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BARBADOS



COUNTRY PROFILE



UNITED NATIONS

INTRODUCTION - 2002 COUNTRY PROFILES SERIES

Agenda 21, adopted at the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro in 1992, underscored the important role that States play in the implementation of the Agenda at the national level. It recommended that States consider preparing national reports and communicating the information therein to the Commission on Sustainable Development (CSD) including, activities they undertake to implement Agenda 21, the obstacles and challenges they confront, and other environment and development issues they find relevant.

As a result, in 1993 governments began preparing national reports for submission to the CSD. After two years of following this practice, the CSD decided that a summarized version of national reports submitted thus far would be useful. Subsequently, the CSD Secretariat published the first Country Profiles series in 1997 on the occasion of the five-year review of the Earth Summit (Rio + 5). The series summarized, on a country-by-country basis, all the national reports submitted between 1994 and 1996. Each Profile covered the status of all Agenda 21 chapters.

The purpose of Country Profiles is to:

- Help countries monitor their own progress;
- Share experiences and information with others; and,
- Serve as institutional memory to track and record national actions undertaken to implement Agenda 21.

A second series of Country Profiles is being published on the occasion of the World Summit on Sustainable Development being held in Johannesburg from August 26 to September 4, 2002. Each profile covers all 40 chapters of Agenda 21, as well as those issues that have been separately addressed by the CSD since 1997, including trade, energy, transport, sustainable tourism and industry.

The 2002 Country Profiles series provides the most comprehensive overview to date of the status of implementation of Agenda 21 at the national level. Each Country Profile is based on information updated from that contained in the national reports submitted annually by governments.

Preparing national reports is often a challenging exercise. It can also be a productive and rewarding one in terms of taking stock of what has been achieved and by increasing communication, coordination and cooperation among a range of national agencies, institutions and groups. Hopefully, the information contained in this series of Country Profiles will serve as a useful tool for learning from the experience and knowledge gained by each country in its pursuit of sustainable development.

NOTE TO READERS

The 2002 Country Profiles Series provides information on the implementation of Agenda 21 on a country-by-country and chapter-by-chapter basis (with the exception of chapters 1 and 23, which are preambles). Since Rio 1992, the Commission on Sustainable Development has specifically addressed other topics not included as separate chapters in Agenda 21. These issues of trade, industry, energy, transport and sustainable tourism are, therefore, treated as distinct sections in the Country Profiles. In instances where several Agenda 21 chapters are closely related, for example, chapters 20 to 22 which cover environmentally sound management of hazardous, solid and radioactive wastes, and chapters 24 to 32 which refer to strengthening of major groups, the information appears under a single heading in the Country Profile Series. Lastly, chapters 16 and 34, which deal with environmentally sound management of biotechnology, and transfer of environmentally sound technology, cooperation, capacity-building respectively, are presented together under one heading in those Country Profiles where information is relatively scarce.

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LIST OF COMMONLY USED ACRONYMS

ACS	Association of Caribbean States
AMCEN	Africa Ministerial Conference on the Environment
AMU	Arab Maghreb Union
APEC	Asia-Pacific Economic Cooperation
ASEAN	Association of Southeast Asian Nations
CARICOM	The Caribbean Community and Common Market
CBD	Convention on Biological Diversity
CIS	Commonwealth of Independent States
CGIAR	Consultative Group on International Agricultural Research
CILSS	Permanent Inter-State Committee for Drought Control in the Sahel
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
COMESA	Common Market for Eastern and Southern Africa
CSD	Commission on Sustainable Development of the United Nations
DESA	Department for Economic and Social Affairs
ECA	Economic Commission for Africa
ECCAS	Economic Community for Central African States
ECE	Economic Commission for Europe
ECLAC	Economic Commission for Latin America and the Caribbean
ECOWAS	Economic Community of West African States
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
ESCAP	Economic and Social Commission for Asia and the Pacific
ESCWA	Economic and Social Commission for Western Asia
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FIDA	Foundation for International Development Assistance
GATT	General Agreement on Tariffs and Trade
GAW	Global Atmosphere Watch (WMO)
GEF	Global Environment Facility
GEMS	Global Environmental Monitoring System (UNEP)
GESAMP	Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection
GHG	Greenhouse Gas
GIS	Geographical Information Systems
GLOBE	Global Legislators Organisation for a Balanced Environment
GOS	Global Observing System (WMO/WWW)
GRID	Global Resource Information Database
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome
IAEA	International Atomic Energy Agency
ICSC	International Civil Service Commission
ICSU	International Council of Scientific Unions
ICT	Information and Communication Technology
ICTSD	International Centre for Trade and Sustainable Development
IEEA	Integrated Environmental and Economic Accounting

IFAD	International Fund for Agricultural Development
IFCS	Intergovernmental Forum on Chemical Safety
IGADD	Intergovernmental Authority on Drought and Development
ILO	International Labour Organisation
IMF	International Monetary Fund
IMO	International Maritime Organization
IOC	Intergovernmental Oceanographic Commission
IPCC	Intergovernmental Panel on Climate Change
IPCS	International Programme on Chemical Safety
IPM	Integrated Pest Management
IRPTC	International Register of Potentially Toxic Chemicals
ISDR	International Strategy for Disaster Reduction
ISO	International Organization for Standardization
ITTO	International Tropical Timber Organization
IUCN	International Union for Conservation of Nature and Natural Resources
LA21	Local Agenda 21
LDCs	Least Developed Countries
MARPOL	International Convention for the Prevention of Pollution from Ships
MEAs	Multilateral Environmental Agreements
NEAP	National Environmental Action Plan
NEPAD	New Partnership for Africa's Development
NGOs	Non-Governmental Organizations
NSDS	National Sustainable Development Strategies
OAS	Organization of American States
OAU	Organization for African Unity
ODA	Official Development Assistance/Overseas Development Assistance
OECD	Organisation for Economic Co-operation and Development
PPP	Public-Private Partnership
PRSP	Poverty Reduction Strategy Papers
SACEP	South Asian Cooperative Environment Programme
SADC	Southern African Development Community
SARD	Sustainable Agriculture and Rural Development
SIDS	Small Island Developing States
SPREP	South Pacific Regional Environment Programme
UN	United Nations
UNAIDS	United Nations Programme on HIV/AIDS
UNCED	United Nations Conference on Environment and Development
UNCCD	United Nations Convention to Combat Desertification
UNCHS	United Nations Centre for Human Settlements (Habitat)
UNCLOS	United Nations Convention on the Law of the Sea
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNDRO	Office of the United Nations Disaster Relief Coordinator
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization

UNFCCC	United Nations Framework Convention on Climate Change
UNFF	United Nations Forum on Forests
UNFPA	United Nations Population Fund
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
UNIDO	United Nations Industrial Development Organization
UNIFEM	United Nations Development Fund for Women
UNU	United Nations University
WFC	World Food Council
WHO	World Health Organization
WMO	World Meteorological Organization
WSSD	World Summit on Sustainable Development
WTO	World Trade Organization
WWF	World Wildlife Fund
WWW	World Weather Watch (WMO)

CHAPTER 2: INTERNATIONAL COOPERATION TO ACCELERATE SUSTAINABLE DEVELOPMENT IN DEVELOPING COUNTRIES AND RELATED DOMESTIC POLICIES

Decision-Making: Comprehensive national legislation addressing sustainable development is currently under review. Notwithstanding the tough constraints faced, Barbados has sought to overcome them through regional and local collaboration and by emphasising the importance of social partnership (public and private sector).

Programmes and Projects: Three major initiatives to implement Agenda 21 may be identified as the establishment of the National Commission on Sustainable Development (NCSO). The National Strategic Plan (NSP) and the Environmental Management and Land Use Planning (EMLUP) project. In order to meet the challenge of globalization and its impact on trade, the government has undertaken domestic reforms in the area of macro-economic policy to facilitate integration into the world economy, to address issues particularly relevant to trade, investment, commodities and capital markets, to adopt measures to improve competitiveness, among other initiatives.

Status: The National Commission of Sustainable Development, the National Strategic Plan and EMLUP have taken initial steps to address the needs of current and future generations. In this regard some of the strengths of planning for sustainable development are pro-activity, inclusiveness, shared responsibility and integration. With respect to pro-activity, the EMLUP project, for example, recognized that development could not continue along a sustainable path unless measures were put in place to address environmental issues as well. The NSP is structured to anticipate the need for adjustments in the implementation of measures since the Plan is designed to respond to the dynamics within each sector and external forces. In keeping with the principles of sustainable development, the NCSO has sought input of all sectors and major groups. The process at implementing Agenda 21 has been encouraging more groups to work together. This is demonstrated in the formulation of the draft National Sustainable Development Policy. The NSP aims to combine the objectives, ideas and concerns of practitioners, in all sectors in order to facilitate a comprehensive approach to national planning.

Capacity-building, Education, Training and Awareness-Raising: Education for Sustainable Development takes place at the formal level through Education policy and incorporation into school curricula. Informally there are several public awareness campaigns which span the government, private sector and NGO community and use a wide variety of materials including brochures, pamphlets, posters, jingles, video and mini-documentaries.

Information: In keeping with the recommendations of UNCED, Barbados, like many other states established a Cabinet-appointed National Commission on Sustainable Development in July 1994. This original Commission consisted of 30 members representing Government and all major groups including Non-governmental Organizations (NGOs), Community-Based Organizations (CBOs), Trade Unions, Women Organizations, and the Academic Community and Private Sector entities. The Commission functions as an advisory body to Minister of Physical Development and Environment. Secondly, the use of the National Strategic Planning is based on the need to respond to rapid changes at regional and international levels in a more dynamic way. This approach also seeks to reduce duplication of efforts across government department. Analysis of annual experiences are used to establish and to anticipate outcomes using scientific methods and point to policy options for securing the most sustainable outcome for the overall economy. Thirdly, the purpose of the EMLUP study was to provide a policy framework conducive to long-term economic growth and development. It was recognized that such a policy framework was needed to strengthen the ability of the country to implement national policy priorities for natural resource management and update national land use policy and planning to improve its responsiveness to future physical and economic development. The government of Barbados has instituted a process of reform that encompasses both fiscal and monetary policy issues. Fiscal reforms were initiated to place the country fiscal policy on a consumption-oriented basis. A Value Added Tax (VAT) system was instituted in 1997. In the area of monetary policy the Government of Barbados has maintained its fixed exchange rate policy anchor of US \$1 = BDS \$2. Monetary policy remains focused on non-inflationary sustainable growth. The Government of Barbados has started

to reform its tariff and non-tariff barriers to trade in line with the commitments made when it became a member of the World Trade Organisation (WTO). Barriers to trade within the Caribbean Community (CARICOM) are also being removed to ensure that Barbados is in compliance with the terms and conditions of the Caribbean Single Market and Economy (CSME).

Research and Technologies: Most of the research for sustainable development is facilitated through the Ministry of Physical Development and Environment, the Ministry of Health, the Council on Science and Technology, the University of the West Indies and the Ministry of Tourism.

Financing: Within the Ministry of Physical Development and Environment there is a Sustainable Development work programme, which is funded by Government. There are many government projects, for example the Integrated Solid Waste Management Programme, which are funded jointly by Government and international funding agencies such as the Inter-American Development Bank (IDB), the Caribbean Development Bank (CDB) and World Bank. The United Nations (UN) also funding through its agencies such as United Nations Development Programme (UNDP), United Nations Environment Programme (UNEP) and Food and Agricultural Organisation (FAO).

Cooperation: Regional integration efforts include the use of the Association of Caribbean States (ACS) as a vehicle to assist wider Caribbean states in managing the globalisation process.

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CHAPTER 2: INTERNATIONAL COOPERATION TO ACCELERATE SUSTAINABLE DEVELOPMENT IN DEVELOPING COUNTRIES AND RELATED TO DOMESTIC POLICIES – TRADE

Decision-Making: Matters pertaining to local, regional and international trade falls under the mandate of the Ministry of Industry and International Trade.

Programmes and Projects: No information available.

Status: Government recognizes the need for NGO's to be involved in many matters pertaining to sustainable development however, as yet there is no NGO which focuses specifically on issues related to trade. Some of the major issues related to trade, investments and economic growth that are important to Barbados include: the impact of trade liberalization on small economies; limited export concentration; physical vulnerabilities; small size of firms; the potentially harmful effects that may result from the OECD Report classifying Barbados as a "tax haven" when it is in fact a "low tax" jurisdiction. Barbados' pursuit of Sustainable Development has been hampered by a number of international and local constraints within the trade arena, such as: the slow response of the international donor community in providing financial and other assistance to developing states; a reduction in multilateral financial and technical assistance to Barbados (Barbados has been graduated by the International Funding Organizations, and no longer receives grants or concessional funding and any funding Barbados receives is related to specific projects); the globalization of production and finance and the creation of regional trading blocks have served to marginalize small island developing states such as Barbados; adverse effects of trade liberalization and globalization on the economies of small island states are expected to emerge over time; strain on national human and institutional resources have hampered Barbados' efforts at implementing policies and programmes to address the area of trade and environment.

Capacity-building, Education, Training and Awareness-Raising: The Caribbean Regional Negotiating Machinery (RNM) was created by CARICOM Governments to develop and execute an overall negotiating strategy for various trade-related negotiations in which the region is involved.

Information: Information related to trade, investment and economic growth is made available to potential users through the Barbados Industrial and Development Corporation (BIDC) and the International Business Directory of the Ministry of International Trade and Business. At present, information related to major changes in production and consumption patterns due to increases or decreases in trade, investment and economic growth, and the environmental impacts of those changes, is not collected.

Research and Technologies: No information available.

Financing: No information available.

Cooperation: Barbados continues to work with its regional partners in the Caribbean Community (CARICOM) on a programme for the elimination of tariff and non-tariff barriers to trade. In this respect a Common External Tariff system is being pursued. Barbados continues to strive toward satisfying its commitments and obligations under multilateral trade organizations such as World Trade Organization.

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CHAPTER 3: COMBATING POVERTY

Decision-Making: The National Assistance Act (Cap. 48) of 1969 and the National Insurance and Social Security Act (Cap. 47) are the major longstanding legislative instruments, which specifically seek to redress problems arising from poverty. These acts have not been reviewed after Rio. In 1997, the Urban and Rural Development Commission Acts provided for improvements in social amenities slum clearance and redevelopment and for developmental funding for financially disadvantaged groups. The main gap in the legislation is the lack of national policy defining poverty. Some agencies have working definitions but none of these attempts to quantify the number of poor.

New initiatives were introduced between 1998 and 2000, for empowerment of the poor through economic, educational and vocational programmes geared towards generating and sustaining self-sufficiency – for example the Poverty Alleviation Bureau, the Poverty Alleviation Fund, which targets the most vulnerable groups (those normally excluded from access to traditional funding) and Relief 2000, a social work intervention programme focusing also on training for sustained self-sufficiency. Communities and NGOs are empowered to address poverty issues through the democratic process, freedom of speech and their representation on committees and boards. Generally clean water, sanitation service, free education and health care are available to all. Subsidized school lunches are provided at the primary school level; and a subsidized textbook loan scheme is available at the secondary school level.

Programmes and Projects: For the poor and the elderly, the Government provides an extensive welfare programme. For the elderly, assistance is provided for housing, transportation, home care and free utilities (water and utilities) as well as a non-contributory pension, assistance in kind, and food vouchers. The poor are provided with cash assistance, subsidized housing, legal aid, rents to private landlords and emergency relief for fire victims.

Status: No information available.

Capacity-building, Education, Training and Awareness-Raising: No information available.

Information: No information available.

Research and Technologies: Research and developmental capacities are to be strengthened.

Financing: Government has provided an annual budget of approximately BDS \$10 million since 1997/1998 to finance a poverty alleviation exercise through various government agencies, which inter alia addresses education, joblessness and homelessness.

Cooperation: Poverty alleviation/eradication programmes of individuals and communities are being developed and implemented in the context of consultation and co-operation between governmental, non-governmental and community based organisations.

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CHAPTER 4: CHANGING CONSUMPTION PATTERNS

Decision-Making: There is no government body specifically charged with oversight of this policy area. However, varying agencies and departments oversee aspects of national policy, which could inform sustainable consumption and product patterns e.g. Ministry of Economic Development and International Business and the Ministry of Commerce, Consumer Affairs and Business Development. No specific strategy or policy exists in a comprehensive framework; however national policies regarding energy resources use and water, etc, would lead to sustainable consumption and production patterns. Some specific issues being addressed by policies and programmes include: increasing energy and material efficiency in production processes; reducing wastes from production and promoting recycling; promotion of ISO 14000 by the Ministry of Physical Development and Environment and BNSI; among others. The Ministry of Commerce, Consumer Affairs and Business Development are in the process of developing consumer protection legislation. This legislation is not designed to influence consumption patterns. Further, this Ministry's policy for the development of standards is supportive of sustainable development and the protection of the environment. The government has implemented the Code of Practice for Industries, standards and guidelines for the activities of industry to discourage unsustainable practices and promote sustainable production patterns.

Programmes and Projects: Specific programmes include the preparation of an Energy Efficiency Act for Electrical appliances, coupled with energy efficiency labelling for electrical appliances; the continued promotion of the implementation of ISO 9000 and ISO 14000 Series; leak detection and remedy by the Barbados Water Authority; and desalination of sea water for use.

Status: The Ministry of International Trade is presently undertaking with Barbados Investment Development Corporation and BNSI, to promote ISO 9000 and 14000. Additionally, the Ministry of Physical Development and Environment will seek to promote more sustainable practices in manufacturing and industry. Further, a selected group of hotels are to be part of a pilot project to promote Environmental Management Systems in the hotel sector. Many activities have been undertaken to change unsustainable consumption and production patterns such as energy efficiency awareness, waste management public awareness and water conservation activities and public awareness and education campaigns. However it is difficult to gauge the impact of such activities on public behaviour at this time.

Capacity Building, Education, Training and Awareness-Raising: Programmes for policy makers, industries, and/or consumers designed to educate and raise their awareness for more sustainable consumption and production patterns are undertaken through media such as seminars, workshops, pamphlets, capacity-building and training is executed. Additionally, there may be projects, which specifically target training or capacity-building. Awareness campaign programmes to promote sustainable consumption patterns take place mainly through documentation such as the ISO 14000 fact sheet developed by the Ministry of Physical Development and Environment, radio programmes and distribution of literature.

Information: Normally information for decision-makers is available through contact with the relevant agency in the form of reports, documentation such as books, journals and newsletters. Barbados is one of only two Small Island Developing States (SIDS) participating in the UN Testing Programme on Sustainable Development Indicators.

Research and Technologies: Environmental management systems, namely ISO 14001 and ISO 14004, have also been adopted as Barbadian National Standards. So have ISO 14000 and ISO 14002 on Environmental auditing. Standards in terms of effluent standards are adopted from WHO and CEHL. Clean and environmentally sound technologies are promoted and applied in production mainly on an ad hoc basis as information becomes available. However, use of Environmentally Sound Technology (ESTs) is promoted where possible. Other technology-related issues, for instance in packaging, labelling, product design, manufacturing and other processes that promote energy and material efficiency, reduce and recycle wastes, and extend life expectancy of products have just recently begun being addressed.

Financing: Financing is provided through the National Budget and private sector partnership as appropriate.

Cooperation: Currently Barbados does not directly participate in any mechanism but is signatory to some multilateral environmental agreements such as the United Nations Framework Convention on Climate Change (UNFCCC), Persistent Organic Pollutants (POPs) Convention, Montreal Protocol, and Climate Change which speak to the need to reduce consumption of materials potentially hazardous to the environment.

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CHAPTER 4: CHANGING CONSUMPTION PATTERNS - ENERGY

Decision-Making: The Energy Division, Ministry of Physical Development and Environment is responsible for decision-making in this area. **The national policy for energy in Barbados is geared toward: promoting energy conservation practices and the use of renewable energy technologies, where possible, and becoming self-sufficient in oil and gas production; plans to develop renewable sources of energy are focused on wind energy, solar photovoltaic, solar thermal, fuel cell and biogas/biomass.** There are currently legislative proposals to deal with proper disposal of oil wastes, storage of products and remediation of vacated sites. Among the Major Groups, the following are regularly involved in energy management in Barbados: UWI Centre for Environmental Research Management and Environmental Studies; Barbados Light & Power Company Ltd; Caribbean Solar Energy Society (C.S.E.S.); Additionally, government solicits involvement of industry before implementing new proposals.

Programmes and Projects: Major Programmes in the field of energy and sustainable development include: Wind Farm Study; CERMES Solar Drying Project – University of the West Indies (UWI); Solar Photovoltaic Project for Cooling; Development of Renewable Energy Park; Demand Side Management Programme; Energy Awareness Programmes in Schools and for the general public. Major projects and activities in this area include the following: Schools' Solar Stills; Schools' Renewable Energy Projects; CERMES - Solar Drying Project - (UWI); Solar Photovoltaic Project for Cooling Development of Renewable Energy Project; Oil and Gas Onshore exploration and development and Offshore Oil and Gas development.

Status: The resources in the area of solar and wind are plentiful and once the technology is available they could meet a large part of the energy needs. There is a high potential for increase in the areas of wind energy, solar energy and bio-fuels. However, all the technology needed is not presently available. The proportion of commercial energy needs that is met from imports: Jan-Nov. 1998 - Total imports (Refined Products) - 1,921,611 (barrels); Jan-Nov. 1998 - Total Crude Production - 494,981 (barrels). Priority constraints to implementing effective programmes to address the issues raised in this programmes area are programmes involving oil exploration to increase oil and gas reserves to meet the country's energy needs beyond the year 2000.

Capacity-Building, Education, Training and Awareness-Raising: Government training and attendance at many international seminars and courses are currently being utilized. Government is currently setting up a Renewable Energy Center, which one of its mandates is to provide training in wide areas of renewable energy. However, media such as workshops and national consultations serve to educate both policy makers and the general public. Energy Audit Training is provided to assist planners and industries in managing sustainable development and energy. Campaigns and other efforts to raise awareness of issues related to sustainable development and energy include Outreach Programmes and Schools Programmes: Quiz Competition, Poster Competition, Schools' Lecture Series Development of jingle, Mascot and Posters with tips on energy conservation.

Information: National information available to assist both decision-makers and planners working in sustainable development and energy resources is being provided through the development of a Reference Energy System for Governments (energy models) by the Caribbean Energy Information System (CEIS). The data captured relates to petroleum production, supply, import, transformation, consumption, economic/financial, social/demographic and technical activities. The information is made available through publications. There is no website at the moment. With respect to indicators, the Percentage of Renewable Energy of total energy used and Energy produced per GDP is being calculated as data are obtained. Through the Steering Committee so designated under the NCSD, significant work is being undertaken to develop Sustainable Development Indicators. Under the umbrella of the National Indicators Programme (NIP), indicators for energy resources and their sustainable management will be addressed.

Research and Technologies: Issues related to the development, transfer and use of environmentally sound technologies in this programme area include: Cost to the consumer of renewable energy; Policy initiatives not in

place; Education of persons in the field; Phase out of leaded gasoline. Some technologies have a very high capital cost. e.g. solar photovoltaic, which makes the development less feasible. Solar thermal technologies (Solar heating) results in a shorter payback to the consumer. The cost of energy needs would not be reduced significantly. Decisions related to the choice of technologies are based on the following: the environment benefits; the cost of the technology; sustainability of technology; the benefit of technology to the less advantaged members of society; the number of persons who will benefit from the technology. The Renewable Energy Centre of UWI also be involved in research and technologies by harnessing the expertise of our scientists in an applied manner (see Chapter 24 to 32 for more information)

Financing: This sector is financed through the National Budget and Private Sector Partnership. Assistance is also provided by the following: GEF - Global Environment Facility; Regional project to reduce barriers to Renewable Energy Technologies; CSC - Commonwealth Science Council; Caricom Secretariat; CDB - Caribbean Development Bank; RES - Renewable Energy Systems; OLADE - Latin American Energy Organization; CEIS - Caribbean Energy Information Systems.

Cooperation: Barbados is a Member of the following international and regional agreements: CEIS - Caribbean Energy Information Systems; OLADE - Latin American Energy Organization; CARICOM - Caribbean Secretariat; CEAP - Caribbean Energy Action Programme; United Nations Framework Convention on Climate Change (UNFCCC); and the San Jose Agreement.

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CHAPTER 4: CHANGING CONSUMPTION PATTERNS - TRANSPORT

Decision-Making: The Ministry of Public Works and Transport and the Interim Transport Authority, soon to become the Public Transport Authority, are responsible for National Transport. The Ministry of Tourism and International Transport has the responsibility for International Transport. In the area of National Transport, the Government consults with its Social Partners, the Workers' Unions and representatives of the Public Transport organizations on Major issues. Relevant legislation in the area of Transportation include:

- (a) National Transport - Legislation, Regulations, Codes of Practice and Standards developed for transportation are contained within the Road Traffic Act and Regulations, Seat Belt legislation, Brathalyser testing, Parking regulations etc. are now being incorporated as revisions to the Road Traffic Act and Regulations which would bring the Act more in line with international standards; a new public/private sector partnership has been formed to deal specifically with traffic management issues; all legislation and standards that exist are established by the Government and regulation to some extent is influenced by owners and operators while policy remains in the domain of the board of the Authority.
- (b) International Air Transport - Civil Aviation Act, Cap 288; Airports Act 285A; Civil Aviation (Licensing of Air Services) Regulations, 1983; Air Navigation (Fees) Regulations, 1983; Civil Aviation (Air Navigation) Regulations, 1984; Civil Aviation (Investigation of Accidents) Regulations, 1984; The Civil Aviation (Mortgaging of Aircraft) Order, 1998; Travel Services Act, Cap 373A; Travel Services Regulations, 1983. International Maritime Transport - The Shipping Act Cap 296 (as amended in 1997); The Technical Regulations listed in the Third Schedule of the Shipping Act; The Shipping (Oil Pollution) Act Cap 296A(as amended in 1997); The Technical Regulations listed in the Second Schedule of the Shipping (Oil Pollution) Act; The Shipping Regulations 1994, as amended; The Shipping Corporations Act, 1996-14; The Shipping Corporations Regulations, 1997; Barbados Port Authority Act, 285B; Harbours Regulations, 1961 as amended. The shipping legislation listed above was revised to be in conformity with the international maritime law instruments. Regulation of international transport is primarily based on standards developed in the International Civil Aviation Organisation and the International Maritime Organisation. Both of these organisations have granted observer status to a number of NGOs.

Barbados is in the process of seeking to regularize the operations of all public service vehicles and devising a national Strategy for National Transport within the ambit of the Interim Transport Authority. In the case of International Transport, the policy framework enunciated by Government is as follows: to introduce legislation to develop and maintain a diverse range of products suitable for use by international business, These will include an international maritime registry; to undertake persistent and sustained negotiation with international airlines to increase the airline traffic to or from Barbados and to open new gateways such as the Far East and Africa; to negotiate with additional carriers to fly the US/Barbados routes. In the area of International Transport, several non-governmental organizations are consulted when necessary on proposed legislation, operational matters and major infrastructural projects. Examples would include the proposed Recreational Diving Regulations, the draft Protocol VI - Transport Policy, scheduling at the Airport and the Expansion and Reform Projects at the Air and Sea Ports. The NGOs involved include: The Shipping Association of Barbados; The Caribbean Confederation of Shippers Council; The Caribbean Shipping Association; Airlines Association of Barbados; Professional Association of Dive Operators.

Programmes and Projects: Specific activities related to Air Transport are as follows: regulation of Air Services; to satisfy the requirements for continued growth and expansion of the air transport, trade and tourism sub-sectors; to promote a network of regular air links with adequate seat capacity between Barbados and other countries, (especially major market areas) in keeping with the position of Barbados as a major hub for the Eastern Caribbean; to maintain safety standards to ensure the safe operations of Barbadian airlines; Air Services Agreement discussions with a number of countries to secure new air services; on-going contact with air carriers to encourage the introduction of new air routes and/or the enhancement of existing routes; expansion and refurbishment of Barbados sole international airport, the Grantley Adams International Airport to, *inter alia*, meet international

facilitation requirements generated through the steadily increasing traffic which includes the establishment of a new air cargo facility to enhance air cargo services into and out of Barbados for the benefit of manufacturers and producers in Barbados and the region. Organizational reform will also be undertaken.

Activities related to Maritime Transport consist of: establishing efficient shipping facilities and systems to continue the development of the maritime sub-sector; to contribute towards the national and global mission of a safe and pollution - free marine environment; ensuring that the Caribbean region does not become a haven for sub-standard ships; continuing the operations of an "international" ships register, whilst ensuring that such Barbadian ships maintain the highest standards of safety and do not present a threat to the marine environment; maintaining safety standards and safe practices to ensure the safety of life and property at sea for all Barbadian vessels and seamen world-wide as well as all vessels, seamen and passengers using Barbadian waters; establishing Barbados as a leading port of call and home port for cruise business in the Caribbean. Further specific activities related to this issue include: continued attention will be paid to ensuring that Barbadian registered ships are safe and do not pose a threat to the marine environment; as the Secretariat for the Caribbean MOU on Port State Control, the Ministry will work with other States of the Wider Caribbean to ensure that the region does not become a have for sub-standard ships and in this regard, a Regional Ministerial Conference on Flag State Implementation and Port State Control took place in early, 1999; significant infrastructural improvements are planned at the Bridgetown Port. Organizational reform is also to be undertaken.

Status: The country is adequately supplied with maritime transport services. With regards to maritime transport, there is a problem with over-tonnage and high freight rates. Foreign carriers supply most maritime transport services and most air transport services. With regard to air transport, it is estimated that the average load factor is 55%; hence there is a certain level of under-utilised seat capacity. However, on a seasonal basis each year, there is a severe shortage of available seats. The major projects and activities underway in these areas include: In relation to scheduled air transport services, new planned negotiations are expected to result in new air service. With regards to airline charters, the marketing efforts of the Barbados Tourism Authority are expected to result in increased activity. The level of maritime services provided is dependent on fluctuation in trade activity. Hence as activity in the manufacturing or other industrial sectors improves, shipping lines would take steps to increase their capacity.

Capacity-Building, Education, Training and Awareness-Raising: Barbados undertakes the training of ratings (seafarers) in a co-operatives arrangement between the Barbados Port Authority, the Coast Guard and the Fire Department. The Director of Maritime Affairs undertakes certification of these personnel. A project is in place to transfer this training activity to the Samuel Jackman Prescod Polytechnic, which is a premier technical vocational school. Training in air traffic control and related matters is undertaken at the Barbados Air Traffic Control School that is operated by the Civil Aviation Section of the Ministry, headed by the Technical Director (Aviation). Efforts are in train to achieve for the school TRAIN AIR accreditation by the International Civil Aviation Organisation. Officers of the Ministry and related agencies are exposed, from time to time, to both local and overseas training in transportation related areas. The International Maritime Organisation in association with the Caribbean Community Secretariat is arranging a High Level Conference for Senior Government Officials in the maritime sub-sector to take place in the first quarter of year 2002. This event is intended to sensitise policy makers on matters relating to port State control and Flag State Implementation. The Bridgetown Roads and Safety Improvement project included two technical assistance components to address the need for sustainable development in the transport sector. These were Traffic Management and Control and National Traffic Education. As a result various proposals have been implemented and others continue to be submitted to the Planning and Priorities Committee for long term management, control and education in the sector.

Information: National information available to assist both decision-makers and planners working in transportation includes: For National Transport - Revenue from the licensing of vehicles by category, through the Licensing Authority; Fuel prices by category from the Energy Division; Annual Economic report and budget Speech, from the Ministry of Finance and Economic Affairs; Economic reports, from the Central Bank of Barbados; Accident statistics from the Police Department; the road inventory and condition surveys, and traffic volume data from the Ministry of Public Works and Transport. For International Transport- this Ministry produces origin and destinations

statistics as well as airport flow statistics; the Air Transport Licensing Authority undertakes load factor calculations; the Barbados Port Authority has an extensive statistical programme in relation to its activities. Most of the information is in report form and available from the respective agencies. There is no web site address. All statistics are available in hard copy only and some are restricted in their circulation.

Research and Technologies: Technology has not usually been a problem in the area of transportation.

Financing: The International Maritime Organisation and the International Civil Aviation Organization have technical co-operation programmes. From time to time Barbados has accessed technical assistance under these programmes. The Barbados Port Authority, which is responsible for all of the port and harbour facilities in Barbados, is self-financing. The Grantley Adams International Airport is part of the Ministry of International Transport and its operations are financed from the national budget. Major reform and expansion projects planned for both Ports will be financed from both national and external financing sources. Transport services are provided by the private sector, and no joint ventures with Government have been put in place.

Cooperation: In relation to this area Barbados has signed: International Air Transport-Civil Aviation Act, Cap 288; Airports Act 285A; Civil Aviation (Licensing of Air Services) Regulations, 1983; Air Navigation (Fees) Regulations, 1983; Civil Aviation (Air Navigation) Regulations, 1984; Civil Aviation (Investigation of Accidents) Regulations, 1984; The Civil Aviation (Mortgaging of Aircraft) Order, 1998; Travel Services Act, Cap 373A; Travel Services Regulations, 1983 International Maritime Transport-The Shipping Act Cap 296 (as amended in 1997); The Technical Regulations listed in the Third Schedule of the Shipping Act; The Shipping (Oil Pollution) Act Cap 296A (as amended in 1997); The Technical Regulations listed in the Second Schedule of the Shipping (Oil Pollution) Act; The Shipping Regulations 1994, as amended; The Shipping Corporations Act, 1996-14; The Shipping Corporations Regulations, 1997; Barbados Port Authority Act, 285B; Harbors Regulations, 1961 as amended.

Regulation of international transport is primarily based on standards developed in the International Civil Aviation Organisation and the International Maritime Organisation. Both of these organisations have granted observer status to a number of NGOs. Barbados is part of the UN Testing Programme on Sustainable Development Indicators. Further to that, the Environment Division has developed and coordinates a National Indicators Programme (NIP), which seeks to define national indicators for all policy areas, including communication. Presently, the programme is in a data collection stage in terms of trying to discover what information is available and in what formats. Over twenty States of the Caribbean Region adopted the 1996 Caribbean Memorandum of Understanding on Port State Control. Its main focus is to ensure that the Caribbean does not become a haven for sub-standard ships. There has been a limited acceptance of the Caribbean MOU - only ten States to date. The Caribbean Community Secretariat is currently working with Member States with a view to adopting Protocol VI - Transport Policy that would amend the Treaty establishing the Caribbean Community. This Protocol is expected to form the framework for co-operation in international transport. CARICOM Governments have also signed a Multilateral Air Services Agreement, which is to govern air transport relations between Member Governments.

In addition, Barbados is a party to the following Agreements related to the area of transport: Maritime Conventions - UNCTAD Liner Code of Conduct for Liner Conference, 1974; International Convention for the Safety of Life at Sea, 1974 as amended; Protocol of 1978 relating to the International Convention for the Safety of Life at Sea, 1974, as amended; International Convention on Load Lines, 1966; International Convention on Tonnage Measurement of Ships, 1969; Convention on the International Regulations for Preventing Collisions at Sea, 1972, as amended; International Convention for Safe Containers 1972, as amended; International Convention on Standards of Training, Certification and Watch keeping for Seafarers, 1978, as amended in 1995; Convention on Facilitation of International Maritime Traffic 1965 as amended; Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973, as amended, and: Annex III of MARPOL 73/78: Regulations for the Prevention of Pollution by Harmful Substances Carried by Sea in Packaged Form; Annex V of MARPOL 73/78: Regulations for the Prevention of Pollution by Garbage from Ships; Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972, as amended; International Convention Relating to

Intervention on the High Seas in Cases of Oil Pollution Casualties, 1969; Protocol relating to Intervention on the High Seas in Cases of Pollution by Substances other than Oil, 1973, as amended; Protocol of 1992 to amend the International Convention on Civil Liability for Oil Pollution Damage, 1969; Protocol of 1992 to amend the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, 1971; Athens Convention relating to the Carriage of Passengers and their Luggage by Sea, 1974; Athens Convention relating to the Carriage of Passengers and their Luggage by Sea, 1974; Protocol to the Athens Convention relating to the Carriage of Passengers and their Luggage by Sea, 1974; Convention on Limitation of Liability for Maritime Claims, 1976; Convention for the Suppression of Unlawful Acts against the Safety of Maritime Navigation, 1988; Protocol for the Suppression of Unlawful Acts against the Safety of Fixed Platforms located on the Continental Shelf, 1988. Barbados is also a Party to the following related agreements: United Nations Law of the Sea, 1982; Caribbean Memorandum of Understanding on Port State Control, 1996; Multilateral Air Services Agreement.

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CHAPTER 5: DEMOGRAPHIC DYNAMICS AND SUSTAINABILITY

Decision-Making: The Ministry of Health and the Statistical Services Department address demographic issues. The Government Ministries are engaged in integrated policy coordination in the field of population, environment and development policies. The following Ministries and departments are involved: Finance, Economic Development, Health, Physical Development and the Environment, Labor and Social Security, Community Development, Education, Youth Affairs and Sports and the Division of Women's Affairs. Steps have been taken to involve women in decision-making at all levels of population and sustainable development strategies, policies, projects and programmes. The Government has been involved in supporting NGO activities related to population, environment and development. Among the NGOs, which have received support, are the Barbados Family Planning Association, Barbados National Trust, Caribbean Conservation Association, Barbados Museum and Historical Society and National Council on Ageing.

Programmes and Projects: The National Programme of Action on Population and Development as detailed in the National Report on Population and Development has gone through an extensive review process to priorities areas for immediate action to promote sustainability in the Society. The reviewed document is being submitted by the National Committee on Population and Development to the Government of Barbados to be sanctioned as the policy document on population and development for enactment by the year 2000. The policy document seeks to also address issues as raised in the UN social fora, including the SIDS Conference, Social Summit, World Conference on Women, and Habitat II. Barbados participated in the Cairo Conference on Population and Development in 1994.

Status: In Barbados, the main issues include the lack of a clear defined national population policy, the need to sustain current levels of the population growth, and the need to have more complete, accurate and timely demographic and socio-economic data to inform research and policy decision-making. The demographic transition occurring in Barbados underscores the need for a policy on ageing, poverty eradication, secure and safe livelihoods and improvements in social services and economic development to enhance the achievement of sustainable development. The National Commission on Sustainable Development is looking at these issues as it prepares itself for publishing the first National Sustainable Development Policy for Barbados.

Capacity Building, Education, Training and Awareness-Raising: The Barbados Family Planning Association has consistently worked towards the decrease in the population size. To do this, all polyclinics have daily Reproductive Health/Family Planning clinics run by trained nurses. The Barbados Family Planning Association collaborates with the Ministry of Health by training and service delivery.

Information: Public information activities, such as seminars, meetings, and media campaigns, have been carried out generally in an effort to create awareness of the linkages among population, environment and sustainable development issues

Research and Technologies: The Statistical Department of Barbados plays a major role in facilitating the research of demographic statistics and carries out a number of the useful surveys across the island. Barbados carries out an island wide census every ten years to capture a lot of this demographic data. In the last census conducted in 2000, the population count was around 268,792. With respect to gender issues the statistical department, the Barbados Family Planning Association and the Ministry of Health are the key agencies instrumental in utilising this information.

Financing: Most Government related either the government itself or the relevant international agencies in relation to the necessary obligations, which have to be fulfilled, internationally by the various agencies finance projects.

Cooperation: There are no bilateral or multilateral initiatives in the area of population and sustainable development in which the Government has been involved.

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CHAPTER 6: PROTECTING AND PROMOTING HUMAN HEALTH

Decision-Making: The Ministry of Health is responsible for all health matters. There are a number of health related pieces of legislation, the most important being, the Health Services Act and the Drug Services Act. The Barbados Cancer Society and other NGO's are actively involved in the pursuit of a Healthy Society as well as the prevention and education of the society with regards to the HIV virus and AIDS. The mission of the Health Division is to promote health, provide comprehensive health care for the entire population ensuring that all aspects of health care are incorporated into national development. The Drafted National Sustainable Development Policy also recognizes that human resources are critical to national development.

Programmes and Projects: The Health Division has been organized into the following programme areas: the provision of primary health care services; the provision of acute, secondary, tertiary and emergency care on a 24-hour basis; the provision of mental health care; the provision of care for the elderly including rehabilitation services; the provision of a continuous supply of quality drugs to government health care institutions and to the public. The Government of Barbados has been providing a prevention of Maternal to child Transmission Programme for HIV positive antenatal since 1984.

Status: The Ministry of Health reintroduced a 2nd Measles, Mumps and Rubella (MMR) vaccine to children 2-5 years in June 2001 to ensure full seroconversion and maintain measles elimination (no indigenous cases in the region since 1991) and ensure rubella elimination. The National Expanded Programme on Immunisation had its first evaluation Expanded Programme on Immunisation (EPI) by Pan America Health Organisation (PAHO), Washington; PAHO, Caribbean Office and Caribbean Epidemiology Centre (CAREC) officials in July 2001. The Ministry of Health introduced pentavalent vaccine containing Diphtheria, Pertussis, Tetanus, Haemophilus Influenza B and Hepatitis B in June 2001 to all children being immunised for the first time. The Ministry of Health mounted a mass immunisation of adults 21-35 in 1999 and 2000 reaching 51% of the target of 54,539 by November 2000. A technical Advisory Committee on the EPI has been convened involving the Ministries of Health and Education and Youth Affairs and Sports, the National Council of Parent-Teacher Associations, PAHO and UNICEF in November 2001. The HIV/AIDS programme was taken into the Prime Minister's office in May 2001. All Government Ministries now have HIV/AIDS programmes relevant to their span of control. Training workshops for all public sector employees to sensitise them about the disease and various issues have been ongoing.

Capacity-Building, Education, Training and Awareness-Raising: National "Rights of the Child" Committee of the Ministry of Social Transformation functions with membership from the Ministries of Education, Youth Affairs and Sports, Health, Police Department, Child Care Board, NGO PAREDOS to develop policies, monitor programmes and foster public awareness of Children's Rights. Public Health nurses deliver maternity education to polyclinic attendees. A Perinatal Management Workshop was convened in August 2001 involving PAHO, public and private sector obstetricians, paediatricians, public health trained doctors and nurses, midwives, general practitioners, educators of doctors and nurses at University level and the Ministry of Health officials. The workshop used data from a national survey to identify problems in prenatal management of mother and child and developed a national plan of action to reduce the prenatal mortality rate. The Business sector has developed an AIDS in the workplace policy and presented a manual on practice to the Government in October 2001. The Asthma Society of Barbados and public and private sector doctors, nurses and pharmacists conduct regular asthma sensitisation. education/awareness exercises. The Heart Foundation and the Nation Publishing Co. Ltd sponsors "Healthy Lifestyles" events, which introduced the general public to the healthy lifestyles of living, which should be adopted on a daily basis.

Information: The National Breast Feeding Committee developed a Breast-feeding Policy that was approved by the Cabinet in 1999. Queen Elizabeth Hospital the sole public secondary and tertiary care hospital has been certified Baby Friendly in 1998 and recertified in 2001. Ongoing efforts restarted in October 2001 under the theme "It's Not Just Child's Play – Adults Need MMR Too." Using 2000 census totals of 61680 adults in the 20-34 age group the present coverage has been raised to 70% of this target by the 2001 campaign. The target coverage was

80% by the end of 2001. Barbados has placed CFC free inhalers on the National Drug Formulary. Air quality control and pollution monitoring training and necessary equipment procurement has been part of an ongoing programme by the Environmental Engineering Department of the Ministry of Physical Development and Environment. Family Life Education has been introduced into all primary schools.

Research and Technologies: The Ministry of Health, the University of the West Indies and the Department of Statistics are the major research facilities in relation to health.

Financing: The Health Sector Rationalisation Study that is currently being carried out is worth BDS\$4.6 million.

Cooperation: The Barbados Drug Service (BDS), is a World Health Organisation Collaborating Centre for Drug Supply Management. The BDS collaborates with WHO on projects, which seek to develop programmes to help countries maximise their pharmaceutical resources. A Health Sector Rationalisation Study is being carried out in collaboration with Boston University's Centre for International Health. The Ministry works in close collaboration with the Pan American Health Organisation (PAHO).

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CHAPTER 7: PROMOTING SUSTAINABLE HUMAN SETTLEMENT DEVELOPMENT

Decision-Making: The Ministry of Housing and Lands along with the Town and Country Development Planning Office are responsible for all new settlements. Consultations are held with various interests groups and local communities when certain housing developments are being planned. Home ownership is a fundamental goal of Government's housing policy and in this regard eligible tenants of Government rental units have the option to purchase their residences. In addition, financial packages are available to families in the various income groups to assist in the purchase, repair or improvement of their homes.

Programmes and Projects: Current programmes include: legislative measures which give eligible tenants the right to purchase their residential lots; joint public-private sector projects (for lower middle and low income housing) whereby Government provides the infrastructural services and markets the units; and the construction of public rental units for low income families and the development of serviced-sites for rent with the reserved right to purchase or option for immediate purchase. During the 1995/96 period, Government embarked on two new housing programmes, the Urban Renewal Project and the Rural Development Programme, which are targeted to address the housing deficiencies of residents within these distinct geographic regions. Basically, the two programmes seek: to upgrade the infrastructural services and amenities; to enable homeowners to upgrade pit latrines to water closets; to acquire security of tenure to enter joint venture partnerships with private builders to construct in-fill housing; to restrict the encroachment of housing onto agricultural lands; and to conserve, preserve and sustain historical architectural and environmental areas. The pilot project phase of the Urban Renewal project was estimated to cost BDS\$1.2million.

Status: The indicators developed by the United Nations to assess a nation's housing conditions, when applied to Barbados, invariably lead to the conclusions that Barbadians are well housed. A range of housing programmes implemented or facilitated by Government, with notable contribution from the private sector, should have attributed to the significant national growth in housing standards over the years. Yet the various initiatives undertaken have not alleviated the existence of poor housing conditions or eliminated the absence or need to upgrade infrastructure and utility services within existing communities. Furthermore, as new construction falls behind required production levels by some 20%, the need to develop programmes to embrace a wider scale of beneficiaries is necessary. Issues which still present a challenge to the upgrading of substandard housing conditions include: the inability of the poor to afford housing and its related services; the insecurity of tenure for land renters who are not eligible to purchase their lots; the existence of vacant serviced lots which are too high-priced for low income earners; addressing the needs of special groups e.g. a growing population of elderly persons; and the homeless, disabled.

A Building Authority has devised a Building Code for implementation. Government is now in the process of reviewing the final report on the establishment of the Building Authority. This code should lead to improvements in the quality of the housing stock. The main benefits of the Code will be hurricane and fire resistance. The Town and Country Development Planning Office and the Coastal Zone Management Unit, using Geographical Information Systems, are also providing hazard mapping. This should result in the siting of houses. It is proposed that one of the main amendments to the Town Planning Act will be that any development outside the urban corridor, which necessitates a change of use application should be subject to an Environmental Impact assessment (EIA) study. All homeowners within one hundred (100) metres of such development will be entitled to review the study and the developers will be responsible for holding town meetings.

Capacity-Building, Education, Training and Awareness-Raising: The Housing Planning Unit has undertaken professional training for officers in the area of Urban Planning, which should serve to reinforce and integrate the housing component with the other related elements of shelter and settlements. Training in Project Management is a major thrust. Geographic Information Systems takes place within the Ministry of Housing, while integration and computerisation are undertaken within the Town and Country Planning Department.

Information: The Housing Planning Unit prepares and publishes quarterly reports on activity within the housing sector. This includes information on proposed housing, actual housing starts and completions, financing and relocations. The Unit also prepares the Shelter Indicators under the Indicators Programme of HABITAT, while the Town and Country Development Planning Office is responsible for preparing the settlements indicators.

Research and Technologies: No information available.

Financing: No information available.

Cooperation: The Ministry of Housing and Lands works in conjunction and cooperates fully with UNCHS HABITAT and with MINURVI, which coordinates meetings of Ministers of Housing and Urban Development in Latin America and the Caribbean.

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CHAPTER 8: INTEGRATING ENVIRONMENT AND DEVELOPMENT IN DECISION-MAKING

Decision-Making: Following UNCED, Barbados established the National Commission on Sustainable Development (NCSd) which comprised the following ministries: Foreign Affairs and Foreign Trade; Finance; Economic Development; Education, Youth Affairs and Sports; Tourism and International Transport; Agriculture & Rural Development; Physical Development & Environment; Community Development Officer; Town and Country Development Planning Office; National Council for Science and Technology. The following para-statal bodies, institutions and NGOs are also involved in the Council: Investment & Development Corporation; Barbados Chamber of Commerce; University of the West Indies; Coalition of Trade Unions; Barbados National Trust; Barbados Environmental Association; National Organisation of Women; Barbados Christian Council; Small Business Association of Barbados; Future Centre Trust and Tread light Trust. The mandate of the Commission is to advise Government on measures required to integrate environmental and economic considerations in decision-making processes and on global issues of sustainable development; to facilitate national level coordination mechanisms on sustainable development; to promote greater understanding and public awareness of the cultural, social economic and policy approaches to attaining sustainable development in Barbados.

Barbados is presently in the process of finalising a comprehensive sustainable development Policy. A series of national consultations were held, starting with general sustainable development, then following with various sectors of importance. Based on the work of its various sub-committees, the NCSd has made recommendations to the Government, which were incorporated into a National Sustainable Development Policy. These sub-committees comprised Government, NGOs, CBOs academic and research agencies. To date administration and enforcement strengthening has been sector-specific and in accordance with the development of legislation e.g. legislation was developed regarding the fishing industry and training workshops were held for enforcement personnel. New Coastal Zone Management legislation and Marine Pollution Control legislation were enacted in late 1999.

Programmes and Projects: The Government of Barbados, with the financial assistance of the Inter-American Development Bank (IADB), executed a Project entitled, Environmental Management and Land Use Planning for Sustainable Development. The project had four specific objectives: To establish national policy priorities for natural resources management including guidelines and procedures for impact assessment for Barbados; To develop a framework for a comprehensive national information system of natural resource; To formulate an environmentally-sensitive framework and land use plan to govern land use for the next ten years; To make recommendations for the institutional strengthening of the Environmental Unit with the Ministry of Health, Ministry of Physical Development and the Environment and the Town and Country Development Planning Office, regarding staff requirements and needs as well as a training programme for all agencies involved in environmental management. The project addressed three main areas of critical importance, Environmental Planning, Legislation and Management; a National Park System; and Land Use Policy and Planning. Outputs from the project include an Environmental and Natural Resource Management Plan, revised environmental legislation, guidelines for procedural requirements and supporting legislation for the conduct of Environmental Impact Assessments to accompany planning/development applications; a revised physical development plan; guidelines for the operation of the Barbados National Park and other protected areas, and a revised National Park Development Plan.

Status: The need persists for high-level decision makers throughout the region to recognise the importance of sustainable development issues in general, as well as the need to make decisions, allocate resources etc. on the basis of technical advice from experts in the fields of environment and sustainable development.

Capacity-Building, Education, Training and Awareness-Raising: There is a need for training specifically in environmental law, litigation and legislation drafting. This should take the form of supplementing the knowledge of existing legal personnel as well as developing full-scope programmes for trained environmental-based people with an interest in the legislative aspect of sustainable development and environmental issues specifically.

Information: Information dissemination is of prime importance to the process both flowing in and out. There is a need to be a central clearing house for environmental information with easy and ready access to all. One way of doing this is through the National Indicators Programme, which is part of the Sustainable Development Work Programme of MPE. Additionally, preparations are under way to train staff of the Ministry of Physical Development and Environment (MPE) in the area of information technology. There are a variety of other training courses that staffs attend pertaining to all aspects of environmental management.

Research and Technologies: The Ministry of Physical Development & Environment is currently in the process of bringing a number of programmes on stream, which will provide the necessary data for decision making. The Caribbean Planning for Adaptation to Climate Change (CPACC) was a strategic programme for which Barbados played a major role, setting up the necessary initiatives to carry out a lot of the research needed for Climate Change Adaptation. Also the Ministry's Sustainable Development programme has an indicators programme, which will provide data and information for decision-making in Barbados.

Financing: The cost of the Environmental Management and Land Use Planning for Sustainable Development Project was approximately BDS \$1.5million. It was funded through the IADB, as part of the overall Investment Sector Reform Programme (ISRP) between the Government of Barbados and the IADB. The IDB also assisted Government with Integrated Solid Waste Management Programme.

Cooperation: The Government of Barbados participates in a number of regional institutions that develop strategies on the environment and sustainable development. Additionally, an interim coordinating mechanism was set up for the progress of implementation of the Barbados Plan Of Action (POA) in the Caribbean region, which seeks to direct and coordinate activities to be implemented at both national and regional levels. These institutions include the Association for Caribbean States (ACS), UN Economic Commission for Latin America and the Caribbean (UN/ECLAC), Caribbean Community (CARICOM) and the Organisation of American States (OAS). The Government of Barbados contributes to CARICOM and the ACS as well as the Organisation of American States. It also contributes to regional NGO umbrella bodies such as the Caribbean Conservation Association (CCA) and the Caribbean Tourism Organisation (CTO). Bilateral and multilateral donors facilitate funding for some of the regional institutions. Although provision has been made to ensure coverage of sustainable development issues, staffing and human resources issues have been problematic at the regional level. Additionally, financial support has been limited. Despite this, through the Interim Secretariat of the Bureau, the region has been able to make some headway with regional programmes. Funding is being sought to further additional area programmes such as indicators and economic instruments.

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CHAPTER 9: PROTECTION OF THE ATMOSPHERE

Decision-Making: The Ministry of Physical Development and Environment is primarily responsible for the protection of the atmosphere and is a full-fledged member of the National Coordination Mechanism for Sustainable Development. The national legislation framework to protect the atmosphere has not yet been reviewed or revised in the light of Agenda 21. The Government promotes policies and programmes in energy efficiency, environmentally sound and efficient transportation, industrial pollution control, sound land-use practices and sound management of marine resources, among others. It also encourages industry to develop safe technologies. The Barbados National Standards Institute (BNSI), which is responsible for standards, and the Risk Analysis & Monitoring Committee for Industrial Development (RAMCID), acts as monitoring agencies for industry. The Ministry of Physical Development and Environment (MPE) acts as the implementing agency for both the United Nations Framework Convention on Climate Change and the Montreal Protocol on Substances that Deplete the Ozone Layer.

Programmes and Projects: *National Climate Change Programme* - As Signatory to the United Nations Framework Convention in Climate Change (UNFCCC), Barbados has obligations at the national, regional and international level. At the national level, Barbados is required to collect and communicate data relating to the sources of greenhouse gases, within its National Communications to the UNFCCC, which arise as a reporting obligation under Article 12 of the Framework Convention, and should, among other things, include a national inventory of greenhouse gas emissions by sources and removals by sinks, and, in the case of developing countries, may include project proposals for funding, that would assist in the reduction of local greenhouse gas emissions. National Communications are required of all Parties to the UNFCCC, although developing countries are provided financial and technical assistance to develop the document. It should also be noted that Barbados has benefited tremendously from the training and equipment provided to support the National Communications Project, which is expected to provide data and information for decision-making at the local level. Barbados was provided with some US\$ 189, 417 to complete this project. Barbados presented its First National Communications to the Seventh Conference of the Parties to the UNFCCC in November of 2001.

Barbados has obtained several benefits as a result of its participation in the regional project “Caribbean Planning for Adaptation to Climate Change” (CPACC). These include institutional strengthening and extensive capacity building (inclusive of the acquisition of hard and software) for the Ministry’s Environment Unit and Coastal Zone Management Unit. Barbados is a pilot country for the Coastal Vulnerability and Risk Assessment component of CPACC, as well as the component for the Formulation of a Policy Framework for Integrated Adaptation Planning and Management in the face of Climate Change. Work is ongoing, but nearing completion (as of December 31, 2001) in each of these thematic areas.

The Climate Change Programme has brought together the work of several agencies to assist in meeting the objectives of the UNFCCC, as well as meet the general objectives and targets set by the Government of Barbados.

a) Participation in Global Monitoring Systems - Barbados participates actively in strengthening the Global Climate Observing System. Barbados is a part of the Global Ocean Observing System (GOOS), making it a part of the global network for sea level monitoring, submitting data to the Permanent Service for Mean Sea Level (PSMSL). In addition, Barbados has a climate monitoring station, obtained under the Caribbean Planning for Adaptation to Climate Change (CPACC) Project. This climate monitoring station also monitors crustal changes i.e. vertical movements of the land.

b) Energy Projects - High priority is given to the use of safe technologies in industry, research and development relevant to power and transport, to awareness raising in the area of energy and fuel efficiency, including product labeling, and to the use of Environmental Impact Assessment (EIA) within the energy production sector. Barbados has undertaken a review of its current energy supply mix and has been actively involved in the research and development of biomass, biogas, solar- and wind-generated electrical systems and other appropriate renewable sources of energy.

Apart from taking adaptive steps to the climate change problem, the Government of Barbados, despite contributing little to global greenhouse gas emissions, has embarked on an overhaul of its energy sector to increase the use of renewable energy sources and employ sensible energy conservation techniques. These projects are aimed at enabling Barbados to become more independent and self reliant in catering for its energy needs, as well as to bring it closer to being a true model for sustainable development. As such, Barbados, on its own initiative, has developed several adaptation and renewable energy projects, both planned and on-going, which speak directly to the problem of the impacts of climate change and growing greenhouse gas emissions.

Renewable energy has had a long history in Barbados. After sugar was introduced to the island in the middle of the seventeenth century, the windmill soon followed, and at the height of their popularity they were five hundred and fifty five of them at sugar plantations across the island. Sugar cane bagasse was used as the fuel to concentrate the juice and produce sugar. Several hundred multi-bladed windmills, “fanmills”, were used to pump water, but most of these have been dismantled. In the 1950’s, when there were 22 sugar cane factories in operation, and sugar cane waste or bagasse was their main source of process heat, 50% of the island’s primary energy was from renewable sources. Today, the main renewable energy sources are sugar cane bagasse and solar water heaters, which contribute about 15% of the island’s primary energy supply (see Table 5.1). The Government of Barbados, in conjunction with the Centre for Resource Management and Environmental Studies (CERMES) of the University of the West Indies, is working towards having renewable energy contribute 40% of the island’s primary energy by 2010. There has been much work into the development of solar technologies, including solar water heating, solar crop dryers and solar stills, and solar photovoltaic (PV) systems. In addition, there has been considerable exploration into the generation of power through bagasse cogeneration, wind energy farms, and ocean thermal energy conversion (OTEC).

Solar Water Heating - Over 32,000 solar water heaters have been installed in Barbados, each saving 4,000kWh per year, with total electricity saving of 128 million kWh. At 15¢US/kWh, the financial savings to the consumers is \$19.2 million US/year. This in turn is the heating equivalent of 227,000 barrels of oil, and a foreign exchange saving to the island was about \$6.8 million US (based on the 2000 average oil price of \$30US per barrel). In addition to the fiscal benefits, a substantial quantity of emissions, such as carbon dioxide, sulphur dioxide and the oxides of nitrogen (CO₂, SO₂ and NO_x) are not emitted with the use of solar water heating, and the Barbados Light and Power Company (BLPC) also benefits by not having to produce the equivalent of what is about 19% of its 1998 production total of 658 million kWh. These 32,000 solar water heaters are therefore worth 30 to 35MW of additional electric generating capacity.

Photovoltaic Systems - Barbados has about 37 kilowatts peak (kW_p) of Photovoltaic systems installed at various sites, making it one of the leading Caribbean countries in the utilization of this technology. The largest of these systems are listed below:

- 1100W_p at the University of the West Indies (UWI) for solar cooling;
- 17,300W_p at Harrison’s Cave for running the cave’s lighting system;
- 3,000W_p at Combermere School for operating a computer laboratory;
- 2,000W_p grid-tied PV system installed at BLPC’s Seawell Generating Station, at Grantley Adams airport;
- 2,000W_p at Government Headquarters to operate lights and provide emergency power; and
- 11,100W_p at the Skeete’s Bay fishing complex on the island’s East Coast powering a one-tonne-per-day solar icemaker for the fisher folk.

A 300W_p portable PV system is used to demonstrate the flexibility and versatility of the technology to members of the public. With the exception of the BLPC 2,000 W_p system, the Government of Barbados has funded all of the aforementioned projects.

Solar Crop Drying and Solar Stills - Solar drying techniques have been used in Barbados since 1969, where dryers are used for removing moisture from a variety of agricultural crops. In 1973, the University of the West Indies, under its Solar Energy Project, began to build solar crop dryers; and in 1976 the first large-scale dryer was produced, which had a 1600-kg capacity for drying sugar cane. Since 1990 solar drying facilities have been used to dry many different crops, including sweet potatoes, eddoes, yams and other vegetables. The University of the West Indies, Cave Hill Campus, established a solar drying project in 1995, and has recently developed the Artisanal Dryer, which has been exported to other Caribbean countries.

The Government of Barbados is currently working with the Centre for Resource Management and Environmental Studies (CERMES) of the University of West Indies to construct solar stills in every secondary school in the country to provide distilled water for use in science laboratories and other purposes. Already, 12 of the 21 secondary schools have been equipped with these stills, providing an average of 8 liters per day. Some schools are now selling the excess distilled water produced, and the Government is looking to complete the placement of solar stills at the 9 remaining schools. Similar to the workshops held under the schools' photovoltaic programme, there was a workshop held in 1999 on the operation of solar stills. This initiative has been extremely successful, making the use of electric stills a thing of the past.

Phase out of Leaded Gasoline - As of 2000, the use of leaded gas was phased out in Barbados.

National Ozone Programme - The Government of Barbados has acknowledged its obligations to the Vienna Convention and the Montreal Protocol, such that it has carried out the necessary institutional arrangements and has examined Barbados' ability to control and phase out the use of Ozone Depleting Substances (ODS) on the island. The Ministry with responsibility for the environment has always retained the National Ozone Unit, and has, through the implementation assistance of United Nations Environment Programme (UNEP), its sister organization United Nations Industrial Development Organization (UNIDO), and with the financial assistance of the Multilateral Fund to the Montreal Protocol, benefited from several projects geared to eliminate the consumption of ODS in Barbados, these include:

- Barbados Country Programme (1993-1994) (US\$ 10,000);
- Execution of an Institutional Strengthening Project (1995-1998) (US\$ 112,000);
- Execution of a CFC Recovery, Recycling and Training in Refrigeration Project (1997-1998) (US\$ 167,000); and
- Phase II of the Institutional Strengthening Programme (1999-2001) (US\$90,000).

Through these projects the Government of Barbados has been able to carry out extensive sensitisation of the private sector and the general public, as well as training of the Refrigeration and Air Conditioning Sector in 'ODS friendly' techniques. Barbados has to date been on target with its phase out of CFCs, as laid out in the Montreal Protocol. In May of 2001, the Government of Barbados hosted the Methyl Bromide Policy Development Workshop to assist Methyl Bromide Phase Out in Caribbean Countries under the Montreal Protocol on Substances that Deplete the Ozone Layer (May 8-10, 2001), as a special event in fulfilment of the Montreal Protocol. Barbados is in the process of finalising a Refrigeration Management Plan to assist with providing Customs Training for officers at the island's ports, to enhance their ability to recognise illegal imports of Ozone Depleting Substances.

Status: Through the Climate Change Programme, Barbados has undertaken a coastal vulnerability assessment (including work on the vulnerability of water resources), and formulation of draft policy for the adaptation to climate change, to address potential impacts on several key sectors. Under the CPACC project, there has also been work done on the socio-economic impacts of climate change in Barbados. There is also a repository of climate-related data for the island.

Capacity-Building, Education, Training and Awareness-Raising: As already mentioned, there has been significant training and capacity-building obtained within the First National Communications Project and as part of the CPACC project. Awareness raising has mostly been sectoral, and little general public awareness has been

carried out to date. Under the Ozone Programme, there has also been some training of the Refrigeration and Air-Conditioning Sector (see section on Projects) in the recycling and reuse of CFCs in equipment. The Ozone Programme has had extensive awareness raising through the use of the national mascot 'Ozzy Ozone', a registered trademark of the Government of Barbados. This mascot has been used: (i) with awareness materials (ranging from posters to 'giveaway' items such as pens, pencils, rulers, erasers), (ii) as part of the Ozone Pledge programme where, local companies trading in Ozone Depleting Substances (ODS), signed on to assist in the phase out of ODS; and (iii) as part of the global UNEP campaign for Ozone Day 2000.

Information: No information available.

Research and Technologies: *Future Renewable Energy Projects and Research* - The two fastest growing electricity generation technologies in the period 1990 to 2000 were wind at 25% and solar PV at 20% (Headley, 2001). Renewable projects being considered in the future by the Government of Barbados reflect the global trend, and investigate other forms of renewable energy as well. Currently under consideration are:

- 16MW in wind turbine farms at good wind sites in northern Barbados;
- A 3 MW ocean thermal energy conversion (OTEC) plant;
- A 10 MW waste combustion plant;
- A 2 MW wave power plant (consultations have begun with a UK company who have just installed a 500 kW plant on an island off the west coast of Scotland);
- 2 MW of solar PV distributed around the island;
- Setting up manufacturing facilities to produce high purity silicon for the computer chip and solar PV industries. (The possibility of a joint venture with Trinidad and Guyana is being explored.); and
- Producing hydrogen from renewable energy to power fuel cell vehicles, e.g. cars and buses. (These emit only water and are very environmentally friendly, hence they would enhance the island's image as a 'green' tourist destination. Buses and cars using this technology are already operating in Germany and Canada; Daimler Chrysler, Ford and Ballard are leaders in this field.)

Of these technologies, the wind turbine farms are the most advanced in terms of planning. As aforementioned, the major barrier to their implementation is the establishment of a policy to determine how independent power producers supply electricity to the consumer and their access to the grid.

Ocean Thermal Energy Conversion - The University of the West Indies is currently investigating Ocean Thermal Energy Conversion (OTEC). The technology will use the temperature difference between the bottom of the ocean and that at its surface, to provide the energy to power a generator. It is a technology, which has much scope for islands, which are volcanic in their geology although it is still to be demonstrated on a large scale. It has been recently discovered that Barbados, although not volcanic, may have some potential for development in this area. The Ocean depth to the north of the island is particularly large, and therefore has a significant temperature differential. The economic feasibility of this technology for Barbados is currently being investigated.

The Scientific and Technical Advisory Panel of the Global Environmental Facility (GEF) have evaluated the OTEC plant, and Barbados is now considering ways of financing the pre-feasibility and feasibility studies. The main barrier here is that this will be the first megawatt sized OTEC plant, and there are several technical characteristics, which need to be evaluated in a working plant, which cannot be simulated. Hence construction of the plant will incur the high cost associated with being low on the learning curve. However these are the unavoidable costs inherent in introducing a new source of base load power, and the technology has the potential to supply terawatts of

power at sites between latitudes 30° north and 30° south, most of whose beneficiaries will be in the Third World. Therefore the Government sees continued investigation into OTEC as extremely worthwhile.

Renewable Energy Centre - To facilitate further development in these areas, and to overcome barriers to technology implementation, the Government proposes to establish a Centre for Renewable Energy. The Centre will offer international scientists and technologists the opportunity to do research into renewable energy, and will also address institutional and policy issues which have played a major part in preventing the implementation of renewable energy projects.

The University of the West Indies has been in the forefront of research into renewable energy through their CERMES programme; however the proposed centre will continue and expand the work on renewables. The centre will engage in training, research, development and demonstration in the area of Renewable Energy, as well as Energy Conservation. The centre will also include working exhibits of renewable energy technologies. An officer will also be responsible for organising tours of the facility and short courses for school children and the general public. It is expected that this institution will also play a role in developing capacity in the region and eventually become a node in the international renewable energy network. The projects already in existence will be sustained under the umbrella of the centre. Government is willing to provide some initial financing to set up the centre and to procure the necessary equipment; but there is a need of further funding. Institutional arrangements are still to be finalised but it is expected that the centre will be established as an extension of the currently existing UWI (CERMES) solar project. The centre will enlist the expertise of qualified professionals in all of the Renewable Energy speciality areas.

Financing: See section on Projects and Programmes.

Cooperation: Barbados acceded to the Montreal Protocol on October 16, 1992, and accepted the London and Copenhagen Amendments of the Protocol on July 20, 1994. The latest reports to the Montreal Protocol Secretariat were prepared in June of 2001. Apart from assistance from the United Nations Environment Programme in the implementation process of the Montreal Protocol, the Caribbean ODS Officers Network is a key tool in assisting and building capacity amongst Ozone Officers in the region. Barbados signed the Framework Convention on Climate Change on June 12, 1992, ratifying it on March 23, 1994; and signed and ratified the Kyoto Protocol on August 7, 2000. The Government has not acceded to any regional, multilateral or bilateral agreements regarding Transboundary air pollution. Along with ten other CARICOM states, Barbados is involved in the Caribbean Planning for Adaptation to Climate Change project (CPACC), at a cost of US\$6.3million, financed by GEF and executed by the Organisation of American States (OAS). The Regional headquarters is located at the Cave Hill Campus of the UWI in Barbados. Under CPACC, the effects of climate change, including sea level rise has been monitored and the data fed into regional and global databases. In addition the project has issued recommendations on ways and means of preparing for climate change and mitigating against the adverse effects. The Coastal Zone Management Unit (CZMU) monitors coastal phenomena including sea level information using a number of tidal gauges. The Unit has already developed guidelines for future coastal developments taking into consideration sea level rise and other potential effects of climate change; and has assisted other island countries in the region in the design of coastal protection structures.

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CHAPTER 10: INTEGRATED APPROACH TO PLANNING AND MANAGEMENT OF LAND RESOURCES

Decision-Making: The Town and Country Development Planning Office (TCDPO) are responsible for the development and implementation of national policy on land use and physical planning in Barbados. The TCDPO seeks to ensure compliance with policy for land use and physical development through the development control process. Applications for new developments, as well as changes in existing developments, are submitted to the TCDPO. These applications are evaluated for compliance or non-compliance with national policies and standards, and if deemed necessary are subject to Environmental Impact Assessments (EIA) through the oversight of an EIA Panel. The TCDPO has strong powers of regulation and enforcement, with which to ensure compliance with the legislation and policies of the PDP.

The main policy document for land use planning is the Physical Development Plan (PDP), which is a document that is grounded in law. It contains specific provisions for physical development, the use of land and natural resources, including heritage resources, and the Barbados National Park. The 1998-revised PDP has classified island into hierarchical sections. These sections for land use are: National Centre (Bridgetown) – which is intended to serve as the primary focus for major office, government, and shopping functions in Barbados; Regional Centres (Speightstown, Holetown, Oistins, Six Cross Roads) – which are intended to evolve as regionally important activity areas with a wide mix of uses, including a strong residential component; Suburban Centres (Warrens and Wildey) – which are located on main highways and serve as important employment and shopping areas. The suburban centres are developed in a more automobile – oriented form than National or Regional Centres (Planning Department is in the process of preparing a detailed plan for Warrens Area) – There are plans to extend Six Cross Roads Area – taking 100 acres of agricultural land for the extension of this centre; Local Centres (Eagle Hall, Worthing, Hastings and St. Martins) – which provide shopping, business and professional services to local communities and neighbourhoods, and may also accommodate more intensive residential developments and Mixed use Corridors (Collymore Rock, South Coast, Highway 7, Baystreet, Carlisle bay, Fontabelle, Coleridge Street, White Park, Baxter's Road, Roebuck Street) – which are linear areas of intensive mixed use development, oriented along a major street or highway, and are intended to accommodate the same range of uses as Centres. Mixed Use Corridors shall generally have a strong pedestrian and transit orientation, although each designated corridor has its own unique characteristics and development policies.

A detailed land use policy was prepared for the Central Bridgetown urban corridor. There are also plans to extend the urban corridor to utilise more of the area formerly under agricultural use. Thus, Rural settlement areas such as Boscobelle (traditional village setting) will become subdivided areas to consolidate rural settlement for small farmers. The Area Development Plan will form part of the PDP (section 3.13). This detailed study reviewed the use of agricultural land between 1976 and 1998. The census was conducted between 1997 and 1999 to gather the necessary information. The findings were that originally an approximate figure of 5764 hectares was available for use of which approximately 14000 acres (15%) of agricultural land was lost to urban development. Out of these areas approved only 28% of those were actually used for agriculture and the others remained vacant. Agricultural land is classified under categories 1,2,3 and 4 of the study. The study indicated that approximately 43, 176 hectares (of land) was available for use; for which 22000 hectares and 19200 hectares are classified as class 1, 2 and a further 7200 hectares are in class 3 and 5600 hectares are classified as 4, and 5 (only suited for trees and pastures). The agricultural study also recommends ways to better utilise the land with respect to land use policy. This Area Development Plan is an agricultural policy prepared to be incorporated into the PDP.

The PDP therefore guides the type of developments that are allowable in different parts of the island. In 1996 the Environmental Management for Land Use Planning and Sustainable Development Project (EMLUP) was initiated. With a view to promoting sustainable land use in 1998 the project delivered a revised PDP and T&CP Act intended to integrate the concepts of sustainable development into every aspect of land use planning and development in Barbados. One of the major outcomes of the EMLUP project is the Environmental and Natural Resources

Management Plan, which provides the framework and policies within which the islands environmental and natural resources could be protected, regulated, used and monitored. The Ministry of Physical Development and Environment (MPE) is now actively involved in carrying forward specific recommendations for the institutional changes necessary for implementation of the outcomes of EMLUP. The EMLUP project has made specific recommendations for institutional strengthening and restructuring within the Ministry of Physical Development and Environment and the Town and Country Development Planning Office (as described above), with a view to improving co-ordination mechanisms for land and land resources management in Barbados.

The revised institutional structure, policies, regulations and legislative instruments allow for objections to planning applications to be considered in the approval process. Town Hall meetings and public consultations are convened with a view to extracting public opinions on land use proposals. The overriding objective is the achievement of sustainable national development including: conservation of environmental and natural resources; efficient use of resources; improved quality of life; inter- and intra-generational equity with regard to resource allocation; and full stakeholder participation in the development and implementation of national policies. The strategy/policy reflects an integrated approach addressing: rural development; viability of rural areas; environmental aspects (e.g. minimisation of negative environmental impacts of human-induced activities such as unsustainable agriculture practices on marginal lands, regulation of productive lands and urban land use zoning and enhancement of positive impacts such on the environment through better land use and management practices); and social aspects. Best possible land use and sustainable management of land resources in Barbados is to be encouraged through the use of various market based instruments as proposed in the revised Physical Development Plan (1998) and Town and Country Planning Development Act (1998). Legislation and guidelines stipulated within these documents would be the dominant measures in use. Performance bonds have been recommended for the management of quarry sites and coral reefs.

Biodiversity conservation currently falls under the mandates of the Ministry of Physical Development and Environment (MPE) and the Ministry of Agriculture and Rural Development's Plant Quarantine Unit and Veterinary Unit. Public participation is recognised as an essential component in the decision-making process on land-use planning and management of land resources in Barbados. The TCDPO has already adopted EMLUP recommendations in this regard by way of the convening of Town Hall Meetings, which provided a forum for wider discussion and feedback on development proposals. Currently the existing process allows for limited public involvement in decision-making process. The MPE facilitated the establishment of the National Commission on Sustainable Development. The Commission relies on the voluntary contributions of a wide range of Barbadian technocrats, professionals and community resource persons from the public/private sectors. It is to advise Government in respect of strategies necessary to enhance, develop and implement approaches to sustainable development in Barbados. Barbados has no remaining indigenous groups therefore there are no associated issues of land ownership and tenure rights. The involvement of Major Groups in national decision-making related to land management in Barbados is described in some detail above. Major Groups in Barbados include Youth; Community Groups; Non-governmental organisations (non-profit and for profit); Women; Farmers. The Government encourages agricultural and small business cooperatives to participate in land management. Under the Land Tenantry Act, plantation tennantry land has been sold to long-term tenants at minimal costs.

Programmes and Projects: EMLUP (1998) recommended the establishment of a Natural Heritage Unit, which will be mandated to: Make management plans for natural heritage conservation areas and national forest candidate sites as provided for by the PDP; Ensure consultation with other government agencies and the public to discuss and evaluate proposed management plans; Enter into agreements with private land owners to establish easements and regulate the use of lands; Protect trees; Inspect land or buildings believed to have a deleterious affect on the proposed National Park or natural heritage conservation areas; and Initiate an EIA on a proposed development if it is expected to pose a deleterious affect on the proposed National Park or natural heritage conservation area. The Proposed Environmental Management Act (EMLUP 1998) makes recommendations for a Water Resources Division and the creation of a Water Resources Board. It has been proposed that the Water Resources Board be

composed of representatives from a wide cross-section of government departments and agencies to ensure an integrated approach to decision making. Currently all government applications for major proposed development proposals are referred to the Barbados Water Authority (BWA) to ensure the availability of water to service the development. All lands in Barbados are classified in accordance with water protection policy. There are 5 Water protection Areas (WPA) with varying degrees of planning controls enforced by the TCDPO.

Plans to expand human settlements with respect to the impacts on farmland, landscape (open space), forest land, wetlands, and biological diversity in coastal areas, all of the factors are taken into consideration when planning applications for the expansion of human settlements are submitted to the TCDPO for approval. This kind of integrated review is essential in Barbados; not least of all because the resource of land space itself is limited. As such, the TCDPO office consults with other relevant government agencies and departments to obtain specialised advice to ensure that situations of conflict in land use do not occur and/or are resolved efficiently. Government's poverty eradication policy includes the provision of adequate low-income housing, which should be accommodated under the PDP. Government has established two commissions, the Urban Development Commission (UDC) and the Rural Development Commission (RDC). Both of these agencies facilitate the improvement in physical conditions of target populations in the urban and rural areas. The programmes are aimed at providing improved amenities such as roads, electricity, water, sanitary facilities, etc.

In order to meet the competing demands for land while ensuring the conservation of land resources, the Government instituted a land use zoning policy with restrictions on use determined by the location of underground water reserves; 45000 acres of Government owned available land is set aside for agricultural use. Government, through the Sewerage and Solid Waste Project Unit, is in the process of implementing an integrated National Solid Waste Management Programme. Components of the programme include the construction of a new sanitary landfill, which is near completion. A separate facility exists for the disposal of bulky waste. The national waste management programme will also see the establishment of a storage facility specifically for hazardous waste prior to export from Barbados. The Physical Development Plan (revised 1998) and Area Development Plan for Barbados were prepared by the Environmental Management for Land Use Planning and Sustainable Development Project. Once endorsed the recommendations generated by this project will provide the necessary policy, legislative and institutional frameworks for planning developments and approvals. It is anticipated that the procedural process and legislation for environmental management and sustainable land use planning in Barbados will be improved to enable more efficient decision-making. It is further expected that new instruments and regulations will make foreign direct investments more environmentally friendly. Proposed amendment of the Town and Country Planning Act Cap 240 to include provisions governing EIA is being pursued.

Status: The main issues of concern relating to land use in Barbados have to do with the following: Competing demand from numerous sectors – residential, tourism, agricultural and industrial; The need to restrict activities/land use above protected underground water reserves; Potential for contamination of ground water due to the pervious nature of coral rock; Management of land resources to meet aspirations of citizens and to provide sustainable economic development for current and future generations. Very little research has been dedicated to the anticipated impacts of El Nino Southern Oscillation (ENSO) on Barbados' land resources. However, preliminary investigations suggest that the island is likely to be subject to increased intensities and total quantities of rainfall. These views have not been reflected in integrated land management planning. As a small island state, land, as well as other natural and environmental resources in Barbados, is in very limited supply. There are many competing demands for the use of land and other resources. Full cost valuations of the use of natural and environmental resources including land have not been developed or used to any great extent for land use planning and policy development. Core concepts and principles of sustainable development are still to be integrated into land use planning and policy development. There exist implications of "smallness" on the island's vulnerability to natural and man-made

disasters. Coastal Zone Management issues are magnified due to the smallness of the island and the pressure exerted on the limited natural resources.

Capacity-Building, Education, Training and Awareness-Raising: Barbados promotes public participation for land resources planning and management. Public awareness campaigns are conducted. Improvements are planned to strengthen systems and procedures for the supply of information to the public and interested parties. Institutional strengthening (e.g., training of staff) is occurring. A public awareness and education programme that is an important component of the overall solid waste project is currently being developed. It is aimed in part at informing citizens on ways of reducing their total output of solid waste and adopting more environmentally sound waste management practices.

Information: Data on biological diversity in Barbados were collected and catalogued by the recently completed National Biodiversity Strategy and Action Plan Project. Information on soil and land is available and is utilised by the Town and Country Planning Office in order to make sound decisions on an integrated approach and sustainable use of land resources. Some information is available in the form of Ordinance Survey Maps, which are available from the TCDPO. Data on soil and slope characteristics are available (Vernon and Carrol Study) however the data is very old and should be updated. The recent Agricultural Development Plan (1999) is intended to assist in providing more up-to-date data. Barbados is the only Small Island Developing State involved in the United Nations sustainable development indicators Testing Programme since 1997. In December Barbados hosted the third international workshop on UN Indicators of Sustainable Development and is in the process of finalising a national list of indicators. National Indicators for Human Settlement were developed for Habitat II, Istanbul 1996. These indicators are currently being reviewed for Habitat III. Information on integrated land management and sustainable use of land resources can be accessed from the TCDPO.

Research and Technologies: The EMLUP project involved a comprehensive assessment of land use in Barbados including the use of GIS technology. Maps of land uses have been generated and the relevant information exists on digital databases. It is intended that the Lands and Surveys Departments will undertake on-going monitoring and updating of these databases. Databases and inventories are updated regularly (usually every 3 to 5 years).

Financing: No information available.

Cooperation: Barbados is party to the Convention on International Trade in Endangered Species as well as the UN Convention on Biological Diversity. Policies, programmes and action plans have been implemented to meet the obligations encompassed within these agreements. Barbados cooperates with UNDP (clearing house), UNCHS (Habitat II) and IADB (improvement of planning systems). These organisations have participated in the review of national strategies but have not provided additional financial or human resources after UNCED. Barbados has provided technical expertise in land resource planning and management to the islands of Montserrat and Anguilla. Currently, solid waste is disposed of in a sanitary landfill while hazardous waste is packaged and exported for overseas disposal. The latter activity is conducted according to the requirements of the Basel Convention on the Transboundary Movement of Hazardous Waste to which Barbados is a Party.

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CHAPTER 11: COMBATING DEFORESTATION

Decision-Making: The Town and Country Development Planning Office employ a cross-sectoral review process for planning application appraisal. Input from the Soil Conservation Unit, the Ministry of Agriculture and Rural Development and that office when considering applications with implications for forested areas seeks the MPE. Legislation exists to protect trees and forested areas. The Physical Development Plan is administered by the Town and Country Planning Office and guides all land uses. In appraising planning/development applications that office ensures that existing legislation with regard to forest management/ trees preservation is upheld. Town and Country Planning Office administers the Tree Preservation Act, which requires that planning permission be given before trees of specified dimensions are cut down.

The Soil Conservation Unit of the Ministry of Agriculture and Rural Development is responsible for combating deforestation and land degradation in the Scotland District an area that comprises approximately 17% of the land area in Barbados. During the last two decades the Soil Conservation Unit has reduced soil erosion and land slippage on steep slopes of the Scotland District by the re-forestation of extensive areas. Deforestation and the felling of trees outside of the Scotland District are controlled by the Trees (Preservation) Act 1981. Re-afforestation is encouraged and promoted through the Cultivation of Trees Act 1951. No national forest programme exists *per se* but ongoing programmes include forest enrichment; urban forestation and roadside planting. NGOs and Community Groups conduct reforestation programmes, usually with private sector sponsorship and involvement. Individual landowners who retain trees on private land over a certain area are given a tax rebate to promote tree preservation. NGOs, schools and community groups are actively involved in tree planting projects.

Programmes and Projects: There is soil erosion and land degradation as a result of deforestation in the Scotland District. Fruit trees are planted to combat this. Beautify Barbados Project initiated in 1999, a large component of which involves revegetation of various areas. An initiative at Joes River Forest on the East Coast of the island involved enrichment planting with potentially commercial tree species such as mahogany, *Cassuarina* and cedar. The small size of this area prevents economically viable harvesting of these species. Teaching and research expeditions are conducted in this area with established trails for Nature Walks and Recreation.

Status: Barbados has only a few very small remaining areas of indigenous forests. One is a protected area and the others occur within steep gullies and watercourses around the island. Deforestation for commercial exploitation does not occur in Barbados due to the very limited supply of suitable resource and the subsequently uneconomical nature of such activities. The terrain of Barbados rises in terraces, with the lowest at sea level and the highest at the central interior. One of the islands more outstanding topographic features is the Hackleton Cliff in St. Joseph where a narrow band of white cedar and balsam extend for several miles. Only a very small component of the total area of the country actually contains forest. Pre-colonial virgin forest does exist in an area called Turners Hall Wood and within the steeper and deeper gullies that criss-cross the island. Wetland and Mangrove Vegetation is found at Graeme Hall, Christ Church, but pockets of mangrove also occur along the leeward coastline. Three species of mangrove are present in Barbados. It is interesting to note that areas of plantation land traditionally under sugar cultivation become invaded by secondary forest growth when that land is abandoned due to the decline of the sugar industry.

Since the removal of nearly all forest cover in Barbados during the period of settlement after 1627, soil erosion has remained one of the major environmental problems on the island. In particular, lands within the Scotland District are at risk due to severe erosion associated with high rainfall and steep topography. Through the National Forestry Action Plan, Barbados reports a total of 5,070 hectares of wooded areas. This figure represents less than 2% of the Island's land area, the majority of which is located within the Scotland District or the proposed area of the National Park. Most of this forest cover is secondary forest since little remnant natural forest exists apart from Turners Hall Woods, which stands on approximately 20 hectares. Coastal mangrove swamps, once abundant, has been largely destroyed due to coastal development. The largest remaining mangrove area is located at Graeme Hall Swamp where a significant number of red mangrove and white mangrove are still in existence. Specific legislation is being considered as an additional instrument to control the removal and destruction of any of this vegetation.

Capacity-Building, Education, Training and Awareness-Raising: At the local level, various public awareness activities and events provide information e.g. for National Arbour Day.

Information: Monitoring of forest area is carried out only indirectly through Town and Country Planning records of tree areas destroyed for development and or additions to forested areas by programmes mentioned above. No web site exists.

Research and Technologies: On very small-scale wooden furniture, cardboard boxes and other paper products are recycled.

Financing: No information available.

Cooperation: Barbados has not participated in the IPF process.

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CHAPTER 12: MANAGING FRAGILE ECOSYSTEMS: COMBATTING DESERTIFICATION AND DROUGHT

Decision-Making: In Barbados, the Focal Point for the United Nations Convention to Combat Desertification and Drought is the Ministry of Physical Development and Environment (MPE). However, matters relating to the issues of land degradation and drought also reside in other government departments. The Ministry of Agriculture and Rural Development (MARD) has responsibility for the Scotland District in Barbados, an area that suffers from severe impacts of land degradation. The Ministry has a department Soil Conservation Unit (SCU) in this area, which deals specifically with these problems. The MARD also has responsibility for Ministry is the Barbados Meteorological Office, which monitors rainfall, patterns and also has input into the drought issue. The Ministry of public works and Transport (MPT) address the issue of land degradation in the Scotland District by the erection of gabion boxes to stabilise the road network in this part of the island. The Barbados Water Authority (BWA) addresses the issue of water resources in Barbados and is responsible for matters relating to drought. There are a number of plans, policies and pieces of legislation across various Ministries and departments, which address the issues of land degradation and drought. These are highlighted below.

Draft National Physical Development Plan (1998) - This document is intended to provide a vision for the future growth and development of the Nation by setting out policies to guide relationships among land uses, community facilities and physical infrastructure. It is prepared by the Town & Country Development Planning Office, which has responsibility for all land use planning decisions in Barbados. Specific reference is made to erosion-prone lands that will be subject to a policy whereby the Soil Conservation Officer will review all applications involving residential development or the construction of permanent structures. Permission is not to be granted for those developments, which are to be placed on sites susceptible to erosion or slippage.

Area Development Plan - The Area Development Plan (ADP) was developed in a project undertaken by the Town and Country Development Planning Office and examines agriculture and non-agricultural land classes, as well as the future land use policies affecting agricultural land. The ADP carries out its evaluations against the background of a GIS mapping and resources analysis that is more detailed than the draft National Physical Development Plan. The ADP policy proposals are available for inclusion within the PDP to provide that plan with detailed policy for those areas with which this study has been charged. The ADP's Terms of Reference requires that it takes into account and be consistent with the PDP. In this regard, the PDP lays the foundation for the ADP by establishing basic principles and policies.

The National Park Development Plan 1998 - This plan seeks to promote land management within the designated park boundaries in such a way that the biodiversity of the various ecological systems are preserved and enhanced for the benefit and enjoyment of the Barbadian society. The National Park boundaries which include the Scotland District, encompasses a landscape that has, until relatively recently been intensively farmed over three centuries, and is typified for the most part by private land ownership.

The Environment and Natural Resources Management Plan (1998) - The Environment and Natural Resources Management Plan (ENRMP) provides for the sound use and development of all natural resources in the island in a manner that is harmonious with the natural ecosystems. In so doing, it seeks to achieve the overall goal of sustainable development through which both current and future generations will continue to enjoy and be sustained by the environment. Its purpose is to underline, with as much emphasis as possible, the importance of maintaining the high quality of all, aspects of the environment that impart beauty and diversity to the Barbadian landscape.

The Medium Term Macro-Economic Strategy (1996 - 1999) - Development policies enunciated in this document establish the Government of Barbados' intentions and expectations for each sector of the economy over the medium and long term. The strategy emphasises restructuring and revitalising the sugar industry, support for the Barbados Agricultural Marketing Cooperation (BAMC), Independent Producers and for small farmers. Continued emphasis

on diversification in the non-sugar sub-sector and expansion of the irrigation development programme to boost the agricultural sector are presented as major objectives.

Integrated Coastal Zone Management (1998) - Various sections of this policy document are significant for the ADP in terms of the concern it raises in regards to land use and resource use in the agricultural sector. The concern has been expressed that run-off containing toxic substances originating from the misuse of pesticides from agricultural production contaminate water supplies and affect marine life.

Barbados Tourism Development Plan (1998) - The Tourism Development programme sets out the framework for development of an integrated rural land use policy bringing greater tourism access and sustainable tourism development to rural areas, such as the Scotland District.

National Tourism Policy - The National Tourism Policy also addresses the issues of land degradation and water conservation, as these resources are vital to the prosperity of this industry. The broad policy objective of this sector incorporates sustainable development principles through conservation of natural resources. Programmes implemented in this sector include the water Conservation and management Project for the Barbados Tourism Industry and the Coastal Conservation Programme.

National Water Conservation Plan - This plan has been accepted by the Board of the Barbados Water Authority and is currently in the implementation phase. The Barbados Water Authority is the agency responsible for the management of our water resources. The National Conservation Plan comprises two parts, 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.

The Emergency Drought Management Plan - A drought and emergency Plan was approved by the Planning and Priorities Committee in 1997. This is a plan of action with respect to drought. It identifies parameters that would be used to monitor, forecast and predict the impact of drought. Such parameters include - rainfall measurements, groundwater measurements, and salinity and weather data from the Meteorological Office as well as reservoir levels. As a result of this, the BWA has now started looking at establishing a rainfall-gauging network to supplement the existing network so that estimation could be made on the impact and variation of rainfall.

Programmes and Projects: There are two projects for which Barbados has been earmarked so far by the United Nations Convention to Combat Desertification. These are the *Harmonisation of Public Policies* Pilot Project and a GEF funded project *Conserving Biodiversity in Small Island Ecosystems of the Caribbean*. Neither of these projects has started to date.

Status: Barbados is currently in the process of preparing its National Action Plan to address the issue of land degradation. Two of the greatest challenges hindering the implementation of actions to combat land degradation are the lack of funding for projects and the lack of technical training for employees of agencies such as the Soil Conservation Unit.

Capacity-Building, Education, Training and Awareness-Raising: There is a dire need for capacity-building in the areas of desertification and drought. The Soil Conservation Unit has identified areas requiring training as forestry, water conservation and management and aquaculture. Currently their personnel lack the required technical expertise and international consultants are brought in when the situation demands it. The Barbados Water Authority identified the assessment of droughts as well as forecasting as priority areas, which require additional training. It is currently difficult with the existing hydro-meteorological data collection system, to forecast drought. Also the setting up of a hydrological and hydro meteorological network would assist the work of the BWA in monitoring and evaluating the water resources and drought. The Meteorological Office would function more effectively if they had an enhanced climate-monitoring network. Also more up-to-date technology and equipment used in weather forecasting would also be an asset. Training of available personnel in current fields of meteorology would assist in producing more accurate weather forecasts.

Much is done in Barbados to raise the public's awareness about the issue of desertification and drought. Barbados celebrates the annual World Day to Combat Desertification on June 17, usually with a tree planting exercise. There is usually also a supplement in the local newspapers highlighting the importance of the day and what Barbadians can do to prevent land degradation. The Ministry of Physical Development and Environment (MPE) also created a comic series for a local newspaper entitled Mr and Mrs Green, which highlight environmental issues. A comic strip depicting Desertification is usually prepared to coincide with June 17th celebrations. The MPE also has a desertification brochure, which is distributed at exhibitions, meetings, workshops etc. Plans are in place to produce a poster next year. Barbados celebrates National Arbor Day on September 22, each year. There is usually a week of activities during National Arbor Week aimed at educating and sensitising the Barbadian public about the importance of planting and maintaining trees. During the week members of the National Arbor day committee usually conduct interviews on the radio, visit schools and give talks, have open days at various organizations and attractions and distribute trees to the public on the Road Runner programme. The Road Runner is a programme put on by one of the island's leading Radio Stations, it travels across sections of the island and during this time, members of the committee disseminate information on trees, tree planting and tree maintenance and even give trees to members of the public.

National Arbor Day is recognised at the highest level in Barbados and for Arbor Day 2001 the Prime Minister at his official residence planted two trees. The Soil Conservation Unit (SCU) is also involved in educating the public about the appropriate techniques that should be employed to decrease the potential for land degradation. The Soil Conservation Unit is involved in educating farmers to adopt sustainable farming practices. These practices include teaching them to keep the soil covered about the incorporation of organic matter to assist in percolation, encouraging reduction in the use of fertilisers and the adoption of the principles of Integrated Pest Management. The SCU also holds workshops to educate farmers in the effective use of herbicides, water conservation practices - use of organic matter, collection of rainwater from roofs - as well as in methods of ploughing which reduces land erosion. The introduction of agro-forestry is also being looked at whereby farmers will be encouraged to plant more fruit trees in addition to natural vegetation surrounding the land, the fruit trees would serve as an economic incentive for the farmer whilst playing its natural role in soil conservation.

The Barbados Water Authority (BWA) is also involved in a public education programme, which they deem to be an important part of any water conservation programme. A public education campaign has been launched by the BWA, which started with the free distribution of low water use showerheads and kitchen faucet aerators to customers not in arrears (30,000 were distributed). Special programmes are also in place to work with the private sector in the implementation of water conservation projects. Currently the BWA is working with the Ministry of Education on a school project where a private sector supplier of low water use fixtures has retrofitted the water fixtures at the school free of cost. Under this project the water used is being logged and monitored. The BWA, Environmental Engineering Division and Ministry of Tourism are also collaborating to implement a Water Conservation and Management Project in the Tourism and Hotel Sector.

Information: The Ministry of Physical Development and Environment web-site is currently under construction. Some of the indicators of relevance to desertification such as active slippage and drainage slopes can be found in the GIS database, which was created under the Environmental Management and Land Use Planning Study (EMLUP). The development of an inventory of resources inclusive of soil types and location, volume of water resources and available technical resources is needed. It is recognised that although this information already exists, what is needed is the compilation and augmentation of the information into one comprehensive computerised database. Barbados' First National Report to the United Nations Convention to Combat Desertification was submitted in April 2000 and can be found at the UNCCD web-site www.unccd.int

Research and Technologies: The Soil Conservation Unit (SCU) currently has plans in place to develop a demonstration plot at the SCU to identify the best method of ploughing which would reduce land slippage in the area. The use of engineering structures in the Scotland District is also employed. Gabion structures to reduce surface water run-off, which facilitates land erosion, are placed in the area to minimise land erosion and the land is

terraced to reduce the length of slope. Facing the prospects of less than enough water to satisfy the Barbadian population, the BWA contracted a consultant to examine the feasibility of establishing a desalination facility in Barbados. Thus a desalination plant was set up.

Financing: Funding for the work of the Soil Conservation Programme comes from the national budget. However the SCU does have a relationship with the Food and Agricultural Organisation (FAO) and funds are obtained from this organisation to undertake projects.

Cooperation: The United Nations Convention to Combat Desertification and Drought offers some assistance and has so far put Barbados in a position to receive funding for two regional projects. The Secretariat also provides funds and tries to assist countries in finding funds to implement the Convention. The Soil Conservation Unit has associations with the Food and Agricultural Organisation.

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CHAPTER 13: MANAGING FRAGILE ECOSYSTEMS: SUSTAINABLE MOUNTAIN DEVELOPMENT

This chapter is not applicable to Barbados as there are no mountain areas on the island.

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CHAPTER 14: PROMOTING SUSTAINABLE AGRICULTURE AND RURAL DEVELOPMENT

Decision-Making: The Ministry of Agriculture and Rural Development (MARD) is responsible for this sector. A National Consultation on Agriculture was convened in 1998. The outputs from this forum form part of the recommendations of the Consultants hired to analyse the agricultural sector in Barbados and identify the roles and functions of the MARD and its para-statal organisations, particularly, the Barbados Agricultural Development and Marketing Corporation. That consultancy is completed and the report was submitted in 2000. Government is currently assessing the recommendations.

The following legislation is relevant: Cap. 347 Factories Act, 1984; Cap 355 Registered Sugar Factories Smoke Control, 1962; Cap 395 Pesticides Control, 1974; Cap 396 Soil Conservation, 1959; Cap 397 Trees (Preservation), 1981; Cap. 398 Wild Birds Protection, 1907 (to be amended); Cap. 390 Cultivation of Trees, 1951; Cap. 391 Fisheries Regulation, 1904 (amended 1993); Cap. 252 Agricultural Aid; Cap. 253 Animals (Diseases and Importation); Cap. 260 Dairy Industry (Regulation and Control); Cap. 261 Fertilizers and Feeding Stuffs; Cap. 263 Irrigation; Cap. 264 Love Vine and Wild Native Cotton (Eradication); Cap. 266 Plant Pest and Diseases (Importation). Apart from Cap. 391, legislation has not been amended recently. While there are no expressed provisions in law to prohibit the transfer of productive arable land, one of the objectives of the national land use policy is to ensure the availability of a prescribed area of arable agricultural land. This policy is enforced by the Town and Country Development Planning Office, which is responsible for granting permission for change of use, for example from agricultural to housing, industrial or other uses. In support of the use solar technology island wide, Government provides a tax rebate for the purchase and installation of solar water heaters.

Barbados has not established a national strategy or policy on sustainable agriculture and rural development (SARD), but has taken a number of initiatives and implemented programmes, which address sustainable agriculture and rural development. For example, an Area Development Plan (ADP) has been developed for Barbados that stipulates appropriate land use options for various parts of the island. It includes specifically agricultural development areas, rural development areas, soil classification, data base development, storage and management, policy reforms and rural planning policies. It is envisaged that the recommendations of the Area Development Plan will be integrated into the overarching document, which guides national planning and development, the Physical Development Plan. The issue of pesticides and the safe use thereof is currently being explored in some detail. The Pesticide Control Board is currently responsible for monitoring and managing the importation of pesticides used in agriculture. It has been recognised that the existing system needs to be upgraded in order to deal effectively with evolving issues including: Increasing demand for pesticides, implications for human and environmental health, national requirements in accordance with Multilateral Environmental Agreements (MEA) such as Prior Informed Consent (PIC) and Persistent Organic Pollutants (POPS) and the Basel Convention. Collaboration is ongoing between the relevant agencies, including the Ministry of Agriculture and Rural Development, Pesticide Control Board and the MPE, towards finding a suitable and timely solution to these pressing issues.

National consultations, committee meetings, community group meetings as well as small and specific consultations convened by the Ministry of Agriculture and Rural Development are mechanisms which promote the integration of stakeholder concerns into the decision making process with regards to agricultural development. A Rural Development Commission has been established which has among its priorities, the funding of commercial enterprises in rural areas. This includes all types of self-employed businesses that may be ongoing or new initiatives. Government in the mid 1990's enacted special Development Areas legislation to establish certain enterprise zones within the rural areas to encourage investment and development. Women have been involved in addressing rural welfare. Women and Youth have been involved in food security issues, enhancing self-reliance of farmers, and in integrated pest management. Local communities, small farmers and landless people also participate in these activities. Farmers' organisations and other stakeholders are involved in the following: creating farm employment opportunities, collecting data and establishing databases, establishing land reclamation programmes for degraded land, and improving and implementing plant protection and animal health services. Local

communities are involved in the establishment of national and local agricultural planning bodies and in drawing up land reclamation policies for degraded land.

Programmes and Projects: A draft Agricultural Strategic Plan has been developed by the MARD which addresses issues of sustainable development, such as, programmes/projects to: ensure food security; review land tenure and agricultural land use policy; review international trade relations; improve agricultural production and farm productivity; minimise ecosystem risks; enhance self-reliance of farmers and create farm employment opportunities; collect data and establish databases; strengthen land use and resource planning; establish agricultural national and local level planning bodies; establish land reclamation programmes for degraded land; collect and study plants useful for increased food production; share benefits and results of Research & Development in plant breeding; improve and implement plant protection and animal health services; make integrated pest-management (IPM) practices available to farmers and to create IPM networks involving farmers, researchers and extension services; make available all necessary know-how and technology regarding soil fertility management; improve and increase the capacity to monitor export and import crop and livestock products for nutrient quality, pest and disease infestation and the level of chemical residues.

Increased emphasis is being placed on biological control agents as a means of reducing the use of toxic chemicals for pests and disease control. Indeed the draft Agricultural Strategic Plan sees Integrated Pest Management as an important long-term strategy for pest and disease control. Research in this regard is taking place at the Ministry of Agriculture and Rural Development's Plant Protection Division, the Caribbean Agricultural Research Institute (CARDI) and the University of the West Indies, Biology Department. Biological pest control options have been developed for the Pink Hibiscus Mealy Bug, which affects a variety of crops and for the sugar cane moth boer, which affects the sugar cane plant. The issues of land degradation and rehabilitation are most prominent in the Scotland District region of Barbados. There is a Soil Conservation Unit within the Ministry of Agriculture and Rural Development, which performs work specifically to reduce soil erosion and improve the sustainable productivity of the area. Programmes include revegetation of slopes with grass and fruit and forest trees, low intensity grazing and the use of gabions, public awareness and education, extension services, etc. Government subsidies are available to promote orchard development. This was originally intended to promote soil conservation in an erosion prone part of the island but the subsidy has since been made available in other areas to promote crop diversification.

There is tremendous pressure from other sectors, especially tourism and housing, for the change of use of agricultural land to other uses. Law to consult with the Chief Agricultural Officer concerning specific applications for change of use of agricultural land mandates the Chief Town Planner. Government through an Integrated Rural Development Programme (under the management of the Barbados Agricultural Development and Marketing Corporation, BADMC) offers an irrigation service and infrastructural development to farmers at subsidised rates. In addition Government has recently introduced a "Land for the landless programme", which seeks to make unused, arable land in private or public ownership, available for lease or rent to eligible persons who may be desirous of farming, but have no land. Much of the unused public land is in the Scotland district. The ADP Study estimated that 1 271 ha. Of plantation land and some 2 551 ha. of small holdings land are permanently idle or uncropped. The "Land for the landless programme" hopes to bring most of this land back into production. Government also has a comprehensive package of incentives, aimed at stimulating agricultural production. These incentives were enhanced and expanded upon in the 2001 budget, to include incentives aimed at promoting sustainable development. For example: rebates for retooling dairy farms and fish processing operations in order to bring them up to required Hazard Analysis and Critical Control Point (HACCP) and International Standards Organisation (ISO) standards; a technical assistance fund to facilitate organic production; and grant assistance for design and construction of bio digesters on livestock farms, to promote the recycling of waste water, gas and organic slurry, to mention a few.

Status: Agricultural development policy has focused heavily on initiatives to increase local productions of agricultural commodities. Critical success factors include: expansion of the agricultural incentive programme; the establishment of the Agricultural Development Fund; and establishment of the "Land for the landless" programme;

and expansion of the use of drip irrigation systems, in recognition of the fact that Barbados is a water scarce country and hence the need to better manage the use of its water resources. In the area of alternative energy, biomass energy is utilised in the sugar cane industry. Cane trash from fields and crushed cane fibres from the sugar production process, are used for fuel generation. The fuel generated contributes to powering the sugar cane factories themselves and any excess are channelled to the national grid. Quantities for the latter are unknown. Major problems faced in implementing conservation and rehabilitation of degraded lands includes lack of personnel and small budget allocation.

Capacity-Building, Education, Training and Awareness-Raising: The Ministry of Agriculture and Rural Development (MARD) manages an agricultural extension service programme to provide agricultural services and training to small farmers and NGO's involved in agriculture. The recently established Farm Management Desk, in the Agricultural Planning Unit, supports them. The Barbados Agricultural Development and Marketing Corporation have recently launched two Internet products aimed at e-marketing of agricultural produce, and forecasting agricultural production, respectively. The Rural Development Commission also facilitates some programmes especially through funding for small-scale agricultural enterprises. An Agricultural Development Fund has recently been established, to provide concessional financing and support to commercial agriculture ventures. The MARD continues to utilise the printed media, television and radio programmes for public awareness and information purposes. In addition, formal training in agriculture is provided through the Barbados Community College, the Samuel Jackman Prescod Polytechnic, and on- the-job training sponsored through the Vocational Training Board. No research or remedial measures have been undertaken to determine or reduce the effects of UV radiation on plants and animals. However, there have been public awareness and educational programmes highlighting issues such as: ozone depletion issue; risks posed by UV exposure; and options for avoiding and reducing risk.

Information: Research and Development programmes and Farming Systems Research are active work programmes of the Agronomy Unit. In respect of Plant Genetic Resource (PGR) development, significant progress has been made in improving Sea Island cotton lines. Early warning and monitoring of food supply and those factors affecting household demand for food is carried out through collaborative action between the Government Statistical Department, the National Nutrition Centre and the Agricultural Economic Planning Unit. A National Indicators Programme is currently being developed as part of Barbados' participation in the UN Indicators for Sustainable Development Testing Programme. The initial composite list of potential national indicators still needs to undergo refinement by the national committee mandated to address this issue. For the Agricultural Sector, production information is collected bi-monthly.

Research and Technologies: Research and development in solar technology is ongoing at the University of the West Indies, Centre for Environmental Resources Management Studies (CERMES). Solar ovens and driers for food preservation have also been produced. The latter are used commercially while the ovens are still used for demonstrations only. Photovoltaic technology has been developed by CERMES and is currently in use at a number of sites. A demonstration project has been initiated at one secondary school for the use of photovoltaic power for the computer lab. It is expected that the this pilot project will be expanded for the specific school, and eventually replicated by other schools. Another project currently awaiting funding aims to use photovoltaic power to make ice at fish markets. A unit is already in operation at the new fish market at Skeetes Bay.

There is ongoing research in a number of food and non-food crops, carried out by Ministry of Agriculture and Rural Development or in collaboration with other research institutes/agencies, such as Caribbean Agricultural Research and Development Institute (CARDI), University of the West Indies (UWI), Agricultural Research and Variety Testing Unit (ARVTU) and Sugar Technology Research Unit (STRU). The main activities include; genetic improvement in cotton; yield improvement in sugar cane; bio-control and IPM technologies for the control of pest and disease in priority economic crops, viz: hot peppers, onions, yams, sweet potatoes and sugar cane; mutation breeding techniques for the development of productive and marketable quality cut flowers and other ornamentals; development of protocols for mass propagation of tissue culture plantlets; variety selection for increased yield,

quality, productivity and disease resistance in tomatoes, cut flowers, onions, carrots and cabbage. Drip irrigation is promoted over sprinkler systems and greater use of mulching is promoted to help reduce agricultural water use.

Livestock research activities are geared towards solving livestock production problems, particularly those relating to nutrition, genetic improvement and management. In the area of genetic improvement special emphasis is placed on improving the Barbados Blackbelly Sheep. This local breed of sheep is probably best known for high fecundity and prolificacy, but it also produces good quality of meat. Selection effort is emphasizing high growth rate to exploit the potential of the breed for commercial rearing.

Financing: National funding has been secured for most of the above activities.

Cooperation: The country cooperates in agriculture with FAO, UNDP, European Union and with the Inter-American Institute for Cooperation in Agriculture (IICA). These organizations have participated in the review of national strategies, and in some cases, have provided project specific financial support.

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CHAPTER 15: CONSERVATION OF BIOLOGICAL DIVERSITY

Decision-Making: The Environment Unit, Ministry of Physical Development, Environment is responsible for coordinating matters related to biodiversity and the implementation of the obligations of the Convention on Biological Diversity. A committee made up of experts in various fields advises the Ministry. The group was convened to advise the Ministry on general biodiversity issues and matters related to the implementation of the Convention on biological Diversity. Existing legislation in place which applies to biodiversity includes the Marine Areas (Preservation and Enhancement) Act; Coastal Zone Management Act which make provisions for the conservation and management of coastal and marine biodiversity; Fisheries Act which makes provisions for the conservation of marine biodiversity; National Conservation Commission Act; Trees (Preservation) Act; Cultivation of Trees Act; Soil Conservation (Scotland District) Act; Wild Birds Protection Act.

The Biodiversity Work programme of the Environment Unit addresses the following areas: Alien/Exotic Species Management; Local Species Awareness & Management; issues related to the implementation of international convention and agreements including the UN Convention on Biological Diversity (CBD); Biosafety Protocol; Convention on International Trade in Endangered Species of Fauna and Flora (CITES); UN Convention to Combat Desertification (CCD); and more recently, the Protocol Concerning Specially Protected Areas of the Cartagena Convention. The National Biodiversity Strategy and Action Plan is being finalized. In addition, legislation and regulations is also currently being developed with respect to Convention on International Trade in Endangered Species of Fauna and Flora (CITES); Zoos and Related Matters. Policies are being developed for Alien/Exotic Species (Import/export/domestic trade); the Protection of Local Species and Biosafety. The Ministry also has underway a Gully Ecosystems Management Study, which will prepare a comprehensive integrated management strategy and program for the national gully system. The Ministry has already prepared an Environmental Management and Natural Resources Management Plan, which is accompanied by an area specific plan, the National Park Plan.

The Ministry ensures the involvements of the major stakeholders in the country such NGOs, Business and Industry, Scientific and Technological Community and Farmers in biodiversity management through their presence on a number of permanent and adhoc advisory committees convened by the Ministry and their participation in national consultation of various issues. The participation by community groups for the protection and conservation of biological diversity is encouraged through programmes currently being developed to involve communities in land stewardship and species data collection and species management under a number of programmes initiated by the Environment Unit, Fisheries Division, Ministry of Tourism and the University of the West Indies. Examples include Sea-moss Farming (SeaWeed); Nature Trail Development; Data gathering on indigenous species.

Programmes and Projects: The main issues relating to biodiversity management in Barbados include: Local Species Management; Alien/Exotic Species Management; Bio safety; Protection and Conservation of Biological Resources; sustainable use of resources e.g. through Eco-tourism initiative. Most Biological resources remain stressed due to the historic development of the island. In recent years many positive steps have been taken to address issues of Conservation and Preservation. Major projects and activities underway or planned to address these issues include: South and West Coast Sewerage Project; Tourism Development Programme (Sub-programme C); Nature & Heritage Based Tourism; Environmental Management and Land Use Planning Project; National Biodiversity Strategy and Action Plan; Coastal Conservation Programme and Integrated Development Programme: Feasibility studies of Carlisle Bay, Folkestone Park and Marine Reserve and Harrison's Cave and Associated Sites, the Gully Ecosystem Management Study.

Status: Constraints to effective implementation of the programmes identified include human resources – inadequate staffing levels and a need for training in specialized areas, financial constraints and equipment and other capacity constraints.

Capacity-Building, Education, Training and Awareness-Raising: The Ministry is responsible for Public Awareness and education with respect to bio-diversity in Barbados. Workshops are the main awareness raising

tools used for matters pertaining to biodiversity. The development and distribution of poster and articles for the media are also used. Information on biodiversity is incorporated into the programmes of several schools and the Ministry's officers are responsible for presenting this information to the classes at the schools. Training on a limited scale is available through national programs and through overseas organizations.

Information: The Ministry has set up for internal use a database for CITES which details information related to applications for CITES permits. Information is available from an on site documentation center. The Ministry's Web site is under development.

Research and Technologies: No information available.

Financing: The Ministry uses the National budget to finance work in the area of biodiversity management. International assistance has in the past provided funding through grants for projects and also technical assistance.

Cooperation: The Convention on Biological Diversity was signed in 1992 and ratified in December 1993. The Convention on International Trade in Endangered Species of Wild Fauna and Flora was acceded to in December 1992. Barbados is a Party to the following biodiversity-related agreements: United Nations Convention on Biological Diversity; Convention on International Trade in Endangered Species of Fauna and Flora (CITES); United Nations Convention to Combat Desertification; International Convention for the Protection of Plants and Plant Products. Other related agreements to which Barbados is a Party include: United Nations Convention on the Law of the Sea (UNCLOS); United Nations Framework Convention on Climate Change (UNFCCC); MARPOL; Convention on the control of Transboundary Movements of Hazardous Wastes and their disposal; Cartagena Convention.

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CHAPTERS 16 AND 34: ENVIRONMENTALLY SOUND MANAGEMENT OF BIOTECHNOLOGY AND TRANSFER OF ENVIRONMENTALLY SOUND TECHNOLOGY, COOPERATION AND CAPACITY-BUILDING

Decision-Making: Technologies: The Ministries of Agriculture and Rural Development; Health; Physical Development and Environment; Public Works and Transport; and the National Council for Science and Technology are the key agencies responsible for the promotion and transfer of Environmentally Sound Technologies (ESTs). No organized forum exists for stakeholder involvement in the decision-making process. The involvement of stakeholders has traditionally been ensured through various mechanisms such as working groups, workshops etc, on an ad-hoc basis. Harmonization occasionally occurs if there is an incident in which more than one group is involved and a common solution is being sought for an urgent problem. Potentially, this could be facilitated through the National Commission on Sustainable Development (NCSd). Presently, no National Strategy or Policy for the promotion of innovation in the area of Environmentally Sound Technologies exists. However, it must be noted that the National Council for Science and Technology (NCST) and the Barbados Industrial Development Corporation (BIDC) have had discussions on the setting up of an innovation centre. As regards Ozone Depleting Substances, a policy document is being developed to address the promotion of ESTs to complement the drive to freeze and phase-out ODS consumption. There has been no legislation or regulation to address ESTs at present. However, the Environment Unit of the Ministry Physical Development and Environment and the Ministry of Economic Development and International Business are collaborating to develop a policy on the application of economic instruments to promote sustainable development, including the promotion of ESTs. Major efforts are also underway in the legislation of the following: the regulation and harmonization of pesticides. The Pesticide Control Board deliberately restricts or bans products that are likely to have a deleterious effect on the environment, particularly with respect to the contamination of the potable water supply; and (the Barbados National Standards Institution has legislative responsibility in collaboration with the Ministry of Health, in instituting strategies aimed to guarantee the general environmental safety. The Environmental Engineering Division of the Ministry of Physical Development and Environment focuses specifically on waste disposal and its environmental consequences.

Biotechnologies: The Environment Unit of the MPE is primarily responsible for this sector. Some legal elements are to be enforced by the Environmental Engineering Division. There is only one law related to the use of biotechnology: the Pest Plant and Disease (Importation) Act, Cap. 226, which prohibit imports of bacteria and the like, with the exception of specific cases for laboratory research purposes. The Environment Unit Division has established a National Committee on Biosafety/Biotechnology. The NGO community initiated education programmes concerning biotechnologies.

Programmes and Projects: Technologies: Some environmentally sound technologies (devices etc) are available in Barbados and upon serious discussion; specific incentives and economic instruments have been applied to encourage consumption. These include water-saving devices - provided free to Paid-up domestic consumers of the Barbados Water Authority; solar water heaters. A good example of a best practices in Barbados in relation to EST is the case where consumers were given a tax rebate of a maximum of BDS \$3500.00.

Biotechnologies: The University of the West Indies, the Caribbean Agriculture Research and Development Institute (CARDI) and the Ministry of Agriculture and Rural Development are involved in biotechnology projects. The following are the most important: epidemiological enhancement of onions and peppers to increase resistance to heavy metal bactericides; development of bio marking to determine the specific identification of different varieties of flowering plants; tissue culture - production of large number of banana and plantain suckling for dissemination to local (and external) farmers.

Status: Technologies: ESTs are most urgently needed in the following sectors: Tourism, Agriculture, Health Industry and Manufacturing. As a result of their research, the Sewerage and Solid Waste Project Unit should promote innovation and transfer of ESTs as regards waste management, and the Water Resources Management and Water Loss Study should do the same for water resources management. Other areas may be addressed through more informal mechanisms. The National Environment and Sustainable Development Policy will also seek to

address this issue in a comprehensive manner. Presently, there is no defined policy for the use of ESTs. An important constraint is the lack of a coordinated strategy and government policy. Public awareness would be more effective in the midst of such a policy.

Biotechnologies: The scientists and experts included on the committee would be responsible for advising Government on biotechnology related issues as well as for establishing guidelines pertaining to the safe import, handling, use, storage and disposal of genetically modified organisms. There are no specific policies or strategies in place to promote the use of biotechnologies, and there are no biotechnology risk assessments or risk management mechanisms.

Capacity-Building, Education, Training and Awareness-Raising: *Technologies:* No specific programmes to educate policy makers in the concept of and policy design for innovation and transfer of ESTs are presently in place. Through some NCST activities, there is facility for awareness and education. At the regional level, the Caribbean Council for Science and Technology is considering hosting a workshop to address the specific issues of innovation and technology for sustainable development. Science and Technology Exhibitions "Sci-Tech Expos" staged by the NCST are aimed at promoting and improving the selection, transfer and application of ESTs, wherein Science and Technology Practitioners and particularly science students of secondary schools as the major target groups, exhibit the results of their scientific enquiry. The categories selected highlight Environmental Sustainability and the potential role of science, in terms of innovation and research and development. In addition, agencies such as the Environment Division pass on information to the relevant sectors and agencies regarding environmentally sound technologies. *Biotechnologies:* No information available.

Information: *Technologies:* Information for decision-makers on ESTs is available from individual agencies through reports, issue papers as well as through workshops and any tests carried out on the technology before a decision was made. The information is usually available by request. There are no web sites on the issues of technology as yet. Barbados is part of the UN Testing Programme on Sustainable Development Indicators. Further to that the Environment Division, has developed and coordinates a National Indicators Programme (NIP) which seeks to define national indicators for all policy areas, including science and technology. Indicators for biotechnology are being developed through the National Indicators Programme (see Chapter 40 for more information). More generally, the NCST is involved in the collection of information on Science and Technology Indicators. Sustainable Development Indicators are not specifically targeted but such matters will be part of the general information collected.

Biotechnologies: No information available.

Research and Technologies: *Technologies:* Decisions regarding technology choice are often made at the department/division level by officers who are directly involved in the specific programme area. Once information on a particular technology is available, the relevant Ministry will usually develop a response and a rationale for its promotion and through inter-ministerial and inter-sectoral collaboration, a decision will be made. Pursuant to this, then details for promotional incentives will be defined and presented to Cabinet for approval on the recommendation of the Ministry of Economic Development. Administrative support is often received in order that funds may be provided.

Biotechnologies: No information available.

Financing: *Technologies:* Most activities in this area are funded through the public sector, from the national budget or from funding resulting from loans or grants from international agencies such as the Inter-American Development Bank (IDB), which funds a regional project in which Barbados participates. Projects that may suggest the adoption of some ESTs are partly funded by government as well as by external assistance. In addition, some innovation will result from the research of regionally and nationally funded institutions such as the University of the West Indies and UWICED, among others.

Biotechnologies: UNESCO, Barclays Bank International, Third World Academy have supported the projects mentioned for Science and the International Foundation for Science with approximately US\$100,000 annually.

Cooperation: Technologies: There is cooperation through the Regional Indicators Project, coordinated through the CDB. No convention is involved. The Caribbean Council for Science and Technology (CCST) is also involved in a regional Indicators Project in which Barbados is a participant.

Biotechnologies: No information available.

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CHAPTER 17: PROTECTION OF THE OCEANS, ALL KINDS OF SEAS, INCLUDING ENCLOSED AND SEMI-ENCLOSED SEAS, AND COASTAL AREAS AND THE PROTECTION, RATIONAL USE AND DEVELOPMENT OF THEIR LIVING RESOURCES

Decision-Making: The agencies which share responsibility for decision-making with respect to integrated coastal zone management and sustainable development are: Coastal Zone Management Unit; Town and Country Development Planning Office; Ministry of Finance, Ministry of Economic Development; Fisheries Division; Barbados Defense Coast Guard; Environment Unit; Environmental Engineering Division; Government Analytical Services; National Conservation Commission. Those responsible for marine environmental protection, both from land-based activities and from sea-based activities include: Coastal Zone Management Unit; Barbados Defence Coast Guard; Environmental Engineering Division; Chief Parliamentary Counsel; National Conservation Commission; Ministry of Tourism and International Transport - Harbour Master; Port Authority. Those responsible for sustainable use and conservation of marine living resources (both of the high seas and under national jurisdiction) are: Coastal Zone Management Unit; Ministry of Foreign Affairs; Fisheries Division; National Conservation Commission; Customs Division Ministry of Finance; Marine Division Royal Barbados Police Force; Ministry of Foreign Affairs; Environment Division.

The following legislation, regulations, and policy instruments are used for integrated coastal zone management and sustainable development, marine environmental protection and sustainable use and conservation of marine living resources: The Coastal Zone Management Act; The Fisheries Management Plan; The Marine Pollution and Control Act; The proposed Integrated Coastal Zone Management Plan; Environmental Impact Assessments; Proposed Accreted lands legislation; Tree Preservation Act; The Marine Pollution and Control Act; The Marine Oil Spill Action Plan (MOSAP); The Pesticides Control Act; The Factories Act; The Fisheries Act and the Fisheries (Management) Regulations; The Maritime Boundaries Delimitation Act and MARPOL 73/78; The Port Handling Regulations; The Marine Areas Regulations; Marine Areas Designation of Restricted Areas; Barbados Territorial Waters; Marine Boundaries and Jurisdiction; and Diving Regulation Draft Bill. There are several initiatives to encourage the sustainable development and conservation of marine living resources. These include: Attempts to introduce Community based management of the sea egg fishery, Creation of Protected Areas and Marine Reserves, The Barbados Coastal Conservation Programme Phase I, The Permanent Mooring Project, The Implementation of Diving Regulations, Mesh size limitation on fish pots, Biodegradable escape panels for fish pots. There is an indefinite ban on harvesting of turtles and regulations of harvesting corals.

There are several activities that involve Major Groups, and these include: The Adopt-your-Beach Committee, which utilizes various companies and groups, e.g. the Jaycees, Church groups etc. to aid in beach clean-ups and awareness campaigns; the Fisherfolk organization. The Committee is comprised of Government Departments, NGO's, the media, among others. Consultation processes with the Government and Communities are ongoing. These are carried out as is deemed necessary, such as the public meetings to address conflicts between Fishermen and Divers. The Coastal Conservation Programme Phase I has as part of its structure, five Community based demonstration projects which are non-governmental organization driven. The intention is that at the end of these projects, the Communities themselves will carry on the work. In respect of unauthorized development (activities such as sand mining and the placement of artificial reefs) there are several projects which have been set up, including: The Coral Reef Monitoring Programme, The South and West Coast Sewerage System, and the Capacity-building, education, training and awareness-raising.

Programmes and Projects: With respect to integrated coastal zone management and sustainable development, there are other relevant proposed strategies that include: The National Biodiversity Strategy and Action Plan; The Integrated Coastal Zone Management Plan; The Physical Development Plan; The Environmental Management Plan. With respect to marine environmental protection: The Marine Pollution and Control Act; The South and the West Coast Sewerage projects; The Coastal Zone Management Act; The Marine Oil Spill Action Plan; The programmes of the Central Emergency and Relief Organization. With respect to sustainable use and conservation of marine living resources: The Fisheries Act and the Fisheries Regulations; The National Biodiversity Strategy And

Action Plan; The Barbados Sea Turtle Project; The Coastal Zone Management Act; The Marine Pollution And Control Act; The Integrated Coastal Zone Management Plan. There are Plans and programmes that have been developed specifically to address the preservation and sustainable use of fragile ecosystems include: The Graeme Hall Bird Sanctuary (which protects the last large mangrove ecosystem); Coral Reef Monitoring Programme (CZMU); The proposed Environmental Management Plan; The CARICOM monitoring regime. Other programmes and projects that address any or all of the three issues discussed in this Chapter include: The Barbados Coastal Conservation Project Phase 1; The Fisheries Management Plan; Ongoing monitoring programmes of the Coastal Zone Management Unit such as: Beach Profiling, Tide monitoring, Current monitoring, Coral Reef disease monitoring programme, Structure inventory monitoring Planning assessment, Coral Monitoring Programme, The Fisheries Advisory Committee, The Adopt-Your-Beach Committee, The Caribbean Programme for the Assessment and control of Marine Pollution (CEPPOL) and the Caribbean Planning Adaptation Climate Change (CPACC) sea level rise. . The proposed Coastal Infrastructure project has as its main objective the guarantee of a healthy environment and continued economic development of Barbados through improved management and conservation of the coastal zone. The programme will comprise various coastal management works and activities including shoreline stabilization and erosion control, restoration of coastal habitats, improvement of public coastal access and institutional strengthening for coastal management. Negotiations are ongoing with an expected startup date for early 2002.

Status: The current major uses of the coastal marine areas in Barbados are: Fishing: sea egg fishing, lobster, conch, sea-cat fishing, spear fishing, Cast net fishing, Seine fishing, Pot fishing, Hand lining, trolling, Market Sites, Beaching and mooring Boats, Boat Building, Jetties, Wharves; Housing-Private cottages and Residences, Government low - income housing, Traditional Villages; Tourism-Hotels, Condominiums, Guest Houses, Speciality Shops, Boutiques, Night Clubs, *Other Ancillary Services* e.g. restaurants, Taxi stands; Recreation-Sport fishing, Sailing, Parasailing, Scuba diving, Snorkeling, Water Skiing, Surfing, Swimming, Sun bathing, Picnicking, Jet Skiing; Marine/Scientific Reserves-Folkestone Underwater Park, Animal Flower Cave, Graeme Hall Swamp, Inch Marlow /Chancery Lane Swamp; Industrial-Rum Refinery, Flour Milling, Cement Manufacturing, Oil Refining, Power Generation, Desalination (proposed); Transport and Marine Services-Coastal Highways, Port Facilities, Barbados Defense Force Coast Guard Base Waste Disposal-Industrial Effluent, Domestic Sewerage and Treatment, Runoff from Inland Drainage systems; Coastal Defences-Groynes, Gabions, Revetment, Retaining Walls; Local Craft-Shell Collection, Itinerant Vendors (Souvenirs to Tourist); Other- Small- scale Sand Mining, Public Access.

Fishing contributes between 0.9% - 1% to the national economy of Barbados. The fishing industry employs approximately 2000 fishermen and another 4000 persons in spin off activities which include boat builders, market vendors, persons doing repairs to boats, persons selling fishing gear, etc. Ship anchors impact in a variety of ways: *Anchoring*-The large anchors that are used by most shipping vessels cause significant damage to the marine ecosystems, especially the coral reefs. Two of these incidents have been reported to the CZMU in the past two years, and many more such incidents occur, but are unreported. In one case, 5361m² and in the other 372m² of coral reef was destroyed. Taking into consideration the importance of the reef systems, coupled with the knowledge that corals are extremely slow growing animals, and under eutrophic conditions are out-competed by sponges and algae, it can be seen that this is an extremely undesirable situation. There is also the possibility therefore that these reefs might not recover and therefore both present and future benefits could be lost to us; *Ballast Water*-Large ships often empty their ballast water at sea which is often contaminated with oil. Ballast water can contain marine organisms, which are not native to the regions where the ballast water is released. If these foreign marine organisms become established in their new location, they will compete with native marine organisms for food and space. The oil has deleterious effects on marine fauna; *Garbage*-Many large vessels are guilty of disposing of their solid waste at sea, which for the most part washes up on land. Plastics cause the largest problems to marine organisms, but paper, tins, bottles and articles of clothing for example, are not aesthetically pleasing and can also wreak havoc on marine animals. Annual beach clean-ups have been carried out in Barbados since 1996 and the amount of garbage found during these activities has been compiled and documented by the Adopt-Your-Beach Committee

The illegal construction of buildings and jetties, groynes etc, has contributed to erosional problems on the coast. Inappropriate disposal of waste, from the heavily populated south and west coasts hotels and other buildings constructed for the purpose of tourism. The practice has greatly contributed to eutrophication of our near shore waters that in turn has resulted in degradation of our coral reefs. Government is presently addressing this through the establishment of a sewerage system on the South and West coasts. Dive Tourism is responsible for some of the physical damage to the reef systems. Divers have been guilty of toppling and trampling corals, as well as removing them for souvenirs. Dive boats have carelessly dropped anchors on the reefs and are also guilty of dragging their anchors across these sensitive ecosystems. The destruction (by vehicular traffic for example), and removal of coastal vegetation for construction purposes, as well as for "aesthetic" purposes, has resulted in the erosion of sand from beaches. Also it has further resulted in reducing the amount of area suitable for turtle nesting. In other cases, the beachfront lighting generally confuses hatchlings, so that they cannot find their way to the water and relative safety. This is a crucial problem as the turtles found around Barbados are on the endangered species list. (Hawksbill, Leather and Green). Additionally, the removal of coral rubble and sea grasses for, "aesthetic" purposes have resulted in the loss of important nursery habitats for fish and other marine organisms. Various industries are guilty of releasing their effluent directly into the near shore, which has a negative impact on marine ecosystems in the vicinity.

The primary sources of land based pollution of the marine environment are Sewage from through flow of septic wells into the near shore region from domestic septic wastewater; Industrial Discharge; Agriculture chemicals and Land runoff; and Illegal dumping of garbage. Shipping, as previously mentioned from solid waste and ballast wash out. Other relevant issues include the following: *Conflict Resolution*-There are limited marine resources which have to be shared by a variety of users, each with their own agenda; *Public Beach Accesses*-There is a concern that beach access is being threatened by residential encroachment; *Enforcement*-Even though many of the coastal-related problems have been addressed in the Coastal Zone Management Act and the Marine Pollution Control Act, the primary problem lies in actually enforcing all the regulations that will be put in place. The following are priority constraints to implementing effective programmes to address the issues raised in the programmes areas: The presence of inadequate legislation, as well as the absence of legislation altogether is a major hindrance to sustainable management.

Capacity-Building, Education, Training and Awareness-Raising: Programmes to educate policy makers in the concept and policy design of sustainable coastal management and its aspects include: Technical Papers, Cabinet Papers, Planning and Priorities Committee, and Interdepartmental Meetings. Other training available for the responsible planners and for relevant industries to assist them in managing sustainable development in coastal zones includes: Geographic Information Systems, Job attachments, Seminars, Pamphlets, and Seminars and training attachments. Campaigns or other efforts to raise awareness of issues related to sustainable development and the oceans and seas include: Coastal Zone Management Unit Initiatives-Open days, Exhibitions, Brochures, Lecture series, Panel Discussions, Interviews with the press, Television and radio talk shows, Government Information Service features; Environment Division-Environment Month Activities in 1998 focused on the Year of the Oceans including exhibitions and lecture series, and Biodiversity awareness activities and brochures on preserving coral etc; Fisheries Division-Awareness Seminars, Training sessions, and Provision of brochures.

Poor or little knowledge of the importance of coral reefs for example has resulted in many of the problems that plague this ecosystem, such as diver damage, harvesting of corals, anchor damage and solid waste disposal. With knowledge of the ways in which these and other ecosystems function and a concept of their true economic and social values, the attempt to protect and conserve them would be given an added impetus. In some cases, laws are presently related to the protection of marine ecosystems, but these are not enforced for a variety of reasons: public perception of the activity not being an important crime, judiciary perception of environmental issues as being "waste of time"; lack of enforcers; and the lack of equipment used to carry out enforcement, for example, boats. There is also a problem with the lack of education of the enforcement officers. In many cases there are not enough persons available to carry out assessments or they do not possess the necessary skills. Also, the required equipment is often absent.

Information: There has to be consistency with these activities, so that there is a continuous out-flows of information to the public. National information available to assist both decision-makers and planners working in coastal areas are related to the following areas: Sustainable management of fishery resources-Catch data, Landings by species; Marine pollution-Long term water quality monitoring (EEZ, CZMU); Mineral resources-Inventory of sand / sources (Energy Division); Living resources other than fish-Time series data on coral abundance and diversity, on sea grass, productivity and abundance. (CARICOMP, CZMU, Bellairs); Critical uncertainties (e.g., climate change, El Niño, La Niña, sea-level rise)-Sea surface temperatures, Illumination levels, Tide gauge data, Current meter data, IOC data, IOCARIBE data, Inter Governmental Panel on Climate Change (IGPCC) data, Transshipment of nuclear waste, and Regional management of migratory stocks. There is no surveillance system in place. Different agencies have GIS capabilities, but not for this purpose. Different agencies have specific Web Sites. The CZMU as part of the CEPNET programme has produced a State of the Coast report that will be hosted on their web page. This project is completed. The Cabinet has established a National Commission on Sustainable Development, which has created a Sub-committee for Coastal and Marine Resources/issues that reviewed a number of proposed indicators. The Caribbean Development Bank environmental indicators have also been established. And the Ministry of the Environment is coordinating a National Indicators Programme that seeks to develop broad-based Sustainable Development Indicators including ones relevant to the issue of coastal and marine resources.

Research and Technologies: There is no adequate technology. However, specific technological advances means that the Government can improve internal capability e.g. GPS, LIDAR, GIS, OSCR. Determining factors for decision-making in the choice of technologies are the following: Effectiveness, efficiency and reliability in terms of long term goals; Cost; Maintenance; Compatibility with existing equipment; and the Learning curve for certain technology.

Financing: the National Budget and international funding agencies, e.g. Global Environment Facility (GEF), Inter-American Development Bank (IDB), and United Nations (UN), finance this sector.

Cooperation: The UN Convention on the Law of the Sea was signed by Barbados in 1982 and ratified in 1993. Barbados is a party to the UN Framework Convention on Climate Change (UNFCCC). It also participates in the following: Centre For Marine Conservation (CMC), Organization Of Eastern Caribbean States (OECS) Technical Corporation, Global Positioning System (GPS) real time data, Caribbean Coastal And Marine Monitoring Programme (CARICOMP), International Maritime Organisation (IMO), International Panel On Climate Change (IPCC), United Nations Environmental Programme (UNEP), and the United Nations Convention for Law Of The Seas (UNCLOS). See also under **Programmes and Projects**.

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CHAPTER 18: PROTECTION OF THE QUALITY AND SUPPLY OF FRESHWATER RESOURCES: APPLICATION OF INTEGRATED APPROACHES TO THE DEVELOPMENT, MANAGEMENT AND USE OF WATER RESOURCES

Decision-Making: The Barbados Water Authority (BWA) is a statutory corporation that is responsible for the management and control of water resources. It is responsible for managing, allocating and monitoring the water resources of Barbados with a view to ensuring their best development, utilization, conservation and protection in the public interest. It is also responsible for the designing, construction, acquisition, provision, operation and maintenance of water and sewerage works for the purpose of supplying water for public purposes and the receiving, treating and disposing of sewage, respectively. The process of policy formulation is generally conducted through the work of a committee of experts and stakeholders. This is a fairly recent initiative aimed at involving all major stakeholders in the decision-making process. The BWA was an active participant in the work of the National Commission on Sustainable Development providing information on water resources and recommendations for conservation activities for inclusion into the Draft National Policy on Sustainable Development, which is being finalized by the Ministry of Physical Development and Environment. There is also an appeals process under the existing BWA Act for conflict resolution.

National Strategies and Policies are contained in A Draft Policy Framework for Water Resources Development and Management in Barbados document. The policy for integrated land and water management and development is contained in the draft policy noted above and in the Environmental Management and Land Use Planning for Sustainable Development Project Plans currently being finalized under the Ministry of Environment. The policy for disaster preparedness, particularly with respect to floods and droughts are contained in, the Drought/Emergency Management Plan. The pricing policy is informed by the desire to recover as much as possible operating costs, through metering and charges for water consumption. Full cost recovery may not be possible. With respect to policies and legislation for Ground water Development and Management, a substantial body of applicable laws and policies exists to address ground water development and management in Barbados. However, the Government of Barbados has not formally adopted a policy pertaining to public and private ground water rights and recourse has had to be sought from the English Common Law when these issues have arisen.

The following Acts and Policies are applicable: Underground Water Control Act, CAP.283, 1953, an Act to make provision for the control and use of underground sources of water supply in the island and other matters connected therewith. The Act provided for the establishment of a Water Board with powers to control and regulate the development and use of the ground water resources, through licensing and provision of necessary regulations. This includes control of abandonment of wells that, however, has not been fully exercised. Also Ground water Protection Zoning Policy, 1963, a far-sighted policy adopted by Cabinet as Government Policy in 1963 and revised by the Cabinet in 1973, to provide for the protection of the ground water by sub-dividing the island into five zones prohibiting harmful land uses, with the highest degree of protection in the Zone 1 areas which are closest to the public supply wells. See Table 4 for a summary of the conditions applicable to each Zone. The prohibition of the new development in Zone 1 has been incorporated in the Development Order under the Town and Country Planning Act. The Barbados Water Authority Act, CAP.274A, 1980, an Act to provide for the establishment of the Barbados Water Authority, a statutory corporation falling under the Ministry of Public Works, Transport and Housing. Apart from the two main spring sources that fall under the Three-Houses and the Porey's Spring Acts, the remainder of the water resources is controlled under this Act. The Act gives power to the Barbados Water Authority to provide water and sewerage services and jurisdiction to make regulations, educate, advise and operate systems to manage, allocate, and monitor the water resources of Barbados with a view to ensuring their best development, utilization, conservation and protection in the public interest. The Act also requires the Authority to obtain and analyze information and maintain records of the total water resources of Barbados as well as conduct research programmes and prepares statistics for its purposes. The Barbados Water Authority, administered through a Board of Directors, has assumed the authority of the Water Board to license wells under the Underground Water Control Act and provision has been made to extend the provisions of the Act relating to the control of underground water to apply mutatis mutandis to the control of surface waters.

Currently there are no formally adopted standards or guidelines for the water industry in Barbados. However, the World Health Organization (WHO) Drinking Water Guidelines, USEPA Regulations of Standards, British Water Industry Standards and the American Water Works Association Standards and Codes of Practice are utilized on a voluntary basis as needed. A committee chaired by the Environmental Engineering Division of the Ministry of Physical Development and the Environment and the Barbados National Standards Institute (BNSI) has been set up and a paper has been prepared which will lend to the development of some environmental standards, which include water, and wastewater standards. Major Groups are further involved in decision-making generally through presentations at workshops at which the general public and specific stakeholders are invited to attend and voice their opinions. Other fora such as town meetings are utilized.

Programmes and Projects: There are three major programmes in this area: first, the Prevention of pollution of freshwater supplies that is achieved through a Ground water Protection Zoning Policy implemented in 1964. The island is subdivided into five water protection zones. Zone 1 is closest to the production wells or areas earmarked for such and have the most stringent restrictions on development activities. Zone 5 has the least restriction. The boundaries for the zones are based on travel times of pollutants. Enforcement is through the Town and Country Development Planning Office, Ministry of Health and the Barbados Water Authority. This is coupled with a nationwide water quality monitoring programme which is carried out by the Barbados Water Authority and the Environmental Engineering Division of the Ministry of Physical Development and Environment; second, the Water Conservation, which consists in a public education campaign that has been launched by the BWA which started with the distribution of free low water use shower heads and kitchen faucet Aerators to customer not in arrears (30,000 were distributed). Special Programmes are also in place to work with private sector in the implementation of water conservation projects. Currently the BWA is working with the Ministry of Education on a school project (West Terrace Primary School) where a private sector supplier of low water use fixtures has retrofitted the water fixtures at the school for free and water use is being logged and monitored. The BWA, EED and Ministry of Tourism are also collaborating to implement a Water Conservation and Management Project in the Tourism and Hotel Sector. Two sewerage projects are currently in progress: one to cover the South Coast and the other the West Coast. The treatment plant for the south coast has been completed and work has been ongoing for house connections. Work on the West Coast Sewerage Project is expected to be fully underway in 2002. Also of significance is the fact that a 30,000m³/day Reverse Osmosis Desalination Plant, desalinating brackish water was constructed in 2000 to augment the potable water supplies.

Status: The sources of Barbados' water supply are ground water and two springs. Abstractions are very near to potential ground water field estimates. There is almost ninety-eight percent coverage of potable water supply. Ninety-six percent of the population receives piped water directly to their homes, while the remaining population has access from public sources. The pricing policy (Block tariff structure) is intended to ensure that the basic needs of the poor are met at minimal cost. Currently the Social Welfare Department covers the cost of water bills for the indigent and aged poor. Percentage of urban sewerage presently treated is less than eight percent. All drinking water is treated by disinfections with chlorine gas. There are no targets established for sanitation coverage. Priority constraints to implementing effective programmes to address the issues raised in this programme area include the following: Institutional constraints related to lack of capacity to address the issues; Capacity constraints relate to both lack of allocation of responsibility to specific sections and lack of adequately trained manpower; Currently the human resources needs have not been identified and quantified; Funding for some of the programmes is a major constraint. Other constraints include scarce water resources, numerous competing demands for water use, conflict between domestic and tourism-related demands, educating the public about water scarcity and the need to conserve thereby effecting attitudinal change, shortage of trained human resource and funding. Tourism is the major economic industry in Barbados and as such is a major user of fresh water resources. The scare supply of this resource, as well as the great number of competing demands for use, could well be a constraint to future development of the tourism industry especially if the proposed development poses great demands on water resources.

Capacity-Building, Education, Training and Awareness-Raising: Present capacity to treat or recycle waste water (public sewerage scheme) is limited to the Bridgetown Sewerage Treatment Plant with a capacity of approximately 9000 cubic meters/day. There are about 12 package plants at various hotels. Some are treating the

wastewater and reusing it for irrigation (i.e. Sam Lords Castle, Almond Village Resorts. Education of policy makers in respect of the concept utilization and policy design of water resource management policy is basically achieved through presentations and public relations officer campaigns for the public. There are no specific programmes as yet, except as part of the NCSD policy paper being prepared. Currently, training has been achieved through attendance at workshops organized by the Caribbean Basin Water Management Project (CBWMP), the World Bank, Caribbean Science and Technology Association, Inter-American Development Bank (IDB) and the Caribbean Water and Waste-Water Association (CWWA).

Campaigns or other efforts to raise awareness of issues related to sustainable development and freshwater resources have been carried out by the BWA through TV, tours and presentation to various groups and organizations. A public education campaign has been launched by the BWA started with the free distribution of low water use showerheads and kitchen faucet Aerators to customer not in arrears (30,000 were distributed). Special Programmes are also in place to work with private sector in the implementation of water conservation projects. The BWA has worked with the Ministry of Education on a school project (West Terrace Primary School) where a private sector supplier of low water use fixtures has retrofitted the water fixtures at the school for free and water use is being logged and monitored. The BWA, EED and Ministry of Tourism are also collaborating to implement a Water Conservation and Management Project in the Tourism and Hotel Sector.

Information: National information available to assist both decision-makers and planners working in the management of freshwater resources related to the following areas includes the following: *Agricultural Sector:* Current levels of ground water abstraction by government managed irrigation schemes, the individual private well abstractions are now being measured; *Household Sector:* Metered customer consumption levels/figures. Fixed rate consumer consumption estimates (currently universal metering programme on-going); *Industrial Sector:* Metered water consumption figures. Information is available upon request from the Barbados Water Authority. It is currently not accessible through Internet. Sustainable development indicators related to freshwater resources are currently being developed by the NCSD and the Caribbean Development Bank. Barbados is part of the UN Testing Programme on Sustainable Development Indicators. Further to that, we have developed a National Indicators Programme (NIP), which has defined national indicators for all policy areas, including freshwater resources. Presently, the programme has reached the data collection stage in terms of trying to discover the level of existing available information and formats.

Research and Technologies: Major problems relate to access to information on new developments in technology and exposure to their usage. This is being addressed through attendance at various regional and international workshops, memberships in professional organizations and association, and access to Internet. Technologies are chosen through review by the technocrats and recommendations, made to either acquire samples or visit suppliers for examination of the technologies. Standards that are used to measure water quality, including contamination of water by Persistent Organic Pollutants, include the World Health Organization Drinking Water Guidelines, United States of American Environmental Protection Agency Standards (USEPA) and European Community Standards. The technological needs of Barbados with respect to waste water treatment is up to tertiary level treatment technologies; and, with respect to water purification, it is presently limited to filtration and disinfections.

Financing: This sector is financed mainly through the operating costs of the Barbados Water Authority, which are partly recovered through charges etc, as well as some national budget funds etc as appropriate.

Cooperation: Barbados is a Member of the Commission of Hydrology of the World Meteorological Organization (WMO).

The Barbados Water Authority collaborates with the Caribbean Council for Science and Technology, based in Trinidad and Tobago, providing expertise on initiatives to develop and encourage the adoption of integrated water management strategies in Caribbean Countries.

The Caribbean Environmental Health Institute (CEHI) based in St. Lucia on the Integrated Management of Watersheds and Coastal Areas also involves Barbados in a regional project co-ordinated. This project is currently seeking GEF funding.

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CHAPTER 19: ENVIRONMENTALLY SOUND MANAGEMENT OF TOXIC CHEMICALS, INCLUDING PREVENTION OF ILLEGAL INTERNATIONAL TRAFFIC IN TOXIC AND DANGEROUS PRODUCTS

Decision-Making: Coordinating and executing agency for the Management of Toxic Chemicals is the Environment Division, Ministry of Physical Development and the Environment. The Environmentally Sound Management of Toxic Chemicals has received national priority since 1993. A Chemical Substances Technical Working Group (CSTWG), comprising representatives from relevant agencies inclusive of the private sector, workers unions, academia and the public sector was commissioned under the aegis of the Environment Division to produce guidelines on the management of hazardous waste. As a result of the work of this group, in 2000 the presented to the Cabinet:

1. The Hazardous Chemicals/Substances, Survey and Inventory 1995-1998;
2. The National Hazardous Material Emergency Response Plan; and
3. Recommendations for a revised Administrative Framework for the Management of Hazardous Substances.

Cabinet approved the Emergency Response Plan and mandated that a 'policy paper to be used as the basis for legislation that is wider than Chemical Substances and must include solid waste'. This policy paper has been drafted and provides a legal and administrative framework within which hazardous substances including pesticides will be managed in the long term. This draft paper has proposed that matters pertaining to the temporary storage of hazardous wastes and the subsequent shipment overseas for treatment and disposal should fall under the mandate of the Sewerage and Solid Waste Project Unit (SSWPU) of the Ministry of Health, which has responsibility for the construction of a Chemical Waste Storage Facility. However the long-term management of hazardous materials will be carried out by a proposed environmental protection agency to be formed as a result of ongoing institutional strengthening with respect to environmental management.

Programmes and Projects: Long-range plans with respect to Institutional Reform exist as a result of the Environmental Management and Land Use Planning for Sustainable Development Project, which was completed in 1999. The proposed co-ordinating agency responsible for the management of hazardous chemicals will carry out relevant programmes and activities warranted as a result of the recommendations and guidelines laid out in the plans and policies already developed.

Status: Barbados needs to improve its capabilities in Cleaner Production for Industrial Chemicals and the manner in which the chemicals are processed at the port of entry.

Capacity-Building, Education, Training and Awareness-Raising: No information available.

Information: Statistical baseline data is being collected on the importation and handling of toxic chemicals. The issue of an Emergency Response Protocol is also being addressed.

Research and Technologies: No information available.

Financing: Support offered through National provisions from the Consolidated Fund.

Cooperation: As mentioned previously private sector, workers unions, academia and the public sector collaborate through their involvement in the CSTWG.

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CHAPTERS 20 TO 22: ENVIRONMENTALLY SOUND MANAGEMENT OF HAZARDOUS, SOLID AND RADIOACTIVE WASTES

Decision-Making:

Hazardous wastes: Under the Integrated Solid Waste Management Plan (ISWMP) a full hazardous waste management plan is being developed utilizing a 'cradle to grave' approach with respect to management of hazardous chemicals and wastes. Additionally a Chemical Waste Storage Facility is being constructed as a component of ISWMP. Complementing these initiatives is the preparation of a Draft Policy Paper on Hazardous Substances Management, which is being prepared by the Chemical Technical Working Group in Hazardous Substances (CSTWG).

Solid wastes: Several Government agencies share responsibility for the management of wastes in Barbados:

- a) The Sewerage and Solid Waste Project Unit (SSWPU) of the Ministry of Health is responsible for establishing the framework for and the initial overall implementation of the Integrated Solid Waste Management Plan (ISWMP). The Unit continues to implement the programme and will hand over the various components to the appropriate Government Agencies that will carry out the long-term implementation/management of these components.

Under the ISWMP, the SSWPU is charged with the development of solid waste management legislation and environmental education with respect to solid waste management. As a result of a study conducted in 1993, the following two-component programme was prescribed.

Physical Component - The physical component includes:

- i. A national sanitary landfill (designed to also handle septage and sludge),
- ii. A waste transfer station,
- iii. A national composting facility,
- iv. A disposal facility for non-combustible non-biodegradable 'bulky' waste,
- v. A chemical waste storage facility
- vi. Road and other infrastructural upgrades.

The Non-Physical Component - The second, non-physical component includes:

- i. Institutional Strengthening of key Government agencies,
- ii. Public Education /Awareness Programme,
- iii. Development of cost recovery measures,
- iv. Policy development to provide mechanisms for the implementation of the Programme,
- v. Drafting of solid waste management legislation.

The Department of Economic Affairs, of the Ministry of Economic Development administers international financing associated with the Programme and offers advice and guidance in respect of economic instruments and research in solid waste management.

- b) The Sanitation Service Authority (SSA) of the Ministry of Health has responsibility for the collection and disposal of Solid Waste from homes islandwide and government agencies. It also has a commercial arm, which offers service to the private sector in addition to service already offered by private waste collectors. Under the ISWMP, this agency will be less involved in the disposal of waste, but will manage the private sector agency that will operate the disposal facilities. The SSA will retain responsibility for the collection of municipal solid waste.
- c) The Environmental Engineering Division (EED) is responsible for monitoring and enforcement issues that pertain to solid waste management. The Environmental Health Officers (EHOs) of the Ministry of Health assist with the monitoring and enforcement in respect of solid waste management.

- d) The Office of the Attorney General drafts and revises solid waste management legislation and provides advice to Government with respect to legal issues in solid waste management. In addition, a number of agencies such as the Royal Barbados Police Force, Customs and Excise Department and the Barbados Defense Force, as well as the Judiciary, play critical roles in the enforcement of solid waste management legislation.
- e) The Ministry of public works and Transport has responsibility for road construction and maintenance of roads that lead to the disposal facilities.

A number of existing pieces of legislation exist to address the various issues of solid waste management. These include:

- i. The Health Services Act (Cap 44) and its associated collection and disposal of refuse regulations. The Act defines the regulatory framework for solid waste management in Barbados while the regulations address landfill siting, littering and dumping, waste containment and waste collection and transportation. Importantly, penalties are set for contravention of the Act. The Nuisance Regulation, The Rodent Control Regulation and the Disposal of Offensive Matter Regulation provide control over littering and dumping.
- ii. The Underground Water Control Act regulates disposal of sewerage or waste into the ground via water wells.
- iii. The Returnable Containers Act (1987) creates a system for recycling beverage containers.
- iv. The Environmental Levy Act (1996-8), which provides for the imposition and collection of a levy on specific goods to assist in defraying disposal costs, and to encourage Barbadians to recycle.
- v. The Marine Pollution Control Act (1999) address pollution of the marine environment from all sources.
- vi. The Sanitation Service Authority Act-Sanitation Service Authority (fees, Amendments) Regulations (1996), which allows for the charge of \$25.00 per tonne for the deposit and disposal of refuse at any refuse disposal site.
- vii. The Comprehensive Solid Waste Management Act now being promulgated which will rationalize solid waste management issues and will complement other pieces of related legislation.
- viii. The proposed Environmental Management Act will empower the present and proposed departments of the restructured Ministry of Physical Development (MPE) and establish regulatory frameworks for environmental management issues, which are not presently embodied in legislation.

Radioactive wastes: Radioactive waste, which is composed mainly of medical waste, is being handled in an initiative undertaken jointly by the SSWPU and the QEH through a medical waste programme with funds to be obtained under the HIV/AIDS Project, which has received World Bank Funding

Programmes and Projects: *Hazardous wastes:* Please refer to information provided under the category “Decision –making”

Solid wastes: In early 1993, recognising the need for comprehensive Solid Waste Management in Barbados the GOB entered into an agreement with the Inter-American Development Bank to undertake an integrated Solid Waste Management Programme, using an independent consultant.

The key issues that were identified were:

- i. Lack of an integrated approach to collection and disposal of solid waste,
- ii. Littering,
- iii. Illegal dumping,
- iv. Handling and disposal of special waste,

- v. The need for organisational change,
- vi. The need for a cost recovery mechanism.

Status:

Hazardous wastes: The hazardous waste that is produced in Barbados is comprised of small quantities of several waste streams. The constraint of the lack of space has to be considered when addressing the most appropriate method of hazardous waste disposal.

Solid wastes: All existing equipment and technologies need to be reviewed periodically with an aim to upgrading them. At all stages, the BATEA- Best Available Technology Economically Achievable Approach will be utilised. Community support, through promotion at summer camps and private sector workshops, has been established and seeks to encourage greater public responsibility with respect to solid waste management.

Radioactive wastes: Barbados has no nuclear reactors and does not utilize large amounts of radioactive materials. The only sectors that utilize minute quantities are health and research institutions in laboratories. The management of these quantities is under the Ministry of Health. Of special concern to Barbados and the region as a whole is the issue of the Transboundary movement of radioactive wastes from one developed country to another through the ecologically sensitive Caribbean basin.

Capacity-Building, Education, Training and Awareness-Raising: *Hazardous wastes:* No information available.

Solid wastes: It is recognised that new skills are needed by both private and public sectors to effectively implement the ISWMP for Barbados. A training programme is being conducted for personnel in the government agencies involved in solid waste management, as well as for private sector individuals. The ISWMP has an extensive education component, which is pivotal to the successful implementation of the programme. A number of programmes and incentives have been established including the 'Bring Your Own Bag Programme' and home composting pilot projects.

The "*Bring Your Own Bag*" programme encourages shoppers to provide their own re-usable shopping bags instead of accepting plastic shopping bags. The *Home Composting* project involves combining kitchen scraps and yard waste in a composting container, which upon completion is a useful and valuable product. Both projects seek to promote the reduction of the amount of waste taken to the landfill; therefore, extending the time it will take to utilise all the landfill space. Public awareness and education materials have been developed, such as physical and computer models, brochures and videos as well as steps have been taken to integrate solid waste management into the curricula and activities at schools. It is recognised that the education programme needs to be improved and will be more effective when the overall framework for the ISWMP is established, and the necessary infrastructure and institutional arrangements are in place. No information available.

Radioactive wastes: No information available.

Information:

Hazardous wastes: Data collection on hazardous waste produced in the island has only been recently done (late 1996) and therefore at present figures can only be considered as baseline data.

Solid wastes: Indicators for the solid waste sector have been developed and included in the National List of Indicators of Sustainable Development. To date estimates for some of these indicators exist however frequent and accurate data will be generated once the weigh scale at the new Greenland Landfill becomes operational.

Radioactive wastes: No information available.

Research and Technologies:

Hazardous wastes: The technology needs for sound waste management include safe, sound and effective waste reductions options; Information systems - updated by industry and effective sampling and identification of hazardous waste streams (equipment lacking for laboratory).

Solid wastes: No information available.

Radioactive wastes: No information available.

Financing:

Hazardous wastes: The hazardous waste management plan is to be carried out with funding from Government of Barbados (GOB), the Inter-American Development Bank (IDB) and Pan America Health Organisation (PAHO).

Solid wastes: The programme is being funded jointly by the GOB and the IDB. Additional funding has also been accessed through regional and international funding organisations.

Radioactive wastes: As previously mentioned, finance for the development of a medical waste management programme will receive assistance under the national HIV/ AIDS Project funded by the World Bank

Cooperation:

Hazardous wastes: 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. The Government is considering the establishment of a temporary storage facility for hazardous wastes prior to export for offshore treatment in accordance with the requirements of the Basel Convention. Canada has consented to receive hazardous waste for disposal. Barbados is involved at the regional level in the development of measures to address the Environmentally Sound Management of Hazardous Wastes as governed by the Basel Convention. As identified in the 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. This will serve to build capacity of existing institutions and agencies in the different islands.

Solid wastes: No information available.

Radioactive wastes: The Government of Barbados has, since 1992, issued statements at various regional and international for a calling for the immediate ban of Transboundary movement of nuclear materials through the Caribbean sea and that the Caribbean Sea should be declared a nuclear-free zone. It is noted that in the event of an accident that would result in release of the nuclear materials, that there is very improved capacity within the region to adequately deal with the consequences. CARICOM, which represents eleven (11) English-speaking nations of the region has issued a statement to the same itself in 1992 and renewed it in 1995. A compensatory and liability fund should be established in the event of such a catastrophe so that there will possibly be some measures, which can be taken. The Government of Barbados will be pursuing along with CARICOM partners how this issue can best be addressed through a multilateral instrument.

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CHAPTER 24 TO 32: STRENGTHENING THE ROLE OF MAJOR GROUPS

WOMEN: Decision-making: The Government of Barbados has taken some positive measures to ensure the full development of women and to make sure they enjoy human rights and fundamental freedom on equal terms with men. The Bureau of Women's Affairs has been re-designated as the Bureau of Gender Affairs. The Bureau facilitates gender mainstreaming of National Development Policies and Programmes, so that equality and equity between men and women can be achieved. It advises Government Agencies and Non-Governmental Organisations on matters of concern to and affecting women and men. It monitors and evaluates gender awareness in Government policies, plans and programmes in all sectors. There is no barrier to women's participation in public and political life. Women are entitled to hold public office and to exercise all public functions established by national law on equal terms with men. The 1999 elections in Barbados saw an increase in the number of women in active politics. During the 1999 national elections three (3) women were elected to parliament. In 2001, another female representative was elected to parliament via a by-election. Programmes and Projects: Women continue to make strides in gaining legal reform that enhances their status and remove any gender imbalances in the community. Status: The non-governmental organisations in Barbados have formed an Umbrella Body for policy co-ordination. Capacity-Building, Education, Training and Awareness-Raising: Curricula and educational material already promote gender relevant knowledge. Information: The Barbados Association of Non-Governmental Organisations (BANGO) represents 3,000 persons. BANGO held a Conference on March 27, 1999, to explore the roles and functions of the non-governmental organisations in relation to the occasion to the Ministry of Social Transformation. The National Organisation of Women (NOW) held a number of public meetings entitled "Shared Power" in order to prepare women for entry into politics. In addition to this, the political parties have hosted leadership training opportunities from time to time. The School of Continuing Studies of the University of the West Indies has recently offered a training course on Women and Politics. Research and Technologies: The Statistical Department and the University of the West Indies (Gender Studies) department are the major stakeholders within research of this area. Financing: The Bureau is currently involved in a project designed to address gender as a factor of development with a 1995 budget of BDS\$683,723 provided jointly by the Government and the Inter-American Development Bank. Total Government disbursement to the Bureau for 1995 was BDS\$297,544. The Government also provides an annual subvention of BDS\$2,000 to the NOW, for human resource development, office equipment, operating expenses and projects. Cooperation: The Convention on the Elimination of All Forms of Discrimination against Women was signed on 24 July 1980 and ratified on 16 October 1980.

Men: In Barbados, male roles have been identified as just as important as female roles and thus to bring some balance to the concept of gender, we wish to highlight our achievement to date through the work of the Men's Educational Support Association; a recently formed NGO. The Men's Educational Support Association (MESA) was formed to address "the male in crisis" situation. The motto of MESA is "Stronger Men, Stronger Families, A Stronger Nation" and was formed in 2000. MESA's objectives are:

- To provide a forum for males to share experiences and ideas and to serve as a positive support group;
- To identify and effect positive change regarding key issues affecting males;
- To contribute to the education of males with respect to their roles as fathers, spouses and citizens;
- To help empower males to effectively share the leadership roles within the family;
- To communicate and interact with local, regional and international organisations having similar objectives; and
- To pursue other objectives consistent with the forgoing.

MESA has five subcommittees namely:

- Legal subcommittee
- Health Subcommittee
- Counselling Subcommittee
- Education and Spiritual Subcommittee; and
- Budget and Fundraising Subcommittee.

MESA's mission "is to contribute to the education and empowerment of males to be more effective fathers, spouses and responsible citizens through sharing information and experiences while networking and interacting among males of all ages". MESA is evolving into a strong, vibrant and respected organisation, which will guide and assist males to become even better fathers, spouses and citizens. To do this we will need the support of all males and civic-minded agencies in particular.

Children and Youth: Decision-making: To facilitate the efficient promotion of youth programmes the Ministry of Education, Youth Affairs and Sports and the Ministry of Health are the two major stakeholders. The Ministry of Education, Youth Affairs & Sports is the main ministry responsible for youth affairs in Barbados. The Ministry of Education, Youth Affairs and Sports has accepted that education is the major vehicle to bring about positive, relevant changes within our society. To facilitate this, the initiative was taken to revamp the curriculum within the school system. Since equality is of paramount importance, a provision has been made to improve the quality of education of students with special needs. This clearly exemplifies this Ministry's motto "Each One Matter - Quality Education for all". The Ministry of Health also plays a pivotal role within youth development as they seek to maintain health at a respectable level. Programmes and Projects: The Government supports a youth programme under the Division of Youth Affairs and Culture. Also, the Government of Barbados supports a Youth and Community Development Programme to provide leadership training and to improve community participation in the development process. Children and youth are full participants within the national sustainable development processes through the following youth fora: Zonal and National Youth Consultation Workshops; National Youth Survey; and Community Dialogue. With the support of the OAS (US\$23,000), a Youth Business Centre has been established, promoting Entrepreneurship among youth through training and advisory services. Parent Education for Development in Barbados (PAREDOS) provides parenting training and day care facilities. National Children's Homes provide training in adolescent health education. Status: To ensure that education is of high quality the revised curriculum is a skilled-based one aimed at achieving integration within and across subject areas. The use of technology within all subjects is also a stated requirement. Another feature of the new curriculum is the renewed emphasis on the child-centred approach, as opposed to the teacher-centred one. This paradigm shift is aimed at producing individuals with adequate critical thinking and problem-solving skills. The Health programmes are reviewed on a regular basis to facilitate the necessary responses to disease breakouts. Capacity-Building, Education, Training and Awareness: Social and emotional learning is also embedded in all areas of the curriculum. Another of the new innovations in the reform is the integration of cultural art forms across subject areas. Changes have also been implemented in the area of assessment. The new thrust is to ascertain the children's strengths and weaknesses at an early stage. Health staff are trained on a regular basis to facilitate the health management of the country's youth. Information: Multifaceted approaches were taken to ensure that well-rounded individuals exit the school system. This would benefit the nation as a whole, since persons would possess the skills, attributes and competencies, which will allow them to function in any situation. Research & Technologies: The Ministry of Education, Youth Affairs & Culture has a comprehensive research department. The Ministry of Health conducts the necessary programmes to gather the necessary information. Financing: The Youth Division of the Ministry of Education, Youth Affairs and Sports, receives approximately BDS\$10.9 million, out of which approximately BDS\$3.2 is dedicated specifically to youth programmes. The Ministry of Health programmes are also well financed by Government. Cooperation: The National Cultural Foundation for 2001 worked in conjunction with the Ministry of Culture to promote cultural programmes within the schools across the island. The National "Rights of the Child" Committee of the Ministry of Social Transformation functions with membership from the Ministry of Education, Youth Affairs and Sports; Health; Police Department; Child Care Board; NGO, PAREDOS to develop policies, monitor programmes and foster public awareness of Children's Rights.

Indigenous People: Not applicable to Barbados.

Non-Governmental Organizations: Decision-making: NGOs inputs are important for reviewing decision making and implementation and NGOs participate in the conception, establishment and evaluation of official mechanisms to review Agenda 21 implementation. The following organisations are full members of the national sustainable development coordination mechanism: National Organization of Women; National Council for Science &

Technology; Barbados National Trust; Barbados Christian Council; Small Business Association; Coalition of Trade Unions; Community Development Division; and Barbados Environmental Association, inter alia. The following major groups/organisations participate in impact assessment projects at the national and local level: the University of the West Indies; the Bellairs Research Institute; the Barbados National Trust; the Barbados Association of Professional Engineers; the Barbados Town Planning Society and the Barbados Environmental Association. Major groups' organisations such as the Tourist Development Programme, Small Business Sector (e.g. vendors), The Barbados Chamber of Commerce, Business and Industry (hoteliers) and Environmental and Heritage (NGOs) participate occasionally in the design of national sustainable development projects and policies. Major groups' organisations also occasionally participate in the implementation of national sustainable development projects. For example, concerning a Coastal Zone Management Project, the fishing community and hoteliers were involved in the implementation of pilot projects. Programmes and Projects: The NGOs have conducted a number of programmes and projects with relation to national sustainable development co-ordination mechanism. Some NGOs participate in impact assessment projects at the national and local levels and the tourism development of Barbados. Status: Government includes representatives from major groups in its delegation to international meetings such as the CSD, the UN International Conference on Women in Beijing (China 1995), and the Cairo Conference on Population and Development. However, lack of funding for non-governmental representatives remains an obstacle to their greater participation in regional and international conferences. The Government has developed the following new and innovative methods (including those designed in partnership with major groups' organisations), that have increased local or national major group participation in sustainable development: establishment of National Commissions (e.g. Commission on Social Development; Commission on Sustainable Development) and Task Forces to address various sectoral parameters (e.g. education, culture, environment, solid wastes management). Capacity-Building, Education, Training and Awareness-Raising: A lot of these NGOs are responsible for providing the necessary information to the public. Information: Various publications are produced by these organisations in their effort for public awareness efforts. Research and Technologies: A lot of the research information for the NGOs is either provided by the Statistical Department or is researched by the NGO organisation; itself at its own expense. Financing: In the agriculture sector the NGOs receive a total of BDS\$65,000 (US\$32,500) annually. NGOs involved in environmental and heritage conservation receive total annual subventions of BDS\$450,000 (US\$225,000). The Caribbean Conservation Association (CCA), a regional NGO, receives a subvention of BDS\$15,000 annually, as well as office accommodation and tax concessions on equipment. The Barbados Museum and Historical Society receives an annual subvention of BDS\$360,000. The Barbados National Trust receives an annual subvention of BDS\$75,000. In addition, for 1995-1996, the Barbados National Trust (BNT) received BDS\$600,000 for a special restoration project. The Government provides a subvention of over US\$500,000 to the Barbados Family Planning Association. The NGO Theocratic Government of His Majesty Haile Selassie I. Churchical Order of Nyahbinhi received US\$6,680 for a project in sustainable agriculture from the GEF Small Grants Programme. The GEF also supported the Professional Association of Divers with US\$10,000 for the installation of permanent mooring buoys for reef protection. Cooperation: The Government has received special assistance from the following international organisations or bilateral donors to strengthen the role and contribution of Major Groups in national Agenda 21 implementation: European Development Fund (US\$4,209,084), European Economic Community (US\$787,200), Kuwait Fund (US\$59,439), IDB (US\$14,500,000) and Global Environmental Facility/Small Grants Programme (US\$50,000). Barbados collaborates with international NGOs and other international organisations of major groups in national and regional sustainable development programmes, such as the IUCN-World Conservation Union, FAO, UNICEF, UNESCO, UNDP, OAS, the Inter-American Institute for Cooperation in Agriculture (IICA) and the Caribbean Agriculture Research and Development Institute (CARDI). Local NGOs relate directly to their international counterparts.

Local Authorities: This Chapter is not applicable to Barbados.

Workers and Trade Unions: Decision Making: In Barbados the mandate of Strengthening the Role of Workers and their Trade Unions lies primarily with the Ministry of Labour and Social Security. The Ministry comprises a number of agencies:

- The Labour Department is primarily responsible for: (a) Industrial Relations, (b) Occupational Safety and Health and (c) Employment Services;

- The Technical and Vocational Education and Training Council responsible for all programmes and schemes that contribute towards the development of knowledge and skills required for work. It transcends education systems and includes many non-formal programmes provided by government and private institutions. This helps in the development of a comprehensive Human Resources Development Programme;
- The Barbados Vocational Training Board provides quality occupational training programmes to enable greater opportunity to gain employment and upgrade skills of the work force; and
- The National Insurance Service (NIS).

The Ministry monitors the application of standards applied in the industry and workplace and seeks to integrate them with the laws of Barbados as necessary. Labour relations have been significantly affected by the impacts of globalisation, thus, to maintain a stable and competitive socio-economic environment, steps have been taken to ensure that the role of workers and their representatives – the trade unions- are strengthened.

- There is a new bill being considered by a select cabinet committee - The Employment Rights Bill
- New legislation is in the process of being developed which cover Trade Union recognition, Health and Safety at Work, and Sexual Harassment.
- **In 1996 the amendment to the “Shop Acts” provided a 40-hour five-day workweek for shop Assistants with two rest days.**
- The present Wages Councils (Wage regulation) (shop Assistants) Order came into force on the 12th June 1997.
- The ILO has stated that the promotion of decent work should be the mandate of all member countries. Barbados supports this convention.
- The ILO adopted a convention on Health and Safety in Agriculture in 2001. Barbados supports this convention.
- The ILO adopted a convention on Maternity leave in 2000. Barbados voted in favour.
- Draft proposal on National Advisory Committee on Trade and labour.
- In order to satisfy the provisions of convention 144 Tripartite consultations is being carried out mainly by written communication at present.
- Tripartism: The Tripartite prices and incomes protocol was signed on August 24, 1993, but was effective April 1 1993 until March 31 1995. The Barbados Government, number of representatives of the employers and Trade Union representatives, signed this agreement. The major features were (1) a general freeze on wages/salaries with increases being allowed based on productivity or profit sharing (2) a review and monitoring of prices (3) the maintenance of the collective bargaining process to address conditions of work and the sharing of productivity gains (4) The establishment of a government tax regime supporting the objectives of the protocol and (5) the establishment of a tripartite national productivity board to give advice and support to productivity improvement efforts. There is a tripartite national body called the Social Partnership Committee that allows for consultation on social and economic issues.
- The second protocol was a reaffirmation of the social partners’ commitment to sustainable growth and development of the economy through increased competitiveness. It covered the period April 1995 to March 1997 and was extended to March 1998. This protocol provided for bonus payments based on productivity and other measures of organisational performance. A sub committee of the social partners was established comprising Government, equal number of representatives of the employers and the Congress of Trade Unions and Staff Associations of Barbados (CTUSAB).
- The third Protocol which is more wide ranging than the previous two was agreed in 1998 to cover the period April 1998 to March 2000. This protocol sought to affect the deepening and widening of the social partnership. This protocol was extended to March 31 2000. The Social Partners have started the process to review the process with the intention of completing an expanded document as Protocol four. The National Insurance Scheme (NIS) is tripartite in structure and operations. The trade unions and employers serve on government’s industrial and employment planning committees.

Programmes and Projects: The Ministry, under the sponsorship of the United States Department of Labour has established a Resource centre geared toward the availability of labour market information and other resources for

the general public. Status: *Challenges* - Some employers with a North American orientation are challenging Barbados' existing Industrial Relation System regarding the process for verification of the union's claim for recognition. Although there is tripartite consultation, in line with convention 144, this is voluntary and is not binding in any court of law. Barbados' existing legislation meets some of the requirements of the convention on Maternity Leave. There are, however, some, which are proving difficult to implement. These include the provision of nursing breaks for mothers who have returned to work and the requirement to extend the leave to fourteen weeks. Capacity building, Education, Training And Awareness-Raising: The Ministry of Labour and Social Security has been at the forefront of coordinating and conducting seminars which assist the private and public sectors as well as the trade unions in understanding their roles in globalisation and the collection of information which is key in measuring the productivity of the nation. The National Productivity Council has conducted a number of joint workshops and seminars on productivity with the Barbados Workers' Union Labour College as well as at the National Union of Public Workers Academy. The Manpower Research and Statistical Unit (MRSU) of the Ministry, has also been involved in conducting and assisting in workshops and seminars with the National Union of Public Workers Academy Unions. Attending Local, Regional and International Conferences, Seminars and Training has afforded the Ministry's officials to gain insights, ideas and guideposts which assists them in forging linkages and technical co-operation as well as keep abreast of the current thinking, trends and practices in Labour Management and Industrial relations. These activities are part of the Ministry's institution building strategy and are an ongoing activity. Information: Information not available. Research & Technologies: The Labour Market Information Advisory Committee (LMIAC), comprises members of the government, employers and their representatives, various Trade Unions. The Manpower Research and Statistical Unit (MRSU) - the statistical and research arm of the Ministry -, which focuses on areas of concern in which emphasis and research should be undertaken. Financing: The United States Department of Labour, ILO, other governments and various donor agencies have funded programmes and training for personnel. Cooperation: Important ILO Conventions have been ratified (138 -year 2000, 182 - year 2000) and a tripartite grouping of Government, Unions and the Private Sector attend ILO conventions.

Business and Industry: Decision-making: There are governmental policies which encourage the increase in the efficiency of resource use, including reuse, recycling, and reduction of waste per unit of economic output. The Government provides assistance to companies for export promotion and training initiatives. There is an Environmental Levy, which is imposed on all plastics, glass bottles, refrigerators, stoves, paper board boxes and cartons, tyres, washing machines, motor vehicles, car batteries, TV sets and mattresses. Programmes and Projects: Information not available. Status: A few enterprises of various sizes have adopted sustainable development policies. Individual hotels within the sector have adopted sustainable development strategies such as the recycling of solid waste, composting and energy and water conservation techniques such as solar water heaters. Capacity-building, Education, Training and Awareness-Raising: Information not available. Information: Information not available. Research & Technologies: Information not available. Financing: Assistance is provided through the Barbados Investment and Development Corporation. Total disbursements for 1995 were approximately BDS\$253,000. Cooperation: Information not available.

Scientific and Technological Community: Decision-Making: The Government of Barbados through the National Council of Science and Technology (NCST), the University of the West Indies (UWI) and the Energy Division of the Ministry of Economic Development, are the major stakeholders for the Science and Technology in Sustainable Development. Programmes and Projects: The Government of Barbados through the National Council of Science and Technology (NCST), the University of the West Indies (UWI) and the Energy Division of the Ministry of Economic Development, have opted embark on a number of Millennium Energy Products which are expected to have significantly positive impacts on the daily lives of Barbadians. These projects are but a small part of Government's projection for the alternative energy sector, with plans on the drawing board for a Renewable Energy Centre that will harness the expertise and competencies of our scientists in an applied manner. The Barbados National Standards Institute (BNSI) has adopted the ISO 14000 standards. Status: The need for significant social, environmental and economic change becomes more explicit when one considers the advances that have been made in the areas of Science and Technology in the last decade or so. No society or community is untouched by the phenomenal development of science and technology. Capacity-Building, Education, Training and Awareness-

Raising: There is some effort in the direction of improving exchange of knowledge and concerns between the science and technology community and the general public. Lectures are being given to schools and youth groups. Work is being done with NGOs, e.g., Counterpart Caribbean and Treading Lightly. The year 2001 has received much attention and was being touted as the year of major change when the adoption of new perceptions and attitudes are expected to encompass the principles of social and economic reform. **Information:** The process of science and technology as a tool to promote Sustainable Development is a multi-faceted one and the objectives of the National Council for Science and Technology include the development of a broader programme aimed at popularising Sustainable Development and is so doing, increasing financial efficiency and productivity in the economy. **Research and Technologies:** The BNSI is involved in the testing of water saving devices for showers and taps in conjunction with the Barbados Water Authority. Medicine is already being transformed with advances in genetic engineering techniques and non-invasive surgical procedures. In agriculture pest-resistant crops can be created and the desirable characteristics engineered into produce. Continued advances in molecular biology are expected to result in new highly specialised materials, and the applications of nanotechnology are infinite. Furthermore, Information Technology will be revolutionised with advanced video communication systems. E-commerce will create new and revamp old industries. For further information please refer to Chapter 9 for information on technology. **Financing:** Government along with International Agencies are mainly responsible for most of the financing of these projects. **Cooperation:** The Government of Barbados through the National Council of Science and Technology (NCST), the University of the West Indies (UWI) and the Energy Division of the Ministry of Economic Development, are the major stakeholders for the Science and Technology in Sustainable Development.

Farmers: Decision-making: A farmer's Incentive/Subsidy Programme exists under the Ministry of Agriculture and Rural Development. The Government gives concessions with respect to machines and agricultural imports. **Programmes and Projects:** Some of the major objectives were to fully operationalise the incentives programme, to fully operationalise the Agricultural Development Fund and to increase disbursements from the Rural Enterprise Fund to the agricultural sector. With respect to the Land for the Landless Programme it is to be expanded by incorporating 90 acres at Spencer's Plantation plus additional private lands. Another plan is to develop policies and plans for providing agricultural inputs from local sources – planting material, breeding stock, energy, manures and fertilisers, pesticides, labour, feedstuff and water. There are plans to also produce agricultural statistics that facilitate good planning and management. A public awareness campaign precipitated commitment to local food production and consumption of locally produced foods. There are plans to restructure the Food Promotion Unit to provide leadership in food preservation. **Status:** Most of these projects have been introduced in the last Financial Budgetary Presentation. The implementation of the incentives programme of the Ministry of Agriculture & Rural Development should be accelerated in order to provide the momentum needed to expand food production activities without undue delay. The initiative to expand domestic food production will require the mobilisation of capital resources. The Agricultural Development Fund will be the principal institution for financing agricultural activity. The Land for the Landless Programme must be speedily expanded to other areas of the island. More private lands should be made available to the programme's land bank, and there should be faster distribution of lands to successful applicants in order to ensure productive activity commences as soon as possible. The development of a national germplasm programme is a vital component of any effort aimed at improving self-reliance in food production. **Capacity-Building, Education, Training and Awareness-Raising:** The Ministry is of the view that government could lend assistance to the sector through the scouring of technical assistance from regional and international organisations, to provide financing in those areas which are considered to be capable of leading to the development of viable enterprises. It is considered that in this way commercial agriculture could be given the boost that it needs. The issue of human resource development is another area to which urgent attention must be paid, to ensure the progress of the sector and this must be carried out at all levels of the sector. In an effort to lend support to the competitiveness enhancement programme, priority will need to be assigned to the development and management of the human resource development, including a training needs assessment, must therefore be formulated and implemented to ensure that well trained and professional personnel service the sector. **Information:** There is a need for clearly articulated policy as defined by the government, in order to guide the development of the agricultural sector. The Ministry of Agriculture and Rural Development is of the opinion that incentives schemes once properly managed and monitored can greatly assist in repositioning the agricultural sector

and should accordingly be upgraded and retooled. The agricultural sector has been faced with increasing competition for available land from other sectors of the economy, as a result of the more lucrative alternative uses of land. This has resulted in land being held for speculative purposes and escalation in the market price. The aim of the Ministry is to implement benchmarking as a tool to be used in undertaking a comparative analysis of the performance of various agricultural sub-sectors. This will then be used as the basis for the provision of financial support to various segments of the sector. There is a need for special resources to be made available to the sector to aid in its development. The recently established Agricultural Development Fund (ADF) is one source through which these funds could be made available to the agricultural community. A legislative framework needs to be implemented for the retooling and revitalisation of the agricultural sector. This would assist in ensuring Barbados's compliance under the various agreements. A legislative framework would also ensure that Barbados' legislation is consistent across line Ministries and in harmony with international agreements, whilst at the same time avoiding duplication of efforts among Ministries. In an era of increasing international trade, there is a need to institute a system for safeguarding local health and the quality of foods. It is imperative that intellectual property of Barbados is safeguarded, as Barbados becomes increasingly more service oriented. In addition, this area would become increasingly important as Barbados seeks to expand its trade in non-traditional areas. Given Barbados' position as a relatively high cost producer of agricultural products, products would have to be marketed on the basis of quality. In this regard, quality assurance and the issue of standards would become increasingly important. This would apply both for domestic production as well as goods produced for the export market. Consideration would have to be given to ensuring that commercial producers achieve certain minimum certification of standards such as International Standards Organisation (ISO) and Hazard Analysis and Critical Control Point (HACCP). The upgrading and redevelopment of the marketing infrastructure is considered important to ensuring that there are adequate opportunities for employment under sanitary and attractive conditions and to increase the scope for the sale of agro-industrial products. In addition, efforts will continue to ensure that there are adequate marketing arrangements in place for the export of agricultural commodities. In this respect, the Barbados Agricultural Development and Marketing Corporation has a role to play in ensuring that there are adequate marketing facilities available. Research and Technologies: It is imperative that there be a strong and commercially relevant research and development focus, in order for the agricultural sector to become competitive in both the domestic and export markets. The Ministry is presently in the process of reconfiguring its research and development portfolio, with emphasis being on those commodities identified as having a comparative advantage. It is the aim of the Ministry to develop a research programme with some input from other agricultural institutions including the University of the West Indies and Caribbean Agricultural Research and Development Institute (CARDI). The need for increased access to production improving technology and, where applicable retooling in certain industries are vital for enhancing the competitiveness of commercial agriculture in Barbados. Financing: In the approved estimates 2001 – 2002 there was \$1.1 million allocated to incentives programme of Ministry of Agriculture and Rural Development. (Grants to Individuals (3EX14) under Code 25164178). The additional incentives announced on August 8, 2001 were budgeted at \$3.78 million of which \$2.115 million is to be derived from the Agricultural Development Fund (ADF) and the balance \$1.665 million from the Consolidated Fund to be disbursed by Ministry of Agriculture and Rural Development with relation to the incentives programmes. In terms of Capital Financing, funds are already earmarked (\$7.5 million) for the ADF and these are to be transferred pending enactment of the regulations of the Act, which has been passed. In addition, a recommendation was made for \$10.0 million from the sale of the Barbados Agricultural Credit Trust (BACT) to be transferred to the ADF. The Rural Development Commission administers the Rural Enterprise Fund. Some 50% of the portfolio goes to agricultural activities. The fund contains \$1 million, which was provided by the European Development Fund and is earmarked specifically for livestock activities. Other resources for agriculture are depleted and it will be necessary to replenish the fund by providing the sum of \$1.0 million. The Barbados Agricultural Development and Management Corporation was allocated \$0.5 million for this programme. There is no additional budgetary requirement over the next 90 days. For the Inputs to Food Production, no additional resources are required. In relation to strengthening of the agricultural statistics system, a sum of \$50,000 is required to meet the cost of implementing this activity. No additional resources are required for public awareness, information and communication or preservation. Cooperation: The Ministry of Agriculture and Rural Development works in collaboration with the Soil Conservation Unit, CARDI and the University of the West Indies with respect to various programmes.

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CHAPTER 33: FINANCIAL RESOURCES AND MECHANISMS

Decision – Making: The limited financial resources of the country are expended on the basis of decisions made by the Cabinet, which comprises the ministers responsible for the various ministries and statutory entities. The Government of Barbados has therefore sought to implement a fiscal policy, which seeks to maintain Government expenditure at a sustainable level for future generations. The policy is based on keeping the fiscal deficit at fewer than 2.5% while ensuring a declining balance on the foreign debt component of overall Government debt.

Programmes and Projects: The Government of Barbados has implemented a public expenditure management programme, which aims to ensure the cost effective management and deployment of limited financial resources. The programme will also cover aspects of human resource planning to enable the Government to monitor the skill developments of the human resources base of the public sector. It is imperative that in this period of almost non-existent overseas development assistance and minute FDI whatever resources are earned by a country must be managed on a sustainable basis.

Status: The programme has critical status on the Government of Barbados' list of priorities. It is vital that expenditure should be based on a programmed budgeting methodology thereby ensuring that money is not wasted but is spent on cost effective initiatives.

Capacity-Building, Education, Training and Awareness-Raising: The Government of Barbados has initiated a series of training programmes aimed at upgrading the skills of the financial personnel who monitor expenditure in the public sector. This will allow Government to better monitor the dispersal of funds and their effective use.

Information: The lack of a consistent and accurate management information system in the context of the public sector led to great deficiencies in the operations of various Government ministries and departments. With the information of the Smart Stream accounting and human resources packages on a phased basis and the use of the programme budgeting methodology in tandem has provided management information on a more sustainable basis.

Research and Technologies: In the area of technology Government will continue to upgrade its information collection and generations systems on the basis on a sustainable way. This will be done through rigorous cost-benefit analysis to determine the relevant gains and losses.

Cooperation: Government has sought funding through various agencies such as the IMF and the IADB for the implementation of financial systems to provide Government with the necessary information for making informed decision. These systems allow Government to generate financial information in an internationally-recognised format. The need to provide information in an accurate and timely basis was highlighted in the 1991 –92 period of economic uncertainty.

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CHAPTER 35: SCIENCE FOR SUSTAINABLE DEVELOPMENT

Decision-Making: The National Council for Science and Technology, within the Ministry of Commerce, Consumer Affairs and Business Development is responsible for decision-making in this area. The Ministry of Education, Youth Affairs and Sports play a role in terms of curriculum and human resource development. The National Council for Science and Technology has the responsibility for the coordination of Science and Technology. In addition, other institutions which facilitate dialogue between these sectors include: National Commission on Sustainable Development (NCSD); Barbados National Standards Institution (BNSI); Coastal Zone Management Unit (CZMU); Caribbean Counterpart; Caribbean Project for Adaptation to Climate Change (CPACC) soon to become the Caribbean Climate Change Center in 2002; Fisheries Division; and Energy Division. Science is incorporated in decision-making in a quasi ad-hoc manner but there is movement to integrate scientific considerations within the decision-making process. In several ways, science has contributed to the formulation of policy etc. It is also being pushed in the curriculum. The involvement of major stakeholders is facilitated through the traditional channels, such as meetings, workshops and working groups where the various interests will meet and discuss issues with decision-makers.

Programmes and Projects: As mentioned before CPACC will become the Caribbean Climate Change Center in 2002. The Caribbean Climate Change Center will be a Caricom specialized agency with independent management. The Centre's main functions relate directly to the mission it has in supporting the program of action on climate change for the region. It will act as: an executing agency for regional climate change programs and projects, including the follow-on project to CPACC, to be called: Mainstreaming Adaptation to Global Climate Change (MACC); an advisory mechanism on climate change policy to Caricom Secretariat and its member countries; and a source of scientific and technical information on climate change and its potential impacts in the region. The faculty of Science and Technology at University of the West Indies (UWI) is coordinating a project on the diffusion of salt water into coastal aquifers. There are also plans for an Ocean Thermal Energy Project. This project already was sent to the IADB. There are plans for a South-South linkage to be developed within the field of renewable energy and marine science with the University of Quintana Roo in Mexico. There are plans to create a new Center for Renewable Energy. These plans are well advanced and this centre should be opened in 2002. This center will undertake research and development in renewable energy efficiency and commercial development of renewable energy technologies. It will also be a centre for training and education, which will offer certification up to graduate level. This centre will provide consultancy service. The Barbados Light and Power Company should also be looking for an international partner to set up a wind farm.

Status: The scientific community in Barbados, though comparably small, is very well respected. Its contributions have been ad-hoc up to this point. However, there are clear indications that efforts are afoot to present science in a more systematic way with the efforts of the University of the West Indies (UWI), the National Council for Science and Technology (NCST) and the Barbados Academy of Academic Scientists (BAAS). Certainly, the work of eminent scientists such as Professor Oliver Headley has led to the promotion of renewable energy concepts and research in varying forms such as Ocean Thermal Energy Conversion (OTEC), wind and tidal energy possibilities. Much of the research work is focused on national development. There are no projects or programmes as such to increase the contribution of science for sustainable development, though mechanism exists which can facilitate this such as the NCSD. Other mechanisms include science fairs; specific projects such as the solar still project, alternative energy and tissue culture technology. In addition, efforts are being made to make a shift in the structural methodologies with regard to the teaching of science to the cultivation of the environment as a resource medium. A policy toward science has evolved, but it is not strictly documented. Most departments and ministries address problems, aimed at economic, social and environmental development in an ad-hoc manner.

Priority constraints to implementing effective programmes to address the issues raised in this programme area include the following: fragmented approach adopted as each department conducts its activities in isolation from others; funding to cover costs; attitude adjustment - how people perceive the issue and how that affects their involvement; require project-oriented activities which is time-consuming and adds to already overburdened work

schedules of teachers which can also affect their involvement; and need for continuous financial input since projects are only short-term and this can lead to a loss in continuity and progress made.

Capacity-Building, Education, Training and Awareness-Raising: There are no specific guidelines or legislation in this area, but government has always regarded science as an important developmental tool and has provided resources to enable training of professionals and the development and strengthening of scientific research. In terms of guidelines, the Ministry of Education develops course syllabi to ensure training in science and is also guided by the Caribbean Examination Council for the various course offerings. The University of the West Indies (UWI) has developed programming, which would facilitate the development of a cadre of scientists and researchers. A significant scientific research effort is undertaken in UWI, especially in Barbados with regard to environmental research e.g. on energy through CERMES. Science is not regulated in domestic law but is guided by practice and tradition. The overall education regulations i.e. the Education Act, speaks to education generally and in so doing to the issue of science education.

There are no specific programmes to educate policy-makers in the concept and policy design of science for sustainable development. The Environment Division does work in collaboration with other agencies, for example, to sensitize policy-makers on the entire issue of Sustainable Development. No organized programmes for awareness raising are conducted. Generally the National Council would coordinate these for Science and Technology (NCST) as well as by various agencies with whom scientific research is part of their programme area. In addition, the University of the West Indies also coordinates activities, and the Associated Schools Project funded by UNESCO (which focuses on sustainability and the connection between science and sustainable development). Further, the Science and Mathematics Integrated Learning Experience (SMILE) funded by the OAS and administered by NCST will also build capacity and raise awareness.

Information: Information for decision-making is readily available from any of the agencies involved, but there is no single repository and there is no cross-linkage of information. Types include: Reports and pamphlets and a variety of print media; the National Council for Science and technology may have a website on this matter; and Edutech 2000 has a website. Information is also available through news media, T.V. and radio programmes. There is no national website as yet but several agencies have their own sites, which address partially, on the issues mentioned above. The Environment Division is developing its own website which, after further development, may deal with this issue. Barbados is part of the UN Testing Programme on Sustainable Development Indicators. Further to that, we have developed a National Indicators Programme (NIP) that seeks to define national indicators for all policy areas, including science. Presently, the programmes have reached a data collection stage in terms of trying to discover what information is available and in what format.

Research and Technologies: No information available.

Financing: Financing in this area has several aspects. Evidently, there is considerable government expenditure (national budget) and co-financing. In addition, some of the above-mentioned projects are funded by external assistance from United Nations Educational Scientific and Cultural Organisation (UNESCO) and the Organisation American States (OAS). Further some private sector firms have contributed and assisted with projects, which would improve our technology options e.g., Barbados Light & Power co. Ltd with alternative energy research.

Cooperation: No information available.

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CHAPTER 36: PROMOTING EDUCATION, PUBLIC AWARENESS AND TRAINING

Decision-Making: The Ministry of Education, Youth Affairs and Sports is primarily responsible for promoting education, public awareness and training. It is also a full member of the National Coordinating Body for Sustainable Development. The Ministry does not have an advisory or consultative body on Environmental Education, but there is an Education Officer for Science who sits on the Environmental Education Committee of the Ministry of Physical Development and Environment. The Environment Division has an education unit responsible for public awareness on environmental and sustainable development issues. Currently the Environment Division is coordinating the development of a National Sustainable Development Policy for Barbados through a broad-based collaborative process. Significant component of this policy will focus on education and public awareness. The training Administration Division of the Ministry of the Civil Service is primarily responsible for human resources development. However, its efforts are supported and supplemented by the Human Resources Development Section of the Ministry of Education, Youth Affairs and Sports.

The Ministry of Education, Youth and Sports encourages partnerships, mobilises resources, provides information and prepares the National Education Strategy, which addresses both formal and informal environmental education. The National Development Strategy formulated in 1995 and submitted to the Heads of Government of CARICOM in Jamaica in 1997, addresses human resource development as well. In addition, through the Public Awareness and Education Steering Committee of the National Commission on Sustainable Development, key stakeholder groups have been brought together to coordinate a comprehensive public awareness programme. This is partially achieved through printed material, audiovisual tools and special classes. In addition workshops and seminars are used at all school levels to promote environmental education. The education system is currently undergoing curriculum reform and provision has been made to include environmental units in a number of subjects. Generally, on an ad hoc basis, stakeholder involvement in decision-making is ensured through workshops and national consultations.

Programmes and Projects: Awareness-raising programmes aimed at increasing appreciation for nature and the need for its preservation include television programmes, cartoons, skits as well as photography and poster competitions. These activities are supplemented using isolated demonstration projects in the areas of tree planting and beach clean up by individual organizations. There are also National Debushing and Clean-Up Campaigns. Some examples of innovative public awareness activities are: “Train-the Trainers” programme under the Montreal Protocol: which involves training refrigerator technicians in Chlorofluorocarbon (CFC) recovery and recycling as part of the drive to phase out Ozone-depleting Substances (ODS); recreational parks promotions/competitions; newsletters and newspaper articles: television programmes; “Mr. And Mrs. Green” cartoon series; and Sustainable Development Seminars.

Status: The Ministry of Education, Youth Affairs and Sports has recognised the need to establish formal environmental education programmes to assist children in appreciating the finite nature of the world’s resources and the need for ensuring sustainability. To this end the national school curricula have been revised and efforts were made to ensure that environmental and development issues are adequately addressed at all levels in school. The syllabus for early-childhood education also seeks to expose students to the importance of caring for the environment. At the junior level in Primary school, environmental education forms an integral part of the Integrated Science syllabus and includes study of the environment, safe drinking water, sanitation as well as recycling. In the junior classes at secondary school, the Integrated Science and the Citizenship Education syllabuses serve as vehicles to promote environmental education. Students will be required to study conservation, recycling, solid waste management, ecosystems and energy efficiency to mention a few pertinent areas. The Ministry of Education, Youth Affairs and Sports is cognisant of the fact that our greatest resource is our people, and that sustainability can only be achieved through education. Hence, it has been mandated that education is compulsory to the age of sixteen (16) years. The system has also been restructured to cater to coeducation in most secondary institutions. This should assist with the creation of equal opportunity for women in non-traditional fields and to eliminate gender stereotyping in the curriculum, within schools as well as the wider community.

This educational thrust towards increased emphasis on environmental issues cannot be achieved without adequate teacher input. To this end training must be provided. This is accomplished via pre-service and in-service programmes, as well as workshops for teacher administrators, educational planners and non-formal educators. These sessions deal with the nature and methods of environment and development education. Since, the majority of the teaching staff is female; other incentives besides training had to be provided. These include availability of child-care facilities, and payment of maternity benefits from the National Insurance Scheme (N.I.S.).

The tertiary institutions are also involved with supporting the initiative to provide relevant environmental education. The Barbados Community College (B.C.C.), Health Science Division offers courses in Human Health Care. Also, the Natural Science Division has introduced an Environmental Science Major and has fashioned the requisite syllabuses. This course was opened for admission for the academic year 2001-2002. There are plans in the pipeline to make B.C.C. more environmentally friendly and to establish it as recycling plant. At the national level, public officers are given leave to pursue studies in Human Resource Development, and every year funds are budgeted for the award of ten national Development Scholarships to persons who have gained entry to university to study courses which would contribute to the general development of this country. Every year the composition of the courses changes depending on the countries needs. Some of the areas of study considered in previous years are special education, coastal zone management, software development, early childhood education, Dietetics and Archives Management.

Special courses are offered for teachers in Education Administration and management. Administration Courses are offered at the University of the West Indies (U.W.I.) and Barbados Institute of Management and Productivity (BIMAP) for example Management Information Systems (MIS), and Management for Managers. BIMAP is given a subvention by Government every year. In addition, training courses are provided under the second IBDR (World Bank) project in the following areas: Management of Training, Training in management of the Resources centre and the use audio-visual aids, Personnel Management, Manpower Development, Manpower budgeting and staff inspection, manpower information systems, Industrial relations, Training facilities, Computer Literacy, Development of specific career paths in the public service, Mutual interchange of Public and Private Sector Personnel, and Capacity-building and Awareness-raising. The Barbados Water Authority conducts public awareness programmes utilising the television, radio and print media. This awareness drive focuses on reasons for water conservation and sound use practices, as well as actual measures and actions that can be take at the domestic level to achieve these. These programmes have complemented the free distribution of water saving devices to paid-up customers by the Barbados Water Authority. Priority constraints to implementing effective programmes to address the issues raised in this area are limited funds and the need for continued training of available human resources.

Information: National information available to assist decision-makers and planners working in human resource development is contained in the Inter-Ministerial Report on Human Resource Development Strategy - 1995, readily available at the Resource Centre of the Ministry of Education, Youth Affairs and Sports. Barbados is also undertaking compilation of a database on Education, Training and retraining. The database forms part of the Labour Market Information System (LMIS) providing information for formulating development plans, employment policies and programmes. Every Ministry and private enterprise is required to prepare a database on education training and retraining to be included in the database at the Manpower Research and Statistical Unit (central agency for this information). Additionally, under the National Indicators Programme (NIP) approved in 1998, indicators for sustainable development are being developed, including those, which would facilitate monitoring and evaluating on human resource matters. Further, the Human Resources Committee under the National Commission for Sustainable Development will collaborate with the Ministry of Physical Development and Environment on indicator development.

Research and Technologies: The Ministry of Education, Youth Affairs and Sports has embarked on a programme to increase technology-literacy across the island. This is being achieved under the Education Sector Enhancement Programme (ESEP) which involves retrofitting of schools with the current technologies. These technologies are to be used to enhance teaching and to achieve integration across the curriculum. The equipment will also be

accessible to the communities surrounding the school in order to reach a wider cross-section of persons. If the population of Barbados becomes more aware of the trends in the technological world and are intimidated by them then sustainability will become inevitable.

Financing: This sector is financed mainly through the national budget and external assistance.

Cooperation: United Nations (UN) agencies and organizations have supported educational programmes on environmental and sustainable development issues. For example, United Nations Educational Scientific and Cultural Organization (UNESCO) provided funding for training of teachers in physics and environmental studies, as well as for a workshop on human development strategies with regard to structural adjustment and education policy.

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CHAPTER 37: NATIONAL MECHANISMS AND INTERNATIONAL COOPERATION FOR CAPACITY-BUILDING IN DEVELOPING COUNTRIES

This issue has been covered either under Chapter 2 or under the heading **Cooperation** in the various chapters of this Profile.

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CHAPTER 38: INTERNATIONAL INSTITUTIONAL ARRANGEMENTS

This issue deals mainly with activities undertaken by the UN System.

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CHAPTER 39: INTERNATIONAL LEGAL INSTRUMENTS AND MECHANISMS

This issue has been covered under **Cooperation** in the various chapters of this Profile.

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CHAPTER 40: INFORMATION FOR DECISION-MAKING

Decision-Making: Currently split among various arms of the Government:

- (a) Barbados Statistical Service (BSS) (collection/dissemination of specific data)
- (b) Ministry of Finance & Economic Affairs
- (c) Ministry of Physical Development and Environment

The closest mechanism we have with respect to coordinating related bodies rests with the National Commission on Sustainable Development, which sets priorities. However these recommendations etc. have to be formalised, via Cabinet, into policy. Additionally, institutions such as the Ministry of Economic Development have informal information-sharing arrangements with the private sector and other Ministries.

Currently the Barbados Statistical Service receives its mandate from Statistics Act Cap. 192) that requires it to prepare specific statistics. There has been an effort to establish an overall policy for information at the national level by integrating environment and development information. The initial work has been done, and the research and database development was to occur in mid-1996. There is no programme yet to develop or use indicators of sustainable development, but Barbados considers the CSD process of developing such indicators and the methodologies as a good basis for a national programme. Decision-makers at the national level, institutes, researchers at universities and Major Groups are the main users of sustainable development information.

Programmes and Projects: Barbados is one of 22 pilot countries involved in developing and testing international Indicators of Sustainable Development under a programme being coordinated by UNCSO. As a result Barbados has had a National Indicators Programme in place since 1997. At the same time we are in the process of developing a national policy for sustainable development. The Indicators Programme is intimately linked to the policy since it is hoped that Indicators can be used to monitor and/or measure the success of the implementation of the policy. The Ministry of Physical Development and Environment has an ongoing public awareness campaign on the principles of Sustainable Development and or what ordinary citizens can do to facilitate Sustainable Development. With specific reference to information for Sustainable Development, there are plans for training of staff, technical and clerical, in the near future to manage the substantial amount of data generated on Sustainable Development and Indicators of Sustainable Development.

Status :

Structure:

DATA	ECONOMIC	SOCIAL	ENVIRONMENTAL
<i>Government</i>	<i>Barbados Statistical Service</i> <i>Central Bank of Barbados</i> <i>Ministry of Finance</i> <i>Ministry of Economic Development and International Business</i> <i>Ministry of</i>	<i>Ministry of Health</i> <i>Ministry of Education, Youth Affairs and Sports</i> <i>Ministry of Social Transformation</i> <i>Barbados Statistical Services</i>	<i>Ministry of Physical Development and Environment (and its various departments)</i> <i>Ministry of Agriculture & Rural Development</i> <i>Barbados Water Authority</i>

	<i>Commerce, Consumer Affairs and Business Development</i>		
<i>Private Sector</i>	<i>Major financial bodies e.g. Caribbean Development Bank, Ernst & Young etc. University of the West Indies</i>	<i>University of the West Indies (UWI)</i> <i>Local NGO bodies e.g. Heart Foundation</i> <i>Regional and International bodies e.g. UNDP</i>	<i>UWI</i> <i>Bellairs Research Institute of McGill University</i>

Traditional information is not generally collected or utilized. Both the Central Bank of Barbados Annual Statistical Report and the Annual Economic Report contain data fully accessible to the public. Databases with limited access include the Pesticide Control Board Database, the Coastal Conservation Project Database, and the Barbados Water Authority Database. A comprehensive database of environment and development parameters is needed as the basis for sustainable development policies.

Capacity-Building, Education, Training and Awareness-Raising: Recently there has been an increased use of GIS in various aspects of environmental management data collection. Specifically, the technology has been used in land-use assessment, coastal zone monitoring, soil erosion monitoring, freshwater resources monitoring. With respect to satellite-based remote sensing the Meteorological Office has been using satellite information for a long time to carry out weather monitoring and forecasting and for disaster preparedness. The regional project Caribbean Planning for Adaptation to Climate Change (CPACC) will soon be using IKONOS satellite imagery to monitor climate change activity. We are aware that there is a lot of satellite-based environmental data available. The drawback seems to be lack of receiving systems to capture this data and the need for equipment and trained staff. With specific reference to the Indicators programme, once the data is gathered and information system is created, it is hoped to launch a large-scale public awareness campaign to sensitize the public on our progress towards sustainability

Research and Technologies: No information available.

Financing: At this time, it is difficult to put a figure since public expenditure on information for decision-making is included within other costs/expenditures of the ministries/ departments concerned. They do not stand out as a clear, separate expenditure. Additionally from assessment of the expenditures of these agencies the improvised figure seems to be quite a small percentage of the national expenditure. Currently the Barbados Statistical Services is looking at establishing a Local Area Network. It is felt that this will improve the dissemination of information. This move requires acquiring technology, staff training. There is also a proposal for overall institutional strengthening of the statutory service.

Cooperation: As previously mentioned the Barbados Statistical Service is planning to implement a Local Area Network and the Ministry of Physical Development and Environment is developing its National Indicators Database. These two departments cooperate frequently under the umbrella of the National Commission on Sustainable Development and will continue to co-operate in the arena of dispensing information on indicators of Sustainable Development. With respect to international cooperation Barbados participated in the initial stages of a twinning programme with Costa Rica and the Maldives under the aegis of the UNDESA in the area of sharing know-how on Indicators of Sustainable Development systems.

CHAPTER: INDUSTRY

Decision-Making: With regard to implementing a national policy for ecologically sustainable industrial development, efforts are being undertaken to establish a Code of Conduct procedure regarding environmental issues and Sustainable Development, to be adopted by the private sector industries in general. The Code, though not finalized, so far envisages the following: An institution responsible for implementation: industries, companies etc, will comply with the code of conduct on a voluntary basis; objective: to integrate environmental considerations into the procedures and practices of all industries, businesses etc. both private and public; and targets, with particular reference to time-bound targets: the Code of Conduct initiative is to be started by 1999.

Programmes and Projects: No information available.

Status: The principal threats to human health or the sustainable use of natural resources associated with industrial activity in Barbados come from the Sugar Industry which generates smoke emissions from factory chimneys. Regulations and legislation pertaining to regulating smoke emissions exist and are enforced. Recently an overhaul of the cane transport sector has reduced emissions from all old and inefficient vehicles. The Mobil Oil Refinery poses a potential risk of pollution in case of an accident. However the refinery is in the process of closing down its operations and the major focus now is to ensure comprehensive remediation of the site so that it is suitable for future developments. Tourism is the major economic industry in Barbados and as such is a major user of fresh water resources. The scarce supply of this resource, as well as the great number of competing demands for use, could well be a constraint to future development of the tourism industry especially if the proposed development poses great demands on water resources. No major incidents of industrial pollution have been recorded to date. However, Atrazine from the agricultural sector has been detected in freshwater supplies. Efforts have begun to replace atrazine with alternative fertilizers including organic ones.

Capacity-Building, Education, Training and Awareness-Raising: No information available.

Information: No information available.

Research and Technologies: No information available.

Financing: No information available.

Cooperation: No information available.

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CHAPTER: SUSTAINABLE TOURISM

Decision-Making: The Ministry of Tourism and International Transport is responsible for sustainable tourism at the national level. At the local level, the Barbados Hotel and Tourism Association is responsible. Barbados has a National Tourism Policy, whose broad objective is to pursue sustainable tourism development through improvement and optimal use of human resources and services, and through the conservation and managed use of our cultural, built and natural heritage, in order to ensure a product of the highest quality whilst improving the life and economic development of the people of Barbados.

Specific objectives of the National Tourism Policy include: Human Resources-to enhance the quality of the visitor experience by improving the interaction between visitors and hosts, and by implementing initiatives designed to enhance the skills, knowledge and attitudes of the people of Barbados, especially those involved in the tourism sector; Organizational Structure-to collaborate with the social partners in fostering the development of an organizational framework and culture which enhances the productivity and competitiveness of tourism institutions and related businesses; Standards-to encourage the development, promotion and enforcement of world class standards in the tourism industry; Contribution to the Economy-to maximise the tourism sector's financial and economic contribution to the growth and development of the Barbados economy; Investment-to support the creation and maintenance of an enabling investment climate for the tourism industry in Barbados; Marketing-to develop and implement year round globally competitive marketing programmes which reflect consumer expectations while respecting the diversity of Barbados and its people; Community Involvement-to encourage and facilitate the involvement of communities in all areas of tourism development and the visitor experience; Services-to develop, support and enhance a range of economically viable, wholesome and self-sustaining services in order to provide a rewarding and high quality visitor experience; Accommodation-to determine the optimal mix of the types of establishments to be encouraged; continuously upgrade the accommodation product and encourage investment which would promote an operating environment to help the sector to be economically viable and self-sustaining; Built Environment-to encourage the management and development of the built environment in such a way as to ensure its conservation and enhancement so that it can be promoted as part of the unique Barbadian experience; The Natural Environment-to promote sustainable tourism development through the protection, conservation and development of the natural environment within its carrying capacity and through education and awareness of, and respect for, our unique and natural heritage; Cultural Heritage-to invest in the conservation, development and marketing of our cultural heritage whilst encouraging the preservation of its integrity; Cruise Tourism-to optimise the contribution of cruise tourism to the Barbadian economy while ensuring that growth is sustainable; and Sports Tourism-to use sports as a means of fostering closer interaction between locals and visitors, and enhance international publicity for Barbados.

All issues are addressed by this policy including: services, standards, environment, protection of the built environment and ensuring harmonisation with natural features, and community involvement to name a few. Also included are nature-based tourism and heritage tourism. At the present there are no established procedures to monitor continuously the progress of tourism development. although periodic review is undertaken as part of the work of the Ministry to review progress, etc. Deterrents exist mainly in terms of social mechanisms and legal ones to some extent. The Environmental Engineering Division (EED) enforces standards on issues of water quality and wastewater treatment. Legislation or other regulatory instruments, which seek to ensure sustainable tourism, includes: Physical Development Plan, Fisheries Act , and National Conservation Commission Act Cap 393. Codes of Practice, Standards or Guidelines for the activities of industry in sustainable tourism include: S.I. 1982 No. 160 - Hotels, Apartments and Guest Houses (Registration and Classification) Regulations 1992 - established by Government and mandatory; Green Globe - established by industry (voluntary); and ISO series of standards - industry (voluntary).

Major Groups are involved in decision-making through active participation in the development of National Tourism Policy through submission of written comments and participation in national form. They are also represented on committees convened by the Ministry of Tourism. The Ministry collaborates with the Barbados Tourism Authority

and the Barbados Hotel Tourism Association to promote sustainable tourism in terms of holding seminars, operating campaigns and also undertaking projects or activities such as Adopt-a-Beach.

Programmes and Projects: Major programmes in effect to promote sustainable tourism include: Sub programme C of the Tourism Development Programme - Nature and Heritage-based Tourism; Water Conservation and Management Project for the Barbados Tourism Industry; Coastal Conservation Programme; Environmental Management Systems for Tourism Programme; Caribbean Action for Sustainable Programmes; and the Caribbean Tourism Organisation Sustainable Tourism Plan of Action. Examples of the ways in which eco-tourism and nature-based tourism are being promoted include activities of the Future Trust Centre (through their exhibits); and the Environmental Park at Bawden's Nature trail development (Martin's Bay to Bath, Speightstown, and Joe's River), proposed Discovery Route System. Some activities, which are geared both to sustainable tourism and to eco-tourism and nature-based tourism, are: Adopt-a-Beach, Brochures and pamphlets, Standards/behaviour promoted by hotels such as Casuarina in adopting a clean operation providing for separation of garbage etc.

Status: Tourism is the major foreign exchange earner in Barbados, totalling \$1.4b at the end of 1997. Also at the end of 1997, 12,300 persons were employed by the tourism industry directly. One of the negative impacts of tourism has been on coral reefs. The carrying capacity of some reefs especially on the south and west coast has been surpassed due, in part, to the concentration of both tourist and local populations in these areas. Additionally, anchoring shipping mainly for sailing vessels have contributed to degradation in some areas particularly because of solid waste disposal. Constraints to pursuing sustainable tourism include: Lack of National Sustainable Development Policy; Absence of focus on Sustainable Development in the National Planning Process; Availability of funding and other resources; Attitudes; Access to appropriate training; and Bureaucracy in accessing funds from International funding sources such as the GEF.

Capacity-Building, Education, Training and Awareness-Raising: Seminars and workshops are available for employees in the tourism industry to assist them in understanding, applying and promoting sustainable tourism. These are also used to educate policy makers in the concept and policy design of sustainable tourism. The Ministry of Tourism undertakes periodic campaigns as well as works with the Barbados Tourism Authority on activities such as Tourism Week. The Ministry also collaborates with CZMU and the Environment Division on Sustainable Development awareness programmes. With regard to marketing, at the property level there are facilities promoted as being environmentally conscious marketed Casuarina Hotel and Beach Club. However there is no specific focus in this area in national destination marketing efforts. Segmentation of the tourism product or branding is not yet a specific activity.

Information: National information available to assist both decision-makers and the tourist industry in promoting sustainable tourism includes brochures and pamphlets, videos and reports. Mapping and undertaking inventories of natural resources and ecosystem characteristics have been conducted by the country as a whole under the National Biodiversity Strategy and Action Plan and the Environmental Planning and Land Use Study. Relevant information is made available through the Ministry upon request; through the GIS, through the library and various other Government departments; as well as the Press/Media. The Ministry of Tourism is in the process of developing a Website. Barbados is part of the UN Testing Programme on Sustainable Development Indicators. Further to that, we have developed a National Indicators Programme (NIP), which seeks to define national indicators for all policy areas, including sustainable tourism. Presently, the programme has reached the data collection stage in terms of trying to discover the level of existing available information and formats.

Research and Technologies: Technology-related issues that need to be or are being addressed include those such as the use of freshwater resources - devices are available to reduce consumption; wastewater treatment and reuse are also promoted. Additionally, the Government has undertaken a project to address sewerage of the south and west coasts. Energy Saving Techniques (ESTs) are often promoted as they become available. Environmental management systems are applied in hotels and other tourist establishments. Examples include Casuarina Beach Hotel and Almond Beach Resort. Additionally the Ministry of Tourism is currently undertaking a project aimed at

increasing the awareness of the importance of environmental management systems and developing fiscal incentives to facilitate tourism operators implementing such systems.

Financing: Activities in this area are financed through special funds, the national budget, private sector partnership, and external assistance.

Cooperation: Barbados signed the following instruments Agenda 21; Agenda 21 for the Travel and Tourism Industry; CITES; Convention on Biodiversity; UN Framework Convention on Climate Change; and MARPOL.

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