approximately 1,022 kilometres.

The climate of Jamaica is mainly tropical with the most important climatic influences being the North East Trade winds and the island's orographic features, (mainly the central ridge of mountains and hills).

Other influences are the warm waters of the Caribbean Sea, as well as synoptic weather systems, primarily the Azores-Bermuda high-pressure system, surface, mid and upper level troughs, frontal systems, easterly waves, tropical depressions, tropical storms, hurricanes and infrequently, the inter-tropical convergence zone. Rainfall is the dominant meteorological variable that influences the meso-scale fluctuations of temperature, humidity, sunshine and evaporation.

Jamaica, like the other countries of the Caribbean, Central America and the Southern and Eastern sections of the United States is impacted from time to time

by severe tropical weather systems including tropical waves, tropical depressions, tropical storms and hurricanes. The official hurricane season for the Atlantic is June to November, although systems have occurred outside this period. The mean average annual rainfall for the period 1881-1998 was1895 millimeters while the mean average temperature ranges from over 33° Celsius at the Norman Manley International Airport at sea level to a cool 12° Celsius at Cinchona Gardens located in the Blue Mountains.

The population in Jamaica in 1999 was estimated at 2,590,500 with a population growth rate of 0.7 percent. Crude Birth Rates declined steadily from 24.8 per cent in 1990 to 22.0 per cent in 1999, while crude death rate has been estimated at 6.7 percent in 1999. In 1994, 22.8 percent of the Jamaican population lived below the poverty line. During the past decade real GDP growth in the Jamaican economy has declined from 1.1 percent in 1994 to 0.4 percent in 1999. The major economic earners in Jamaica are tourism, agriculture, manufacturing and the bauxite-alumina industry.

Greenhouse Gas Inventory

In 1994 Jamaica's emission of Carbon Dioxide (CO2) was 8,585 gigagrams, Methane (CH4) 58.47 gigagrams and Nitrous Oxide (NO2) 344 gigagrams.

Land-use changes and forests removed 167 gigagrams of carbon dioxide.

The energy sector is responsible for the majority of the carbon emissions with 8182 gigagrams of carbon emitted as a result of fuel combustion. Further analysis shows that the manufacturing industries and construction are responsible for 4111 gigagrams of carbon being emitted into the atmosphere, while energy industries emit 2245 gigagrams of carbon. The transportation sector is responsible for 1257 gigagrams.

Agricultural soils emitted 339 gigagrams of nitrous oxide, 36 gigagrams of methane were emitted as a result of enteric fermentation.

More appropriate emissions factor data is required, as many emissions factors found within the IPCC literature are not relevant. There is a need for improved data systems and data gathering to ensure that appropriate and correct data is obtained for the production of inventories.

Vulnerability and Adaptation

The Vulnerability and Assessment Chapter is an initial assessment of Jamaica's vulnerability to climate change. The key sectors of agriculture, water resources and the coastal zone were examined utilizing interviews and consultations with relevant government agencies, non-governmental organizations (NGOs) and representatives of the private sector and a review of the available literature. Generally, available quantitative data was not in a form that allowed a specific quantitative analysis on the effect of climate change on the given issue of concern. However, quantitative data together with expert opinion and anecdotal

evidence allowed for a qualitative assessment of climate change on the sector and, specifically, the areas most vulnerable to climate change. Adaptation measures have been proposed taking into account the need for an integrated approach noting existing activities. It is clear however that detailed technical vulnerability and adaptation studies are needed.

Coastal Zone

Jamaica is largely dependent upon its coastline. Key infrastructure such as the airport and many industries are located in coastal regions. Tourism is a key activity in the coastal zone contributing in 1998, 20 percent of GDP or an estimated foreign exchange earning of US$1.196 billion. The cost to protect Jamaica from a one metre sea level rise was estimated by the IPCC, in 1990 to be US$462 million which equates to a cost of US$197 per person or an annual cost that is 19% of GNP.

Sea level rise will compound beach erosion and permanent inundation in some areas could also occur, affecting industries and key infrastructure. The effects of climate change could be amplifying some natural hazards. Jamaica is already very vulnerable to tropical storms and hurricanes. It was estimated that the cost associated with damage from Hurricane Gilbert in 1988 was in the region of J$25milllion.

Climate change may have already affected the island's coral reefs. The death of large numbers of corals in 1988 and 1990 has been attributed to the increases in the temperature of coastal waters.

The economic value of all resources within the coastal zone will be adversely affected in a changing climate and a rising sea level. The resulting impact will be a loss of income, loss of commercial and industrial structures and infrastructure resulting in a detrimental impact on employment and the economy generally. Earning losses will occur in all sections of the community as a result of reduced economic activity and threats to human health.

Water Resources

Jamaica's freshwater resources come from surface sources (rivers and streams) and underground sources (wells and springs) and rainwater harvesting. Groundwater supplies most water demands (approximately 80% of production) and represents 84% of the island's exploitable water.

The island's water sources are associated with major rock formations and their interrelationships. The three dominant hydro-stratigraphic units are basement aquiclude, limestone aquifer, and alluvium aquifer/aquiclude. The island is divided into ten hydrological basins.

Raw water supplies are directly affected by changes in climatic conditions. Changes in the amount of rainfall as well as its frequency and intensity determine the amount of water that will be available for exploitation. The changes to the amount of total rainfall that Jamaica may receive under the climate change scenarios are uncertain; however, even minor changes in Jamaica's rainfall patterns could have significant impacts on its water resources.

Reductions in rainfall will have a number of effects on water sources and supply, most obviously reduced supply availability. Sea level rise most directly impacts water resources by causing increased saline intrusion in coastal aquifers. The effect of sea level rise will be exacerbated by lower rainfall thus reducing the groundwater head. Intrusion into alluvium aquifers may be moderate and higher in limestone aquifers. Saline intrusion into rivers or streams will affect the ecosystem balance of estuarine areas.

While a change in climatic conditions could have negative impacts on the water resources in Jamaica, the key issue still remains the effective distribution of the abundant available water resources.

Agriculture

Agriculture is one of the key economic sectors of Jamaica. This sector contributes approximately 7.3 percent of gross domestic product (GDP), represents approximately 12 percent of foreign earnings, and employs approximately 25 percent of the population. Sugar cane is the most important crop in Jamaica contributing approximately 45% of the export earnings for all export crops. Bananas are the second most important crop. Coffee citrus, pimento, coconut and cocoa are also exported.

Changes in temperature and atmospheric carbon dioxide will also affect agricultural output for Jamaica. Changing temperatures may result in changing wind patterns. If surface winds increase, soil erosion will increase. Increased soil erosion reduces the potential soil moisture reserves, which increases crop vulnerability to short-term dry spells. Any reduction in the amount of rainfall will result in lost production. In addition changes in patterns of rainfall will cause conditions to be more favorable for disease.

Adaptation

It is clear that there is a need for comprehensive adaptation strategies, which cross sectors. For the coastal zone there is a need for advanced planning to avoid worst impacts, assessments of need for modification of land use and implementation of identified land use guidelines, modification of building styles and codes, and a withdrawal of Government subsidies for development in high

risk areas. In addition there needs to be more structured coral reef management and greater support for research and environmental monitoring.

In the area of water management their needs to be a greater use of water conservation techniques as well as improvements in the distribution and supply of water. For agriculture there needs to be continued research into different varieties of crops as well as utilising more efficient irrigation systems

National Policy and Actions

Decision and policy makers need to be sensitized on the importance of climate change and incorporating adaptation strategies into broader sustainable development. There is a need for further cross-sectoral consultation on the issue of climate change as well detailed comprehensive public awareness activities.

There is a clear need for continuous ongoing research in the area of climate change, particularly in the area of climate modeling. There is still a need for additional technical expertise in the area of climate change. There is a need for the development of capacity and the transfer of technology. The legal and policy framework with regards to climate change also needs to be analyzed effectively.

The Caribbean Planning for Adaptation to Climate Change has built significant capacity and there is a need for continuation of this work. There is a need for considerable financial assistance in the area of vulnerability and adaptation, and for renewable energy technologies.

The institutional framework for the management of climate change and its adverse effects exists within the region. However, the human, technical and financial capacities are lacking. If Jamaica is to take advantage of existing and future opportunities and face the challenge that climate change will bring, then it is a matter of urgency that these deficiencies be addressed.

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