

NATIONAL ENVIRONMENTAL SUMMARY



BARBADOS
2010



United Nations Environment Programme

ACKNOWLEDGMENT

The National Environmental Summary (NES) for Barbados has been developed by United Nations Environment Programme (UNEP), with financing from the European Community. It serves as an information tool to support the incorporation of environment as a component into the United Nations Common Country Assessment (UNCCA) and the United Nations Development Assistance Framework (UNDAF). This NES is intended to provide a critical analysis of gaps and opportunities that exist within the current policy/programme and national legislative framework and which are used to address the major environmental issues. The linkages to poverty reduction and development are also highlighted.

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Acronyms

ACCC	Adaptation to Climate Change in the Caribbean Project
ACS	Association of Caribbean States
BADMC	Barbados Agricultural Development and Marketing Corporation
BIDC	Barbados Investment Development Corporation
BL&P	Barbados Light and Power Company Ltd.
BNRT	Barbados National Response Team
BNSI	Barbados National Response Team
BSS	Barbados Statistical Services
BWA	Barbados Water Authority
CANARI	Caribbean Natural Resources Institute
CARICOM	Caribbean Community Secretariat
CAR/RCU	Caribbean Regional Coordinating Unit
CBO	Community Based Organisations
CCCCC	Caribbean Community Climate Change Centre
CCRIF	Caribbean Catastrophe Risk Insurance Facility
CBD	Convention on Biological Diversity
CDE	Centre for Development Enterprise
CDEMA	Caribbean Disaster Emergency Management Agency
CDKN	Climate Development Knowledge Network
CDM	Comprehensive Disaster Management
CEHI	Caribbean Environmental Health Institute
CHENACT	Caribbean Hotel Energy Efficiency Action Programme
CHM	Clearing House Mechanism
CIDA	Canadian International Development Agency
CIMH	Caribbean Institute of Meteorology and Hydrology
CIP	Coastal Infrastructure Programme
CLME	Caribbean Large Marine Ecosystem Project
CPACC	Caribbean Planning for Adaptation to Climate Change
CPD	Central Purchasing Department

CRFM	Caribbean Regional Fisheries Mechanism
CSR	Corporate Social Responsibility
CTO	Caribbean Tourism Organisation
CZMU	Coastal Zone Management Unit
DFID	Department for International Development
DPSIR	Driving Forces, Pressures, State of the Environment, Impacts and Responses
DU	Drainage Unit
EC	European Commission
EDF	European Union Economic Development Fund
EEZ	Exclusive Economic Zone
EHD	Environmental Health Department
EMLUP	Environmental Management and Land Use Planning for Sustainable Development Project
ENCAPD	Environmental Capacity Development
EPD	Environmental Protection Department
EU	European Union
FAO	Food and Agricultural Organisation
FMMA	Folkestone Marine Management Area
GHS	Folkestone Marine Management Area
GOB	Government of Barbados
GDP	Gross Domestic Product
GEF	Global Environment Facility
GTZ	German Technical Cooperation
ICAM	Integrated Coastal Area Management
IBRD	International Bank for Reconstruction and Development
IDA	International Development Association
IOC	Intergovernmental Oceanographic Commission
IWCAM	Integrated Watershed and Coastal Area Management
ISWMP	Integrated Solid Waste Management Programme
JICA	Japan International Cooperation Agency
LBS	Land-Based Sources of Pollution
MACC	Mainstreaming Adaptation to Climate Change

MMA	Marine Management Authority
MOU	Memorandum of Understanding
MW	Mega Watt
NAP	National Action Plan
NCC	National Conservation Commission
NCSA	National Capacity Self-Assessment
NES	National Environmental Summary
NGO	Non Governmental Organisation
NHD	Natural Heritage Unit
ODS	Ozone Depleting Substances
OAS	Organisation of American States
OECS	Organisation of Eastern Caribbean States
OSR	Oil spill response
OUCE	Oxford University Centre for the Environment
PAHO	Pan American Health Organisation
POPs	Persistent Organic Pollutants
RDC	Rural Development Commission
SAICM	Strategic Approach to International Chemicals Management
SBRC	Sustainable Barbados Recycling Center SRL
SCP	Sustainable Consumption and Production
SCU	Soil Conservation Unit
SIDS	Small Island Developing States
SLM	Sustainable Land Management
SSA	Sanitation Service Authority
SWPU	Solid Waste Project Unit
TCDPO	Town and Country Development Planning Office
TVCA	Tourism Vulnerability Country Assessment
UDC	Urban Development Commission
UNCCA	United Nations Common Country Assessment
UNDP	United Nations Development Programme
UNECLAC	United Nations Economic Commission for Latin America and the Caribbean
UNEP	United Nations Environment Programme

UNESCO	United Nations Economic Commission for Latin America and the Caribbean
UNCCD	United Nations Framework Convention to Combat Desertification
UNFCCC	United Nations Framework Convention on Climate Change
UNITAR	United Nations Institute for Training and Research
USAID	United States of America International Development
WB	World Bank

TABLE OF CONTENTS

ACKNOWLEDGMENT.....	i
ACRONYMS.....	ii
TABLE OF CONTENTS.....	v
EXECUTIVE SUMMARY.....	vii
INTRODUCTION AND BACKGROUND.....	1
1. STATE OF THE ENVIRONMENT & ENVIRONMENTAL ISSUES.....	3
2. NATIONAL RESPONSES.....	7
3. INTERNATIONAL ASSISTANCE PROGRAMMES.....	25
4. CRITICAL GAPS AND OPPORTUNITIES TO SUPPORT COUNTRY ENVIRONMENTAL PRIORITIES.....	31
BIBLIOGRAPHY.....	36
ANNEX 1: STAKEHOLDERS AND/OR INFORMANTS.....	38
ANNEX 2: BARBADOS' PARTICIPATION IN MULTILATERAL ENVIRONMENTAL AGREEMENTS.....	42
ANNEX 3B: LIST OF INTERNATIONAL PROJECT IMPLEMENTED IN 2005-2009 AND PLANNED FOR 2010-2015.....	45

EXECUTIVE SUMMARY

The National Environmental Summary (NES) for Barbados was prepared using the DPSIR (Driving Forces, Pressures, State of the Environment, Impacts and Responses) Framework. Information was gathered by way of a desktop review of scientific studies, national reports and documents along with interviews of key environmental and technical experts working in the various agencies and organisations in Barbados.

The conclusions drawn from the study identified the following environmental issues as being of national priority:

1. Inadequacy and Reliability of Freshwater Supply,
2. High Cost and Inefficient Use of Energy,
3. Coastal Ecosystems Degradation,
4. Inadequate Waste Management,
5. Limited Land Space and Inefficient Land Use,
6. Inefficient Traffic Systems and Supporting Infrastructure, and
7. Natural Disasters and the Threat of Climate Change.

Barbados has successfully responded to these issues with a significant number of interventions by way of overarching policy initiatives that speak to GOB's commitment to addressing its environmental problems:

- the National Strategy Plan: Goal four - building of a green economy which requires advancement and protection of the environment, resources, infrastructure while advancing social and economic development;
- the Barbados Sustainable Development Policy;
- the Barbados Medium Term Strategy 2010-2014: preservation by promoting and facilitating the environmentally sustainable use of our natural resource, maintaining a safe and reliable water supply; ensuring an efficient and reliable energy sector, developing a modern transport infrastructure, improving disaster management, and maintaining an efficient land-use policy; and
- The 2008 Throne Speech.

In addition to these broad plans and policies, specialised policies, programmes, legislative frameworks and projects have been undertaken to address each environmental issues identified. Despite these efforts, a number of gaps have been identified in the current framework. As such, relevant opportunities have been identified that may be utilised to orient and align international development assistance and partnerships in support of the Barbados' development goals in a sustainable manner. Generally, issues identified can be further improved by way of:

- Mainstreaming environment by the creation of an overarching policy framework;
- Improving the legislative and enforcement framework;
- Increasing private sector and non-governmental multi-sectoral participation;
- Achieving positive attitudinal changes in citizens by ways of education;

- Establishing environmental standards, as well as improving systems for information gathering and monitoring;
- Building capacity by ways of increased manpower and professional development; and
- Implementing more initiatives based on horizontal and regional cooperation.

INTRODUCTION AND BACKGROUND

Barbados is the most easterly of the islands of the Caribbean, located at 13° N, 59° W, approximately 160 kilometres from the nearest landmass. The island is 34 km long and 23 km wide with a total land area of approximately 432km², 92km of coastline and an Exclusive Economic Zone (EEZ) of 167, 000km². The Barbadian climate is classified as dry sub-humid with temperatures between 20° and 30° C. There is a distinct dry season from December to May and a wet season from June to November. The average annual rainfall is about 50 inches (1254 mm) in the lower elevations and about 66 inches (1650 mm) in higher elevations.

Eighty-six percent of the island is made up of a karst landscape of deeply fractured and gullied limestone laid down in a series of terraces, deeply incised by numerous gullies and underlain by a complex underground cave system. The remaining land area consists of the sedimentary deposits of the Scotland Series. The island is relatively flat, with the highest point being Mount Hillaby at 336m (1, 104 ft). Barbados' resident population in 2008 was estimated at 275,300¹ making it one of the most densely populated countries in the world, with a density of 637 persons per square kilometre.

Barbados has controlled its rate of population growth through the successful implementation of an island-wide family planning programme for the past five decades. This, coupled with economic development, has contributed to the attainment of an average rate of growth of 0.3 percent between 1980 and 2008.

The majority of Barbados' population is settled along the south-east, south and west coasts of the island, predominantly in the coastal areas of the parishes of St. Philip, Christ Church, St. Michael, St. James, and the southern reaches of St. Peter. The 'suburbanization' phenomena emerging from the capital, Bridgetown is expected to continue, leading to the gradual increase in densities to the northwest, north and east of Bridgetown, while most other areas will remain relatively constant.

Peak demand for electricity has been growing steadily for the past ten years, from 125 (mega watt) MW in 2000 to 166MW in 2009, with total electricity consumption growing at approximately 3.6% annually, from 676 GWh in 1999 to 944 GWh in 2008. Commercial customers account for most of the growth. The tourism sector is the major driver of commercial demand. The industrial sector, over the same period had an average growth rate of 3.5% and the residential sector, 1.1%

Method

The National Environmental Summary (NES) for Barbados was prepared during July 2010 as an information and decision making tool to support the mainstreaming of the

¹ Barbados Economic and Social Report, 2008.

environment as a thematic area (issues, management, responses and opportunities) into to United Nations Common Country Assessments (CCA) and the United Nations Development Assistance Programme (UNDAF) within the broader UN One initiative. The NES is meant to be a succinct analysis of the environmental issues and the gaps which exist within policy and programme responses as well as in the national legislation, while taking into account the link to poverty reduction and improved human well being through development.

This NES was prepared by collection and analysis of information and data from a desktop review of relevant documents (scientific reports, policy documents and reports) and 'face to face' interviews with key stakeholders and experts from national government, regional and international organisations. The DPSIR (driver-pressure-impact-state-response) approach was used as the framework model.²

² DPSIR is a general framework for organising information and reporting about state of the environment covering Driving forces, Pressures, State of the environment, Impacts and Responses. The idea of the framework is often used for organising systems of indicators in the context of environment and sustainable development: http://maps.grida.no/go/graphic/the_dpsir_framework.

STATE OF THE ENVIRONMENT & ENVIRONMENTAL ISSUES

The major environmental challenges for Barbados can be summarised as follows:

1. Inadequacy and Reliability of Freshwater Supply

Barbados' freshwater supply is primarily a function of the duration and frequency of rainfall³ and the island's geomorphology - that is, a low-lying coral-based island where groundwater supplies, located in aquifers, are protected only by a thin layer of , permeable soil. The wet season, lasting from around June to October, affects the quantity of groundwater since this is when the underground aquifers are replenished, and this is the major source of potable water on the island. The amount available for use is heavily influenced by the island's geological structure and thereafter by the distribution system in place for water supply. With the current population, available supply is well under the 1000 m³ per capita set internationally as the limit below which a country is classified as "water scarce". As such Barbados is ranked as one of the fifteen most water scarce countries in the world.⁴

With the growth in development over the last few decades there has been a new dimension added to management of freshwater resources, i.e increased surface water and storm water runoff as a result of the expanding level of development in the urban corridor. This has the potential of impacting the amount of water available to recharge the underground aquifers.

A zoning system is used to protect ground water against contamination. This system divides the island into five water protection zones---Zone 1 to Zone 5---with Zone 1 being the most restrictive with respect to 'allowed' physical development, and Zone 5 having no such restrictions. The zones are not protected against chemical pollution and as such, the existing ground water protection policy does not guard against source control of nitrate and pesticide. Increasing levels of nitrates in groundwater is a pressing national concern. Water quality risks being compromised by agricultural chemicals and therefore requires stricter control on the release of chemicals in sensitive areas.

2. High Cost and Inefficient Use of Energy

Barbados has universal access to electricity. The power supply⁵ is generated using a number of fuel sources: comprising approximately 92% Bunker C, 7% diesel and less than 1% natural gas. The Energy Division has stated that the energy intensity in Barbados has been falling as the country shifts to GDP growth sectors that rely less and less on energy, however despite the reduced use of energy, factors of population growth and the increased

³ Rainfall for Barbados averages 56 inches per year and the annual renewable freshwater resources have been estimated at 225,410 m³ or 49.59 mgd per day.

⁴ Barbados Water Authority. "Sustainable Water Resources Management - Recommendations". Paper presented at the Barbados National Consultation on Sustainable Development, November 1996/7.

⁵ The transport industry uses 33% of all fossil fuel used in Barbados with 50 percent going toward the production of electricity.

cost of fossil fuels have increased the percentage of the import bill spent on fossil fuels to approximately 13 % in 2010. The cost of energy therefore has a significant impact on the Barbadian economy. While there are negative environmental impacts from use of fossil fuels such as pollution, the government's initiative to promote less reliance on fossil fuel is fundamentally as a result of the economic burden of unpredictable oil prices, the drain on foreign exchange and the opportunity costs of maintaining the status quo - use of resources that could be employed to combat other development issues.

3. Coastal Ecosystems Degradation

The 92 kilometres coastline is surrounded by a narrow, insular shelf which supports a variety of living reef systems and a great diversity of species. The majority of the island's population and infrastructure is concentrated in the southwest urban corridor, and the Caribbean coast is the focal point of the island's tourism sector. Development along this coast has witnessed encroachment of buildings into the active beach zone, loss and degradation of significant wetlands, degradation of coral reefs and coastal water quality and loss of public beach access. These negative changes impact on the livelihoods and wellbeing of many Barbadians including fishers, hoteliers and other related businesses.

4. Inadequate Waste Management

Significant volumes of solid waste are generated by the importation of large volumes of consumer items as a result of residents' high per capita income and high standard of living. This when pooled with the high population density in a small land area and annual stay-over tourist arrivals that almost double the local resident population at any given time, presents challenges for sound waste management and disposal.

The main method of solid waste disposal is by sanitary landfill. Government is challenged to dispose municipal solid waste at the main facility at Mangrove, St. Thomas as well as several other forms of waste. In spite of an established system of waste management comprising of government programmes, private entities and business initiatives, waste management has proven to be a major challenge in the last twenty years. Specific challenges include illegal dumping by private citizens and businesses in gullies, quarries and on roadsides. This has consequences on the health and human wellbeing of the citizens as mosquitoes, rats and mice, and illegal dumps and stockpiles of vegetation, tires and old containers are sources of vector borne diseases. There is also the associated adverse impact of dumping on marine and coastal resources. Finally, an emerging issue is finding an economically viable means to dispose non-biodegradable packaging generated through foreign imports and local producers and retailers.

More than 700 tonnes of hazardous material⁶ has been known to move through the Port Authority⁷ - with over 50% of this total are in the form of pressurized gases with little or no potential for generating recoverable residuals, while the remainder is of liquid or solid

⁶ Potentially hazardous wastes include: acids, alkalis, solvents, pesticides, heavy metals, ink and dyes, lead acid batteries, used oil, medical waste and asbestos.

⁷ Government of Barbados, Barbados National Assessment Report of Progress made in addressing Vulnerabilities of SIDS through Implementation of the Mauritius Strategy for Further Implementation(MSI) of the Barbados Programme of Action Government of Barbados, the Medium Term Development Strategy of Barbados 2010- 2014, 2010.

compounds with the potential for generating a recoverable solid or liquid hazardous waste and oftentimes requiring strict management procedures for the entirety of their product life cycle. Leachate infiltration into the groundwater aquifer from illegal dump sites in gullies continues to be problematic and can pose a significant long term threat to the potable water supply.

Advances in development have been accompanied by an increased use of chemicals for agriculture, industry and transport to name a few. This has resulted in increased amounts of Persistent Organic Pollutants (POPs) as well as lead, mercury and other heavy metals. Management of these chemicals is necessary to avoid detrimental impacts on human health and contamination of groundwater and coastal ecosystems.

5. Limited Land Space and Inefficient Land Use

Land allocated for various uses in Barbados has undergone notable change over the past three to four decades. According to the Barbados Report to Habitat II (1996), over the period 1966-1976, the land allocated for urban development increased from 21.2% to 37.6%, while the amount of arable land declined from 57.7% to 46.2%. In 1976, 62.2% of total rateable land was used for sugar plantations and tanneries, 26.4% for residential with agriculture and commerce, 9.8% for residential alone and 1.6% for tourism, commerce and industrial activities.

Given current trends, land previously allocated to agricultural use has been, or is at risk of being, reassigned to residential and other development (for example in the areas of St. Thomas, St. George and St. Michael) which is incompatible to the drive of ensuring a vibrant agricultural sector in the face of food security. These changes give some indication of the pressures on Barbados' land resources that result in environmental impacts. Expanding settlement areas increase the coverage of hard surfaces that result in increased runoff and potential for flooding, while inappropriate agricultural practices lead to soil erosion and land degradation which ultimately affects the marine environment.

6. Inefficient Traffic Systems and Supporting Infrastructure

Regarding the transportation sector, it is estimated that there is approximately 116,675 vehicles on the road, 94,496⁸ of which are private cars. Such a volume on a small island like Barbados presents traffic congestion, air pollution and emissions, waste management and health and productivity of society. There is also the issue of abandoned motor vehicle bodies constitute an eye-sore and also provide breeding grounds for pests, and forming a general health hazard.

7. Natural Disasters and the Threat of Climate Change

Natural disasters such as hurricanes and droughts have a significant impact on the national development as they affect the social, economic and environmental fabric of the island. Like other islands, it is believed that climate change has significantly played a hand in the increased frequency of the threat of hurricanes and prolonged drought conditions experienced in recent years. In respect of the latter there have been shifts in rainfall

⁸ *Ibid.*

patterns and hence changes in dry and wet season. The resulting consequences of natural disasters and climate change include: coastal erosion as a result of unpredictable swells; sedimentation; increased rates of coral bleaching; and decreased productivity of coral reefs and other coastal ecosystems. Impacts include decline in the tourism product, opportunities for recreation (especially in coastal areas), livelihoods (fishers and recreational service providers); and the decline in the productivity of agricultural lands due to long droughts.

Key drivers of the environmental issues listed above include:

1. Economic crisis - there is a dearth of funds available for national programming across the board. As such a number of issues can only be addressed immediately with the injection of funds from donor agencies. A negative impact of this, is that local environmental issues are often addressed within parameters set by the donor. However, it should be noted that when funds are available the national agenda supersedes the donor agenda as appropriate;
2. Attitudes as well as traditional practices in the face of a changing environment - this is particularly challenging as rapid changes in environment (such as those caused by climate change) does not allow for incremental human behavioural shifts. This in turn affects the political will of politicians to support measures necessary to effect change;
3. Development demands – housing, , tourism, industry and agricultural;
4. Inadequate institutional capacity – lacking in manpower, requisite training, and equipment for research and monitoring;
5. Existence of outdated legislation, absence of regulatory instruments and poor enforcement of existing legislation;
6. Lack of synergies among sectoral programmes as well as the limited exposure of key decision makers to the extent of the cross-sectoral nature of environmental issues and management particularly in a small island like Barbados; and
7. Overall lack of medium and long-term development strategies and implementation in a way that addresses economic, social and environmental issues in tandem.

2. National Responses

There are a number of policies, programmes and projects to address issues identified as national priorities. Barbados' approach also combines a mix of legislative mechanisms and economic instruments to bring about positive environmental governance. Generally, the following overarching policy initiatives that speak to GOB's commitment to addressing its environmental problems:

- the National Strategy Plan: Goal four - building of a green economy which requires advancement and protection of the environment, resources, infrastructure while advancing social and economic development;
- the Barbados Sustainable Development Policy;
- the Barbados Medium Term Strategy 2010-2014: preservation by promoting and facilitating the environmentally sustainable use of our natural resource, maintaining a safe and reliable water supply; ensuring an efficient and reliable energy sector, developing a modern transport infrastructure, improving disaster management, and maintaining an efficient land-use policy; and
- The 2008 Throne Speech.

The Medium Term Development Strategy 2010-2014 states that GOB has been pursuing various elements of a Green Economy throughout the country's development. The Barbados working definition for a green economy⁹ for Barbados is "an integrated production, distribution, consumption and waste assimilation system that, at its core, reflects the fragility of our small island ecosystems as the basis for natural resource protection policy intervention, business and investment choice, human development programming, and, the facilitation of export development strategies." Broadly speaking this addresses all issues highlighted as being of national priority.

Specific responses to Barbados' environmental issues of national priority are listed in Table 1. Associated conventions are listed in Annex 2.

TABLE 1: NATIONAL RESPONSES TO ENVIRONMENTAL ISSUES

ISSUE	RESPONSE
Inadequacy and reliability of freshwater supply	Fresh water resources are managed under the following statutes: Three-Houses Spring Act, 1713; Porey's Spring Act, 1864; The Underground Water Authority Act 1953 [Cap. 283]; The Soil Conservation (Scotland District) Act, 1959; The Health Services Act and Regulations (1969); The Barbados Water Authority Act, 1980 [Cap.274A]; The Town and Country Planning Development Order, 1972; and The Marine Pollution Control Act, 1998. Between 96-98% of households are connected to the public water supply system. The

⁹ According UNEP (2010) a green economy characteristic includes "substantially increased investments in economic sectors that build on and enhance the earth's natural capital or reduce the ecological scarcities and risks."

ISSUE	RESPONSE
	<p>remainder have access to the public water supply. Groundwater quality is good and a reasonably effective disinfection system providing a biologically safe water supply.</p> <p>Sewage Treatment Plants: The GOB operates two wastewater treatment facilities in Bridgetown and Graeme Hall on the South Coast while most hotels have privately operated sewage treatment plants. Plans are also being developed for a West Coast sewerage system in which water recovery and argumentation will be incorporated Domestic and commercial properties vary in disposal methods from water borne facilities or environmental sanitary pits. Final disposal from homes is underground via septic tank, well or earth pit while effluent from the treatment plants are usually to the sea or underground via a well after primary treatment.</p> <p>A Draft Policy Framework for Water Resources Development and Management in Barbados: laid out the policy for integrated land and water management and development was articulated under the 1998 Environmental Management and Land Use Planning for Sustainable Development Project (EMLUP).</p> <p>Water Quality Management: under the Barbados Water Authority Act, Barbados Water Authority (BWA) is legally responsibility of ensuring water quality which is protected at 3 levels: the National Groundwater Protection Zoning Policy¹⁰ protects the groundwater resource; the water at the pumping station is disinfected to ensure biological safety; and the Minister of Health under the Health Services Act has legal responsibility for protecting the health of all residents inclusive of ensuring a safe drinking water supply. Source monitoring is undertaken by the Environmental Protection Department (EPD) and BWA, as well as via distribution system monitoring by the Environmental Health Department (EHD) and the BWA. The EPD and EHD act as regulators of the BWA. Barbados Agricultural Development and Marketing Corporation (BADMC) also monitors water quality for agricultural purposes.</p> <p>Land Use and Zoning: The Revised Policy of Private Sewerage and Waste Water Disposal Systems seek to control any development or liquid waste disposal system that could be injurious to the national water resources. It is enforced primarily though BWA, EPD, Town and Country Development Planning Office (TCDPO) and the Ministry of Agriculture.</p> <p>The Groundwater Protection Zoning Policy's primary object is protection of groundwater from bacterial contamination by way of zoning. The prohibition of new development in Zone 1 (the zone with the most restrictions) has been incorporated into the Development Order under the Town and Country Planning Act (Amended 2003). The Barbados Physical Development Plan, as mandated by the Town and Country Planning Act addresses the issues of water and sewage and lists the requirements guiding the groundwater zoning policy. The BWA and EPD have the joint task of policing the zoning policy; however the TCDPO has sole responsibility for its enforcement.</p>

¹⁰ 1963, (Updated 2010).

ISSUE	RESPONSE
	<p>Pollution Prevention and Control: The Marine Pollution Control Act (1998) is designed to establish discharge standards for all waste water into the groundwater as well as the marine environment listed in a table of prohibited concentrations. A Draft list of Prohibited Concentrations was prepared in 2004. Full implementation of the Marine Pollution Control Act (1998), will address the regulation of all sources of marine pollution, including the impacts of contaminated groundwater.</p> <p>National Water Conservation Plan: currently in the implementation phase, comprises long-term ongoing measures such as leakage reduction and universal metering and short-term measures such as temporary shutdown of parts of the system on a rotational basis or temporary licence restrictions on private abstractions.</p> <p>The Emergency Drought Management Plan: identifies parameters used to monitor, forecast and predict the impact of drought such as rainfall measurements, groundwater measurements, and salinity and weather data from the Meteorological Office as well as reservoir levels. BWA is looking at the establishment of a rainfall-gauging network to supplement the existing network.</p>
<p>High Cost and Inefficient Use of Energy</p>	<p>The legislation governing energy management include the Electricity Act , Cap 277, the Electric Light and Power Act, Cap 278, the Fair Trading Commission Act, Cap 326B and the Utilities Regulation Act, Cap 282.</p> <p>GOB's target for renewable energy contribution to the island's primary energy to be in excess of 30% by 2020. Currently the main renewable energy sources are bagasse and solar water heaters. These contribute approximately 15% to the island's primary energy supply. Other forms of renewable energy will be developed as well as measures put in place to improve the contribution from current sources.</p> <p>Policy interventions by the GOB include:</p> <ul style="list-style-type: none"> • Use of GOB properties in generation of electricity from solar, wind and waste for its own facilities and for sale into the national electricity grid; retrofit its buildings and facilities, revamp its fleet of vehicles to conserve energy use - particularly of fossil fuel energy. • Putting in place building standards and incentives to encourage major conservation of energy. • The Income Tax Act provision for the cost of energy audits is currently up to \$2,000.00 to be deducted as part of the general Income Tax Allowance for Home Improvement of \$10,000 in any one year. Also a separate allowance called the Energy Conservation and Renewable Energy Deduction of a maximum of \$5,000.00 per year over each of five (5) years to cover the costs of an energy audit and fifty per cent of the cost of retrofitting a residence or installing a system to produce electricity from a source other than fossil fuels was proposed. This applies to incorporated or unincorporated businesses. • Under Part II B item 87 of the Customs Tariff, various items of wind turbines, photovoltaic components and systems, bio fuel systems, hydropower systems, solar thermal systems, wave or tidal power systems, fuel cell systems and geothermal heat pump systems are exempted from import duty (20%) and environmental levy, on the basis of ministerial approval. The need for ministerial

ISSUE	RESPONSE
	<p>approval in each and every instance will no longer apply and these items will automatically enjoy the concession from the Customs.</p> <p>GOB has invested in a 17.5KW photovoltaic installation at Harrison’s Cave, the major tourist attraction. This installation is connected to the recharging system for the electric trams that transport visitors through the cave system.</p> <p>The Barbados Light and Power Company Ltd. (BL&P) has two 2 kW solar photovoltaic installations which are connected to the national grid but their contribution to the total power supply is minimal.</p> <p>Other photovoltaic projects include: the ice machine at Skeetes’ Bay, a rural fishing community; the computer laboratory at Combermere School, one of the island’s secondary schools; and the lighting of a statue of National Hero Sir Grantley Adams, located at Government Headquarters.</p> <p>Greening of Government Project under the Ministry of the Environment, Water Resources Management and Drainage. One of the line departments of the Ministry has commenced the conversion from conventional sources of electricity to photovoltaic sources.</p> <p>The solar water heating industry (approximately 40,000 units in use with more than 30 000 for domestic use and locally manufactured)has lead to significant savings in fuel import costs, direct energy savings, energy security benefits and savings in greenhouse gas emissions.</p> <p>Barbados transfers technology re solar water heaters in St. Lucia and in Trinidad. Barbados has been approached by over 10 developing countries from throughout the world and in particular, is seeking to be part of the US \$12 million dollar GEF solar water heater project.</p> <p>IADB funded project facilitates independent production of electricity and selling excess power to the Barbados Light and Power Company Ltd. It involves the installation of solar panels on private homes, commercial entities and government buildings and will also pursue small wind and bio fuel projects.</p> <p>Barbados’ Draft Energy Policy: Barbados is seeking to reduce the impact of the high oil prices on economic performance of the country. Strategies include but are not limited to the introduction and maintenance of energy conservation and efficiency measures to maximize efficiency of use of energy; and ensuring that renewable energy plays a greater role in the economy. Forms of renewable energy being considered include:</p> <ul style="list-style-type: none"> • Wind energy: a wind farm of 10 mega watt (MW) to generate 26,000,000 kilo watt hours (KWh) annually – approximately 2.8 percent of the total electricity produced. • Fuel Cane: Ministry of Agriculture and Rural Development through the Barbados

ISSUE	RESPONSE
	<p>Agricultural Management Company (BAMC) commissioned a Feasibility Study on a Fuel Cane Power Generation Project. It is envisaged that through this fuel cane project, 20 to 30 MW of electricity will be produced.</p> <ul style="list-style-type: none"> • Expansion of Solar Water Heater Industry: GOB is seeking to implement measures that will stimulate greater interest in fuel saving water heaters. <p>Energy Conservation Programme: To mitigate high-energy prices through a comprehensive energy conservation programme GOB is seeking to establish a significant energy conservation programme. Elements of this programmes include:</p> <ul style="list-style-type: none"> • Home Energy Efficiency: prevention of the energy-demanding hot house syndrome by encouraging and facilitating the use of materials, which keep houses cooler, such as thermal barriers, roof insulation, window tint and ceramic roof coatings; • Home Energy Audits: identification of areas in which each householder could reduce their energy bill by an average of 10%. The Ministry responsible for Energy will develop criteria for approval/certification of auditors. • Energy Conservation in Cooling: Development of a programme that encourages greater use of fans while discouraging the use of the seemingly low-cost air conditioners; • Energy Efficient Electrical Appliances: seek to implement a fiscal incentive and an appliance labelling policy to empower consumers to make better energy-saving decisions when purchasing energy using goods; • Energy Savings from Fluorescent Light Bulbs: encourage and facilitate the use of energy efficient light bulbs by increasing duties on incandescent light bulbs and fittings, while reducing import duties of fluorescent light bulbs and fittings; and • Transport Sector: promote the reduction in fuel consumption cost through use of cheaper alternative fuels such as ethanol, natural gas, and LPG.¹¹
<p>Coastal Ecosystems Degradation</p>	<p>The CZMU is the primary government entity with the mandate for undertaking research and assessments of marine resources in Barbados. The Fisheries Division is responsible for the assessment of fish stocks.</p> <p>National response to coastal degradation are as follows:</p> <p>Coral Bleaching and Temperature Monitoring Project: CZMU in conjunction with CERMES, UWI has established long term monitoring protocols at several reef locations along the west and south coasts and more specifically, developed a long term coastal water temperature profile.</p> <p>Coral Transplantation: CZMU transplanted approximately 220 numerically tagged coral from the new Coast Guard site to Batts Rock and instituted a monitoring programme on the new site. Monitoring has shown that the transplanted corals are in good health.</p> <p>The Bellairs Research Institute of Mc Gill University conducts assessment of living</p>

¹¹ The energy used by the transport sector is in excess of 30% of the national energy bill representing over \$100 million in import value. The total value of gasoline consumed at the retail level is approximately \$294 million: Medium Term Strategic Framework for Barbados 2006-2008.

ISSUE	RESPONSE
	<p>marine resources in the Barbados’ coastal waters.</p> <p>Coastal Structures Inventory Programme: CZMU assesses the number and condition of all coastal structures.</p> <p>Beach Profiling Programme: monitors the condition of selected beaches</p> <p>Coastal Water Quality Monitoring Programme: CZMU is in the process of bringing on stream a coastal water quality monitoring programme, while EPD also conducts near-shore beach water quality assessments on a routine basis.</p> <p>GEF Integrated Watershed and Coastal Area Management Project: GOB aims via this project to develop a project to strengthen the area of information management in partnership with the Food and Agricultural Organisation. The project is designed to improve the monitoring system land and water resources available for agriculture and the environment, by providing them with an optimised water resources monitoring network and an easy accessible land and water resources database; develop the functional strategic linkages between the departments found in the Ministries of Agriculture and Environment and other influential partners that have specific responsibility for water resources management on the island; strengthen the capacity of the technical staff of the Ministry of Agriculture (Water Resources Management Unit) and the Ministry of Environment Water Resources and Drainage (CZMU, EPD, BWA, European Union (EU), Drainage Unit (DU)), in data collection and management; strengthen the capability for data sharing inter-ministerial between the Ministries of Agriculture and Environment; and strengthen the link between management of land and water resources.</p> <p>Fisheries Research: Fisheries and fisheries –related research is carried out by the Fisheries Division and the University of the West Indies on:</p> <ul style="list-style-type: none"> • Biological and fishery aspects such as species diversity and distribution, size or age composition of the catch, fecundity, potential yield or maximum sustainable yield, life history and ecology, migration, stock structure catch and landings, fishing effort, catch per unit effort, fishing gear selectivity and efficiency. • Social aspects such as the age and education distribution, family and social unit composition, quality of life, social networks and organizations, participation in fisheries management, effects of changes in fishing technology, recruitment into the fishing industry, occupational alternatives. • Economic aspects such as contribution to GDP, fishery enterprise profitability, average fisher folk income and expenses, input cost analysis, fish price analysis, cost-benefit and cost- effectiveness analysis of management measures, employment and trade trends. <p>Protected Areas: The establishment of a Marine Management Authority (MMA) is important, given the integrated role the MMA will play in the management of coastal related activities and the use of coastal space for recreational purposes. Currently, the Folkestone Park and Marine Reserve is the only official national Marine Protected</p>

ISSUE	RESPONSE
	<p>Area (MPA); however, Carlisle Bay is recognised as an unofficial protected area where fishing is not permitted. With reference to MMAs, the Natural Heritage Department to date has reviewed the institutional setting, organisational framework and legislative changes necessary to establish an MMA; developed a Business Module for the MM Agency and MM Areas including stakeholder consultation; and developed an implementation plan.</p> <p>Four demonstration projects were completed as part of Phase II of the process:</p> <ul style="list-style-type: none"> • <i>Design of Public Changing Facilities at Carlisle Bay</i>: to enable the GOB to implement visible site improvements, completion of a detailed design for the proposed public changing facilities at Carlisle Bay; • <i>Mobile Educational Display</i>: to promote the concept of Marine Management Areas and a Marine Management Agency in Barbados; • <i>User Surveys</i>: observational surveys of marine areas users in several areas within Carlisle Bay and the Folkestone Marine Management Area (FMMA): and • <i>Planning a Visitor Facility for the FMMA</i>: consideration of concept plans for some type of visitor facility with interpretative features. <p>Future work for the Natural Heritage Department (NHD), as it relates to MMAs, will focus on the following:</p> <ul style="list-style-type: none"> • A co-management study structure is proposed to manage and operate marine management areas in Barbados. The distinct roles and responsibilities in the four management areas identified are enforcement and people management, revenue generation and use, education/interpretive programming and resource protection and management; • A Business Plan proposed potential costs and revenue for operation of MM Areas; • In respect of the legislative and regulatory frame work proposed, it was recommended that a MM Board manage the MM Areas. New legislation would be required to establish the enforcement agency; and • An implementation plan which constitutes finalisation of zoning for Folkestone and Carlisle Bay MM Areas, public education programme, new legislation and regulations for MM areas and establishment of regulatory bodies. <p>Barbados Participation in Regional Initiatives:</p> <ul style="list-style-type: none"> • An initiative being coordinated by the Association of Caribbean States to have the Caribbean Sea designated a Special Area in the context of sustainable development, by the UN General Assembly; • Caribbean Regional Fisheries Mechanism (CRFM) the GEF funded Integrated Watershed and Coastal Area Management Programme in conjunction with the Caribbean Environmental Health Institute (CEHI); • United Nations Environment Programme (UNEP) CAR/RCU (Caribbean Regional Coordinating Unit) Special Protected Areas and Wildlife Programme (SPAW), as well as the Marine Debris Monitoring Programme; • Regional Action Plan on Marine Litter in the Wider Caribbean Sea (RAPMaLi), Improving Marine Litter Management in the Caribbean - The Barbados Project; • The Caribbean Revolving Fund for Waste Water Treatment;

ISSUE	RESPONSE
	<ul style="list-style-type: none"> • The projects and programmes of the Intergovernmental Oceanographic Commission (IOC) include: <ul style="list-style-type: none"> ○ The Caribbean Large Marine Ecosystem Project (CLME), a US\$7.08 million programme funded by the GEF, to develop a plan for sustainable management of the shared living marine resources of the Caribbean and adjacent regions. The Project is heavily geared towards the reversal of trends in declining fish stocks and resulting potential interstate conflicts. ○ The IOC officially began the formulation of a project in Integrated Coastal Area Management (ICAM) for Latin America and the Caribbean. It is expected that the CZMU programme will be used as a best practice, and the staff of the Unit as resource persons. ○ The IOC approved the Tsunamis and Coastal Hazards Warning System for the Caribbean and Adjacent Regions. ○ The Harmful Algal Blooms Programme, Integrated Coastal Area Management, and the Tsunamis and Coastal Hazards Warning System for the Caribbean and Adjacent Regions. <p>Land-Based Sources of Pollution (LBS) Protocol: Barbados is currently conducting the background preparations to sign on to the Land-Based Sources of Pollution (LBS) Protocol. However, current initiatives include the Marine Pollution Control Act (MPCA) 1998; development of the Draft Marine Pollution Control (discharge) Regulations and the associated Table of Prohibited Concentrations which propose effluent discharge and marine water quality standards; the near shore water quality monitoring programme where 34 sites at 18 south and west coast beaches are routinely monitored for <i>Enterococci</i>, <i>Faecal coliform</i> and other parameters; and the National Programme of Action for Lands-Based Sources of Marine Pollution, which is currently being drafted.</p>
<p>Inadequate Waste Management</p>	<p>Waste disposal is governed by the Health Services Act (Cap. 44), 1969; the Health Services (Nuisances) Regulations, 1969; and the Health Services (Disposal of Offensive Matter) Regulations, 1969.</p> <p>The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal was signed by Barbados in 1994 and ratified in 1995.</p> <p>GOB is seeking to establish a temporary storage facility for hazardous wastes before export for offshore treatment as mandated by the Basel Convention. Some chemical waste is treated and disposed of locally; the remainder is shipped with hazardous wastes abroad. As stipulated by the Basel Convention each shipment is individually assessed.</p> <p>EPD monitors shipment of hazardous waste and mandates that a 3 stage protocol (Initial Notification, Pre-Shipment Notification and Post Shipment Notification) is followed.</p> <p>There is an Environmental Management Bill and associated regulations have been drafted which makes provisions for the management of hazardous wastes for</p>

ISSUE	RESPONSE
	<p>individuals and commercial entities. The Draft EMA has a section addressing toxic substances from import to disposal.</p> <p>EPD with technical assistance from the United Nations Institute for Training and Research (UNITAR) and funded by Strategic Approach to International Chemicals Management (SAICM) Quick Start Programme Trust Fund has received funding approval for Development of a National Implementation Strategy for Globally Harmonised System (GHS) for Classification and Labelling of Chemicals in Barbados project which aims to strengthen national capacities to implement SAICM and the GHS as well as make a contribution to the implementation of the BASEL, Rotterdam and Stockholm Conventions by focusing on labelling of chemicals as a building block for sound chemicals management. Under the same enabling framework EPD has also undertaken the Updating a National Chemicals Management Profile, Development of a National SAICM Priority Setting Workshop. The Updated National Chemicals Management Profile has been prepared as a key component of the enabling phase for Barbados towards implementation of the SAICM, with the hope of facilitating greater understanding of the functioning, strengths and weaknesses of the Barbados chemicals management framework. The capacity assessment and priority setting workshop has also advanced the work on chemicals management.</p> <p>Regional Programme of Action for the Environmentally Sound Management of Chemicals: Barbados will benefit from the establishment of the sub-regional Technology Transfer Centre at Caribbean Industrial Research Institute (CARIRI), Trinidad & Tobago which will build capacity of existing institutions and agencies in the different islands.</p> <p>The Barbados Sustainable Development Policy speaks to the need to ensure that a focus is retained on solid and liquid waste, and air emissions within the context of a comprehensive framework of environmental quality guidelines.</p> <p>Solid Waste is primarily the responsibility of EPD, the Sanitation Service Authority (SSA) and the Solid Waste Project Unit (SWPU):</p> <ul style="list-style-type: none"> • The EPD (with its Solid Waste and Hazardous Substances Section) monitors and regulates solid waste management and government operated solid waste disposal sites. Specifically, it regulates and monitors solid waste disposal facilities; and develops policies for the regulation of solid waste management. • SSA is responsible for the collection and disposal of non-hazardous solid waste from homes and government agencies around the island. There is also a commercial arm which offers services to the private sector. The Authority operates 4 disposal sites: Mangrove Pond Landfill; Bagatelle Bulky Waste Disposal Site; Rock Hall Asbestos Disposal Site; and Lonesome Hill Blood and Grease Disposal Site. • The Solid Waste Project Unit (SWPU) is responsible for the implementation of the Integrated Solid Waste Management Programme (ISWMP) - an infrastructural project which provides for the preparation of a long term (20 year) vision of

ISSUE	RESPONSE
	<p>managing solid waste in Barbados.</p> <p>A significant recent development is the operationalisation of the Solid Waste Management Centre at Vauclose, allowing for the recovery of significant volumes of recyclables that would have been landfilled prior to the operation of the Centre. Through the operation of this facility some sixty-five percent (65%) of the waste will be diverted away from landfilling and towards the production of useful products including recyclables, compost, aggregates and mulch.</p> <p>The Centre includes a transfer station, composting facility and chemical waste storage facility. This component is being done under a Public Private Partnership Agreement between the Government of Barbados (GOB) and Sustainable Barbados Recycling Center SRL (SBRC). The Centre is divided into two compounds, the compound housing the facilities operated by SBRC and the Northern Depot of the Sanitation Service Authority.</p> <p>The facilities on the SBRC Compound includes the following:</p> <ul style="list-style-type: none"> • Scale House; • Public Drop-Off Depot; • Office; • Transfer Station; • Composting Facility; • Workshop; • Chemical Waste Storage Facility; and • Materials Recovery Facility.
<p>Limited land space and inefficient land use</p>	<p>The Government of Barbados has recognised the possible threat that land degradation and drought poses to Barbados’ social and economic development. Government therefore has continued to strengthen some of its key agencies to manage this issue, including:</p> <ul style="list-style-type: none"> • The Soil Conservation Unit (SCU); • National Conservation Commission (NCC); • Ministry of Agriculture; • Drainage Unit (DU); • Environmental Protection Department (EPD); • Coastal Zone Management Unit (CZMU); and • The Town and Country Development Planning Office (TCDPO). <p>Significantly, the NHD established in 2005, has as part of its mandate ensuring that land-use practices occurring within the proposed National Park are consistent with sustainable land management. Similarly, a National Botanical Gardens Unit was established primarily to promote and showcase best land-use practices on environmentally sensitive landscapes.</p> <p>The Government of Barbados via the Environmental Unit as national focal point, in accordance with its commitment to the implementation of the provisions of the United Nations Convention to Combat Desertification and Drought, is undertaking a</p>

ISSUE	RESPONSE
	<p>number of actions including:</p> <ul style="list-style-type: none"> • ongoing capacity building; • continual allocation of financial resources via national budgetary processes; • amendments to existing legislation and the creation of new laws and regulations; • participation in regional and international functional and technical cooperation arrangements on degradation and drought issues; • development of national data collection, indicator, and information dissemination systems including developing a framework for the interpretation and monitoring requirements of the new performance and operational indicators necessary for reporting to the UNCCD; • increased efforts in public consultation, engagement, education and outreach programmes; • Preparation of national Reports to the UNCCD report on a country's progress in implementing the UNCCD Convention; and • Development of a National Action Plan (NAP), which conducts a gap analysis of the national situation and prescribes a number of projects to address these gaps <p>These actions are essential elements of the country's national action programmes to combat land degradation and drought.</p> <p>The Ministry of Agriculture plays a vital role with respect to land management in Barbados, as this Ministry provides a number of incentives not only to promote sustainable farming, but also, to improve the quality of life in rural communities. In addition, the Barbados Investment Development Corporation (BIDC) administers incentives to promote businesses based on applying sustainable and clean technologies to agricultural production and agro-processing industries</p> <p>As it relates to agriculture, over the years government has embarked upon a number of sustainable land management initiatives that have impacted significantly on the quality of life in several rural communities. Such initiatives include:</p> <ul style="list-style-type: none"> • Leasing of arable agricultural lands to landless rural farmers for the purpose of promoting sustainable agriculture; • Providing free extension services to farmers in an effort to ensure best cropping practices on these lands; • Providing free technical advice in the area of land cultivation; • Offering rebates on agricultural machinery and other equipment; • Offering rebates on fruit and forest trees being used in various reforestation programmes; • Offering tax benefits to land owners who are involved in sustainable land management programmes; • Funding of sustainable projects and programmes by various government agencies, e.g. Urban Development Commission (UDC) and Rural Development

ISSUE	RESPONSE
	<p>Commission (RDC);</p> <ul style="list-style-type: none"> • Construction of terraces and other access roads in an effort to give rural farmers entry to their farm lands; • Construction and maintenance of dams and other water bodies being used in national irrigation programmes; and • Sinking and maintenance of wells for the purpose of capturing and controlling storm water and surface water runoff and other run-off that would otherwise accelerate soil erosion. <p>National assessment of the effectiveness of existing policies and incentives to promote Sustainable Consumption and Production (SCP): The Ministry of Environment, Water Resource Management and Drainage is currently undertaking sectoral assessments of ongoing SCP initiatives as a means of identifying opportunities for new incentive measures and potential projects. The main objectives are:</p> <ul style="list-style-type: none"> • To describe the current status of sustainable consumption and production in the Water, Energy, Waste, Construction, Transport and Food production sectors. • To articulate what policy tools exist (e.g. taxes and subsidies, other economic instruments and trade policies); • To highlight where applicable any analytical tools utilized e.g. life cycle analysis, indicators, technology impact assessment; and • To highlight where measures can be taken to improve consumption and production patterns e.g. <i>inter alia</i> application of regulations and incentives, investment incentives, emissions regulations and standards, cleaner production, pollution prevention and resource efficiency.
<p>Inefficient traffic systems and supporting infrastructure.</p>	<p>The Barbados Transport Board is a Government owned and funded public transport system. The Transport Board was established as a result of an Act of Parliament in 1955.</p> <p>A Draft Energy Policy for the country was completed in December 2007. It is described as a series of measures to ensure a secure supply of energy, at competitive prices, with efficient use, in an environmentally sound manner. The Draft Policy promotes the use of renewable energy technology and the development of a low carbon economy as key strategies to ensure sustainability. This was followed in 2009 by the articulation of a Sustainable Energy Framework for Barbados prepared through IADB funding.</p> <p>The Ministry of Transport and Works (MTW) is currently researching the issue of emissions in collaboration with the EPD and the Barbados National Standards Institute (BNSI) in order to establish a policy. Existing legislation cover emissions in a very subjective way, i.e. it doesn't refer to specific levels/standards.</p> <p>With regard to efficiency, the Transport Board has acquired diagnostic software for the most recent acquisitions in the fleet of buses.</p>

ISSUE	RESPONSE
	<p>Additionally there is a policy from the Ministry of Finance via the Central Purchasing Department (CPD) regarding vehicles which can be imported for government use to ensure that they are fuel efficient</p> <p>The Ministry of Transport and Works (MTW) is currently researching the issue of emissions in collaboration with the EPD and the Barbados National Standards Institute (BNSI) in order to establish a policy. Existing legislation cover emissions in a very subjective way, i.e. it doesn't refer to specific levels/standards.</p> <p>With regard to efficiency, the Transport Board has acquired diagnostic software for the most recent acquisitions in the fleet of buses.</p> <p>Additionally there is a policy from the Ministry of Finance via the Central Purchasing Department (CPD) regarding vehicles which can be imported for government use to ensure that they are fuel efficient.</p>
<p>Natural Disaster and Climate Change</p>	<p>CLIMATE CHANGE</p> <p>The GOB's responses to dealing with climate change involves a number of projects, programmes, policies and institutional measures.</p> <p>Barbados has been a party to the Vienna Convention on the Protection of the Ozone Layer and the Montreal Protocol on the Phasing out of Ozone Depleting Substances (ODS) since October 1992.</p> <p>Barbados has met all phase out targets established under the Protocol with a ban on CFC imports for 2010 being effected with an amendment to the Customs (List of Prohibited and Restricted Imports and Exports)(Amendment) Order, 2009. With respect to mitigation, there are several projects in early inception stage or already on-stream, to increase our carbon storage capacity as well as reduce greenhouse gas emissions.</p> <p>Specific projects designed to address the impacts of climate change include:</p> <p>Drought: (Proposed \$108 million project approved): GOB via the Barbados Water Authority intends to improve water resources management via sustainable water and wastewater service provision. This involves modernising the institutional setting of the water and sanitation sector; improving water production infrastructure and the efficiency of the operations by reducing unaccounted-for-water and implementing adequate cost recovery mechanisms.</p> <p>Coastal Infrastructure Programme (CIP) [\$40 million to date]: The major objectives of the CIP is shoreline stabilization and erosion control. The project is intended to maintain the quality of the coastal environment taking into account the physical impacts of sea level rise and extreme weather events. It is also intended that the issue of climate change and disaster risk management will be mainstreamed as part of the Integrated Coastal Zone Management (ICZM) process and better decision support</p>

ISSUE	RESPONSE
	<p>tools will be developed to assist the CZMU in the execution of its mandate.</p> <p>Harrisons Cave Redevelopment project [\$51 million]: demonstrates the development of tourism products in an environmentally sustainable way and as such has strong elements of disaster and risk management and is a demonstration of decentralizing tourism from the fragile coastal environment. The bed and breakfast programme designed for the project also demonstrates that other forms of accommodation are viable rather than concentrating solely on the coastal zone which remains vulnerable to the impacts of adverse weather.</p> <p>South and West Coasts Sewerage Projects [\$149 million to date]: intended to improve environmental conditions for residents and tourists but also to protect coastal and marine ecosystems especially the coral reef system thereby sustaining their role in beach sand production, reducing beach erosion, and ensuring the overall health of the reef which protects the coast line from the direct impacts of storm waves. [South Coast Sewage Project is already in place and the West Coast Project will commence in the near future]. Currently an upgrade to the existing facility has been proposed and is in the developmental stages. For the West Coast, the emphasis is intended to be on water augmentation and recovery. These projects are also a response to the impact of climate change as it offers options for wastewater re-use in a water scarce country.</p> <p>The Mainstreaming Adaptation to Climate Change Project (MACC): The main objective was to mainstream climate change adaptation strategies into the sustainable development agendas of the Small Island and low-lying states of CARICOM. MACC adopted a learning-by-doing approach to capacity building, consolidating the achievements of its predecessors the Caribbean Planning for Adaptation to Climate Change Project (<u>CPACC</u>) and Adaptation to Climate Change in the Caribbean Project (<u>ACCC</u>). Currently, CARICOM Member States are implementing some of the strategies that emerged out of the MACC Project.</p> <p>The Caribbean Community Climate Change Centre (CCCCC): coordinates the region's response to climate change is the key node for information on climate change issues and on the region's response to managing and adapting to climate change in the Caribbean.</p> <p>The Department for International Development (DFID), United Kingdom of Great Britain and Northern Ireland and United Nations Economic Commission for Latin America and the Caribbean (UNECLAC) Sub Regional HQs in Port of Spain and Mexico Review of the Economics of Climate Change in the Caribbean: This project assesses likely economic impacts of climate change on key sectors of the Caribbean economies, to stimulate governments, regional institutions and private sector actions to develop and implement policies to mitigate and adapt to climate change.</p> <p>Barbados Drought Precipitation Monitor: Caribbean Institute of Meteorology and Hydrology (CIMH) coordinated project focused on development of a drought</p>

ISSUE	RESPONSE
	<p>forecasting model using recorded rainfall data.</p> <p>The programmatic responses are implemented via the following agencies:</p> <p>Coastal Zone Management Unit (CZMU): monitors important coastal resources and habitats and ensures that targeted policy, legislative and infrastructural interventions are made to combat the impacts associated with global climate change including – shoreline erosion, coastal inundation, species loss, warming ocean temperatures. CZMU also develops standards for water quality in coastal and marine areas to ensure the maintenance, rehabilitation and enhancement of coastal and marine habitats; monitors temporal changes in coral reef communities, and determining measures necessary to protect, rehabilitate, and enhance coastal and marine habitats. The Unit also takes part in coastal planning and management activities by way of professional technical evaluations of coastal related applications TCDPO, use Geographic Information Systems to better assess user conflict and development pressure points along the coastline and use the policies developed in the Integrated Coastal Zone Management Plan for the implementation of sound coastal management practices for Barbados</p> <p>Drainage Unit [Budgeted \$6.4 million for the 2009-2010 financial year] plays a critical role regarding climate change in reference to predicted increased instances of severe weather. The Unit provides a drainage management and flood prevention system aimed at remediating the perennial flooding, using appropriate personnel, equipment and technology to mitigate disaster flood risk; and maintain storm drainage system.</p> <p>Energy Division: In 2010, Cabinet approved the Sustainable Energy Framework for Barbados which had as its major objective “ to unlock viable investments in renewable and energy efficiency to reduce costs, improve energy security and enhance environmental sustainability.</p> <p>Ministry of Agriculture Incentive Programme: Under the Ministry of Agriculture, the BADMC has established an irrigation scheme for both urban and rural farmers. This is of great importance as this is a mechanism to tackle extended severe droughts brought on by the effects of Climate Change. BADMC offers a 40 % rebate on irrigation systems; subsidised water from the irrigation scheme; free technical advice to farmers; and ensures that farmers use water conservation measures.</p> <p>Meteorological Office: is responsible for data collection and monitoring regarding climatic factors and changing weather patterns. The Meteorological Office is currently investigating the potential impacts of the ongoing negotiations on climate services.</p> <p>Soil Conservation Unit (SCU) of the Ministry of Agriculture: There is an ongoing programme to address land degradation. SCU by combating erosion is enabling carbon capture by securing the vegetative cover and preventing the run-off of soil into the marine environment thereby ensuring overall reef health.</p>

ISSUE	RESPONSE
	<p>Town and Country Development Planning Office (TCDPO): seeks to lower the impact of disasters on development via development planning control by way of planning approval requirements, and via zoning.</p> <p>NATURAL DISASTERS</p> <p>The lead agency for Disaster Management on the island is the Department of Emergency Management. In 2003 GOB embraced the Comprehensive Disaster Management (CDM) Strategy, where Caribbean Disaster Emergency Management Agency (CDEMA) participating states incorporate all phases of the disaster management cycle (prevention, mitigation, preparedness and response, recovery and rehabilitation) while focusing on promoting and accelerating disaster risk reduction initiatives. The 2006 Emergency Management Act gives legislative authority for the mainstreaming of Comprehensive Disaster Management and responsibility to the Emergency Management Advisory Council for recommending policies, programmes and activities to enhance the emergency management programme, management of 15 standing committees responsible for advancing detailed sectoral disaster management planning, and 30 voluntary district emergency organizations through which the community disaster management programme is facilitated.</p> <p>A memorandum of understanding (MOU) concerning scientific and technical cooperation in the earth sciences: GOB and the United States Geological Survey signed this MOU which provided seismology training for members of staff, the establishment of an Earthquake and Tsunami Early Warning Station at Gun Hill, St. George and the placement of dart buoys in the Caribbean Sea to provide real time data on seismic activity in the region.</p> <p>European Union Radar Project: The capacity of the Meteorological Department is being enhanced to disseminate public warnings regarding tropical weather systems and a Doppler Radar has been deployed.</p> <p>Tide gauges: CZMU has installed one permanent tide gauge and deployed others to various locations on a temporary basis as required by specific CZMU projects around the island.</p> <p>A Draft Coastal Evacuation Plan is being developed with oversight by the Department of Emergency Management Technical Standing Committee on Coastal Hazards.</p> <p>Adaptation for Climate Change and Disaster Mitigation: Township Planning Strategies for Storm Surge in the Caribbean Project: This Inter-America Development Bank/CDEMA project located at Speightstown, allowed for a Coastal Vulnerability Assessment of the St. Peter coastline and the development of a draft toolkit which provides guidance on the replication of the project in other coastal areas</p>

ISSUE	RESPONSE
	<p>in Barbados.</p> <p>Telephonic Community Flood Warning System Project: the objective of this Japan International Cooperation Agency (JICA) funded/CDEMA is the integration of rainfall early warning systems into the flood hazard mapping systems. Speightstown, St. Peter is the project pilot site.</p> <p>The Public Education and Information Standing Committee of the Department of Emergency Management spearheaded the development of public education initiatives for floods and hurricanes. A similar campaign for the tsunami hazard under a CDEMA implemented “Tsunamis and Coastal Hazards Project” is expected to come on-stream.</p> <p>The Tourism Emergency Management Standing Committee: facilitates the mainstreaming of disaster management in the tourism sector, and has successfully established fully functional Tourism Emergency Operations Centre which provides centralized coordination and control of disaster response within the tourism industry.</p> <p>A Catastrophe Fund was established by Statutory Instrument 1998 No. 74, the Insurance (Catastrophe Reserve Fund) Regulations 1998, and allowed insurers carrying on property insurance business to deduct up to 25% of net premium income from this class of insurance business to establish the fund. This mandatory fund is administered by the Office of the Supervisor of Insurance to provide relief or assistance to persons receiving income of less than the income tax limit of \$22,500.00 per annum in respect of damage to owner-occupied chattel dwellings or dwelling units of wood/concrete block construction.</p> <p>The Barbados Light and Power Co. Ltd. established a self-insurance mechanism providing insurance coverage on its distribution lines, generation plant, equipment, buildings and other contents to meet the replacement cost of its equipment which may be damaged in a catastrophic event.</p> <p>GOB has proposed that to obtain a licence to operate in Barbados all hotels and places of accommodation must be adequately insured for property damage and public liability.¹²</p> <p>The Caribbean Hotel Energy Efficiency Action Programme (CHENACT): This is an Energy Efficiency project financed by: IADB, German Technical Cooperation (GTZ), Centre for Development Enterprise (CDE), Brussels, UNEP, BL&P and the GOB. It is being implemented by Caribbean Tourism Organisation (CTO) with the Technical and Operational Support of Caribbean Hotel and Tourism Association/ Caribbean Alliance for Sustainable Tourism (CHTA/CAST). The Programme was proposed to run from Dec 2009 to October 2010. All CHTA member hotels are eligible to apply to</p>

¹² Local insurance companies are re-insured by international insurance companies. However the latter regard the Caribbean as a catastrophe zone and have applied rates commensurate with the assumed risk for insurers seeking coverage. Higher rates are then passed on to the public by way of high premiums.

ISSUE	RESPONSE
	<p>be a part of the project which has as its objective “to improve the competitiveness of small and medium sized hotels (<400 rooms) in the Caribbean Region through improved use of energy, with the emphasis on Renewable Energy and Micro-Generation”. The Pilot project was carried out in Barbados</p> <p>The Caribbean Catastrophe Risk Insurance Facility (CCRIF): This Facility came about after the events of the severe 2004 hurricane season. The CARICOM Heads of Government requested World Bank assistance in improving access to catastrophe insurance. The Caribbean Catastrophe Risk Insurance Facility (CCRIF) resulted from collaborative work between the region’s governments, key donor partners, and a team of experts from the World Bank.</p> <p>The CCRIF structure allows Caribbean governments to purchase coverage akin to a business interruption insurance that will provide them with immediate liquidity in case of a major hurricane or earthquake. The CCRIF provides participating governments with coverage tailored to their needs at a significantly lower cost than if they were to purchase it individually in the financial markets. The CCRIF functions as a mutual insurance company controlled by the participating governments with initial capital from the participating countries with support from donor partners.</p> <p>MAN-MADE</p> <p>Regarding accidental oil spills, Barbados has a National Oil Spill Contingency Plan that is revised on a periodic basis to ensure compatibility with emerging issues and technologies. It is effective for the territorial waters of Barbados, the adjoining shoreline and in the high seas where threat to Barbados’ waters exists as well as for potential incidents on-shore in Barbados. The Plan establishes the Barbados National Response Team (BNRT) which determines action prior to an oil pollution incident and coordinates and advises during an oil pollution incident. BNRT consist of representatives of Environmental Protection Department, Barbados Defence Force/Barbados Coast Guard, Barbados Fire Service, Barbados National Oil Company Ltd., Barbados National Terminal Company Ltd., Barbados Port Inc., Coastal Zone Management Unit, Department of Emergency Management, Energy Division, International Transport Division, Local Petroleum Industry Representative, Ministry of Public Works, National Conservation Commission, and Royal Barbados Police Force. BNRT is also planning to develop a number mechanisms to give full effect to the plan e.g. pre-agreed response strategies; a list of pre-determined response centre locations; a manual of operational procedures for oil spill response (OSR); and a national inventory of OSR equipment to name a few.</p>

3. INTERNATIONAL ASSISTANCE PROGRAMMES

Table 2 present an analysis of existing United Nations assistance programs and aid provided by other international organisations, as well as bilateral donors relevant to the issues identified, taking into account critical linkages to poverty reduction and development. In all instances, the government of Barbados

partners/partnered/will partner with the international funding agencies identified. Regional entities such as the Organisation of Eastern Caribbean States (OECS) and the Caribbean Community (CARICOM) tend to act as facilitators for regional initiatives funded by international organisations.

TABLE 2: INTERNATIONAL ASSISTANCE PROGRAMMES AND PROJECTS – BARBADOS

INTERNATIONAL INSTITUTIONS	WHAT HAS BEEN/IS CURRENTLY DONE	MAJOR PARTNERS	FUTURE PROGRAMMES
UNDP	<ul style="list-style-type: none"> • Preparation of Barbados First National Communication to the United Nations Framework Convention on Climate Change (UNFCCC); • Climate Change Enabling Activity (Additional Financing for Capacity Building in Priority Areas); • Least Developed Countries (LDC) / Small Island Developing States (SIDS) Targeted Portfolio Project for Capacity Building and Mainstreaming of Sustainable Land Management. This project is expected to promote the mainstreaming of Sustainable Land Management (SLM) in Barbados, through institutional, individual and systematic capacity building. 	GEF /GOB for all	The Second National Communication is about to commence.

INTERNATIONAL INSTITUTIONS	WHAT HAS BEEN/IS CURRENTLY DONE	MAJOR PARTNERS	FUTURE PROGRAMMES
UNEP	<ul style="list-style-type: none"> • National Biodiversity Strategy, Action Plan and First National Report to the Convention on Biological Diversity; • Assessment of Capacity Building Needs and Country Specific Priorities in the Conservation of Biodiversity and Participation in the National Clearing House Mechanism; • National Capacity Self-Assessment (NCSA) for Global Environmental Management; • 2009 Commencement of Barbados phase of the GEF IWCAM project to develop an Integrated Water Resources Management Information Management System for Barbados; • The Partnership Initiative on Land Degradation and Sustainable Land Management in Caribbean SIDS; • Barbados participated in the Global Biosafety Project entitled “<i>Development of National Biosafety Frameworks</i>” which was funded by the Global Environmental Facility (GEF) and implemented by the UNEP to assist countries in putting in place the structures needed to effectively achieve the objectives of the Protocol; • SAICM Laboratory Capacity Project; • The Project for Development of a National Implementation Plan for Barbados (to meet obligations under the Stockholm Convention); and • Updating a National Chemicals Management Profile, Developing a National SAICM Capacity Assessment, and Holding of a National SAICM Priority Setting Workshop in Barbados. 	<p>GEF/GOB</p> <p>GEF/GOB</p> <p>GEF /GOB</p> <p>GEF/GOB/CEHI</p> <p>UNEP/CARICOM</p> <p>UNEP UNEP/GEF</p> <p>SAICM Quick Start Fund.</p>	<p>Strengthening Capacities for SAICM Implementation and Supporting GHS Capacity Building in Barbados funded by SAICM Quick Start Fund. Note that this project has not started as yet.</p>
FAO	‘Participatory Forestry Management’ which addresses aspects of land degradation in managing forest resources.	FAO/CANARI	

INTERNATIONAL INSTITUTIONS	WHAT HAS BEEN/IS CURRENTLY DONE	MAJOR PARTNERS	FUTURE PROGRAMMES
	<p>The project supports the improvement of the socio-economic and environmental benefits that can be derived from forest management by analysing, promoting and building capacity for participatory planning and management of forest resources at the regional, national and local levels. Barbados is one of seven countries participating in this initiative.</p>		
UNESCO	<p>Intergovernmental Oceanographic Commission (IOC) which include:</p> <ul style="list-style-type: none"> • The Caribbean Large Marine Ecosystem Project (CLME), a US\$7.08 million programme funded by the GEF, to develop a plan for sustainable management of the shared living marine resources of the Caribbean and adjacent regions. The Project is heavily geared towards the reversal of trends in declining fish stocks and resulting potential interstate conflicts; • The IOC officially began the formulation of a project in Integrated Coastal Area Management (ICAM) for Latin America and the Caribbean. It is expected hoped that the CZMU programme will be used as a best practice, and the staff of the Unit as resource persons; • The IOC approved the Tsunamis and Coastal Hazards Warning System for the Caribbean and Adjacent Regions; and • The Harmful Algal Blooms Programme, Integrated Coastal Area Management, and the Tsunamis and Coastal Hazards Warning System for the Caribbean and Adjacent Regions. 	UNESCO- IOC/ GOB/ACS	
World Bank	Under the MACC initiative during 2004-2009, Tourism Vulnerability Country Assessment (TVCA)	GEF/ CARICOM	This is currently in the loan preparation phase with the IADB: the project is a Coastal Risk Assessment and Management

INTERNATIONAL INSTITUTIONS	WHAT HAS BEEN/IS CURRENTLY DONE	MAJOR PARTNERS	FUTURE PROGRAMMES
			Project that will have at its focus: coastal hazard identification and mapping; coastal risk reduction; climate change mitigation and disaster risk management mainstreamed within the ICZM process; coastal infrastructure works involving shoreline stabilization and enhancement and public lateral access.
European Union	<ul style="list-style-type: none"> • Under the 8th and 9th EDF Funded a regional weather radar system • Provide funding for a Disaster Management Strategy under the 9th EDF 	GOB	
JICA	<ul style="list-style-type: none"> • In 2009 participated in the development project aimed at formulating a master plan for fulfilling a sustainable fishery resource use and management, targeting local artisanal fishers and their communities in the Caribbean region. • Funded a project “Telephonic Community Flood Warning System Project” which has identified Speightstown St. Peter Barbados as the project pilot site. The objective of the project is the integration of rainfall early warning systems into the flood hazard mapping systems. 	<p>Caribbean Regional Fisheries Mechanism/ GOB</p> <p>CDEMA on behalf of the GOB</p>	
USAID			Currently in the conceptualisation phase : A climate change based project based on water resources and coastal zone management
CIDA	OECS Environmental Capacity Development (ENCAPD) coastal and marine environmental management	OECS/GOB	

INTERNATIONAL INSTITUTIONS	WHAT HAS BEEN/IS CURRENTLY DONE	MAJOR PARTNERS	FUTURE PROGRAMMES
IADB	<ul style="list-style-type: none"> • Under the climate change initiative, funded the development of a Sustainable Energy Framework for Barbados • Funded a Coastal Vulnerability Assessment of the St. Peter coastline under the project “Adaptation for Climate Change and Disaster Mitigation: Township Planning Strategies for Storm Surge in the Caribbean Project”. As part of this project a draft toolkit which provides guidance on the replication of the project in other coastal areas in country was developed. • Funded a Project for the Modernization of the Barbados Statistical Services (BSS) aimed at modernizing the BSS, with the objective to strengthen the ability of the BSS to provide accurate and timely statistics. 	<p>IADB/GOB</p> <p>CDEMA on behalf of the GOB</p> <p>BSS on behalf of GOB</p>	
OAS	Preventing Land Degradation in Eco-systems through SLM	CEHI/OAS	
DFID	<p>Funds a number of Caribbean project in the areas of Climate Change and Disaster Risk Reduction. These include:</p> <ul style="list-style-type: none"> • Comprehensive Disaster Management -Harmonised Implementation Programme (CDM-HIP), • Caribbean Review of Economics of Climate Change (RECC)-Phase 2 and 3, • Caribbean Climate Change Risk Atlas (CARIBSAVE CCRA)-Phase 1 for tourism sector, • Development of an Implementation Plan for the Regional Framework for Achieving Development Resilient to Climate Change, • CCCCC/regional task force support, • Copenhagen and beyond-Capacity building for CARICOM policy makers involved in climate change 		

INTERNATIONAL INSTITUTIONS	WHAT HAS BEEN/IS CURRENTLY DONE	MAJOR PARTNERS	FUTURE PROGRAMMES
	negotiations, <ul style="list-style-type: none"> • Disaster Risk Reduction Capacity building in the UK Overseas Territories, • Low carbon/renewable energy development; and • Sustainable environmental management. 		

4. Critical Gaps and Opportunities to Support Country Environmental Priorities

Review of national documents and information gathered from interviews indicate that the following gaps in existing response mechanisms (policies, programmes, legislation) to the environmental issues taking into account the relationship between the natural environment, social needs and economic development, as well as opportunities to support environmental priorities (See Table 3).

MAIN THRUST

As articulated by interviewees and the various national reports various components of the current framework must be strengthened in terms of an increase in the staff complement of various institutions; provision of requisite training for staff; provision of relevant regulatory and enforcement capabilities of institutions; maintenance of a baseline of programmatic activities such as data collection and monitoring; the ability to use information from various sources for decision making; and the development of fiscal policies to stimulate corporate environmental stewardship, and to incentivise new business models that focus on the sustainable utilisation of natural capital to attract foreign exchange.

The UNCCA and UNDAF process can therefore assist in orienting and aligning international development assistance and partnerships in support of the Barbados' development goals in a sustainable manner.

TABLE 3: CRITICAL GAPS & OPPORTUNITIES TO SUPPORT ENVIRONMENTAL PRIORITIES

	GAPS	OPPORTUNITIES
<p>Mainstreaming environment by the creation of an overarching policy framework</p>	<ul style="list-style-type: none"> • While there is acknowledgment of the import of natural resources to the achievement of national development goals, and that concerted efforts have been made by various agencies to include various stakeholders in the formulation of policies, plans, programmes and projects, there is still a need to mainstream natural resource management in all sectors. • Though concerted efforts have been made by various agencies include various stakeholders in the formulation of policies, plans, programmes and projects, initiatives could be better coordinated and efficiently executed. 	<ul style="list-style-type: none"> • Establishing the enabling environment to support the transition to a Green Economy as articulated in the country’s Medium Term Development Strategy 2010-2014; • Reconstitution of National Sustainable Development Commission to act as an overarching body to harmonise policies and facilitate the development of cross-sectoral bodies to effect the mainstreaming of environmental management and sustainable development; • Rationalisation of policies, plans, programmes, projects, legislation and institutional arrangement in a manner that will promote effective and efficient use of resources. On completion, the NCSA output can be used to inform this process; and • Mechanism to incorporate natural resources into national accounting system – especially in light of the thrust towards the development of a green economy.
<p>Legislative & Enforcement Framework</p>	<ul style="list-style-type: none"> • The absence of comprehensive Environmental Management Legislation and supporting regulations and standards. Absence of Statutory Rules and Orders necessary to effect purposes of the Act, e.g. Regulations to Marine Pollution Act. • Backlog of draft legislation within the Attorney General’s Office. • There is a weak enforcement of existing legislation relevant to the environment in all sectors. 	<ul style="list-style-type: none"> • In keeping with mainstreaming efforts, conduct institutional and legislative assessments of existing institutions and statues; • Training and involvement of legal personnel in sustainable development/green economy and specifically environmental management, to foster a holistic understanding of the role natural resources and related legislation in the national framework; • Education via training courses for law enforcement (Police) regarding the national importance of enforcement of environmental legal provisions; and • Development of programmes/projects that encourage compliance to work in tandem with legislative penalties for breach of law.

<p>Private Sector and Non-Governmental multi-sectoral participation</p>	<ul style="list-style-type: none"> • While there is participation of the private sector in environmental management, there is a need for more Corporate Social Responsibility (CSR) initiatives in private sector, greater extra-governmental involvement in decision making, and specialised training for the business sector. • Lack of strategy approach to access and adopt clean technologies in the local manufacturing and industrial sector. This results in inefficient use of resources (energy, water and waste) and hinders access to foreign markets due to compliance issues. • Lack of institutionalised capacity among Community Based Organisations (CBO) and Non Governmental Organisations (NGO) to pursue environmental stewardship.. 	<ul style="list-style-type: none"> • Development of policies and incentives to encourage CSR as a means of tackling environmental issues identified; and the promotion of fiscal benefits of CSR (by way of Costs Benefit Analysis) to private sector entities; • Capacity building of private sector and civil society (especially CBOs) to increase participation; • Establishment of a common platform to harmonise the input of CBOs in government policies, particularly in the area of natural resource management; • Utilise the Marrakesh Process and the development of the 10-Year Framework of Programmes on Sustainable Consumption and Production to establish a Barbadian Cleaner Production and Resource Efficiency Programme. • Strengthen collaboration among Barbados' UNDP-Small Grants Programme and the education programme of the Ministry responsible for the environment; • To lower energy costs, in addition to the thrust towards alternative sources of energy, there are initiatives such as a move towards encouraging the construction of energy efficient building can run concurrently with the current strategy. This will not only involve government agencies such as TCPDO, EPD, and other agencies including private sector developers, designers, engineers that work towards the development and implementation of energy saving strategies that lock into the national policy of lowering energy costs and decreasing environmental degradation; and • As it relates to energy and transport there is room for research into the expansion of the use of Photovoltaic energy by short route vehicles, e.g. for airport and sea-port buses as well as the city circle route.
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Attitudes & Education	<ul style="list-style-type: none"> • There is a need for change in attitudes/behaviour with respect to the environment 	<ul style="list-style-type: none"> • Establish a tool for monitoring changes in public perception relative to environment in partnership with research institutions and civil society organizations; • Continued support of environmental stewardship programmes undertaken by CBOs; and • Use existing attitudinal information to inform the development of the National Environmental Education Strategic Plan.
Environmental Standards, Information Gathering & Monitoring	<ul style="list-style-type: none"> • There is a lack of environmental standards and more long termed sustained monitoring of productivity of the natural resource base and the ecosystem services provided • There is inadequate collation, publication and dissemination of environmental information to decision-makers and the public at large. Not enough attention is paid to in-situ and ex-situ conservation of economically and ecologically important species and the related intellectual property issues. • There is the need for scientifically sound local research to characterize the state of the environment. 	<ul style="list-style-type: none"> • Development of environmental standards and codes of action e.g. water quality standards. There is the need for dedicated staff and appropriate information technology to address the development and institutionalisation of appropriate data bases on environmental parameters; • Undertake detailed studies and plans for safeguarding intellectual property rights especially in relation to natural assets. The development of gene banks and storage of genetic material is also needed; and • Establishment of partnerships with regional research institutions to articulate a research agenda for Barbados and the OECS.
Capacity Building: Manpower & Professional Development	<ul style="list-style-type: none"> • Many of the agencies charged with responsibility for environmental matters are understaffed, lack the necessary tools and budgets to effectively and efficiently execute their duties. 	<ul style="list-style-type: none"> • Across the board there is a need for increased manpower and specialised training to effect institutional responsibilities.
Horizontal Cooperation	<ul style="list-style-type: none"> • There is the need to for regional technical cooperation platforms so that countries can benefit from “home-grown” solutions that may exist within the region. 	<ul style="list-style-type: none"> • Facilitation of horizontal cooperation programmes to facilitate SIDS-SIDS technology transfer with the OECS and/or, among Caribbean Community (CARICOM) member states.
Regional Cooperation	<ul style="list-style-type: none"> • There are critical issues that are best handled at the regional level either because of sharing of a common regional space (marine pollution, alien and invasive species) or because of the need for economies of scale 	<ul style="list-style-type: none"> • Implementing the provisions of the Revised Treaty of Chaguaramus regarding the formulation of a community environmental and natural resources policy framework. This framework must take into

	<p>given the small size of the island (disposal of waste and hazardous materials).</p>	<p>consideration issues such as disposal of hazardous and e-waste, accessing external markets for waste, land management, and management of alien and exotic species;</p> <ul style="list-style-type: none"> • Strengthening of the CARICOM Secretariat Sustainable Development Unit to support Member States in Regional approaches is essential.
Built Environment and Disaster Response	<ul style="list-style-type: none"> • A National Building code has been developed but not yet implemented. Draft building standards legislation exists but have not been finalized. There is also need for enhancing the Department of Emergency Management to allow it to effectively cope with address a wide variety of disaster including but not limited to hurricanes, flooding, fires, earthquakes and mass casualty events. 	<ul style="list-style-type: none"> • Stakeholder sensitization on the National Building Code including workshops and seminars for contractors, architects, businesses and financial institutions; and • Enhanced capacity of the Department of Emergency Management to conduct annual revision of various disaster management plans for major sectors e.g. tourism, fishing, and agriculture.
Water	<ul style="list-style-type: none"> • Measures are being put in place to deal with the supply side of provision of water resources. Significant work has to be done however on the issue of demand side management. 	<ul style="list-style-type: none"> • Increase education for individuals and businesses on increased efficiency of water use; • Adopting an integrated approach to water resources management inclusive of storm water and the coastal zone; • Development of standards and benchmarks for waste water utilization; and • Sensitisation of the public on the use of water from non traditional Sources e.g. reuse of waste water.

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ANNEX 1: STAKEHOLDERS AND/OR INFORMANTS

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ANNEX 2: Barbados PARTICIPATION IN MULTILATERAL ENVIRONMENTAL AGREEMENTS

MEA	STATUS
Wildlife /Conservation	
Convention of International Trade in Endangered Species, 1972 (CITES) <i>This is an international agreement between governments. Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten their survival</i>	A -1992
Convention on Wetlands of International Importance especially as Waterfowl Habitats (RAMSAR) <i>This is a treaty that embodies the commitments of its member countries to maintain the ecological character of their Wetlands of International Importance and to plan for the "wise use", or sustainable use.</i>	R-2005
Protocol Concerning Specially Protected Areas and Wildlife to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean, 1983 (RE) : <i>The objective of the Protocol is to protect rare and fragile ecosystems and habitats, thereby protecting the endangered and threatened species residing in the Wider Caribbean Area</i>	A-2002
Biodiversity/Bio-safety, Traditional Knowledge	
International Plant Protection Convention, Rome, 1951 <i>The agreement seeks to securing common and effective action to prevent the introduction and spread of pests and diseases of plants and plant products and to promote measures for their control</i>	Ad-1976
Convention on Biological Diversity, 1992 <i>This agreement aims to conserve biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies</i>	R-1993
Cartagena Protocol on Bio-Safety <i>It is an international agreement which aims to ensure the safe handling, transport and use of living modified organisms (LMOs) resulting from modern biotechnology that may have adverse effects on biological diversity, taking also into account risks to human health</i>	A-2002
Marine Protection and Safety	
Convention on the Protection and Development of the Marine Environment in the Wider Caribbean, 1983 (Cartagena Convention) (RE) <i>This is a comprehensive, umbrella agreement for the protection and development of the marine environment. This regional environmental convention provides the legal framework for cooperative regional and national actions in the Wider Caribbean Region</i>	A-1985
Protocol Concerning Cooperation in Combating Oil Spills in the Wider Caribbean, 1983 (RE): <i>This Protocol applies to oil spill incidents which have resulted in, or which pose a significant threat of, pollution to the marine and coastal environment of the Wider Caribbean Region or which adversely affect the related interests of Contracting Parties</i>	A-1985

MEA	STATUS
Protocol of 1973 to the International Convention for the Prevention of Pollution from Ships as Amended (MARPOL 1973/78)	A ¹³ 1994
International Convention on Civil Liability for Oil Pollution Damage, 1969 (CLC, 1969)	A-1994
Protocol of 1992 to Amend the International Convention on Civil Liability for Oil Pollution Damage, 1969 (CLC PROT, 1992)	A-1998
International Convention for the Establishment of an International Fund for the Compensation of Oil Pollution, 1971 (FUND,1971)	A-1994
Protocol of 1992 and 2003 to the International Convention for the Establishment of an International Fund for the Compensation of Oil Pollution, 1971	A-1998 2005
International Convention relating to Intervention on the High Seas in Cases of Oil Pollution Casualties, 1969; (INTERVENTION, 1969)	A-1994
Protocol relating to Intervention on the High Seas in Cases of Pollution by Substances other than oil, 1973 as Amended (INTER-VENTION PROT 1973)	A-1994
Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972, as Amended (LC 1972)	DI-1994
1996 Protocol to the International Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972, (LC PROT 1996)	A-2006
International Convention for the Control and Management of Ship Ballast Water and Sediment, 2004 (BMB 2004)	A-2007
Marine Resources	
United Nations Convention on the Law of the Sea, 1982 <i>The Law of the Sea Convention defines the rights and responsibilities of nations in their use of the world's oceans, establishing guidelines for businesses, the environment, and the management of marine natural resources</i>	R-1993
Agreement Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Species, 1995	R-2000
Chemicals/Waste Management	
Basel Convention on the Control of Transboundary Movement of Hazardous Waste and their Disposal	A1995
Rotterdam Convention on the Prior Consent Procedures for Certain Hazardous Chemicals and Pesticides in International Trade	S-1998
Sustainable Land Management	
United Nations Convention to Combat Desertification <i>The UNFCCC convention aims to address the anthropogenic impacts on the global climate patterns</i>	A-1997
Atmospheric/Climate Systems	
Vienna Convention for the Protection of the Ozone Layer, Vienna, 1985 <i>It acts as a framework for the international efforts to protect the ozone layer. However, it does not include legally binding reduction goals for the use of CFCs, the main chemical agents causing ozone depletion. These are laid out in the accompanying Montreal Protocol</i>	A-1992

¹³ With the exception of Annex IV of the Convention, in respect of Annex IV, 26 November 2001

MEA	STATUS
Montreal Protocol on Substance that Deplete the Ozone, 1989*	A-1992
United Nations Framework Convention on Climate Change, 1992 <i>The objective of the treaty is to stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system</i>	R-1994
Kyoto Protocol <i>The Kyoto Protocol is an international agreement linked to the United Nations Framework Convention on Climate Change. The major feature of the Kyoto Protocol is that it sets binding targets for 37 industrialized countries and the European community for reducing greenhouse gas (GHG) emissions.</i>	R-2000
Protection of Human Health and the Environment	
Stockholm Convention on Persistent Organic Pollutants (POPs), 2001	A-2004
Culture and Natural Heritage	
Convention for the Protection of World Culture and Natural Heritage, 1972	Ac-2002

Key	
A:	Accession
Ac:	Accepted
Ad:	Adherence
DI:	Date of Deposit of Instrument
R:	Ratification
RE:	Regional MEA
S:	Signature

ANNEX 3B: LIST OF INTERNATIONAL PROJECT IMPLEMENTED IN 2005-2009 AND PLANNED FOR 2010-2015

IMPLEMENTING AGENCY	INTERNATIONAL PROJECT	TOTAL FUNDS (000,000.00)	TIMELINE	NOTES
BARBADOS AS PART OF THE REGION				
CIDA/PAHO	Health Sector Disaster Risk Management	CAN \$3.00	2007-2015	
CIDA	Disaster Risk Management Facility	CAN \$12.86	2007-2015	
CIDA/WB	Caribbean Catastrophe Risk Insurance Facility	CAN \$20.00	2007-2012	
CIDA	Caribbean Disaster Responsive Fund	CAN \$10.00	2003-2008	
CIDA/OAS	Disaster Preparedness	CAN \$3.86	2001-2008	
DFID/CIDA, EC and OECS Secretariat <i>(CDEMA)</i>	Comprehensive Disaster Management - Harmonised Implementation Programme (CDM- HIP)	USD 3.6	April 2009- March 2013	
DFID/UNECLAC; IADB/CDB and AusAID (tbc) <i>(UNECLAC and CCCCC)</i>	Caribbean Review of Economics of Climate Change (RECC)-Phase 2 and 3	USD1.125	June 2009-January 2011	
DFID/AusAID supporting CCRA for five additional countries <i>(OUCE and CCCCC)</i>	Caribbean Climate Change Risk Atlas (CARIBSAVE CCRA)-Phase 1 for tourism sector	USD1.125	March 2010-June 2011	
DFID/Climate Development Knowledge Network	Development of an Implementation Plan for the Regional Framework for Achieving Development Resilient to Climate Change	co funded with CDKN USD 0.66	August 2010- March 2011	

IMPLEMENTING AGENCY	INTERNATIONAL PROJECT	TOTAL FUNDS (000,000.00)	TIMELINE	NOTES
(CDKN)				
(CCCCC)				
DFID	CCCCC/regional task force support	USD 0.269	Oct 2007-June 2010	
(CCCCC)				
DFID	Copenhagen and beyond-Capacity building for CARICOM policy makers involved in climate change negotiations	USD 0.2245	Sept 2009- June 2010	
(UNDP with CCCCC)				
DFID	Disaster Risk Reduction Capacity building in the UK Overseas Territories	USD 0.450	2008-2011	
(National Disaster Offices)				
DFID	Low carbon/renewable energy development	Tbc	2010-	Regional (pipeline)
DFID	Global Environmental Facility – Sustainable environmental management	£11.00	2010-2012:UK	
EC (8 th & 9 th EDF)	Regional Weather Radar System	€13.20	2003-2006	
EC (9 th EDF)	Disaster Management	€3.40		
EC (7 th & 8 th EDF)	Caribbean Regional Sustainable Tourism Development programme	US\$8.00	2000-2007	
EC (7 th EDF)	Caribbean Regional Environmental Programme	US\$9.15	2000-2006	
GTZ/UNDP	Caribbean Renewable Development Energy Programme – Phase II (CRDEP)	???	2008 - ???	
OAS	Caribbean Sustainable Energy Project	???	2008- ??	
WB (IBRD/IDA)	OECS Protected Areas and Associated Livelihoods Projects	US\$2.70	2005-???	
BARBADOS				
GEF/UNDP	National biodiversity Strategy, Action Plan and Report to the CBD	US\$0.144		Project Closure
GEF/UNDP	Assessment of Capacity Building Needs and Country-Specific Priorities in the Conservation of	US\$0.287 [+0.058 Co-		Under Implementation

IMPLEMENTING AGENCY	INTERNATIONAL PROJECT	TOTAL FUNDS (000,000.00)	TIMELINE	NOTES
	Biodiversity and Participation in the National Clearing House Mechanism	financing]		
GEF/UNDP	Enabling the Barbados to Prepare its First National Communication in Response to its Commitment to UNFCCC	US\$0.189		Project Completion
GEF/UNDP	Climate Change Enabling Activity (Additional Financing for Capacity Building in Priority Areas)	US\$0.100		Project Completion
GEF/UNEP	National Capacity Needs for Self Assessment (NCSA) for Global Environmental Management	US\$0.210 [+0.037 Co-financing]		Under Implementation
IDB grant	Sustainable Energy Framework for Barbados	US\$1.0		Approved