Executive Summary

The Government of Grenada has embarked upon the preparation of its Biological Diversity Strategy and Action Plan (GBSAP) in fulfillment of its obligation under the Convention on Biological Diversity and as part of the Government's renewed commitment to sustainable management of the country's natural resources.

An assessment of key sectors, namely; Land Use and Environmental Planning; Agriculture /Forests/Wildlife; Fisheries, Marine and Coastal Areas; and Tourism as well as an identification of the gaps in effective management of natural resources, provided the basis for developing the Strategy and Action Plan. Effective national action depends on developing an institutional, policy and legal framework that supports effective planning and management of biodiversity. National decision-makers must be cognizant of the benefits gained from conservation and sustainable use of biological resources and the environmental, social and economic costs associated with the loss of these resources.

The actions recommended in this Strategy and Action Plan are not a wish list of all the policies, legislation, plans and programmes that are needed for improvement in the various sectors of the country. A practical and easily measurable set of objectives with supporting activities for implementation over a 5-year period are proposed. Key objectives shortlisted are to:

- Provide broad-based support for conservation and sustainable use of biodiversity.
- Protect key ecosystems from negative human induced impacts.
- Develop and encourage sustainable utilisation of biological resources that are essential to the livelihood of local communities.
- Maintain, recover and promote genetic resources necessary for sustainable agriculture.
- Ensure a fair and equitable sharing of the benefits arising out of the utilisation of genetic and ecosystem resources.
- Provide information on key ecosystems for incorporation into national accounts and decisions on national development projects.

Several activities were identified in fulfillment of these objectives. Many of these activities were developed as priority project concepts and are recommended for implementation. These project concepts include:

- Building Awareness on Biological Diversity in Grenada
- Drafting a National Land Use Policy for Grenada
- Strengthening Management of Key Ecosystems
- Promoting Sustainable Use of Biological Resources
- Capacity Building for Germplasm Conservation
- Strengthening Biological Pest Control
- Incorporating Ecosystem Valuation into National Accounting
- Strengthening Existing Legislation for Biodiversity Protection

Towards the end of the 5 year period, a review of the GBSAP should be undertaken and a new action plan for further activities should be developed to continue safeguarding Grenada's biodiversity.

Acknowledgement

The Ministry of Finance wishes to acknowledge the following persons and organisations for their efforts towards the completion of the Grenada National Biodiversity Strategy and Action Plan:

1. The Project Team

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2. The Project Steering Committee

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Mr. Glen Noel

3. The Sustainable Development Council the Cabinet appointed Committee to supervise the execution of the Project.

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6. The Permanent Secretaries and staff of the several Ministries involved in the exercise.

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1.0 Introduction

Over the past decade there has been increasing attention paid to the conservation of biological diversity. Human induced negative actions have often led to unacceptable and sometimes irreversible loss of biological resources. Government, non-governmental organisations and international institutions around the world developed the Convention on Biological Diversity (CBD) which was open for signatures in June 1992 and entered into force in December 1993. The CBD was designed as a legally binding instrument to secure commitments from governments for the conservation of biological resources and to serve as a facilitator of their prescribed activities through information sharing and technical and scientific guidance.

Article 2 of the CBD defines biological diversity (biodiversity) as "the variability among living organisms from all sources including *inter alia*, terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part: this includes diversity within species, between species and of ecosystems". The term biological diversity has generally, not conveyed any special meaning or produced sufficient support for its conservation among the non-biologists and the community at large. This has primarily been due to a lack of sufficient explanation of the term and its relationship to sustainable livelihoods. It is important to consider how biodiversity links with the rest of the biosphere.

In the case of small islands, biodiversity conservation helps to reduce the islands' vulnerability to natural disasters, providing a wide gene pool from which to recolonise damaged areas. From a human view point this is important for survival and biodiversity conservation can thus be seen as a means of contributing to sustainable livelihoods, rather than purely as an end in itself.

The Government of Grenada signed the CBD in December 1992 and ratified the Convention in August 1994. Through assistance from United Nations Development Programme (UNDP), the Government has embarked upon the preparation of the Grenada Biological Diversity Strategy and Action Plan (GBSAP) in fulfillment of its obligation under Article 6 (General Measures for Conservation and Sustainable Use), and Article 7 (Identification and Monitoring). Additionally, the GBSAP will partially support decision III/9 (Implementation of Articles 6 and 8 of the Convention) from the Third Meeting of the Conference of Parties to the Convention (COP3), and decision IV/10 (Measures for Implementing the Convention on Biological Diversity) from the Fourth Conference of Parties (COP4), as well as serve as part of the renewed commitment to sustainable management of Grenada's natural resources.

1.1 Methodology

The essential elements of the assessment phase of the Grenada Biodiversity Strategy and Action Plan consisted of gathering the information on the status of biological resources, benefits, threats to and loss of biodiversity and the causes of these threats and losses, and gathering information needed to define national priorities for biodiversity conservation. The stocktaking and assessment categories included the following:

- Biodiversity and biological resources
- Cross sectoral issues
- Policy and regulatory framework
- Institutional and human capacity
- Analysis of root causes of Biodiversity loss

- Technologies for conservation and sustainable use
- Activities with adverse impacts
- Existing measures and programmes
- Preliminary statement of objectives
- Identification of gaps
- Assessment of existing needs

The level of detail required for these assessments was aided by: "Guidelines for the Preparation of Country Studies on Biological Diversity, UNEP, 1993" and "National Biodiversity Planning-Guidelines based on early experiences around the world, WRI/UNEP/IUCN, 1995". The former document describes 20 Guiding Principles that ought to be considered during the country assessment, however, the following seven Principles were considered most relevant to Grenada:

- The biodiversity assessment should aim to include only those data that can be readily compiled from existing in-country and external sources. The intention in this initial assessment is to identify gaps in the knowledge but not to fill them. Such gaps should be identified as priorities for action. The assessment will provide the baseline against which efforts of the nation to implement the Convention can be measured.

- The compilation of data for the assessment must include all species within national jurisdiction and a full attribution for each data accession, following as far as possible standard definitions and units of measures. It may be necessary to confine data gathering to achieve a manageable level, but all types of species such as marine mammals in off-shore waters and migratory birds, should be considered together with introduced species as well as native and endemic species. The full attribution of each data item should include source, date and accuracy (i.e. quality/reliability).

- The biodiversity data must incorporate human uses of biological resources and the functional benefits of biodiversity. Resource utilisation, whether at the national, local or individual level, must be the key criterion for selecting biodiversity data.

- Data on processes or activities that are likely to have an adverse impact on biodiversity must be compiled. The initial focus should be on the direct human-induced threats that can be most readily monitored and reversed, for example, enforcement of existing national legislation. It must be recognised that most threats are created by a potential beneficiary, normally, the causal agent of the threat, and that actions for threat relief therefore involve an economic trade-off.

- Priorities for filling the gaps in the data coverage must be based on the needs of senior decision makers to improve their management of biodiversity. Priorities for filling these gaps must be set out in national strategies, based on the principle of asking managers what additional information they need.

- Identify and document sources of information, both national and external, on the status and trends in local biodiversity. The main in-country sources of information will be government departments, statutory agencies, universities, NGOs, museums and botanic garden.

- The data gathering should include an assessment of the current capacity of the country to conserve, study and sustainably use its biodiversity. Such information should cover national institutions, programmes, policies and legislation including both government and private sectors, and should include estimates of the human resources directly and indirectly associated with biodiversity.

The biodiversity planning process involved the appointment of a Project Coordinator/Team Leader and an Administrative Officer within the Ministry of Finance. A team of local consultants was recruited to conduct an assessment in four defined areas namely Fisheries, Marine and Coastal Areas; Agriculture/Forests/Wildlife; Land Use and Environmental Planning; and the Tourism. Public participation was an essential feature in the process. Public consultations were held in several communities to determine local needs and issues on biodiversity and to identify gaps and trends. Also included were bilateral consultations with NGOs, government departments and the private sector. An International Consultant was later recruited to assist with the preparation of the Biodiversity Strategy and Action Plan. The planning and implementation of the resource assessments and consultations received policy guidance and approval from the Cabinet appointed Sustainable Development Council (SDC) which served as the National Biodiversity Steering Committee.

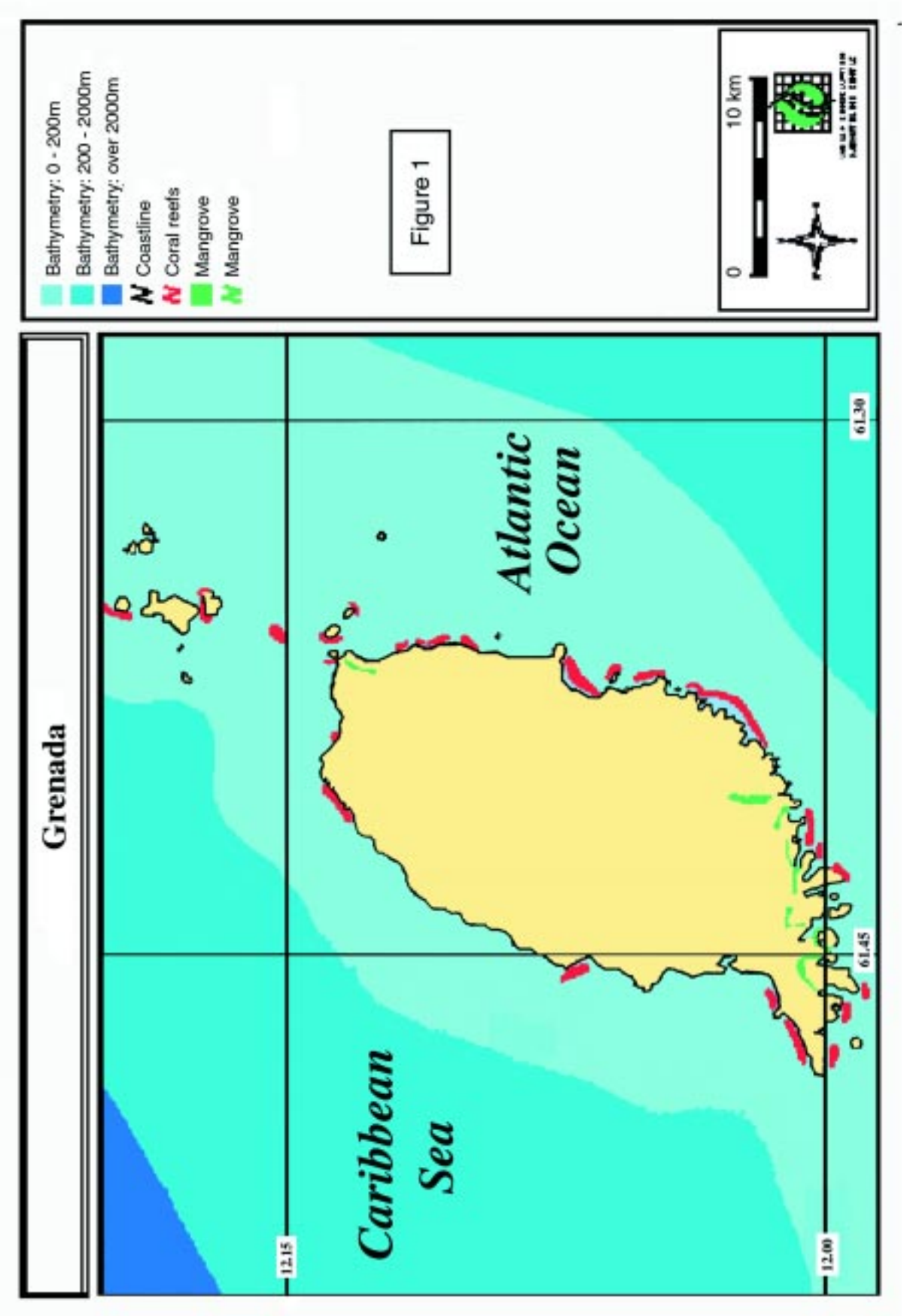
Grenada
Caribbean Sea
Atlantic Ocean
12.15
12.00
61.45
61.30
Bathymetry: 0 - 200m
Bathymetry: 200 - 2000m
Bathymetry: over 2000m
Coastline
Coral reefs
Mangrove
Mangrove
Figure 1
0
10 km

Figure 1

2.0 Background

The state of Grenada, which includes the islands of Carriacou and Petit Martinique and several small uninhabited islands mainly off the east coast is located in the Caribbean Sea between latitudes 11°59' and 12°20' North and longitudes 61°36' and 61°48' West ***(Figure 1)*****.** Grenada is the largest and main island with a width of 18 km, a length of 34 km, a coastline of about 121 km and an area of 312 km2 The highest point is Mount Saint Catherine, at 840m. Carriacou located 24 km to the northeast of Grenada is much less mountainous and has an area of 34km2. Petit Martinique is 2.3 km2 and lies east of the northern section of Carriacou. Unless otherwise stated Grenada refers to the tri-island nation of Grenada, Carriacou and Petit Martinique.

2.1 Geology

Grenada is predominantly of volcanic origin, although some sedimentary rocks of the Tertiary and Quaternary periods are present. The island was largely built up by a series of volcanic eruptions during Tertiary and early Pleistocene times. This volcanic activity has given rise to lavas, ranging from alkaline to acid andesites, which are well fractured and jointed and extensively weathered, and pyroclastic rocks which include volcanic ash, tuff, and agglomerate (CCA/GOG/USAID, 1991; Ternan *et al*, 1989).

The islands of Carriacou and Petit Martinique are also of volcanic origin and represent the exposed summits of peaks on a single narrow bank of submerged volcanic mountains. Carriacou has been studied by geologists since the 19th century and the most recent studies have indicated fossiliferous limestone formation ranging in age from upper Eocene to Pleistocene. The island can be divided into two zones: (i) the fossiliferous limestone area which is mainly of the miocene age with outcroppings in the eastern part and (ii) the volcanic areas which covers about two thirds of the Island. It is rounded in shape with an average diameter of 1.6 km and a generally regular coastline. The land form is essentially conical with an off-center high point at Piton - 225 meters (GOG/OAS, 1988).

2.2 Soils

The soils of Grenada are dominated by clay loams (84.5%) with clays (11.6%) and sandy loams (2.9%). The three major types of clay loam are the Woburn, Capitol, and Belmont, which together constitute 77.8% of the island's soil. The Capitol and Belmont types dominate the central part of the island, with Capitol in the south and Belmont in the north. The Woburn clay loam is a shallow dark-brown-to-grey soil formed over ash and agglomerate and is neutral-to-basic in reaction. Agricultural problems tend to arise from its shallowness, high erodibility, and low moisture retention capacity.

The Capitol clay loam, found on steep slopes over deeply weathered igneous rocks, is brick red in colour and tends to be acidic. The Belmont clay loam is well drained and is the most naturally fertile; it is usually developed on ash and agglomerate. Other clay loams are the Palmiste, a brown soil of medium-high natural fertility developed over tufaceous shales; the Concord, a black or dark brown heavy soil with good water retention properties; and the La Tante and Plains clay loams, which are alluvial soils of limited distribution.

Of the clays, the Perseverance clay is the commonest (7.8%). It is widespread in occurrence, usually near the coast. As its name indicates, it is heavy, poorly drained, and difficult to work. Other clays are the Hartman clay in the southwest, a heavy colluvial soil on gentle slopes, and the Hope clay, a poorly drained alluvial soil. Sandy loams are the least represented but the most agriculturally desirable. One of the best soils in Grenada is the Plains sandy loam, a light alluvial soil, well drained and naturally fertile. The Bonair sandy loam is stony and usually occurs at river mouths and is subject to periodic flooding (Ternan *et al*, 1989).

2.3 Climate

Grenada lies in the humid tropical zone of the northeast trade winds, and the seasonal shift in these winds gives rise to a wet season (June to December) and a dry season (January to May). The frequency, duration and intensity of rainfall varies considerably throughout the island, with the least rainfall in the lowlands of the northeast and southwest and the most rainfall in the inland mountainous areas.

The climate is affected mainly by the subtropical cyclone belt and the Inter-Tropical Convergence Zone. The location of these two meteorological systems varies in a cyclical pattern. There is some risk of hurricanes from June to November, however, Grenada lies just south of the path of most tropical storms and is only infrequently affected by hurricanes.

The temperature of the islands at sea level is generally high with little seasonal, diurnal or spatial variation due to the dampening or stabilizing effect of the adjacent ocean. Annual average temperature ranges from a low of 28.3^{o} C to a high of 33.3^{o} C (CCA/GOG/USAID, 1991), however, the temperature in the highland areas can reach the low 20's occasionally.

2.4 Human Demography

Grenada is relatively mountainous with most of the settlements located within 1 km of the coast. There are two urban centres, St. George's the Capital (in the Parish of St. George) the town in the southwest and Grenville (in the Parish of St. Andrew) in the east. These two parishes account for about 59% of the population. The last population census, in 1991 recorded 95,597 persons resident in the country. However, the population estimate for 1996 was 98,900 persons, giving a density of 287 persons per km2 (CDB, 1997). The annual population growth rate is estimated at six percent.

The densest areas of human settlement occurs in St. George's, as well as most of the industrial and tourism development. Thus this area is said to be the most significant contributor to the many environmental problems arising from such development.

2.5 Socio-economic Conditions

2.5.1 Land Tenure and Development

During the post colonial history of Grenada, citizens were given the right to own land. With the exception of Grand Etang Forest Reserve, Mt. St. Catherine and a few agricultural estates, most of the land in Grenada is privately owned. Private ownership means clear transferable rights, which has resulted in land being sub-divided among family members and passed on through generations. This has led to the development of very small holdings and difficulty in tracking the ownership of properties.

The Grenada Industrial Development Corporation has indicated that 63% of planned development projects are for the parish of St. George, which also has the majority of economic activities. Almost 90% of projects approved for development are in the tourism sector, with only few projects related to agro-processing and other activities. The geographical concentration of opportunities has encouraged rural to urban migration and led to deficiencies in housing, unauthorised settlements and poorly serviced accommodations.

2.5.2 Economic Factors

The per capita GDP in 1999 was approximately US $3,100. The economy has achieved an average annual growth rate of over 5% for the period 1997 to 1999. The unemployment rate was estimated at 29% in 1995 and estimated at 14% in 1999. Inflation has been relatively low and is now estimated at 1%. The tourism sector exceeded agriculture as the main contributor to foreign exchange earnings. The rate of growth of the tourism sector (1991 - 1996) averaged 8% surpassing all other sectors, except construction. Construction has been growing due to increased demand for residential buildings and hotel expansion has been declining.

Exports in 1997 of US$22 million comprised mainly of bananas, cocoa, nutmeg, fruit and vegetables, clothing, and mace which went primarily to other CARICOM countries, the USA, and the UK. Imports are primarily from the USA, UK, CARICOM and Japan.

2.5.3 Land Use Data

The most recent survey of land use in Grenada was conducted during the agricultural census of 1995, which focused on farms and households. There are less details on other forms of land use. The Land Use Division within the Ministry of Agriculture and the Physical Planning Unit are both working on initiatives which will result in a current land use map. The land use categories from the 1995 census indicated that approximately 75% of the land is under some form of agriculture and permanent crops have the largest contribution.

It is difficult to determine the magnitude of land use change over time because there are insufficient data on trends in land use; the extent of abandoned agricultural lands (mostly large plantations) is unknown; and expansion of the construction sector and conversion of abandoned agricultural estates and pastures in coastal areas into tourism, commercial and residential infrastructure is expected to continue well into the next decade.

2.6 Policy Framework

2.6.1 Medium-Term Economic Strategy

Overall national economic development is guided by the government's Medium-term Economic Strategy. There is no environmental policy, however, the Medium-term Economic Strategy Paper (1996-1998) outlines the government's thinking on environmental issues and include the following key statements:

- The Government's main objective is to promote the sustainable economic and social development of Grenada;
- The Government will institute environmental protection programmes, to ensure that economic and social development is physically and institutionally sustainable;
- The Medium-term Economic Strategy emphasises greater attention to environmental issues;
- Over the medium-term the Government will continue to emphasise policies and actions designed to safeguard the environment;
- The Government will put mechanisms in place to ensure preservation of coral reefs and marine life, coastal forests and wetlands.

2.6.2 Land Use Policy

There is currently no national land use policy or a physical development plan for Grenada. There was however, a Land Management Development Plan (LMDP) proposed in 1992, but it was not approved by the government. The underlying objective of the LMDP, developed by personnel within the Ministry of Agriculture, was to ensure that all land zoned for agriculture remains in agriculture. The plan also recommended that the change of use of any agricultural lands should require the approval of the relevant Authority. The proposed policy had proposals which recognize the importance of conserving sensitive ecological areas given their relationship with watershed management and the nations water resources. The strategic policy focused on an integrated development plan approach, together with the legal instruments, economic tools and institutional mechanisms. There have recently been renewed attempts to prepare a national land use policy and a national physical development plan.

2.6.3 Agricultural Policy

The elimination of poverty is one of the government's major goals and one of the ways in which it is hoped achieve through the development of diversified crop production including organic agriculture. Recent efforts to provide the policy framework for agriculture have included the:

- Agricultural Policy and Programme of the Ministry of Agriculture 1997-2010, submitted in early 1998 but no formal approval has yet been given;
- Draft Strategic Framework for the Agricultural Sector submitted in early 1999 but no formal approval has yet been given;
- Draft Agriculture Sector Plan for Grenada, prepared by the Inter-American Institute for Cooperation on Agriculture (IICA) and submitted in 1999 which is under review by the government;
- Country Agricultural Strategy Paper prepared by the Ministries of Agriculture and Finance and submitted to the European Union.

The government's long-term objectives for the agricultural sector are to increase exports of traditional and non-traditional crops, attain self-sufficiency in food production, promote the efficient use of available land resources and develop the rural economy

The government's strategy for strengthening performance in the sector includes:

- Assistance in the development of model farms for experimental and demonstration purposes;
- Improving the country's capacity in plant and animal disease management;
- Provision of agricultural and extension services catering to the needs of farmers in production farm management linked to effective marketing, availability of credit and research;
- The introduction of new technologies;
- The training of farmers to ensure proper harvesting and the handling practices
- The control of pests and diseases and
- The promotion of a long-term credit policy to farmers, including the purchase of land.

2.6.4 Forest Policy

A new National Forest Policy was approved by the government in March 1999. This policy gives the Forestry Department the responsibility for facilitating the implementation of the policy and in response to this, a 10-year strategic plan was developed and was submitted early in 2000. In reference to biological diversity, the strategic directions of Forest Policy include:

- Maintenance of representative samples of all forest ecosystems;
- Protection of all species which are important because of their endemicity, rarity or value;
- Establishment and maintenance of a database on Grenada's biodiversity;
- Building awareness and appreciation of biodiversity and its importance;
- Promotion of sustainable use of genetic resources for social, spiritual and economic benefits;
- Building capacity of Grenadian institutions to participate in the conservation and management of the country's biodiversity;
- Creation of incentives and other mechanisms to encourage the conservation of privately-owned forests;
- Encouraging the participation of government and community stakeholders in programmes for biodiversity conservation;
- Minimising conversion of natural forest into plantations, especially in upland areas;
- Minimising and control of burning and wild fires in forested areas.

2.6.5 Tourism Policy

A Tourism Master Plan was prepared for the Government in 1997 and has subsequently been approved. The Plan focuses on product diversification and stresses that the tourism industry be not only economically viable, but also environmentally sustainable and not adversely affect the integrity of the natural environment. The relevant policy objectives outlined in the Master Plan include:

- To ensure that tourism development is consistent with the protection and conservation of the country's natural and cultural resources, built environment and the nation's moral values;
- To foster the most appropriate form and scale of tourism development in harmony with the resource endowment of the islands and the aspiration of the people;
- To ensure that tourism plant and essential infrastructure services keep pace with the demand of the sector within the context of the established carrying capacity.

The Government has recognized that the concentration of tourism development in coastal areas has resulted *inter alia* in demands on water supplies, problems of beach erosion, damage to coral reefs, pollution of coastal waters and destruction of mangrove resources. However, given the dependence on the tourism sector as the main foreign exchange earner, and significant employment generator growth of the industry is encouraged. Priority areas for accommodation development will be La Sagesse, Mt. Hartman, Craigston and the St. Louis Peninsula in Carriacou, Egmont and Levera. Further accommodation development in the Grand Anse area (tourism concentration area) will be restricted to planned extensions of existing properties. Abandoned agricultural lands or lowland scrub woodlands have been recommended for future development.

2.7 Institutional Capacity

The key institutions which have a mandate for managing aspects of biological diversity include the following:

- Ministry of Agriculture (Forestry Department, Fisheries Division, Pest Management Unit, Agronomy Division, Extension Division, Pesticide Control Board and the Land Use Division);
- Ministry of Tourism (National Parks Department);
- Grenada Board of Tourism;
- Ministry of Finance (Economic Planning, Physical Planning Unit, Land Control Development Authority);
- Ministry of Legal Affairs;
- Ministry of Foreign Affairs;
- Ministry of Health and the Environment;
- National Science and Technology Council;
- National Water and Sewerage Authority.

In addition the following NGO's have been involved in several aspect of biological concerns:

- Grenada Community Development Agency (GRENCODA);
- Agency for Rural Transformation (ART);
- Friends of the Earth-Grenada (FOE);
- St. Andrew's Development Organisation (SADO);
- St. Patrick's Development Organisation;
- Several community based organisations.

Some deficiencies appear to be the lack of or inadequate training in database management, and human resource/ operational management skills among many senior staff as well as limited facilities and community participation skills. In several cases, execution of operational activities is constrained by inadequate staffing, equipment, finances and changes in policy or unclear policy guidelines.

2.7.1 Technologies for Conservation and Sustainable Use

The availability and use of appropriate technology such as remote sensing, telecommunications, geographic information systems can significantly and directly assist in the planning and management Grenada's biodiversity. The Physical Planning Unit (PPU) and Land Use Division are equipped with a Geographic Information System (GIS) and a Geographic Positioning System (GPS), which allow mapping and querying of land and biological resources. The Valuations Department has a computerized listing of land holdings and is working with the PPU and Land Use Division to develop a cadastral map.

Although remote sensing capabilities are non-existent, access to satellite imagery can be purchased from any of the international vendors or regional distributor. Departments with GIS capability will be able to convert the digital data into the required resource maps of they can have these maps prepared by any of the GIS Specialists in the Caribbean. Aerial photographs are available at the Land Use Division and interpretation and mapping can be done locally.

Government departments are not yet linked by a central computer network, facilitating easy access to and sharing of information. Some government departments do not yet have adequate computers or software (and training) for improving the efficiency of daily operations. Internet access is available in all Ministries, however not all departments have unrestricted access to this service for acquisition of information on the World Wide Web.

VHF radio and telecommunication service is easily accessible and reliable. The use of cellular phones is becoming increasingly popular and affordable, however, VHF radios are still the most cost effective and preferred medium of communication among field personnel.

2.8 Legislation

In Grenada the management of biological diversity is under the jurisdiction of several governmental and quasi-governmental agencies each having a legal mandate for its area of responsibility, and guided by policy prescribed by the government. Occasionally closely related responsibilities may be shared or may even be separated between or among agencies by selected legal instruments such as regulations or orders.

There are about 40 Acts that together govern protection and management of Grenada's forests, soil and water conservation, planning, development and use of lands; provide for control of beach protection, management of fisheries, protection of marine reserves; protection of wildlife and habitats; control of pesticides, pollution and waste management. A summary of relevant environmental legislation can be found in Sector Report on Land Use and Environmental Planning. Key legislations include the following:

- Beach Protection Act;
- Birds and Other Wildlife Act;
- Fisheries Act;
- Forest Soil and Water Conservation Act;
- Grand Etang Forest Reserve act;
- Land Development Control Authority Act;
- National Parks and Protected Areas Act;
- Pesticide Control Act;
- Public Health Act;
- Territorial Waters and Marine Boundaries Act;
- Town and Country Planning Act;
- Wild Animals and Birds Sanctuary Act.

Enforcement of many of the laws relevant to biodiversity is either poor or non-existent, either through lack of awareness of the particular legislation, lack of support for enforcement or unclear jurisdiction where there is overlap with several agencies and absence of accompanying regulations to respective Acts.

During consultations with various communities and key stakeholders, it was widely stated that some pieces of legislation were inadequate and require revision for better enforcement and more realistic punitive measures. A need for better inter-agency collaboration was also considered essential for the conservation of terrestrial and marine resources.

2.8.1 International Conventions and Agreements

Grenada has signed or ratified or acceded to many conventions, international agreements and protocols which relate to biological diversity. However, many of these agreements and conventions have not been translated into specific local acts or regulations or supported by local institutional arrangements, with the exception of the Grenada Marine Boundaries Act (1978) and the Grenada Territorial Waters Act (1978), both inspired by the UNCLOS process (Informal Composite Negotiation Text (ICNT). These acts were later consolidated into the Grenada Territorial Seas and Marine Boundaries Act (1989) as a consequence of UNCLOS III; and the Grenada Fisheries Act (1986) its regulations and amendments were adapted from the 1982 UNCLOS III.

At this time, it is unclear what impact the range of signed or ratified conventions and international agreements will have on the local conservation of terrestrial and marine resources. It is also unclear when and how many of these will be acceded to, accepted or approved by the government. It seems that the implications of becoming signatory to, and ratifying many of these conventions and international agreements are either unclear or unknown to many of the government agencies which are expected to carry out the country's obligations under these legally binding instruments.

3.0 Assessment of Key Sectors

3.1 Agriculture, Forestry and Wildlife

3.1.1 Agriculture

Grenada has a diverse agricultural sector consisting of permanent crops such as nutmeg, cocoa, banana, sugar cane, citrus, avocados, spices, breadfruit, mangos and other fruits, and temporary crops such as pigeon peas, beans, peppers, sweet potatoes, dasheen, yam, tannia, cabbage, tomatoes and other vegetables. Several varieties of many of these fruits and vegetables are grown and there is preference for varieties that are particularly adapted to the local climate which produce high yields and good quality fruit. Intercropping is common with 76% of permanent and 33% of temporary crops being intercropped. The agricultural census carried out in 1995 found that the average farm size was approximately 1 hectare and that 83% of farms was 2 hectares or less. However, 63% of the total land under cultivation were occupied by farms that were greater than 2 hectares. About 75% of the country is under some form of agriculture.

Pastures support a range of livestock, primarily goats, sheep and cattle, utilised for local consumption. Other domestic livestock includes pigs, chickens and ducks. Stock for many of the breeds of commercially important animals have been imported, however, for cattle and goats much of the local stock are considered as "creole" which resulted from uncontrolled cross breeding and having no easily determined major pedigree.

Agricultural research is contributing to an increase in the number of genomes of selected food crops for commercial exploitation, grasses for pasture improvement, and the propagation of helpful parasites for biological pest control, primarily through the efforts of the Caribbean Agricultural Research Development Institute (CARDI). For example, control of a recent wide spread infestation of the pink mealy bug (*Maconellicoccus hirsutus*) was brought about by the introduction and further propagation of the ladybird beetle (*Cryptolaemus montrouzieri*) and the wasp (*Anagyrus kamali*). The Pest Management Unit of the Ministry of Agriculture is also conducting research focused on finding solutions to a number of pest and disease problems in fruits and vegetables developing programmes of Integrated Pest Management (IPM). Use of fewer broad spectrum pesticides and use of pest-specific compounds are encouraged, chemical spraying is discouraged where practicable to allow for activity of pest predators, and traditional non-chemical control methods are being promoted.

The Agronomy Division has an ongoing programme of identifying locally grown fruit trees which produce large quantities of good quality fruit to serve as prime stock for propagation and distribution to farmers. Micro-propagation (tissue culture) of such stock is not common; cuttings, grafting, layering, and budding are the preferred cost-effective methods for production of stock.

There are relatively few large areas under crop monoculture, which indicates a high agricultural biodiversity. The presence of diverse and intercropped agriculture can lead to the use of a wide range of agrochemicals. Attempts are currently being made by the Pest Management Unit to develop less chemically dependent pest and disease control systems known as integrated Pest Management. There are also moves to increase organic farming thus reducing fertilizer use in Grenada as a whole.

3.1.2 Forests and Natural Vegetation

There is little formal documentation available on the composition and status of Grenada's forests. Although some research has been conducted on a few species of trees, very little attention has been given to herbaceous and non-vascular plants. There is no information available on threatened or endangered plant species. However, three endemic species of plants are known, the Grand Etang Fern (*Danaea sp.*), the Cabbage Palm (*Oxeodoxa oleracea*) and one endemic tree species (*Maythenus grenadensis*). The pioneering work of J.S. Beard in the 1940's classified the major forest communities in Grenada under following types:

- Cloud Forest (montane thicket, palm break and elfin woodlands) - Generally these forests, located in the inaccessible upper areas of Grand Etang and on Mt. St. Catherine have suffered little degradation and appear to be under no serious threat;

- Rain Forest and Lower Montane Rain Forest - These forests occur below the cloud forests where rainfall exceeds 2500 mm per annum. There is little difference in floristic composition between the very tall rain forest proper and the less tall lower montane rainforest. They are largely located in the lower areas of Mt. St. Catherine and the best remnants are found in Grand Etang Forest Reserve;

- Evergreen and Semi-evergreen Forests - These forests occur where the rainfall is between 2000 - 2500mm per annum. A 40 60 ha area of this forest-type occurs at Morne Gazo in the south of the island, due to a 'cloud track' which causes more rain to fall in this area than expected;

- Deciduous Forest and Cactus Scrub - These occur at lower elevations where the rainfall is between 1000 - 2000 mm per annum, usually falling in a five month period. They are found in the south and north of mainland Grenada and on Carriacou and Petit Martinique;

- Littoral Woodlands - These occur along the coast in small stretches and should be found in Grenada, Carriacou and Petit Martinique. However, most of this woodland has been lost, although a small patch remains at the edge of Levera woodland in the north east of Grenada;

- Mangrove Woodlands - Grenada contains 21 patches of mangrove along the eastern coastline from Levera to Telescope, and along the south eastern coastline from Requin to True Blue, and on the north and south coasts of Carriacou. The largest areas are at Levera, Conference, Upper Pearls, Westerhall, Calivigny and Tyrrel Bay.

Timber production from natural forests has declined considerably over the past decade due to poor stocking depleted by more than 100 years of logging activities, clearance for agriculture and hurricane destruction. Commercial production of blue mahoe (*Hibiscus elatus*) which occupied 75% of the area under plantation was seriously damaged during an infestation of the pink mealybug between 1994-1997. Other plantation species include pine (*Pinus caribaea*), mahogany (*Sweitenia sp.*) and *Cupressus lusitanica*. Although the initial reasons for plantation establishment were to reforest and stabilise forest areas with serious hurricane damage, local demand presented an opportunity for income generation.

During the Forest Policy development process, the general public made it clear that the protection / conservation aspects of forests were more important than timber production. It was recommended that timber production by the Forestry Department should be phased out and that there should be a greater emphasis on the multiple-use aspects of forest management such as conservation and recreation.

Currently protection exists for only a few forest areas in Grenada, and not all forest types are represented in these areas. Grand Etang Forest Reserve has an area of 1526 ha of cloud forest, rain forest and lower montane rain forest and plantations which is fully protected by legislation from any change in land use and from hunting. There are National Parks at Levera (123 ha) in the north east of the island, primarily mangrove, and at Mt. Hartman in the south west and Perseverance Estate on the west coast which is dry forest. In Carriacou, of 136 ha forested area is protected at High North. Work is currently in progress by the Forestry Department and the Forest Management Project surveying areas to create three more Forest Reserves at Morne Gazo, Annandale and Mt. St. Catherine. This will result in approximately one third of the island's forests being protected.

Non-timber forest products, primarily screw pine (*Pandanus utilis*) and bamboo (*Bambusa vulgaris*) are harvested and utilised for making baskets and other handicraft. Many naturally occurring herbs are believed by many persons to have medicinal properties. NTFPs are also used to produce herbal medicines, especially in rural areas.

In Carriacou a major obstacle to the regeneration of natural vegetation, other than the conversion of land for development, is the effect of grazing by livestock. Many animals are tethered or allowed to roam freely in forest or scrub land (either private or public) to graze which prevents regeneration of trees and shrubs, since many seedlings or young plants are eaten. Grasses, sedges and unpalatable plants seem to dominate the ground cover in favorable conditions. Where grazing is intense, particularly in the dry season, soil erosion becomes more severe.

3.1.3 Wildlife

There is little hard data about faunal species numbers, distribution and their current status.

Grenada's terrestrial wildlife is thought to consist of four amphibian species, eight species of lizard and five species of snake, 150 species of birds (Groome, 1970), of which 18 species are thought to be threatened or endangered, four native species of terrestrial mammals and 11 native species of bats (Groome, 1970). However the best summary of Grenada's terrestrial wildlife adapted from Thomas (1998) is provided in the relevant sector report. There is little information available on invertebrates in Grenada but several species of fresh-water shrimps, and land crabs are noted. One possible endemic species of weevil (*Diaprepes sp.*) was reported by Groome (1970).

The dry forest found in the south and north of the island is considered prime habitat for two endangered and endemic species of birds - the Grenada Dove (*Leptotila wellsi*) and the Grenada Hook-billed Kite (*Chondrohierax uncinatus murus*). Grenada is also home to four bird species which are endemic to the Lesser Antilles (CCA/GOG/USAID, 1991) - the Grenada flycatcher (*Myiarchus nugator*), the Scaly-breasted thrasher (*Margarops fuscus*), the Lesser Antillian bullfinch (*Loxigilla noctis*), and the Lesser Antillian tanager (*Tangara cucullata*).

Several species have become extinct in Grenada since the arrival of the Europeans, including the Manatee (*Trichecus manatus*), the Grenada parrot (*Amazona sp.*), the Agouti (*Dasyprocta albida*), Neuweid's Moon Snake (*Pseudoboa neuweidi*) Shaw's Racer (*Liophis melanotus*) and the Morocoy Tortoise (*Geochelone carbonaria*) (CCA/GOG/USAID, 1991).

A list of species found in Grenada is given by Groome (1970), but this may have been incomplete when written, and some of the species mentioned may no longer exist. Other studies such as Blockstein (1991) and Glen (1994) provide detailed data about the Grenada Dove (*Leptotilla wellsi*) and the Mona Monkey (*Cercopithicus mona denti*) respectively.

Currently the most important nesting areas for Grenada seabirds are the unpopulated islets between Grenada and Carriacou; especially the islands close to Isle De Ronde). Boobies are by far the most important species group and significant rookeries are to be found at "gwizo" (near Isle De Ronde), Les Tantes and "Upper Rock" with some at "Le Rock". Significant numbers of Frigate Birds called "Scissors-tail" are resident at Sandy and Green Islands. All these birds depend on schools of anchovies and various fry (pischet) very common at the Isle De Ronde zone. Devas (1954) also provides a description of the more popular seabirds of the Grenada and Grenadines. Notably, although fishermen and other poachers target the young (fat chested) boobies and ramier for food, populations have remained vibrant over the years (pers. comm. B. Calliste, current fisherman).
Ramier, *Columba squamosa* seem to nest in the rocks among the boobies. Vincent (1981) describes the daily migration patterns of various species of birds between the main island (Levera area) and the islands of Sugar Loaf, Green and Sandy.

A list of species found in Grenada is given by Groome (1970), but this may have been incomplete when written, and some of the species mentioned may no longer exist. Other studies such as Blockstein (1991) and Glen (1994) provide detailed data about the Grenada Dove (*Leptotilla wellsi*) and the Mona Monkey (*Cercopithicus mona denti*) respectively.

Hunting is a popular activity in Grenada for recreation and as a source of food and income. The main animals hunted are: opossum or 'manicou' (*Didelphis marsupialis insularis*), armadillo or 'tattoo' (*Dasypus novemcinctus hoplites*), mona monkey (*Cercopithecus mona denti*), ramier pigeon (*Columba squamosa*), and iguana (*Iguana iguana*). It is reported that iguana numbers appear to be dropping although the reason for this is uncertain. Members of the hunters association consulted during the Forest Policy development process, indicated that the abundance of the game species was declining and suggested several measures for ensuring survival of these animals, including their willingness to assist in implementation of these measures (Dunn, 1999).

A number of snake species are also said to be under threat, partly because they are often killed on sight by many Grenadians, and, until recently, they were collected in large numbers for the 'djab-djab' during Carnival. It has been suggested that the recent huge increase in the rat population may be because one of their main predators, snakes, are now so few in number.

The major species which were introduced during colonial times were the mongoose (*Herpestes auropunctatus*) for the control of snakes and the mona monkey (*Cercopithicus mona*) as pets. The mongoose is now considered a pest and the mona monkey has become a tourist attraction particularly in Grand Etang Forest Reserve.

Fresh water animals ranging from fishes to snails to insects and worms can be found in Grenada. Not much is known or documented on these animals. Finlay (1999) quotes the most significant recent work on identification of fresh water fishes to include: Tete chien or Yoca, Titiree or Suckstone (*Sicydium plumieri*); Mullet (*Agnostromus monticola*), Mullet (*Mugil sp*), Zandomay (*Eleotris sp*), River Coco (*Centroporanus sp.*), Tilapia (*Tilapia mosambica and T. nilotica*), Guppy or millions (*Gambusia sp, Poecillia reticulata*) and Sword tail (*Xiphophorus helleri*) among others.

3.2 Fisheries, Marine and Coastal Habitats

3.2.1 Fisheries

The most extensive listing of marine and fresh water fish fauna for Grenada is provided by the International Centre for Living Aquatic Resource Management (ICLARM, 1998). ICLARM's data-base records 233 marine species, 69 marine/brackish water species and 17 species for fresh water.

Records of fish landings classified the range of marine species into pelagic finfish, demersal finfish, crustaceans and shell fish and then unclassified fish (mainly demersals). The near shore and offshore coral reefs provided the base for demersal fish such as snappers, groupers, grunts, doctorfish etc. while the offshore ocean provided Yellow-fin Tunas, Oceangar, Marlin, Dolphin fish, and King fish among others; mainly jacks and robins were harvested by beach seines very close to shore when such fish come off the ocean deep on a daily basis (Finlay, 1999). Crustaceans and other shellfish such as lobsters, turtles and conch (lambi), were traditionally harvested by divers in significant quantities.

Although a significant segment of the national fishery remains semi-subsistence and small scale; the large majority of economical fishing effort and recorded fish catches are contributed by commercial operations, species catch abundance generally reflecting both natural abundance and also stocks targeted by fishers. As such main species and stock catches may be ranked as follows, and based on average catches for the years 1987 B 1998: the first is Yellow-fin Tuna (*Thunnus albacares*), in 1999, a highly sought-after species because of its market value and now accounting for the largest species catch in national landings. This tuna fishery grew from small catches prior to the 1970's into catches of 49,895 kg (1981) to 340,194 kg (1994) and contributing 16% of catches, on average over the years.

The second ranking species contributor, 12% of landings, is Big Eye Scad (*Selar crumenopthalmus*); the third, 5.8% of landings, is Flying fish (*Exocoetidae sp*) now in 1999 relegated to a bait fish for Yellow-fin Tuna fish fishery, not because of natural abundance; the fourth is Blackfin Tuna (*Thunnus atlanticus*) contributed 7.6% of landings; the fifth, 5.5% of landings is Atlantic Sailfish (*Istiophorus albicans*); the sixth, 5.4% of landings is the common Dolphin fish (*Coryphaena hippurus*); the seventh, 5.2% of landings, is Round (Red tail) scad (*Decapturus tabl*). Lower ranging contributors include a variety of Caranx sp called 'jack', Scomber species such as Wahoo (*Acanthocybium solandri*), Barracudas mainly Sphyraena barracuda; Blue marlin, a variety of small tunas such as bullet tuna and frigate tuna (*Auxis thazard*). Demersals are mainly snappers (*Lutjanidae sp.*) including L. buccanella, grouper types (*Serranidae sp.*), Red hind (*Epinphelus guttutus*), Coney or Butterfish (*Epinephelus fulva*) Warsaw, Black and Tiger groupers; Parrot fishes (*Scaridae sp.*); Grunts (*Pomadasyidae sp.*), Queen Trigger fish (*Balistes vetula*), Doctor or Surgeon fishes (*Acanthuridae sp.*).

The shellfish crustacean fishery records mainly Conch (lambi) (*Strombus gigas*), Lobsters mainly *Panulirus argus*; four species of turtles, green (*Chelonia mydas*), leatherback (*Dermochelys coriacea*), Loggerhead (*Caretta caretta*) and Hawksbill (*Eretmochelys imbricata*). Topshell and a variety of other marine snails are also harvested. There is no specific fishery targeting shark. However, a variety of species are caught by longlines and setnets and including species such as hammerhead sharks, water sharks, nurse sharks, lemon sharks etc.

The sea egg fishery for white sea eggs (*Tripneustes ventricosus*) maintained a consistently high production on both Grenada and the adjacent islands for about 10 years up to 1994 when a drastic decline in abundance (both catch and field observation) was noted and hence the fishery was closed in 1995 and has remained closed since then. There is now evidence of a reasonable recovery of stocks of sea eggs on main sea grass beds.

The trend in production and therefore an implied abundance of economic stocks of marine species has been more visible for mostly commercial fish landings, since semi-subsistence and subsistence landings are hardly recorded at landing sites. Finlay (1999), suggested that the annual abundance has shown distinct cyclical trends over the period 1978 to 1998.

3.2.2 Marine and Coastal Habitats

The three coastal habitats that are important for maintaining Grenada's nearshore fishery are the mangrove swamp, sea grass beds and coral reefs. Mangrove ecosystems provide substrate for marine organisms, feeding and breeding areas for many commercial species and acts as nurseries for their offspring. Seagrass beds act as a transition point and energy bridge between mangrove communities and the reef system and fishing grounds. Marine turtles e.g. (Atlantic Green Turtles) depend on healthy sea grass communities as a source of food. Coral reefs provide excellent shelter for some resident and transient species (to offshore fishing grounds) as well as substrate for algae and other organisms which form part of a rather complex food web.

Mangrove Swamps

A very good example of mangrove vegetation exists at Levera Pond, St. Patrick and at Harvey Vale, Carriacou. Other areas include the Conference / Pearls area and the bays between St. David and Prickly Bay on the south coast off the island. The main species of mangrove include red mangrove (*Rhizophora mangle*), black mangrove (*Avicennia germinans*), white mangrove (*Laguncularia racemosa*) and button-wood (*Conocarpus erectus*). The rest of the coastal area is considered dry woodland and cactus shrub made up of a mixture of species including *Ipomea sp.* in some sandy beach areas, sea grape (*Cocoloba uvifera*), coconuts (*Cocos nucifera*), almond (*Terminalia cattapa*) and manchineel (*Hippomane mancinella*).

Sea Grass Beds

Marine plants include sea grass communities which exist in the Telescope area and within the barrier type reef extending from Grenville Bay to Prickly Bay in the south; at Carriacou in the L'Esterre Bay and Manchineel Bay and within the reef at North Bay, Isle de Rhonde. The main species are turtle grass, *Thalassia testudinum* and manatee grass, *Syringodium filiforme*. Other marine plants include various species of green, blue green, brown and red algae, some of which are used locally as food. A variety of sea weeds or sea moss (red marine algae) mainly *Gracilaria sp.* is harvested at notable sand-mud locations at Calliste, Conference, Pearls and Telescope as well as locations at Carriacou and Isle de Ronde. The algae are processed into a milk based beverage primarily for local consumption, though some of the dried plants are exported on a small scale to other islands. Sustainable harvesting of *Gracilaria* has been maintained at Calliste, St. George's.

Coral reefs

Most of the reefs around Grenada and the Grenadines, especially along the East and South East Coast are in varying stages of degradation and recuperation. The islands adjacent to Levera Bay have reef systems with Sugar Loaf being in the best state of recovery and dominated by elkhorn coral (*Acropora palmata*). The Grenada Preliminary Data

Atlas (1980) shows areas of living reef along the East Coast which are basically a combination of various species of branching and boulder coral in varying stages of degradation and recovery. There is one barrier type reef stretching from Telescope Point to Marquis Islands with elkhorn coral (*Acoopord palmata*), finger coral (*Porites porites*) and some boulder coral including mustard, and brain coral. Small fringing reefs mainly of elkhorn coral exist along the south east and south coast to Point Salines. These reefs show some signs of recovery but most of them remain overgrown with algae.

On the north West Coast, the reef at Red Rock, originally dominated by elkhorn coral has suffered much physical damage probably from strong storm swells (Ground Sea) which frequently hit the area. Reefs also exist at Beausejour and Mollinere, but Mollinere is being steadily degraded by overuse mainly by tourists (snorkeling and scuba diving). At Grand Anse, the three fathoms reef is badly degraded, however, the six fathoms reef which consists of a combination of hard and soft coral is still in good shape. Large barrier reefs occur along the East coasts of Carriacou, Petit Martinique and some of the smaller islets of the Grenadines. These are strongly dominated by elkhorn corals in the shallow areas and boulder coral in the fore reef. Saline and White Islands have an excellent reef system and presently has the best species combination in the area.

3.3 Land Use and Environmental Planning

3.3.1 Institutional Framework for Land Use and Environmental Planning

To date an integrated approach to land use, physical and environmental planning, and development control has yet to be implemented in Grenada. Development control falls under the jurisdiction of the Physical Planning Unit and Land Development Control Authority (LDCA). In addition, there are several government agencies/ministries which have overlapping and potentially conflicting jurisdictions over the development process in Grenada.

The lack of a national land use policy further compounds the problems resulting from conflicting jurisdictions over development control. Although environmental impact assessments (EIA) are requested for large scale development projects, there is no legal requirement for carrying out EIA's, and the LDCA's enabling legislation and regulations do not contain any prescribed standards for evaluating proposed development.

There is a dearth of documented information that will allow for an assessment of the current status of the environment. However, using information from annual abstracts, maps of Grenada, and community consultations, an environmental profile can be developed for each parish. Since most settlements, industries and tourism activities are concentrated in the parish of St. George's, most of the existing environmental problems are experienced there. The Table below provides a matrix of the environmental profile for Parishes in Grenada.

3.3.2 Environmental Profile for Parishes in Grenada

The Consultant's Report on Land Use and Environmental Planning (Jessamy, 1999) provides a concise summary of major sectors, their role in environmental management and existing measures and programs.

Environmental Profile for Parishes in Grenada

Parish	Population	Natural Resources (Key)	Environmental Problems
St. George's	31,994	Beaches, coral reefs, Grand Etang Rain Forest; Rivers; dry scrub, forests; waterfalls; lakes; Mangrove forests; offshore islands; bays and sheltered harbors	Pollution of rivers and coastal waters from wastewater; algae blooms; solid waste disposal; deforestation; wildlife habitat destruction; squatting; unplanned development; over use of agro-chemicals
St. John's	8,752	Rivers; waterfalls; beaches; lakes; mangrove forests; bays and sheltered harbors	Planting on steep slopes; soil erosion; damming or rivers; squatting; improper waste disposal; over use of agro-chemicals
St. Mark's	3,861	Rain forests; rivers	Improper wastewater disposal
St. Patrick's	10,118	Forests; rivers; beaches; lakes; mangrove forests; coral reefs; offshore islands; dry scrub forests	Planting on steep slopes; soil erosion; damming of rivers; squatting; improper waste disposal, over use of agro-chemicals
St. Andrew's	24,135	Forests; beaches; coral reefs; waterfalls; dry scrub forests; rivers (great river)	Coastal erosion; sand mining and quarrying; inadequate wastewater disposal and management; solid waste dump site; flooding; damming of rivers; pollution of coastal waters; overuse of agro-chemicals
St. David's	11,011	Dry forests; mid-elevation wet forests; beaches, coral reefs; mangrove forests; sheltered bays	Disposal of solid waste into waterways; destruction of mangroves
Carriacou and Petit Martinique	5,726	Coral reefs and beaches; mangrove forests; oyster beds; sheltered bays; dry scrub forests	Destruction of mangroves; overuse of sandy island; over fishing; solid waste disposal problems

Source: Jessamy (1999)

3.4 Tourism

3.4.1 Background on the Sector

The Government of Grenada has identified the Tourism Sector to be a leading contributor to the country's economic development and has elaborated a comprehensive set of policies to guide the future development of the Tourism Sector with a view to mitigating or eliminating adverse effects of further tourism development. The mission statement for the sector encapsulates two major strands in the tourism strategy viz. the concept of sustainable and national development.

The approach to tourism development will focus on sustainable development and has the following basic features:

- To be in harmony with the resource endowments of the country;
- To provide maximum linkages with other sectors and;
- To minimize any adverse effects on the physical, social environmental character of the country.

Seven principal objectives were set out for the development of the Tourism Sector. They are the following:

- To maximise the contribution of stayover and cruise tourism to the economy;
- To distribute the benefits of tourism more evenly and equitably throughout the country;
- To develop stronger linkages between the tourism sector and other economic sectors such as agriculture, fisheries, manufacturing, handicrafts and services;
- To ensure that tourism development is consistent with the protection and conservation of the country's natural and cultural resources, built environment and the nation's moral values;
- To foster the most appropriate form and scale of tourism development in harmony with the resource endowment of the islands and the aspirations of the people;
- To ensure that the tourism plant and essential infrastructure services keep pace with the demands of the sector within the context of the established carrying capacity;
- To enhance the country's reputation as a safe and friendly destination for visitors and nationals.

The role of the Government is defined as providing the infrastructure and the institutional and regulatory framework which will facilitate private sector investment and activity in the tourism sector. The pace of tourism development will be ordered, gradual and in balance with the development of the physical and social infrastructure so as to ensure high standards in amenities and service. The Government will facilitate the Private Sector in investment through a regime of incentives. However, there is need to review these incentives to ensure that they reflect "green policies" and the goals of conservation of biodiversity and sustainable livelihoods.

3.4.2 Social Impact and Carrying Capacity of Tourism

The level of tourist visitation to Grenada at the present time is such that the impact on the host community is still within manageable limits. The Government of Grenada is therefore in a good position to put in place adequate provisions to safeguard the interest of the local community and therefore ensure ongoing good relations between hosts and guests. The industry is expected to expand in Grenada within the next ten years. It is considered that the volumes of both stay-over and cruise visitors can be accommodated within the existing infrastructure with some planned improvements. However, detailed analysis of the physical carrying capacity of the major tourism attractions needs to be performed. The results of these analyses will provide some indication of the desirable upper limits to tourism arrivals.

3.4.3 Environmental Issues

Environmental planning is necessary in order to provide measures to alleviate adverse environmental impacts of past and current tourism activities and to assist in ensuring that proposed tourism development will be in keeping with sound natural resources management principles. In the development of the Tourism Master Plan an analysis of the legal and institutional framework for environmental management was conducted and recommendations made for improvements to this framework. Special attention was paid to the legal and institutional framework for the management of national parks and other protected areas. These areas form the basis for special interest tourism towards which current Government policy is focusing.

Elements of the environment that were found to be most susceptible to tourism impacts included coastal and marine resources (mangrove, coral reefs, sea grass) freshwater, biodiversity and wildlife, and terrestrial vegetation. This is directly related to the recognized tourism sub-sectors which are:

- Beach resort tourism
- Cruise tourism
- Marine tourism (yachting and water sports)
- Special interest tourism (nature, cultural heritage)

Impact evaluation revealed that beach resort tourism impacted most heavily on the environment both through the development of tourism infrastructure and through visitor use of the resources, particularly through freshwater consumption resulting in heavy impacts on rivers, and damages to coastal resources. Visitors from the yachting sub-sector also exert large impacts on the environment, primarily because of coral reef damage, the effects of marine construction, wastes generated during marina use and the effect of these activities on the fragile biological resources of coastal areas. Cruise ship and marine sports tourism were seen as having less impact than the other sub-sectors. Special interest tourism was seen as to have little or no impact on the environment.

3.4.4 Future of the Sector

The main hotel development zones are concentrated in the southwest of the island (Grand Anse tourism belt), with major visitor attractions scattered throughout the island. In general The land use pattern was identified as gradual changing from a mixture of commercial agricultural and light industrial use that is compatible with tourism, to an environmentally unsustainable land use pattern that is incompatible with tourism, such as squatter housing, and ad hoc vending, and building development within protected areas.

In order to minimize the negative impacts from existing tourism activity, as well as provide for environmental conservation and protection from future developments, three types of mitigation measures have been proposed:

- Changes in the legal and institutional framework;
- Environmentally beneficial macro-measures at the national level;
- Micro-measures in the form of guidelines for existing and proposed tourism projects.

In addition, Government policy as noted in the Medium Term Economic Strategy Paper (MTESP) for 1998 - 2000 states that the development of the sector would be restricted to improvements to existing facilities in the tourism belt, and incentives for new development in other parts of the Island. With regards to its role in conservation of natural biodiversity, the plans for the sector (as contained in the 10 year Master Plan for the Tourism Sector) include the following:

- Establishment environmental standards for tourism development areas;
- Establishment of guidelines to facilitate routine environmental screening by the Physical Planning Unit and Land Development Control Authority for all project proposals as part of the planning approval process;
- Development and codification of pollution control standards;
- Development of port facilities to collect ship generated wastes;
- Development of waste handling and pumping facilities at existing and new marinas;
- Implementation of community programs for environmental clean up and landscaping, particularly in tourism host communities;
- Establishment of a Tourism Advisory Committee;
- Establishment of a National Parks Advisory Council;
- Establishment of a Cruise Tourism Association;
- Establishment of a Yachting Facilitation Committee;
- Amendment of the Tourist Board Act;
- Amendment of the National Trust Act;
- Approval and promulgation of regulations for the control of several areas of the Tourism Sector;
- Revision and enhancement of incentive legislation;
- Improvement of institutional capacity/capability of Ministry of Tourism and Board of Tourism.

An important potential future direction for tourism in terms of positive contributions to biodivesity conservation is the enhancement of current, and the development of new eco-tourism opportunities. For example, the Forestry Department's Strategic Plan outlines mechanisms for managing and developing forest recreation facilities, both through its own efforts and through the technical support of private initiatives. The use of forests for recreation, when properly managed to be low-impact, provides an excellent environment for the conservation of biodiversity while at the same time enabling income generation from intact forest areas. Similar initiatives for coastal species such as turtles (protection of turtle nesting sites and development of 'turtle watching' opportunities), will enable multiple uses of coastal areas which actively encourage biodiversity conservation.

4.0 Analysis of Adverse Impacts on Biological Diversity

The range of human activities in pursuit of food, shelter, wealth, and recreation has adverse impacts on natural vegetation, wildlife, rivers, coral reefs, coastal waters and the landscape in Grenada. However, some degradation of the natural environment is necessary for human survival and comfort but there are excesses in biodiversity loss which can be avoided or controlled.

In Grenada, most of the threats to biodiversity can ultimately be attributed to six main factors, namely; land tenure, population change, cost-benefit imbalances, cultural factors, misdirected economic incentives, and national policy failure.

- Land ownership and the nature of land use rights often determine the extent of resource exploitation or degradation. This is compounded by the absence of a Land Use Policy and National Physical Development Plan.

- Improper management of land on steep slopes, and land in or adjacent to wetlands and seagrass beds coral reefs is noticeable in several areas around the country. The change in ownership of coastal lands from either state or private individual to the corporate sector has often led to a change in land use and conversion of natural landscapes and agricultural lands into tourism or housing development.

- The increase in population and the rural to urban migration in search of employment opportunities have created increased demands for housing and utilities, leading to further urbanisation in major population centres. This expansion has been accommodated through the drainage of adjacent wetlands and conversion of land for housing and commercial development. Trees and natural areas are not usually incorporated into such development. Garbage and sewage disposal in some of these areas often tend to be less than desirable with nearby, rivers, gullies, wetlands and the sea serving as the repository.

- Cost-benefit imbalances have not been clearly studied in Grenada, particularly as it relates to the short term benefits of the unregulated use of polluting chemicals, conversion of wetlands, and beach sand mining for a small sector of the population. The environmental cost to Grenada of the loss of species, loss of beach protection and pollution or destruction of critical habitats have largely been ignored, although the benefits of these ecosystems seem to be appreciated. Generally, the costs and benefits of the goods and services provided by critical ecosystems are not given a market price and are not included in national accounting and decision making. This leads to errors in judgement when trade-offs are being decided among development options and inappropriate decisions contributing to further loss of coastal woodlands, wetlands and coral reefs.

- Historically, the culturally derived methods of resource exploitation were in harmony with the immediate demands of the population. Increased population, consumerism and introduction of technology have led to increased resource exploitation and further threats to biodiversity. Sand mining, and unmanaged harvest of wild game species and the fishery are common examples. The deliberate introduction of exotic species such as the mongoose, the burning of vegetation for clearing of land, and the discharge of human effluent and other domestic waste products into the sea or adjacent rivers are culturally linked practices which pose serious problems to biodiversity.

- Economic development has been encouraged through the use of incentives such as concessions of land, tax waivers and subsidies. Some of these economic incentives were misdirected since they led to further conversion of key habitats such as wetlands and littoral forests to tourism development and promoted the overuse and exploitation of natural resources (coral reefs) for recreational reasons. Additionally, intense harvesting of key fishery species such as lobster, conch and grouper for restaurants and export have led to a decline in the abundance and distribution of these species. Also the subsidies on agrochemicals have contributed to increased and widespread use of polluting or potentially polluting agents which find their way into habitats and food chains.

- Government's actions or inaction on developmental issues are guided by national policy. In some instances failure to implement the policy or critical parts of the policy or implementation of policy which produces an unfavorable impact on the environment has contributed to loss of biodiversity. This is reflected in the lack of enforcement of some legislation, insufficient genuine coordination among key governmental agencies, over-exploitation of some natural resources (e.g. some fishery), overuse of popular coastal resources for recreational reasons, unregulated use of potentially polluting chemicals in agriculture, and limited control of wastewater and effluent discharge into the nearshore environment.

5.0 Activities With Adverse Impacts

Based on the foregoing analysis, the sectoral assessment reports and the results of extensive stakeholders consultations, the following activities with adverse impact on biodiversity were identified.

- Degradation and destruction of wetlands, mangroves and coastal habitats for solid waste disposal and clearing for construction (housing and commercial development);
- Improper solid waste disposal in rivers, gullies and wetlands;
- Improper management of land on steep slopes for agricultural purposes, clearing of land and housing. This results in soil erosion, siltation of rivers and smothering of coral reefs;
- Extensive localized beach sand mining, leading to coastal erosion. This situation at Pearls and Telescope is well publicized and documented. Continued growth in the construction industry will impose further pressures on these coastal areas unless alternatives are put in place immediately;
- Overhunting and exploitation of wild game species and fisheries;
- Introduction of exotic species such as mongoose;
- Inadequate management and improper discharge of human effluent and other domestic and industrial waste products into the sea and rivers;
- Increased and widespread use of polluting or potentially pollution agents and agro chemicals (fertilizers and pesticides) which find their way into habitat and food chains.
- Lack of enforcement of legislation;
- Insufficient genuine coordination among key government agencies and stakeholders;
- Overuse of natural resources and popular coastal resources for recreational purposes;
- Conversion of agricultural and forested lands for developmental purposes;
- Absence of environmental audits to guide decision making in planning routes for infrastructural development;
- Over development of coastal areas without necessary infrastructure for wastewater and storm water management.

6.0 Identification of Gaps and Existing Needs for Biodiversity Conservation

Effective national action depends on developing an institutional, policy and legal framework that supports effective planning and management of biodiversity. National decision-making must be cognizant of the benefits gained from conservation and sustainable use of biological resources and the environmental, social and economic costs associated with the loss of these resources. The conservation of biological diversity in Grenada will be improved if the following gaps can be addressed in a timely manner:

- The urgent need to develop a national policy for guiding land management (including a land use policy, and a national physical development plan) and incentives for protection of critical ecosystems;
- Lack of implementation of appropriate policies which contribute to the conservation of aspects of biodiversity and the need to modify policies with significant negative impacts on the environment;
- Lack of effective enforcement of existing legislation and at mitigating the adverse impact on environment due to human behaviour;
- Legislative revision for improved regulation of activities with significant adverse impacts on the integrity of key habitats and on resident and migratory species;
- The need to build awareness on and understanding of the value, sustainable use, and need for immediate conservation of natural resources by decision makers and stakeholders;
- Lack of comprehensive and up to date baseline biological/environmental data and inventories on key species and habitats;
- The need to develop management plans for key ecosystems, biological and genetic resources;
- Institutional strengthening for key agencies with responsibility for management of biological resources;
- Genuine collaborative mechanism among state agencies, and between state agencies and stakeholders for joint management of environmental resources;
- The need to develop a local repository for representative samples of flora and fauna;
- The need to incorporate environmental costs into the planning process.

7. The Strategy and Action Plan

The actions recommended in this Strategy and Action Plan are not an exhaustive list of all the policies, legislation, plans and programmes that are needed for improvement in the various sectors of the country. The local political, social, economic and institutional realities were considered in designing a practical and easily measurable set of objectives with supporting activities for implementation over a 5-year period. This strategy emphasizes the importance of peoples' participation and co-management of all aspect of biodiversity conservation cognizant of the fact that key threat to biodiversity lies with human induced behaviour. Towards the end of this period, a review of the Strategy and Action Plan should be undertaken and a new plan for further activities should be proposed.

Goal 1

Conserve and sustainably use native biodiversity.

Objectives

- Provide broad-based support for conservation and sustainable use of biodiversity;
- Protect key ecosystems from negative human induced impacts;
- Develop and encourage sustainable utilisation of biological resources that are essential to the livelihood of local communities.

Strategies

- Greater public awareness on biodiversity issues and participatory planning would be employed to secure commitment for conservation of ecosystems, species and genome;
- Set aside representative samples of major ecosystems and establish controls to ensure that further degradation is minimised or stopped;
- Build capacity of local institutions and target communities to sustainably manage selected biological resources through partnership arrangements.

Actions

- Public discussions, media programmes, public service announcements, displays and marketing documents on biodivesity conservation in Grenada will be targeted to selected sectors of the public;
- Develop a mechanism for incorporating biodiversity issues into the schools' curriculum;
- Community and public sector consultations will be used to help achieve consensus on biodiversity conservation and sustainable use policies, plans and programmes;
- Prepare, approve and promote a national land use policy that incorporates biodiversity conservation and sustainable use;

- Ecological survey of major ecosystems for conservation and legal status;
- Assessment of past, current and future impacts on these sites;
- Determine if designated protected areas are adequate for protection of major ecosystems;
- Identify preferred management options for these ecosystems;
- Establish a national herbarium as the repository for research on local plant species;
- Strengthen existing legislation for improved protection of biodiversity;
- Determine the priority habitats and biological resources for utilisation;
- Develop sustainable use plans and programmes for inland and coastal fishery, mangroves, forest resources, and wildlife species through community consultations and technical expertise. These should be linked to or be part of the National Physical Development Plan;
- Provide relevant support for key groups;
- Implement sustainable use plans and programmes.

Goal 2

Ensure a fair and equitable sharing of the benefits arising out of the utilisation of genetic and ecosystem resources.

Objectives

- Maintain, recover and promote genetic resources necessary for sustainable agriculture;
- Provide information on key ecosystems for incorporation into national accounts and decisions on national development projects;
- Develop economic instruments to promote the sustainable use of biological resources.

Strategies

- Enabling activities will be put in place for national and locally based regional institutions to continue and expand on germplasm research and development, and biological pest control for agriculture;
- International, regional and local assistance will be sought for determining the valuation of ecosystems of national importance;
- Ensure that resources users bear cost of environmental degradation.

Actions

- Policy, legislation and incentives will be developed to support germplasm and biological pest control research and development;
- The capacity of key institutions will be enhanced to collect, identify, characterise, store and document plant genetic resources;
- A national germplasm programme will be developed, to include awareness, certification and standards for seed exchange;
- Biological pest control will be actively promoted through an education and awareness programme for farmers;
- Linkages will be strengthened with the FAO and its Global System on Plant Genetic Resources, the Caribbean Seed and Germplasm Resources Information Network (CSEGRIN), and other relevant agencies and networks;
- Identify different ecosystems of national importance through consultations with the major stakeholders;
- Identify and procure technical assistance for conducting the valuation of these ecosystems;
- Train personnel from relevant ministries in valuation methodologies;
- Package and present the results of the valuation to selected senior government decision makers;
- Determine and encourage the most appropriate mechanism for incorporation of the valuation results into the national accounts;
- Review the incentives require to promote biodiversity preservation and conservation;
- Develop pollution charges and environmental levies for polluters;
- Impose user fees for resource utilization (eg. recreation areas, national parks);
- Enforce environmental laws and penalties for violation;
- Establish a system to monitor the use of biological resources.

8.0 Recommendations for Implementation of the Grenada Biodiversity Strategy and Action Plan

The activities listed in the Strategy and Action Plan can be formulated into discrete projects for implementation. Overall coordination could be the responsibility of the Sustainable Development Council with specific projects delegated to lead agencies. Implementation should be through a broad based consultative/participatory approach for achieving the desired outputs. Several project concepts are outlined below for implementation of the GBSAP:

GBSAP Project Concept 1

Title:	Building Awareness on Biological Diversity in Grenada
Objective:	Provide broad-based support for conservation and sustainable use of biodiversity
Priority:	High
Justification:	There is insufficient awareness on the benefits of biodiversity and the need for conservation of key habitats among sectors of the public, including senior decision makers. The Project should build on existing public awareness initiatives to conserve biodiversity.
Scope:	Public discussions, media programmes, public service announcements, displays and marketing documents on biodiversity conservation in Grenada will be targeted to schools and selected sectors of the public. A mechanism for incorporating biodiversity issues into the school curriculum will be developed.
Time-frame:	5 years
Location:	Grenada, Carriacou and Petit Martinique
Lead Agency:	Ministry of Agriculture, Forestry and Fisheries
Other Agency(s):	Fisheries Division, Wild Life Unit, Agriculture Extension, Ministry of Education, selected NGOs, and the private sector.
International/Regional Parties:	Caribbean Conservation Association
Budget:	US$80,000
Possible Donors:	To be found
CBD Articles Addressed:	6, 13

GBSAP Project Concept 2

Title:	Drafting a National Land Use Policy for Grenada
Objective:	Provide broad-based support for conservation and sustainable use of biodiversity
Priority:	High
Justification:	There is a lack of coherent policy for the management of land and marine resources. Conservation of critical biological resources requires national support and commitment from the political directorate.
Scope:	Community and public sector consultations will be used to help get consensus on biodiversity conservation and sustainable use policies, plans and programmes within sectors that use biological resources. Prepare, approve and promote a national land use policy that incorporates biodiversity conservation and sustainable use.
Time-frame:	2 years
Location:	Grenada, Carriacou and Petit Martinique
Lead Agency:	Ministry of Finance, Physical Planning Unit
Other Agency(s):	Land Use Division, Forestry Division, Fisheries Division, Agriculture Extension, Ministry of Foreign Affairs and selected NGOs.
International/Regional Parties:	None
Budget:	US$40,000
Possible Donors:	UNDP/GEF/DFID
CBD Articles Addressed:	6, 7, 8, 13

GBSAP Project Concept 3

Title:	Strengthening Management of Key Ecosystems
Objective:	Protect key ecosystems from negative human induced impacts.
Priority:	High
Justification:	Key ecosystems require baseline information for informing management decisions on protection and sustainable national benefits
Scope:	Ecological survey of major ecosystems for conservation. Assessment of past, current and future impacts on these sites. Determine if designated protected areas are adequate for protection of major ecosystems. Identify preferred management options for these ecosystems. Develop and establish a national herbarium as the repository for research on local plant species.
Time-frame:	2 years
Location:	Grenada, Carriacou and Petit Martinique
Lead Agency:	Ministry of Finance, Physical Planning Unit
Other Agency(s):	Fisheries Division, Agriculture Extension, Ministry of Tourism, National Parks and selected NGOs.
International/Regional Parties:	None
Budget:	US$250,000
Possible Donors:	To be determined
CBD Articles Addressed:	6, 7, 8

GBSAP Project Concept 4

Title:	Promoting Sustainable Use of Biological Resources
Objective:	Develop and encourage sustainable utilisation of biological resources that are essential to the livelihood of local communities.
Priority:	High
Justification:	Inadequate management of key biological resources has led to deterioration of habitat quality and productivity, and loss of potential earnings.
Scope:	Determination of priority habitats and biological resources for utilisation. Develop sustainable use plans and programmes for inland and coastal fishery, mangroves, forest resources, and wildlife species through community consultations and technical expertise. Need full participation of stakeholders/ users from outset for this to be effective. Provide relevant training for key groups. Implement sustainable use plans and programmes.
Time-frame:	2 years
Location:	Grenada, Carriacou and Petit Martinique
Lead Agency:	Ministry of Agriculture, Forestry and Fisheries
Other Agency(s):	Ministry of Tourism, Ministry of Finance and selected NGOs.
International/Regional Parties:	To be determined
Budget:	US$120,000
Possible Donors:	To be determined
CBD Articles Addressed:	6, 7, 8, 10, 12

GBSAP Project Concept 5

Title:	Capacity Building for Germplasm Conservation
Objective:	Maintain, recover and promote genetic resources necessary for sustainable agriculture.
Priority:	Medium
Justification:	There is no national policy for sustainable use of genetic resources in agriculture and inadequate local capacity to manage genetic resources.
Scope:	Policy, legislation and incentives will be developed to support germplasm and biological pest control research and development. The capacity of key institutions will be enhanced to collect, identify, characterise, store and document plant genetic resources. A national germplasm programme will be developed, to include awareness, certification and standards for seed exchange. Linkages will be strengthened with the FAO and its Global System on Plant Genetic Resources, the Caribbean Seed and Germplasm Resources Information Network (CSEGRIN), and other relevant agencies and networks.
Time-frame:	4 years
Location:	Grenada, Carriacou and Petit Martinique
Lead Agency:	Ministry of Agriculture, Forestry and Fisheries
Other Agency(s):	Selected NGOs.
International/Regional Parties:	Caribbean Agricultural Research Development Institute (CARDI)
Budget:	US$300,000
Possible Donors:	To be found
CBD Articles Addressed:	6, 7, 8, 9, 10, 12, 13, 15, 16, 17, 18

GBSAP Project Concept 6

Title:	Strengthening Biological Pest Control
Objective:	Maintain, recover and promote genetic resources necessary for sustainable agriculture.
Priority:	Medium
Justification:	Awareness on and use of biological pest control by farmers needs to be strengthened so as to minimise the dependence on polluting pesticides
Scope:	The Pest Management Unit will be strengthened to actively promote biological pest control through continued awareness and education programme for farmers, including on-farm demonstrations, research and development.
Time-frame:	3 years
Location:	Grenada, Carriacou and Petit Martinique
Lead Agency:	Pest Management Unit
Other Agency(s):	Agronomy Division, Extension Division, Pesticide Control Board and selected NGOs.
International/Regional Parties:	CARDI
Budget:	US$80,000
Possible Donors:	To be found
CBD Articles Addressed:	6, 13, 17

GBSAP Project Concept 7

Title:	Incorporating Ecosystem Valuation into National Accounting
Objective:	Provide information on key ecosystems for incorporation into national accounts and decisions on national development projects.
Priority:	Medium
Justification:	The market value of nationally important ecosystems in terms of the goods and services provided, are unknown to senior government officials and are not included in national accounting process. This leads to further loss of critical coastal woodlands, wetlands and coral reefs in favour of infrastructural development options.
Scope:	Identify key ecosystems of national importance through consultations with the major stakeholders. Identify and procure technical assistance for conducting the valuation of these ecosystems. Train personnel from relevant ministries in valuation methodologies so that other areas can be undergo economic valuation for incorporation into national accounts. Package and present the results of the valuation to selected senior government decision makers. Determine and encourage the most appropriate mechanism for incorporation of the valuation results into the national accounts.
Time-frame:	3 years
Location:	Grenada, Carriacou and Petit Martinique
Lead Agency:	Ministry of Finance
Other Agency(s):	Forestry Division, Fisheries Division and selected NGOs.
International/Regional Parties:	UNDP/GEF
Budget:	US$100,000
Possible Donors:	To be found
CBD Articles Addressed:	6, 10, 11, 16

GBSAP Project Concept 8

Title:	Strengthening Existing Legislation for Biodiversity Protection
Objective:	Protect key ecosystems from negative human induced impacts.
Priority:	Medium
Justification:	Key ecosystems and biological resources require legislative support for effective protection so that national benefits can be sustained.
Scope:	Revise key pieces of legislation to better support biodiversity protection. Develop regulations for implementation of the legislation.
Time-frame:	6 months
Location:	Grenada, Carriacou and Petit Martinique
Lead Agency:	Ministry of Legal Affairs
Other Agency(s):	Forestry Division, Fisheries Division, Agriculture Extension, Ministry of Tourism and selected NGOs.
International/Regional Parties:	Caribbean Law Institute
Budget:	US$80,000
Possible Donors:	To be determined
CBD Articles Addressed:	6, 7, 8

9.0 Monitoring and Evaluation

Implementation of the Grenada Biodiversity Strategy and Action Plan requires a collaborative effort among the key stakeholders, such as, State agencies, the private sector, non-governmental organisations and community groups who depend on biological resources for their livelihood. State agencies in particular, will require that measures be put in place to track the results of the action plan. This will assist in providing information needed to comply with reporting requirements and to justify the timing and usefulness of expenditures on biodiversity activities.

The lead agencies responsible for implementation of specific activities in the action plan can also be responsible for monitoring changes in the environment and progress in achieving the objectives of the plan. Key indicators are proposed below for two broad groups, namely; environmental related and objectives related factors.

9.1 Environmental Related Indicators

9.1.1 Land Use categories

- Residential ha
- Industrial ha
- Commercial: ha
- Tourism ha
- Forest: ha
- Wetlands: ha
- Coral reefs/seagrass beds: ha
- Agriculture: ha
- Recreation: ha
- Rehabilitated area: ha
- Transport (road, shipping and airports): ha
- Other: ha

9.1.2 National Expenditure

- Annual expenditure for management of wetlands: EC$
- Annual expenditures for management of coral reefs/seagrass beds: EC$
- Annual expenditure for management of forests: EC$
- Annual expenditure on biological pest control: EC$

9.1.3 Agrochemical

- Annual total of agricultural pesticides sold: tonnes/yr
- Annual total of fertilizers sold: tonnes/yr

9.1.3 Habitat

- Total natural area: ha
- Total natural area converted by development annually: ha
- Total number of native floral species:
- Total number of native faunal species:
- Number of endemic floral species:

- Number of endemic faunal species:
- Number of threatened or endangered species:
- Total terrestrial protected areas: ha
- Total marine protected areas: ha

9.2 Objectives Related Indicators

9.2.1 Provide broad-based support for conservation and sustainable use of biodiversity.

- Number of biodiversity media activities held per year.
- Mechanism for incorporating biodiversity issues in schools developed.
- Number of consultations on biodiversity held per year.
- Preparation of land use policy and plan.

9.2.2 Protect key ecosystems from negative human induced impacts.

- Number of ecological surveys of major ecosystems initiated or completed.
- Assessment of impacts of major ecosystems initiated or completed.
- Management plans for major ecosystems initiated or completed.
- National Herbarium established.
- Key legislation revised and regulation developed to give better support to biodiversity protection.

9.2.3 Develop and encourage sustainable utilisation of biological resources that are essential to the livelihood of local communities.

- Priority habitats and biological resources for utilisation identified.
- Sustainable use plans or programmes developed for coastal and inland biological resources.
- Number of training activities on issues relevant to management of biological diversity.

9.2.4 Maintain, recover and promote genetic resources necessary for sustainable agriculture.

- Policy, legislation and incentives developed to support germplasm management.
- National Germplasm Programme developed.
- Increase in budget allocation for germplasm management.
- Number of training activities held related to germplasm management.
- Frequency of information exchange with other germplasm management agencies or networks.
- Number of awareness/education activities per year on biological pest control.
- Increase in budget allocation for biological pest control.

9.2.5 Provide information on key ecosystems for incorporation into national accounts and decisions on national development projects.

- Valuation of key ecosystems initiated.
- Number of local personnel trained in valuation methodologies.
- Valuation information on local ecosystems presented to senior decision makers.
- Mechanism for incorporation of the valuation results into the national accounts developed and implemented.

9.3 Evaluation

Evaluation of implementation of the action plan should be a continuous and formal process. The Sustainable Development Council or the Biodiversity Steering Committee should convene quarterly meetings to review progress and develop strategies to overcome any obstacles which may impede successful implementation.

The evaluation process should also seek to determine if increased capacity to manage biodiversity is being created or utilised, or whether an increase in importance of biodiversity is reflected in the actions and decisions of the key stakeholders. Further, the impacts of implementing the activities of the action plan should be determined with respect to conservation, sustainable use, and sharing of benefits.

Towards the end of the five year implementation period, a review of the Strategy and Action Plan should be undertaken and a new plan for further activities should be proposed. This review process should be participatory, involving all key stakeholders.

10.0 References

Principal References: Sector Reports

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Thomas, A. 1998. An overview of forest resources and biodiversity in Grenada. A study for the Grenada forest policy review process.

Vincent, G. 1981. Report on the proposed Levera National Parks Vol. 1.

11.0 Appendix

List of Community Consultations:

Hillsborough Secondary School, Carriacou	-	May 31st, 1999
Agricultural Building, Grenville, St. Andrew's	-	June 1st, 1999
St. John's Anglican School, Gouyave, St. John's	-	July 7th, 1999
St. John's Anglican School, Gouyave, St. John's	-	September 2nd, 1999
St. Andrew's Secondary School, Grenville, St. Andrew's	-	March 9th, 2000
Hillsborough Secondary School, Carriacou	-	March 10th, 2000
Hermitage Government School, Hermitage, St. Patrick's	-	March 14th, 2000

List of Meetings (Consultation) - Sustainable Development Council:

Meetings were held at the Agency for Rural Transformation Conference Room, Marrast Hill, St. George's on the following dates:

May 7th, 1999
May 21st, 1999
June 18th, 1999
July 16th, 1999
August 20th, 1999
September 24th, 1999
October 29th, 1999
November 19th, 1999
February 18th, 2000
March 17th, 2000
May 5th, 2000
June 16th, 2000

Notes

Notes