Government of Grenada

Road Map
Toward
Integrated Water Resources Management Planning for Grenada

Prepared by the Caribbean Environmental Health Institute and GEF-funded Integrating Watershed and Coastal Areas Management Project
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In partnership with the
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EHI
CARICOM
Global Water Partnership
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DHI
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Integrating Watershed and Coastal Areas Management
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Executive Summary

Grenada, the most southern of the Windward Islands group is located between Trinidad to the south and St. Vincent to the north. The tri-island State is of volcanic origin and consists of Grenada, Carriacou and Petit Martinique, which together have an area of 344 km^2 (133 sq miles) and a population of approximately 102,632 (OECS, 2005). The average annual rainfall for mainland Grenada ranges between 1,000 mm and 1,500 mm along the coastal zone, to approximately 4,000 mm in the interior, and supports surface stream flow and recharge of sub-surface aquifers. There are 23 surface and 6 ground water potable supply sources on mainland Grenada, which yield some 54,600 m^3/day (12 mgd) in the rainy season and a maximum of 31,800 m^3/day (7 mgd) in the dry season. The water demand in the rainy season is 45,500 m^3/day (10 mgd) and in the dry season, 54,600 m^3/day (12 mgd) (GEF, 2000). The sister islands of Carriacou and Petite Martinique are totally reliant on rainwater harvesting for their potable supplies.

Water is the most vital natural resource and its integrated managementis necessary for sustainable development. However, conflicting competing uses have resulted in water resources management issues, principally a water governance crisis in terms of ecuring water for people, securing water for food production, protecting vital ecosystems and gender disparities. Consequently, the concept of integrated water resources management (IWRM) was developed and recognised as an appropriate tool for the management of water resources in a sustainable manner. IWRM sets the framework for coordination of management decisions within an appropriate coherent policy setting taking into account overall social and economic goals.

Cognisant of the need to manage water resources in Grenada in a sustainable manner, the Ministry of Agriculture took the initiative to develop a "roadmap", policy and plan for IWRM at the national level. Technical assistance for the road mapping process was provided by the Caribbean Environmental Health Institute (CEHI) and the Global Environment Facility (GEF) funded Integrated Watershed and Coastal Areas Management (IWCAM) project through funding from the United Nations Collaborating Centre for Water and the Environment and support from the Global Water Partnership – Caribbean (GWP-C). The activities undertaken included stakeholder consultations and a situation analysis study which generate the requisite information to guide the "roadmap".

A number of issues and challenges are associated with water resources management in Grenada including *inter alia*: environmental degradation affecting both surface and groundwater quality, quantity and availability; the need for comprehensive policy and integrated management; changing and inadequate land use planning and zoning; lack of coordination, cooperation and integration of stakeholders; lack of education in best management practices for land and water conservation. Additionally, it was found that Grenada is typified by a sectoral approach to water resources management with the National Water and Sewerage Authority (NAWASA), the main abstractor, given the responsibility for the management of the resource (NAWASA Act, 1990). Other Ministries, Agencies and Governmental Departments with responsibility for water resources management include: the Ministry of Agriculture in particular the Forestry Division and the Land Use Division; the Ministry of Health in particular the Environmental Affairs and Environmental Health Departments; the Ministry of Finance in particular the Physical Planning Unit. No formal arrangements for networking and collaboration among the agencies exist for the management of the resource.

Implementing IWRM in Grenada will involve a change in the way in which water resources are managed. The existing sectoral and piecemeal system needs to be replaced by a central coordinating agency which will

be responsible for the management of water resources in a holistic manner. This will ensure that due consideration is given to the various conflicting uses and allocations of water resources. A central collaborating agency with responsibility for water resources management is necessary to execute and implement the principles of IWRM in Grenada. This will require four main elements which are: a holistic and comprehensive national policy and plan for the management of water resources; development of the legal and regulatory framework for the management of water resources; improving and, where necessary, developing the institutional and administrative framework for water resources management; enhancing capacity and capability for the management of water resources.

The Caribbean Environmental Health Institute (CEHI) has been working since inception in 1989 in the area of water resources management. The work of CEHI in IWRM is guided by the Caribbean Community's (CARICOM) agreement establishing the institute, the Caribbean Cooperation in Health Phase II (CCH-II) priority area of water resources and water quality management. Furthermore, CEHI was identified as the lead regional agency for the management of water and waste management by the Ministers of the Environment with regards to implementing the Barbados Programme of Action (BPOA) which resulted from the United Nations Conference on Environment and Development for Small Island Developing States (UNCED-SIDS, 1994). The Institute is the lead executing agency for the GEF-financed Integrating Watershed and Coastal Areas Management Project. For more information visit the web-site at www.cehi.org.lc

Acronyms

ART	Agency for Rural Transformation
BSAP	Biodiversity Strategy and Action plan
CBO	Community Based Organisation
CEHI	Caribbean Environmental Health Institute
CEC	Carriacou Environmental Committee
CWP	Caribbean Water Partnership
CWWA	Caribbean Water and Wastewater Association
DoF	Department of Fisheries
DPA	Development Planning Authority
EHD	Environmental Health Department
FAO	Food and Agricultural Organization
FD	Forestry Division
gals	Imperial gallons
GBS	Grenada Bureau of Standards
GBT	Grenada Board of Tourism
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHTA	Grenada Hotel and Tourism Association
GIDC	Grenada Industrial Development Corporation
GIPE	Grenada Institute of Professional Engineers
GIS	Geographical Information Systems
GoG	Government of Grenada
GPA	Grenada Ports Authority
GRENCODA	Grenada Community Development Agency
GWP-C	Global Water Partnership Caribbean
FoE	Friends of the Earth
IICA	Inter-American Institute for Cooperation on Agriculture
IWCAM (project)	Integrating Watershed and Coastal Areas Management
IWRM	Integrated Water Resource Management

km	kilometers
kph	kilometers per hour
LuD	Land Use Division
m^3/d	cubic metres per day
mgd	million gallons per day
MEA	Multi-Lateral Environmental Agreements
MoA	Ministry of Agriculture
MoF	Ministry of Finance
MoH	Ministry of Health
MoT	Ministry of Tourism
mm	millimetres
mph	miles per hour
NADMA	National Disaster Management Agency
NAWASA	National Water and Sewerage Authority
NGO	Non-Governmental Organisation
NIC	National Implementing Committee
NSTC	National Science and Technology Council
OECS	Organization of Eastern Caribbean States
PAHO	Pan American Health Organization
PPU	Physical Planning Unit
PCL	Produce Chemist Laboratory
PSA	Public Service Announcement
PSIP	Public Sector Investment Programme
RWH	Rain Water Harvesting
SFA	Special Framework of Assistance
SIDS	Small Island Developing States
SOPAC	South Pacific Applied Geoscience Commission
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
US$	US dollar (equivalent to 2.70 East Caribbean dollars)
UWI	University of the West Indies
WRA	Water Resources Agency
WRM	Water Resources Management

Acknowledgements

The Caribbean Environmental Health Institute and the Integrating Watershed and Coastal Area Management Project thanks the Ministry of Agriculture for assistance provided during the Integrated Water Resources Management Road Mapping process. The contribution and efforts of the Permanent Secretary Ms. Lana McPhail and Trevor Thompson of the Land Use Division are appreciated and acknowledged.

We are also grateful for the contributions of all agencies and representatives who participated in the consultations and provided the necessary input to guide the IWRM "roadmap": Mr. Alphonsus Daniel of Grenada Association of Professional Engineers, Mr. Damian Shillingford of National Water and Sewerage Authority, Ms. Judy Williams of Grenada Community Development Agency, Ms. Sandra Ferguson of Agency for Rural Transformation, Mr. Cosmos Joseph of Inter American Institute for Cooperation on Agriculture, Mr. Christopher Joseph of Environmental Affairs and Mr. Desmond John of the European Development Fund, Mr. Paul Hinds and Dr. Lester Forde of the Global Water Partnership-Caribbean.

Additionally, special thanks to all 54 agencies that provided data and information though the survey conducted as part of the situation analysis. The contributions have been incorporated into and used to guide the "roadmap".

Finally, we sincerely acknowledge the United Nations Collaborating Centre on Water and the Environment for providing financial support for the IWRM road map for Grenada and for advice given during the developmental process.

The background literature included in this roadmap document was in some places quoted verbatim.

1.0 Background and scope

In January 1992 some five hundred participants, including government-designated experts from a hundred countries and representatives of eighty international, intergovernmental and non-governmental organizations attended the International Conference on Water and the Environment (ICWE)[1] in Dublin, Ireland. Out of the Conference, the Dublin Statement was crafted, underpinned by four principles that laid the foundation for and basis for guiding the integrated management of the world's water resources. The principles are:

- Fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment;
- Water development and management should be based on a participatory approach, involving users, planners and policymakers at all levels;
- Women play a central part in the provision, management and safeguarding of water;
- Water has an economic value in all its competing uses and should be recognised as an economic good.

Agenda 21 of the United Nations Convention on Environment and Development (UNCED, 1992) indicated in Chapter 18 the need for protection of the quality and supply of freshwater resources by application of integrated approaches to the development, management and use of water resources. Furthermore it exposed that integrated water resources management is based on the perception of water as an integral part of the ecosystem, a natural resource and a social and economic good, whose quantity and quality determine the nature of its utilization (UNCED, 1992). A number of programme areas were proposed including integrated water resources development and management.

[1] See reference on-line at http://www.wmo.ch/web/homs/documents/english/icwedece.html

A decade later, the World Summit on Sustainable Development (Johannesburg, 2002) and the resulting Plan of Implementation (JPoA, 2002) in ***Article 26:*** called for all countries to: "*Develop integrated water resources management and water efficiency plans by 2005, with support to developing countries."* This was deemed as of utmost importance as an instrument to mainstream water in national economy and development and achieving the Millennium Development Goals (MDG´s) by 2015 specifically aimed at addressing the issues of poverty, hunger, health and environment.

Achieving the eight goals of the MDGs is underpinned by water in one way or another, hence it is inevitable that for progress to be made IWRM must be adopted. It should be emphasised however that an IWRM approach will support not just achievement of the MDGs but also the long-term economic development, poverty reduction and environmental sustainability that will be needed to sustain that achievement (GWP-TEC, 2005). Goal 7: *Ensure environmental sustainability (including the target of halving the number of people without access to water and sanitation),* illustrates that if the water resources environment is not managed and protected, it will not be able to sustain human communities. Furthermore a direct contribution offered by IWRM to Goal 7 is to facilitate, in a structured way, the achievement of a balance between economic, social objectives and activities, and environmental sustainability (GWP-TEC, 2005).

The regionalization of the IWRM planning process in the Caribbean was initiated at the Third Caribbean Environmental Forum held in Antigua in 2006 which was jointly hosted by the Caribbean Environmental Institute and Clean Islands International (Annual Wider Caribbean Waste Management Conference). A significant component of the CEF was the convening of a workshop on Integrated Water Resources & Coastal Areas Management in the Caribbean Region that was supported by the United Nations Environment Programme Collaborating Center on Water and Environment (UCC). The workshop was attended by representatives from water agencies and utility companies, ministries of water and

environment, and technical resource agencies from across the region. Presentations were delivered by key resource agencies involved in water resources management in the region and internationally. Findings of a survey carried out by CEHI on behalf of the UCC on the status of national preparedness for IWRM was presented. Participants engaged in a visioning exercise to determine key strategic directions for IWRM in the Caribbean and set out follow up actions by the regional partner agencies and local focal point agencies.

The contributions to the IWRM road mapping process in Grenada were initialized at an Informal IWRM Working Group (IWG) meeting held in Jamaica in December 2006 under the aegis of the IWCAM project. The result is a collaboration between the Global Water Partnership-Caribbean (GWP—C), the United Nations Environment Programme Collaborating Center on Water and Environment (UCC-Water), the Caribbean Environmental Health Institute (CEHI), and the Integrating Watershed & Coastal Area Management (IWCAM Project) to help guide the Government of Grenada in developing an integrated water resource management (IWRM) roadmap. In IWRM a roadmap consists simply of the planned steps toward realization of IWRM. The intervention is timely as the Government of Grenada is beneficiary to a European Union US$8.1 million grant to develop water infrastructure to meet pressing needs in the south of the country. Based on stipulations of the EU grant the country must develop a national water resource policy prior to receiving disbursements. To this end a Cabinet-appointed committee under the guidance of the Permanent Secretary of the Ministry of Agriculture, Lands, Forestry and Fisheries was appointed in February 2007 to facilitate the process. This road-mapping initiative will therefore contribute significantly to the visioning and strategic planning elements that will frame the policy statement. The lessons learnt from the process will serve to guide other Caribbean states in policy and IWRM planning and development processes.

2.0 Issues of water security

There is no doubt that water is the most vital natural resource and all of life and life support processes are dependent on this liquid medium. Water is vital for human survival, health and dignity and is a fundamental resource for human development. The finiteness of available water on earth is very discernible when we consider that of the 1,400 million cubic kilometers of water on earth and circulating though the hydrological cycle, only one-hundredth of 1% of this amount is readily available for human use (FAO, 2005). It is believed that this quantity is sufficient to meet humanity's needs if it were evenly distributed; however, this available 9,000 cubic kilometer volume is very unevenly distributed across the planet. Areas where the indigenous water supplies average less than 1,000 cubic meters per person per year are categorized as water scarce (FAO, 2005).

The amount of water available to each person is falling considerably as growing human populations continue to place tremendous pressure on diminishing water resources. Water scarcity is exacerbated by pollution. According to the FAO (2005), 450 cubic kilometers of wastewater pollute the world's surface waters each year reducing utility of these waters for safe human consumption. This has implications not only for human populations but also for the natural environment, offsetting the delicate balance of ecological systems, and in severe cases, unleashing irreversible consequences which may have direct adverse socio-economic consequences.

This situation is of particular concern for developing countries and Small Island Developing States (SIDS) where nearly one-third of the population has no access to safe drinking water. The Caribbean region has the least water available per capita as compared to other SIDS regions; just 13.3% of that available in the Indian Ocean SIDS and 1.7% of that available in the South Pacific SIDS on a per-capita basis. The island of Barbados for

example is ranked among the ten most arid countries in the world. The geomorphology of most Caribbean islands limits the physical availability of freshwater reserves on account of relatively small landmass areas and typical mountainous terrain. The impacts of relatively frequent natural disasters (hurricanes and floods) exacerbated by human activity compromise water supply systems for extended periods, placing populations at risk under water scarce conditions. The impacts of climate change on the climatic and water regime in SIDS cannot be underestimated and constitutes an additional threat to water security.

In the GWP/Cap-Net Training Manual and Operation Guide for development of Integrated Water Resources Management Plans (2005), key issues in national water resources management were outlined along with the merits of adopting an integrated approach to water resource management planning. These include:

Water governance crisis: The sectoral approaches to water resources management (WRM) lead to fragmented and uncoordinated development and management of the resource aggravating the increase competition for the finite resource. The importance of IWRM is that it brings coordination and collaboration among the individual sectors, plus a fostering of stakeholder participation, transparency and cost-effective local management.

Securing water for people: Deficiencies in water supplies primarily affect the poorest segments of the population in developing countries. In these countries, meeting water supply and sanitation needs for urban and rural areas represents one of the most serious challenges in the future. Implementing IWRM will assist in meeting the challenge of access to potable water, sanitary facilities and poverty alleviation.

Securing water for food production: Irrigated agriculture is already responsible for more than 70% of all water withdrawals projecting serious conflicts between water for irrigated agriculture and water for

other human and ecosystem uses. IWRM offers the prospect of greater efficiencies, water conservation and demand management equitably shared among water users, and of increased recycling and reuse of wastewater to supplement new resource development.

Protecting vital ecosystems: The functionality and survival of our finite and vulnerable ecosystems depend on water flows, seasonality, water-table fluctuations and are threatened by poor water quality. Land and water resources management must ensure that vital ecosystems are maintained and that adverse effects on other natural resources are considered and where possible reduced when development and management decisions are made. IWRM can help to safeguard an "environmental reserve" of water commensurate with the value of ecosystems to human development.

Gender disparities: As custodians of family health and hygiene and providers of domestic water and food, women are the primary stakeholders in household water and sanitation. Hence, a crucial element of the IWRM philosophy is that water users, rich and poor, male and female, are able to influence decisions that affect their daily lives.

The conflicting uses of water resources and the need for integrated management as the key ingredient for sustainability were resounded during the World Summit on Sustainable Development (WSSD). Hence the resulting Johannesburg Plan of Implementation[2] contained commitments, targets and timetables to address the issues of water and sanitation. Noted among these are:

- Halve, by the year 2015, the proportion of people without access to safe drinking water *(reaffirmation of Millennium Development Goal).*

[2] Note: this list is not exhaustive but provides information on the key commitments set out in the Johannesburg Plan of Implementation. For the full text, including the exact terms in which these commitments were made, visit the official website: www.johannesburgsummit.org

- Halve, by the year 2015, the proportion of people who do not have access to basic sanitation.

- Develop integrated water resources management and water efficiency plans by 2005.

This formed the basis for the catalysing of the present impetus by States to develop IWRM policies and plans.

3.0 Principles of integrated water resources management

3.1 What is integrated water resources management?

Integrated water resources management (IWRM) is a systematic process for the sustainable development, allocation and monitoring of water resource use in the context of social, economic and environmental objectives (GWP/Cap-Net, 2005). As the term suggests the process seeks to strengthen cross-sectoral coordination in development of the country's water resources to reduce conflict, waste and unsustainable systems. In IWRM all the different uses of water resources are considered together. These uses range from water for domestic purpose to water for agriculture, to water for commerce and industry to water for environment. In the Caribbean context water is taken to include both fresh water and coastal marine waters including waste water.

IWRM sets the framework for coordination of management decisions within an appropriate coherent policy setting taking into account overall social and economic goals. By necessity the process towards realization of IWRM must be participatory involving all key stakeholders within the economic sectors (agriculture, tourism, manufacturing, etc), non-governmental and community-based organizations, the public sector and other relevant civil society groups. Involvement by the stakeholders can influence strategies for water resource development and management. A significant benefit from this approach is that informed users will be more inclined to observe self-regulation in relation to issues such as water conservation and catchment protection far more effectively than central regulation and surveillance can achieve.

An important consideration is that priority water problems affecting society must be shown to be effectively addressed through IWRM planning and implementation processes. For the IWRM process to succeed there must be strong buy-in at all levels, from top policy makers to the grass-roots, and it must be driven by a committed core group whose work is defined in an IWRM Roadmap.

3.2 The IWRM planning and implementation process

The IWRM planning and implementation process is a logical sequence of phases that is driven and supported by continuous events. The outlined main phases of the planning process are:

Initiation: Triggers to start a planning process and agreement that improved management and development of water resources is important and necessary. This phase will allow for the synthesis of a team to organise and coordinate effort and facilitate a regular stakeholder consultation.

Visioning: Captures the shared dreams, aspirations and hopes about the state, use and management of water resources in a country. In that sense, a vision provides guiding principles and direction to the future actions about water resources and in particular guides the planning process.

Situation analysis: Defines the actions needed to reach the vision and is facilitated by consultation with stakeholders and various government entities. This is vital to understand competing needs and goals in relation to the water resource availability. This phase elucidates the types of solutions that may be necessary or possible, identifies the strengths and weaknesses in water resource management, points out the aspects that should be addressed in

order to improve the situation and guides the path for obtaining vision.

Strategising: Establishing the goals for the IWRM plan is important at this stage and the most appropriate strategy is selected and assessed for feasibility as well as its conformity to the overall goal of sustainable management. The scope for technical and managerial action is very large given the complexity of the water sector and already at this stage priority areas for action should be identified.

IWRM Plan: On the basis of the vision, the situation analysis, and the water resources strategy an IWRM plan may be prepared. Consultations at all levels will be required to get politicians and stakeholders to agree to the various trade offs and decisions made.
Implementation and evaluation: The legal, institutional, management actions and capacities built will create the requisite enabling environment for implementing the plan. However, achieving sustainable management and development of water resources is a long term commitment and therefore the plan should be seen as a revolving plan with features of evaluation and reformulation at periodic intervals.

The main steps in the cycle for developing and adjusting an IWRM plan are depicted in **Figure 3.2.1** (GWP, 2005).

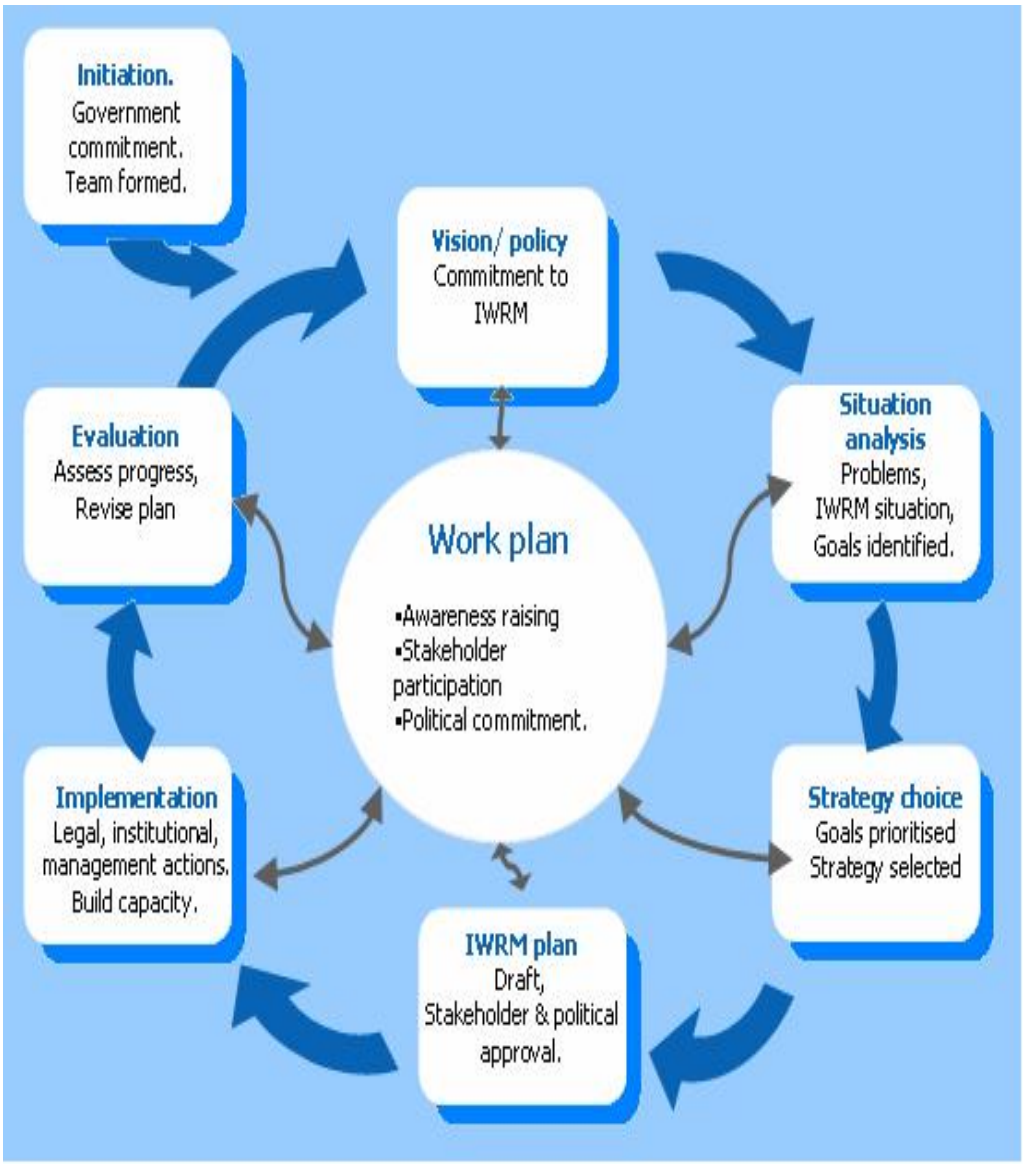

Figure 3.2.1 Cycle for developing and adjusting an IWRM Plan

4.0 Status of water resources management in Grenada

4.1 Geography

Grenada, the most southern of the Windward Islands group, is located between Trinidad to the south and St. Vincent to the north. The tri-island State is of volcanic origin and consists of Grenada, Carriacou and Petit Martinique, which together have an area of 344 km^2 (133 sq miles) and a population of approximately 102,632 (OECS, 2005). The mainland Grenada is 34 km (21 miles) long and 19 km (12 miles) wide and is situated at 11° 58′ north latitude and 61° 20′ west longitude (GEF, 2001). **Figure 4.1.1** is a location map of Grenada, Carriacou and Petit Martinique.

Grenada is predominantly of volcanic origin, although some sedimentary rocks of the Tertiary and Quaternary periods are present. The island was built up of volcanic eruptions during the tertiary and early Pleistocene times. The soils of Grenada are dominated by clay loams (84.5%) with clays (11.6%) and sandy loams (2.9%). 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. About 1/3 of these islands are of fossiliferous limestone which is mainly of the Miocene age (GEF, 2000).

Figure 4.1.1 Location map of Grenada and sister islands

4.2 Demography

Due to the mountainous topography, the majority of the population is confined to settlements within the coastal areas. The population of 102,632 (OECS, 2005) is inclusive of an estimated 5,000 on Carriacou and 800 on Petit Martinique. The main settlements are St. George's and Grenville on mainland Grenada, and Hillsborough in Carriacou; they account for almost 60% of the total population.

4.3 Climate and water resources

Grenada lies in the humid tropical zone within the Atlantic northeast trade wind belt, and the seasonal shift in these winds give rise to a wet season (June to December) and a dry season (January to May). The average annual rainfall for mainland Grenada (Figure 4.3.1) ranges between 1,000 mm and 1,500 mm along the coastal zone, to approximately 4,000 mm in the interior, and supports surface stream flow and recharge of sub-surface aquifers. Due to the orographic effect contributed by the interior mountain ranges there is a marked spatial distribution in rainfall across the island which gives rise to the arid conditions experienced in the northern and southern extremes of the island.

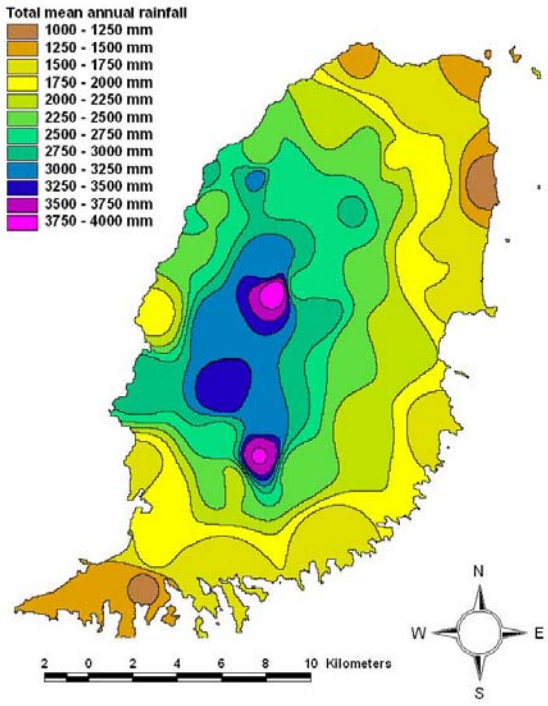

Figure 4.3.1 Mean annual rainfall on mainland Grenada (source: interpolated map developed from rainfall station data; Land Use

Due to their small size and relatively low elevations, Carriacou and Petit Martinique are significantly drier than

the mainland where the average annual rainfall is about 1,000 mm. In all the islands extended dry periods and extreme drought conditions during the dry season are not uncommon.

Temperatures at sea level are generally high with little seasonal, diurnal or spatial variation due to the dampening or stabilizing effect of the adjacent ocean. Annual average sea surface temperatures range between 28.3^{O}C and 33.3^{O}C, however, temperatures in the mountainous interior can dip to the low 20s Celsius during the winter months (GEF, 2000).

Grenada is segregated into 71 watershed areas, while Carriacou is disaggregated into 20 watershed units (Figure 4.3.2). No such differentiation exists for Petit Martinique on account of its small size. On Grenada the watersheds are characterized by a relatively dense network of permanent rivers, while the sister islands are dominated by intermittent streams.

4.4 Water supply and demand

Carriacou

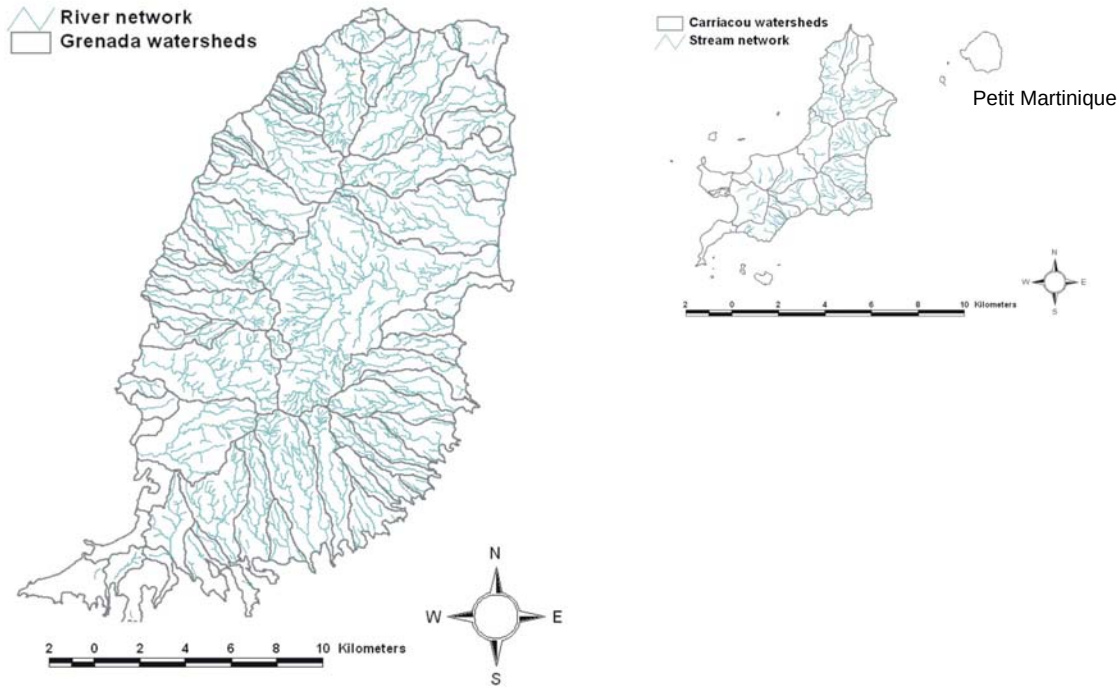

Figure 4.3.2 Watersheds on mainland Grenada and Carriacou (source: Land Use Division, Ministry of Agriculture)

There are 23 surface and 6 ground water potable supply sources (**Figure 4.4.1**) on mainland Grenada, which yield some 54,600 m^3/day (12 mgd) in the rainy season and a maximum of 31,800 m^3/day (7 mgd) in the dry season. The water demand in the rainy season is 45,500 m^3/day (10 mgd) and in the dry season, 54,600 m^3/day (12 mgd) (GEF, 2000). The higher water demand in the dry season is largely due to increased demand from the hospitality sector (peak visitor arrivals occur during this period) and irrigation (landscaping and agricultural) requirements. The bulk of the water requirements are met by potable water supplied by National Water and Sewerage Authority (NAWASA). Some communities particularly in the south of the island rely heavily on rainwater harvesting to augment supplies during shortfalls mainly during the dry season.

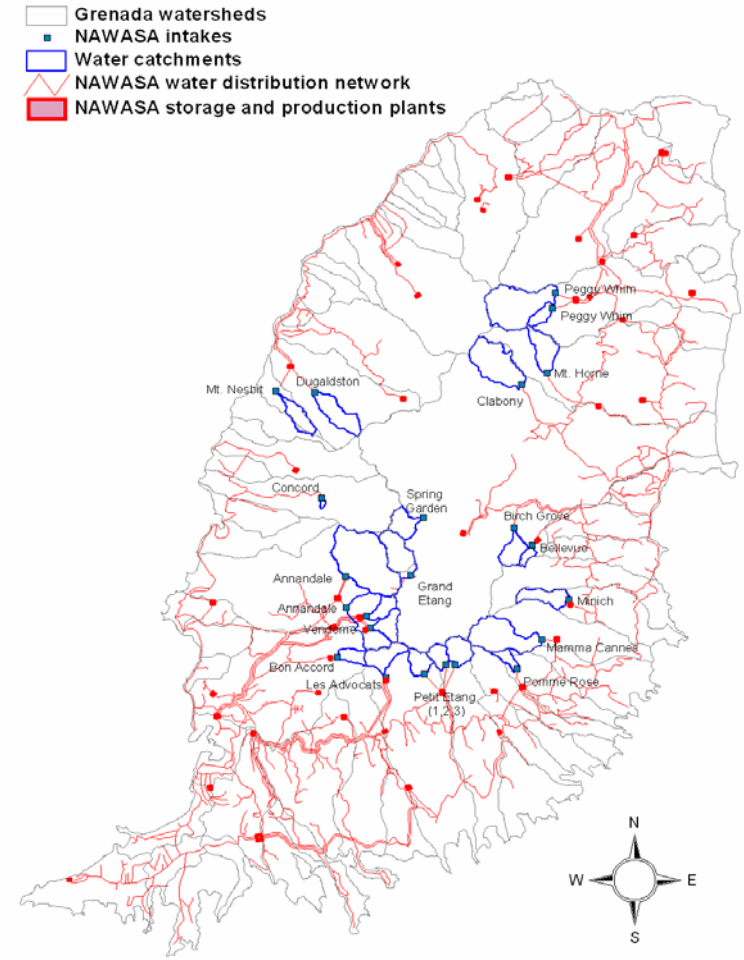

Figure 4.4.1 Grenada's water supply and distribution network
(source: NAWASA and Land Use Division, Ministry of Agriculture)

Carriacou and Petit Martinique are 100% reliant on rainwater harvesting on account of the small size of the islands which are very water-scare. There are 33 community rainwater catchment and cistern systems in Carriacou and Petit Martinique. Communal cisterns have also been installed in public buildings, schools hospitals, medical clinics and churches (Peters, 2002), totalling some 78 public storage systems.

4.5 Vulnerability to natural hazards

Like all tropical countries Grenada is prone and vulnerable to all the classical natural hazards including:

- Hurricanes and tropical storms;
- Floods;
- Landslides;
- Earthquakes.

Torrential rains resulting from extreme weather events, hurricanes and storms result in overflowing and rapidly moving rivers and intermittent streams laden with silt. Since surface water is the main source or potable water, clogged dams and overburden of the water treatment systems are often manifested in water outages. The issue of improper drainage in the flat lands of the south and urban areas compounded by poor solid waste disposal practices usually result in extensive flooding.

The effects of Hurricanes Ivan and Emily on the upland watershed have not been well documented but after two years the impact on the vegetation is still evident (**Figure 4.5.1**). Reports of post-hurricane increased river flows following heavy downpours could be the result of damaged watersheds having reduced retention capacity causingsignificant increases in runoff.

Figure 4.5.1 Post Hurricane Damaged Upland Watershed

4.6 Effects of hurricanes Ivan and Emily

Hurricane Ivan (Category III Hurricane), packing winds of up to 250 kph, struck the state of Grenada on 7 September 2004, causing the deaths of 37 people and damages in excess of USD 900 million equivalent to 200 % of the GDP (UNDP, 2004). Some 90 % of housing stock was destroyed, along with the loss of essential services, leaving the majority of the country's population in a highly vulnerable state. According to a damage assessment conducted by the Organisation of Eastern Caribbean States (OECS) and the UN Economic Commission for Latin America and the Caribbean (UN-ECLAC), approximately 10,000 houses needed to be completely rebuilt and another 22,000 repaired. At the end of 2005 several thousand remained in temporary shelters or otherwise living in deplorable conditions, dependent on public assistance (UNDP, 2004).

During the early hours of July 15 2005, Category 1 Hurricane Emily passed through the tri-Island state of Grenada, Carriacou and Petite Martinique with winds up to 160 kph and rainfall accumulations of up to 254 mm in some areas. The 7 hours of devastation inflicted on Grenada was estimated at US$ 107.5 Million (NADMA, July 2005) or equivalent to 13 % of the current value of the GDP (OECS, 2005), with approximately 2, 600 homes partially or completely destroyed, and roughly 4, 590 persons displaced. One death was reported. Damage was also sustained by the infrastructure with disruption to the essential utilities including power and water supplies.

The passage of both hurricanes and their cumulative destructive effects on Grenada, Carriacou and Petite Martinique heightened the need to reduce human-induced influences in terms of vulnerability to natural disasters by placing greater emphasis on coordinated and integrated land use planning, regularization of unplanned settlements, watershed resource conservation and rehabilitation and integration of hurricane safety provisions in the rebuilding process.

The impacts of destructive cyclones on the watershed systems of small islands are particularly evident in circumstances where the watersheds are highly degraded on account of unsustainable land management practices attributable to agriculture, housing or other infrastructural development. The associated high rainfall accumulations tend to cause massive erosion in steep upland areas where the soils are rendered exposed, with consequent siltation of river channels and deposition of sediment loads in offshore marine ecosystems. In many Caribbean islands, a large percentage of the potable water supply is sourced from rivers and streams typically in upland watershed areas that may be already compromised by human activity. Silt and debris-laden high storm flows often choke the water intake infrastructure, while landslides often cause breakages in the distribution lines, forcing supply interruptions to many communities for weeks and in some cases months. Water supply deficiencies over extended periods can have potentially serious adverse impacts on public health and sanitary conditions. The need to secure adequate potable water supplies to assist with the post-disaster restoration and recovery efforts cannot be understated. Following both hurricanes, the availability of potable water to Carriacou residents, as compared to those on mainland Grenada, was not seriously compromised due to the prevalence of RWH systems on that island. Whereas blockage of intake dams and damage to the distribution network disrupted the water supply of Grenada for extended periods, the individual household cisterns of Carriacou permitted a ready potable water supply during the immediate recovery period.

5.0 Water governance in Grenada

5.1 Existing legislative and policy environment governing water resources

The structure of the legal framework governing the water resources management can be considered to consist of three levels:

- International level through the myriad MEAs ratified or acceded to by the Government of Grenada (GoG);
- Regional environmental protection agreements signed by GoG;
- National laws, policies and plans.

5.1.1 National legislative and policy framework

The regulatory framework associated with water resources management is piece-meal and embedded in various institutions. These legal instruments, due to the dispersion among the various institutions, necessitate inter-sectoral coordination and co-orporation for attaining sustainable management of water resources.

Nationally many pieces of legislation exist for environmental protection, dispersed among a number of Ministries and national agencies. The major legal instruments and institutions with mandates for execution and enforcement are shown in **Table 5.1.1.1.**

Table 5.1.1.1 Legal instruments and institutions

Responsible Agencies/Institutions	Legal Instrument
	• Draft Protected Areas and Wildlife Legislation, 2003 • National Parks and Protected Areas Act

Ministry of Agriculture - Land Use Division - Forestry Division	CAP. 206 (1990) • The Forest Soil and Water Conservation Act CAP.116 (1949) • Forest, Soil and Water Conservation (amendment) Ordinance (No. 34, 1984) • Grenada Forest Policy and Strategy (1999) • Policy and Plan for Preventing Land Degradation (2007)
Ministry of Education	National Heritage Protection Act CAP. 204 (1990)
Ministry of Tourism	• Plan and Policy for a System of Parks and Protected Areas in Grenada (1988)
Grenada National Trust	• Grenada National Trust Act CAP. 207 (1967)
Grenada Tourist Board	• Tourist Board Act CAP. 321 (1988) and amendment 1990
National Water and Sewerage Authority	• National Water and Sewerage Authority Act CAP. 208 (1991) and amendment (1999) • National Water and Sewerage Authority Regulations SRO 40 (1993)
Ministry of Health and the Environment - Environmental Health Department - Environmental Coordinating Unit	• Public Health Act CAP. 263 (1925) • Public Health Regulations Sec.15 (1958) • National Environmental Management Strategy and Action Plan (2006) • Water Quality Act No. 1 (2005)
Grenada Solid Waste Management Authority	• Abatement of Litter Act CAP. 1 (1974) • Solid Waste Management Act CAP. 11 (1995)
National Science and Technology Council	• Science and Technology Council Act CAP. 298 (1982)
Grenada Industrial Development Corporation	
Ministry of Finance - Physical Planning Unit - Agency for Reconstruction and Development	• Physical Planning and Development Control Act No. 25 (2002) • National Physical Development Plan: Grenada-Carriacou-Petite Martinique (2003) • Biodiversity Strategy and Action Plan (2000)

	• Medium-Term Development Framework entitled Economic Growth, Poverty Alleviation and Macroeconomic Stability *(2005)* • National Strategic Development Plan (2007-2017) • Poverty Reduction Strategy (2000) • National Climate Change Policy and Action Plan (2007)
Land Development Control Authority	• Land Development Control Act (1986)

National Water and Sewerage Authority (NAWASA) Act, 1990

The National Water and Sewerage Authority (NAWASA) Act, 1990 was passed to establish the Authority to execute the mandate of the Government of Grenada in:

a) the provision of water supplies and the conservation, augmentation, distribution and proper use of water resources including preservation and protection of catchment areas;

b) sewerage and the treatment and disposal of sewage and other effluents.

According to this Act, the Authority shall have full power over all waters whether surface or underground in the State of Grenada, and shall collate and publish information from which assessment can be made of the actual and prospective water resources in the State. Additionally, the Authority shall, unless unavoidable, be responsible for the provision of a satisfactory supply of potable water for domestic purposes and an otherwise satisfactory supply of water for agricultural, industrial and commercial purposes and for such other purposes as may be prescribed by the Minister.

Essentially, the Act covers all areas such as the institutional arrangements of the Authority and the administration of the powers vested in this body, the powers of entry and acquisition for water and sewerage works,

financial provisions, rates and charges, acquisition of property and wells and boreholes. Catchment areas are given emphasis and measures for the protection and conservation are outlined along with the collaborative arrangement with the Ministry of Agriculture's Forestry Division for the management of these areas.

Water tariff structure

In accordance with the NAWASA Act of 1990, water users are categorized as domestic and non-domestic users for purposes of tariff-setting. The domestic users can be re-classified into the following sub-categories:

- Household (in excess of 86% of the population are serviced by the potable water distribution network NAWASA pers. comm., 2006)
- Agricultural (crop and livestock production).

The non-domestic user category is inclusive of:

- Commercial enterprises (restaurants, businesses);
- Industrial enterprises (light manufacturing);
- Hospitality sector (hotels);
- Public institutions (hospitals, prisons, government buildings);
- Schools;
- Ships

Under the provisions of the Act, water and sewerage charges are incorporated into a monthly customer bill for the metered, and a quarterly bill for the un-metered consumers. The tariff structure is presented in **Table 5.1.1.2** (source: GoG, 1999).

Table 5.1.1.2 Water and Sewage Tariff Structure (NAWASA Act regulation)

(A) Metered Domestic Customers

Category 1 – Consumption less than 10 m³ (2,200 gals):
US$2.22 per 5 m³ (1000 gals) per month
Category 2 – Consumption between 10 m³ (2,200) and 25 m³ (5,500 gals):
US$3.70 per 5 m³ (1,000 gals) per month
Category 3 – Consumption above 25 m³ (5,500 gals):
US$5.56 per 5 m³ (1,000 gals) per month

Fixed charge of US$2.96 per connection.

(B) Un-metered Domestic Consumers

0.25% of the market value of the property for the first US$37,037 per year
0.15% of the market value of the property for the next US$74,074 per year
0.05% of the market value of the property above US$222,222 per year

A minimum charge of US$35.60 per year (if property value is US$14,074 or less)

(C) Metered Commercial and Industrial Consumers

Proportional Part – US$5.86 per 5 m³ (1,000 gals) per month

Fixed Part – 40 % of un-metered rates for these premises.

(D) Un-metered Commercial and Industrial Consumers and Government Buildings

0.35% of the Market Value of the property for the first US$185,185 per year
0.30% of the Market Value of the property for the next US$185,185 per year
0.25% of the Market Value of the property above US$370,370 per year

Minimum charge of US$35.55 per year

(E) Ships – US$25 per 5 m³ (1,000) gallons

(F) Private trucks/tankers – US$5.56 per 5 m³ (1,000) gallons

The existing rates for water supplied from the communal cisterns of Carriacou are outlined in **Table 5.1.1.3.**

Table 5.1.1.3 Existing Water Rates for Carriacou (from communal cisterns)

Cost	Quantity
US$0.24 for 3 months	14 litres (1 pan) per day
US$0.12 for 2 months	14 litres every other day
US$0.06 for 1 month	14 litres every other day
US$0.36 for 450 litres of water	

According to an OECS study (1986), there were no records available to quantify the revenue derived from the distribution of water from communal systems in Carriacou. It suggested that administrative costs such as issuing receipts and maintaining accounts exceeded the benefits of revenue collection. For sustainable operation and maintenance of the RWH systems in Carriacou, a viable system of revenue collection for cost recovery needs to be instituted.

Draft Protected Areas, Forestry and Wildlife Legislation (2003)

The Draft Protected Areas, Forestry and Wildlife Legislation (2003) which evolved to support the Forest Policy and Strategy is divided into XI Parts and two Schedules. Formulated to overcome gaps identified in the existing legislation this draft Act made an effort to identify means for the new law to have the best chances of effective implementation. This includes features such as deadlines for the adoption of management plans and issuance of permits in accordance with the plan ((Cirelli and Wilkinson, 2003). A less authoritarian approach allowing for multi-sectoral and integrated elements to be incorporated regarding protected forest and provisions for watershed management was used. The Forestry Division is optimistic that this draft legislation once enacted will serve as an effective tool for the management and conservation of the forestry resources and important watersheds in Grenada.

This Act is currently before Cabinet for approval and will be the primary legislation governing protection and conservation of forests and watersheds. It was formulated to meet the challenges of conservation of natural terrestrial resource in modern times with a clear understanding of the need for the integrated approach. Implicit in each section of the Act are the sustainable management principles and the wise use of resources for socio-economic improvement while at the same time ensuring perpetuity for future generations.

Forest, Soil and Water Conservation Act Cap. 116 (1990)

The Forest, Soil and Water Conservation Ordinance of 1949, as amended in 1984, is the principal legislation for the protection of "such areas as

may be required to provide natural and undisturbed habitat for the flora and fauna of Grenada." The Ordinance provides authority for the Forestry Department to declare forest reserves on State owned land or protected forests on private land. The 1984 amendments revised the basic conservation concepts, revised the penalties for offences, and included a list of tree species to be protected on private lands.

Plan and Policy for a System of National parks and Protected Areas

In 1988 the Government of Grenada and the OAS published a Plan and Policy for a System of Parks and Protected Areas in Grenada. The Plan has identified 27 areas of outstanding natural and cultural heritage in the country, under both crown and private ownership, which should be included in the National Parks System. The categories for the proposed protected areas included the existing parks, National parks, National Landmarks, cultural Landmarks, Protected Seascapes and multiple use Management Areas such as watersheds. These included many upland watershed areas such as the Grand Etang Forest Reserve which are critical to the provision of potable water supplies.

However, since the publication of the Plan the Government has enacted the National Parks and Protected Areas Act (1990) which allows the Minister to designate land as protected areas for the purpose of the preservation of the natural beauty of the area, including the flora and the fauna, the preservation and maintenance of water supplies and water catchment areas, and the preservation of places of historic, archaeological, cultural or scientific importance.

Largely due to problems of private land expropriation and overlapping jurisdiction, which could give rise to conflicts between different government departments and between different land owners, and lack of technical capacity within the Unit, no orders have so far been made under the Act to designate any National Parks or Protected Areas. Nevertheless, four proposed areas are currently being managed as such: Levera National Park, Grand Etang National Park, Annandale Falls Natural Landmark and Fort Frederick Cultural Landmark.

Grenada Forest Policy and Strategy

In February 1999 the Government approved a New Forest Policy for Grenada, Carriacou and Petit Martinique, prepared by the Forestry Department. Having the goal to "maximize the contribution of forest to environmentally-sound social and economic development," the Policy identified a number of strategic directions with respect to the conservation of biodiversity, the management of mangroves, non-timber forest products and timber production, watershed and wildlife management and recreation and eco-tourism. The document recognised that the implementation of the policy and strategy will require significant legislative and institutional changes, capacity building and appropriate financing arrangements.

The strategic directions embedded in the forest policy include recreation and eco-tourism and has, as sub-components, provision of opportunities for forest-based recreation, enhancement and diversification of the nation's tourism product, bring social and economic benefits to communities located near forest areas and minimize negative impacts of recreational and tourism uses on the forest.

Physical Planning and Development Control Act 2002

The Physical Planning and Development Control Act (2002) is the most updated legal instrument for environmental management in Grenada. The objectives of the Act includes *inter alia*:

- Ensure that appropriate and sustainable use is made of all publicly-owned and privately-owned land in Grenada in the public interest;
- Maintain and improve the quality of the environment in Grenada, including its amenity;
- Protect and conserve the natural and cultural heritage of Grenada.

This Act is administered by the Land Development Control Authority which is headed by the Physical Planning Unit and prescribes the preparation of a physical plan for Grenada. Permission must be obtained from the Authority for the development of land and the request for

further information and an Environmental Impact Assessment is outlined. The process for the conduct and components of the environmental impact assessment study are stipulated including matters for which an EIA will be required in Schedule II.

Waste Management Act 2001

The Act makes provision for a National Solid Waste Management Strategy with components covering *inter alia*:

- Standards, requirements and procedures for the management of all waste, including the generation, handling, storage, treatment, transport and disposal of all types of waste;
- Outline measures for effective training of staff involved in waste management and effective public education and awareness regarding waste management;
- Establish standards and procedures to be implemented in the reduction, recycling of, recovery, reclaiming and re-use of waste and the use of recycled substances;
- Identify methods by which waste is to be transported.

This Act is important for the prevention of litter, illegal dumping and establishment of waste management facilities. This has implication for the protection of watershed and pollution prevention of natural watercourses.

Wild Animal and Bird (Sanctuary) Ordinance (1928)

The Wild Animals and Birds (Sanctuary) Ordinance of 1928 provided early legislation for the protection of birds and certain other species in the Grand Etang Forest Reserve. Wider protection was subsequently afforded for all birds other than the game species, and for sea turtles, lobster and oysters during the closed seasons, under the Bird and Other Wild life (protection) Ordinance of 1957 as amended in 1964.

Limiting the disturbance of the forest and reducing modification of the habitats for the fauna contained therein will be of critical importance to the maintaining the functionality of the watersheds.

Public Health Act CAP. 263 (1958) amended

The Public Health Act addresses the issue of pollution of water courses and watershed areas. Declaration from time to time include among other prohibitions for taking of water from streams for drinking purposes. Activities which may pollute the waters of the streams are not permitted. The primary objective of this Act is the protection of public health however, environmental protection is obtained by extension.

National Strategic Development Plan (2007-2017)

Under the post-Hurricane Ivan reconstruction effort, the Agency for Development and Reconstruction (ARD) is spearheading the development of a 10-year National Strategic Development Plan (2007-2017). The Plan addresses national development imperatives in the context of sustainable development while increasing national productivity through creative solutions. The Strategic Plan has common elements with National Environmental Management Strategy in the context of management of natural resources with emphasis on land and water. It is anticipated that the Plan will be ratified by 2007.

Medium-Term Development Framework: Economic Growth, Poverty Alleviation and Macroeconomic Stability(2005)

The GOG has developed a Medium-Term Development Framework entitled Economic Growth, Poverty Alleviation and Macroeconomic Stability that articulates a series of initiatives that are to be undertaken over the period 2006 to 2008. The broad focus areas of the framework include (1) sustainability of high economic output, (2) restoration of debt and fiscal sustainability, (3) reduction of vulnerabilities and (4) reduction in poverty. Some specific areas identified for intervention of relevance to land management in the scope of this MSP include the establishment of an executive land management agency, strengthening of public sector investment planning and implementation, enhancement of government service delivery and vulnerability reduction (through implementation of post-Hurricane Ivan reconstruction recommendations).

National Physical Development Plan (2004)

The National Physical Development Plan was recently completed in accordance with Section 16 of the 2002 Physical Planning and Development Control Act. The GOG has been effecting environmental aspects of the Plan through planning and development regulations, with particular reference to requirements for environmental impact assessments (EIA) in granting approval for development projects that will have significant effects.

Cabinet approved the National Physical Development Plan for Grenada in 2004. Aspects of the plan are already being implemented such as the requirement of environmental impact assessments (EIA) to grant approval for development projects that will have significant effects. Projects that will have negative impacts on water can be addressed through the cross-sectoral representation on the EIA committee that is formed to review projects by the Physical Planning Unit.

Poverty Reduction Strategy (2000)

The GOG, with the assistance of the IMF has developed an interim Poverty Reduction Strategy Paper. The vision of the PRSP is rooted in the country's commitment to realizing poverty reduction under in the context of the MDGs and focuses on the following priority elements:

- Economic recovery for sustained economic growth;
- Agricultural rehabilitation and development;
- Housing development;
- Reduced unemployment;
- Improved access to social infrastructure;
- Human resource development;
- Modernization of estate service machinery;
- Improved environment management;
- Social safety net programmes.

National Environmental Policy and Management Strategy (2005)

The National Environmental Policy and Management Strategy (NEMS) was developed and approved in 2005. The NEMS proposes a broad policy framework for environmental management in Grenada, and establishes links with policies and programmes in all relevant sectors of economic and social reconstruction and development. It also provides the more specific and practical directions and mechanisms that are needed for effective policy implementation, with an identification of the results expected and the actions necessary to realise the policy objectives.

Eight key strategies have been identified in the NEMS:

- Integrating the environmental dimension in the reconstruction process;
- Integrating the environmental dimension into the fabric of society;
- Creating harmony between environment and development objectives and actions;
- Establishing appropriate institutional arrangements;
- Building the capacity for environmental management;
- Developing and using appropriate, fair, effective and efficient instruments of environmental management;
- Promoting a knowledge-based and scientific approach to environmental management; and,
- Developing and sustaining regional and international partnerships.

The strategic goal of the NEMS is to "optimize the contribution of natural and environmental resources to economic development." This is a crucial factor since the management of water resources is key to the environmental sustainability and cannot be plucked from the relevance to land management and other interrelated activities.

Important initiatives being implemented by the government under the NEMS frameworks include:

- Formulation of a **National Land Policy:** The policy seeks to rationalize land use and to provide the instruments required to achieve a range of land management and development objectives.

The Land Policy development process has now been assigned to the Agency for Reconstruction and Development (ARD) given their mandate in rationalizing land resource allocation in the post-Ivan rebuilding process. The policy development process is expected to conclude within 2007.

- **Legislative and regulatory instruments** addressing noise, air and water pollution were developed in a project that commenced in 2005. The project is expected to be completed within 2007. Final draft legislation is presently before Cabinet.

- **Public Awareness Programme:** A three-year public awareness programme targeting all sectors, institutions and communities commenced in 2005 and is expected to be completed in 2007.

- Rehabilitation and enhancement of an **Environmental Information Management System:** This project entails the development of an electronic data base and documents relevant to sustainable development and environmental management in Grenada. The project is expected to wrap up in 2007.

Proposed Land Management Agency (LMA)

Under a Public Sector Modernization Project the GOG is pursuing the establishment of a new executive agency, a Land Management Agency that will be charged with the responsibility to manage issues related to land use in an integrated manner with all other agencies with mandates for land resource management and administration. The Valuation Section of the Ministry of Finance, the Land and Surveys Division of the Ministry of Agriculture and the Registry of the Supreme Court will be integrated within the new agency. It is anticipated that this agency will be the lead policy and regulatory-setting body for land development processes in Grenada. Establishment is anticipated during 2007 (Grenada MSP, 2006).

5.1.2 Regional legislative and policy framework

Recognising the need to protect the environment of the small island states of the Caribbean region and cognisant of the need for a concerted effort among the states a number of regional instrument were formulated. A synopsis of the major environmental agreements formulated and implemented in the Caribbean region is presented below.

The St. George's Declaration

The St. George's Declaration on Principles for Environmental Sustainability in the OECS is an important agreement for the conservation of natural resources in the sub-region. In this agreement, the Member States of the OECS persuaded that the effective management of environmental resources at local, national, regional and international levels is an essential component of sustainable social and economic development, including the creation of jobs, a stable society, a buoyant economy and the sustaining of viable natural systems on which all life depends.

Principle 11 addressed the sustainable use of natural resources and outlines among other things that Member States should manage terrestrial, marine and atmospheric resources, organisms and eco-systems in an appropriate manner to obtain the optimum sustainable productivity, while maintaining the integrity of natural and ecological processes and inter-relationships between such systems and processes. Further, States should develop a schedule of development activities for which environmental impact assessment will be required as part of project definition and design and the results of which will be considered in determining whether and how a project will proceed.

OECS Model Physical Planning Bill

In 1994, the OECS Model Physical Planning Bill was prepared to address the need for development of appropriate planning and land use legislation, which will serve to offer some measure of protection to the environment in Member States. This Act endeavours to incorporate EIAs as an integral part of planning and is used to guide Member States, including Grenada. The conduct of an EIA to guide the decision on development is critical to the protection of watershed and the water resources. This is particularly important for resolving conflict associated with the resource and securing water for human use and maintaining ecosystem functionality.

The Cartagena Convention, 1983 (The Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region) and the Land-Based Sources of Marine Pollution Protocol (1999)

Notwithstanding the reliance of the islands of the Caribbean on the marine environment the exploitation, degradation and overexploitation of the sea has plagues the region for decades. The Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region was developed to offer some measure of protection to this vital natural resource base. This Convention discusses issues such as pollution from ships, dumping, land-based sources of pollution, sea-bed activities, airborne pollution, specifically protected areas, cooperation between nations in case of emergencies, and environmental impact assessments. This Convention was signed by Grenada in 1983 and ratified in 1987.

Pollution of the marine environment from land-based sources has been recognized as the most significant stressor on the Caribbean Sea. Hence, the Land-Based sources of Marine Pollution Protocol which complement the convention is one of the three ancillary instruments for attaining the aims coastal and marine resource protection. IWRM in particular watershed protection, prevention of land degradation, prevention of pollution of water courses are key element sot reducing the degradation of the coastal and marine resources from land-based activities.

5.1.3Multi-lateral environmental agreements

Grenada has ratified or acceded to a number of international conventions and agreements which require measures and systems to be implemented at the national level for the protection of the environment. However, like most other regional States, the challenge of developing the institutional capacity to administer these instruments at the local level have led to delays in the impacts of these instruments at the national and local

levels. Table 5.1.3.1 provided a listing of the multi-lateral environmental agreements (MEAs) to which Grenada is party.

Table 5.1.3.1 Grenada's commitment to international conventions

Conventions	Commitment Data
Convention on Biological Diversity	Sgn 12/06/92 Rtf 11/08/94
World Heritage Convention	Ac 10/07/98
Cartagena Convention	Sgn 24/03/83 Rtf 17/08/87
United Nations Convention on Law of the Sea	Rtf 25/04/91
United Nations Framework Convention on Climate Change	Wef 09/11/94
United Nations Convention to Combat Desertification	Rtf 27/05/97
Sgn – signed; Ac – Acceded; Wef – With Effect from; Rtf – Ratified	

Grenada Biodiversity Strategy and Action Plan (2000)

The Biological Diversity Strategy and Action Plan (GBSAP) was developed by Grenada in fulfilment of its obligations under the Convention on Biological Diversity as part of the Government's renewed commitment to sustainable management of the country's natural resources. (GBDSAP, 2000). The Strategy contains an assessment of the key sectors and identified gaps in effective management of natural resources. However, it was noted that effective national action depends on developing an institutional, policy and legal framework that supports effective planning and management of biodiversity. Key objectives of the strategy which were transformed into 8 concepts which are crucial elements of implementation include *inter alia*:

- Protect key ecosystems from negative human impacts;
- Develop and encourage sustainable utilisation of biological resources that are essential to the livelihood of local communities;
- 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 decision on national development projects.

United Nations Convention to Combat Desertification and Drought

The United Nation Convention to Combat Desertification and Drought (UNCCD) was ratified by Grenada in 1997 due to the recognition that land management is essential for sustainable development of Grenada. Under the UNCCD countries agree to develop (or adapt existing) strategies, plans or programmes for the conservation and sustainable use of land, and to integrate land management into the agenda of various sectors and sub-national levels of administration and planning. Implementing the objectives of the convention involves the formulation of a National Action Programme (NPA) which is a product of national policy to elevate concern for land management to the level of planning and action. It recognizes land management as an important national asset that offers the country manifold economic options (Bynoe, 2005).

A major thrust of the UNCCD is sustainable land management (SLM) the objective of which is to harmonise the complimentary goals of providing environmental, economic and social opportunities for the benefit of present and future generations, while maintaining and enhancing the quality of the land (soil, water and air) resources. Sustainable land management is the use of land to meet changing human needs (agriculture, forestry and conservation), while ensuring long-term socioeconomic and ecological function of the land. SLM combines technologies, policies and activities aimed at integrating socioeconomic principles with environmental concerns to protect the potential of natural resources and prevent degradation of soil and water quality (protection) among other aspects.

United Nations Framework Convention on Climate Change

The Convention on Climate Change sets an overall framework for intergovernmental efforts to tackle the challenge posed by climate change. It recognizes that the climate system is a shared resource whose stability can be affected by industrial and other emissions of carbon

dioxide and other greenhouse gases. Grenada ratified the convention in 1994 and in doing so has committed to the preservation of sinks for carbon dioxide which was identified at the number one green house gas culprit.

Management of forest is important to mitigate against climate change. Trees provide the sink and absorb carbon dioxide from the atmosphere which they fix during the photosynthetic process to produce organic carbon. Deforestation of any sort will compromise the ability of the state of Grenada to meet its obligations under this Convention. This is important for the protection of forest reserves, watershed and water resources in the State.

Barbados Programme of Action (1994)

Subsequent to the United Nations Conference on Environment and Development (UNCED) Rio 1992, the United Nations Conference on Small Island Developing States (SIDS) was convened due to the recognition that special emphasis needs to be given to these States. The Barbados Programme of Action (BPOA) emerged to guide environmental management in Small Island Developing States and outlined the basis for sustainable development.

A number of issues are associated with environmental management and sustainable development, one of which is that the major long-term land management issue in small island developing States is the degradation of the limited land area due to a variety of factors, including overuse because of high population pressure on a limited resource base; deforestation due to unsustainable commercial logging or permanent conversion to agricultural or grazing pursuits; and other episodic events, such as fire. Natural events, such as catastrophic cyclones, are also major contributors. Land degradation of this kind results in accelerated erosion and a resultant decline in fertility and productivity, a deterioration in water quality and the siltation of rivers, lagoons and reefs. Deforestation is also linked to a decline in the continuity and quality of village water supply, the depletion of genetic, wood and non-wood plant resources,

and the fading away of traditional forest, lagoon and reef-based subsistence life systems.

National programmes for the management of the environment of SIDS include *inter alai*: 1. Prepare and/or review land-use plans in conjunction with agricultural, forestry, mining, tourism, traditional land-use practices and other land-use policies, with a view to formulating comprehensive land-use plans and zoning so as to protect land resources, ensure sustainable and productive land-use and guard against land degradation, pollution and exceeding island carrying capacity. 2. Encourage appropriate forms of land tenure, improved land administration and a greater appreciation of the integrated nature of land development in order to facilitate sustainable land-use. 3. Support appropriate afforestation and reforestation programmes, with appropriate emphasis on natural regeneration and the participation of land owners, in order to ensure watershed and coastal protection and reduce land degradation. 4. Increase attention to national physical planning in both urban and rural environments, focusing on training to strengthen physical planning offices, including the use of environmental impact assessments and other decision-making tools.

6.0 IWRM initiation – Policy and vision for water resources management in Grenada

6.1 Issues in water resources management

At an IWRM meeting for stakeholders held in Grenada in February 2007 issues related to water resources management to be addressed by the proposed water policy were indicated (**Appendix I for Meeting Report**). These were combined with the issues and concerns outlined during the situational analysis study and listed below. Additionally, the participants stated their expectations for the policy and integrated water resources management in Grenada.

A presentation was made by Mr. Trevor Thompson of the Land Use Division, Ministry of Agriculture in which he outlined the issues in water resources management facing Grenada as follows:

- The water supply is not as infinite as Grenadians think it is;
- The need for comprehensive policy and integrated management;
- The lack of comprehensive legislation and regulations resulting in fragmented management;
- Environmental degradation is affecting both surface and groundwater quality, quantity and availability;
- Changing land use is affecting quality, quantity, supply systems, and distribution patterns (making it more expensive);
- The need for a water census to value the total resource is critical;
- Planning for water in disasters such as hurricanes, flooding and drought;

- Deforestation, poor agricultural practices and management of land and water;
- Changing and inadequate land use planning, zoning etc.;
- Lack of storage capacity for potable water resulting in dry season shortage;
- Lack of payment of royalties for water source protection;
- Competition from housing and tourism;
- Lack of adequate supplies for the island of Carriacou and Petite Martinique;
- Lack of coordination, cooperation and integration of stakeholders;
- Poor project planning, design and implementation;
- Lack of a management plan encompassing all stakeholders;
- Sidelining of the role of women in water management and use;
- Lack of education in best management practices for land and water conservation;
- Privatization.

Based on contributions by participant, the meeting subsequently identified and discussed the areas to be addressed by Grenada's Water Policy:

1. **Driving forces**

    - Need for more integrated management of the country's water resources;
    - Need to ensure a safe and adequate water supply;
    - Need to ensure greater economic efficiency, equity and environmental sustainability in the way that water resources are managed;
    - Need to involve more stakeholders in development and implementation of a water policy as well as in IWRM;

- The need to urgently formulate a water policy which meets all of the above in time to access EU funding for the water infrastructure upgrade in southern Grenada.

2. Expectations

- Greater awareness of water resource management, watershed and coastal resources;
- Building of capacity in the areas of water conservation, management, utilization, production (including rainwater harvesting) with available assistance (including the GWP, CapNet etc.);
- Clarification and harmonization of roles/responsibilities at all levels (public, private sector, civil society);
- Greater consistency between various Natural Resource Management policies, national as well as to which Grenada is obligated (e.g. Forestry Policy, RAMSAR, MGDs, SDGs, the Cartagena Convention [LBS] Protocol, others;
- The appropriate valuation of water in all its uses (Public/private debate);
- An enabling environment – introduction of the necessary legislation, regulations and guidelines;
- Improved information sharing;
- Proper management of data and information towards well-informed decision-making;
- A holistic approach to Water Resources Management in Grenada;
- An approach to WRM which ensures greater continuity, implementation and sustainability;
- Improved resource mobilization, funding;
- Greater discipline by users and greater responsibility in water management;
- Issues of salinisation of soils due to irrigation with brackish water and salt water intrusion due to over-pumping of coastal aquifers are addressed;

- That pollution mitigation in the freshwater and marine environment and public health (sanitation, disease control) be addressed;
- Clear and easily assessable indicators;
- Institutional strengthening (personnel and equipment);
- The review of existing regulatory mechanisms, and revision as necessary to meet goals;
- Consideration of who, if anyone, “owns” water;
- Proper valuation of water resources and system of paying for its use.

7.0 Main findings of the IWRM assessment

7.1 Grenada water resources management situation analysis

The water resources management situation analysis conducted for Grenada, as part of the process towards IWRM, was deemed necessary to examine the key factors of influence, characterise the present situation and use the information obtained to guide the IWRM "Road Map". The study aimed at reflecting the concerns and impacts of the present water management systems on users, development, the environment and society as a whole by striking a balance between the analytical tasks and the stakeholder inputs. For the purpose of conducting the situation analysis a data and information collection form (**Appendix II**) was developed and administered to a wide cross-section of stakeholders (**Appendix III**). The form was designed to capture all aspects pertinent to IWRM including *inter alia*:

- The existing WRM system;
- Identification of gaps in the management framework;
- IWRM experience at the country level;
- Experience with the planning process at the sector and national levels;
- Current water demand and supply and future projection;
- Socio-economic aspects;
- External drivers, national, regional and international environmental commitments.

Execution of the data collection form was conducted simultaneously by personnel from CEHI and the MoA to the predetermined targeted agencies. The scheduled meetings had the dual purpose of gathering the

requisite information and further obtaining buy-in to the IWRM process for Grenada.

7.2 Status of water resources management in Grenada

Grenada is typified by a sectoral approach to water resources management with the National Water and Sewerage Authority (NAWASA), the main abstractor, given the responsibility for the management of the resource (NAWASA Act, 1990). Other Ministries, Agencies and Governmental Departments with responsibility for water resources management include: Ministry of Agriculture in particular the Forestry Division and the Land Use Division; Ministry of Health in particular the Environmental Affairs and Environmental Health Departments; Ministry of Finance in particular the Physical Planning Unit.

NAWASA is endowed with powers, for conserving, augmenting, distributing or redistributing water resources and maintaining and improving sewerage systems in Grenada. The Authority is required to undertake surveys of and furnish information relevant to water resources, and to formulate proposals for meeting existing and future water supply or sewage disposal requirements. NAWASA also makes Regulations in relation to prescribing water quality standards for potable and other water supplies, sewage and industrial waste effluents and receiving streams and water courses. Under the Act, the Minister can declare protected areas as necessary for the protection of water supplies, within which it is an offence to carry out certain prohibited activities.

Responsibility for the management and conservation of catchment areas is shared between NAWASA, the Forestry Division and the National Parks Department Division of the Ministry of Tourism, which operates out of the Forestry Division. Over the last 10 years efforts were made by the Division to develop a comprehensive watershed management program. This was reinforced by the 1999 Government-approved Forest Policy for Grenada, Carriacou and Petit Martinique, prepared by the Forestry Department which specifically emphasized the need for watershed

management and the resulting Draft Protected Areas, Forestry and Wildlife Legislation (2003) called for the designation of critical watershed on private lands. However, the management of extractive resources in watersheds will continue to be regulated by NAWASA (Daniel and Daniel Engineering, 2004).

The monitoring of freshwater quality is the responsibility of the Ministry of Health in collaboration with NAWASA. The Fisheries Department within the Ministry of Agriculture is responsible for the management of coastal resources, including the impact of water quality on marine ecosystems.

No specific regulations have been made for protecting water quality, or for establishing standards and specifications for effluent discharges into receiving surface, underground or coastal waters. In the absence of legislative controls the Environmental Health Department and NAWASA have adopted a range of guidelines proposed by the World Health Organisation (WHO) and CEHI for potable and ambient water quality. In association with the Ministry of Health, a regular programme of sampling and bacteriological analyses of treated waters is carried out by the Authority. This is supplemented by periodic monitoring of non-NAWASA managed freshwater sources (rural springs) and sanitary surveys of catchment areas by the Ministry of Health (EHD). Where the need arises and pollution is identified or suspected in the catchment areas NAWASA and the Ministry of Health coordinate efforts to rectify the problems. Monitoring of marine water quality in St. George's Harbour and Grand Anse Bay is also undertaken by NAWASA under a programme directed by CEHI.

Under the United Nations Convention to Combat Desertification (UNCCD) Grenada is in the process of preparing a National Policy and Plan for the Prevention of Land Degradation. Under this instrument the protection of watersheds and sustainable land management principles will have added value for water resource management at the national level.

7.3 Challenges and obstacles to water resources management

As explained earlier water resources management in Grenada is faced with a multiplicity of challenges reflected at many levels such as inter and intra governmental, statutory and private sector agencies. In assessing the main challenges, agencies suggested varying levels of severity for those items identified. The results obtained are summarised **(Table 7.3.1)** and the rating presented represents an average for the responses obtained.

Table 7.3.1 Challenges and Obstacles to water resources management in Grenada

Challenges and Obstacles	Rating
Lack of Good Water Governance	Severe
Fragmented Approach to IWRM:	
➢ Multiple institutions, each with their own piece of legislation and Mandate, none of which is broad or deep enough	Severe
➢ Assigned responsibilities for planning; management and operations affecting quantity to units separate from those responsible for quality management	Severe
➢ Poorly defined responsibilities for departments/section	Severe
➢ Overlap of responsibilities, resulting in duplication	Severe
➢ Cost trade-off between the pollution control and water supply treatment in the same watershed is not evaluated, thus the national investment policies and programmes do not reflect the interrelationships between quality and quantity.	Severe
Lack of effective integration and coordination hampered by:	
➢ The absence of sound and comprehensive national policies on water resources	Severe
➢ The multiplicity of institutions that deal with the management of the resources	Severe
➢ The multiplicity of laws, each dealing with separate aspects of the management of the resources, thus encouraging compartmentalization	Severe
➢ Institutionally divided approach to dealing with environment and development	Severe
➢ Poor management of the dynamics of water supply and demand.	Severe

➢ Inadequate legal and regulatory frameworks for managing the resources.	Severe
➢ The absence of a credible framework for involving civil society in the management process	Severe
➢ The lack of a proper understanding and awareness of the principles of sustainable development and an appreciation of the inseparable linkages between environmental, social and economic issues.	Severe
➢ Institutional arrangements for integrated water resources management are weak/ non-existent.	Very severe
Lack/inadequate institutional resources	
➢ Lack/inadequate human resources	Severe
➢ Inadequate equipment	Very severe
➢ Inadequate financing	Very severe
➢ Weak technical capabilities/lack of a critical mass for water resources management	Severe
➢ Inadequate Research and Technology	Very severe
➢ Inadequate Data and Information Management Infrastructure	Severe
Conflict between water supply and demand	Severe
Poor land use planning and soil management in watersheds	Severe
Poor pollution prevention and control	Severe
Limited/poor Stakeholder Participation	Severe
Limited/little Public Awareness and Education	Severe
Lack of Promote the economic, social and ecological values of water	Severe
Impact of Climate Change and Sea level Rise	Severe

7.4 Stakeholder participation

Since exposure to the Forestry Policy process during 1998 and 1999, key stakeholders and the general public, to a lesser extent, were exposed to the participatory approach to natural resources management. Subsequent initiatives such as the Physical Development Plan, the Biodiversity Strategy and Action Plan, the Prevention of Land Degradation Policy and Action Plan and the Climate Change Policy and Action Plan all sought to include consultation of stakeholders to some extent.

Securing the input of key stakeholders is done through the formation of multi-sectoral committees such as the Environmental Impact Assessment Committee. In some cases the committees are officially appointed by Cabinet to oversee and guide a process as exemplified by the Water Policy and Plan Committee. In these cases, key stakeholders are appointed and meetings held to begin the internal process from which wider consultations radiate. The extent of the consultation and the level of participation targeted is normally a function of available resources.

In the case of the IWRM planning process a similar trend was followed. The Cabinet-appointed committee formed the core that took the process forward. Committee meetings were followed by a widening sphere of consultations. The assessment study conducted sought significant buy-in and provided additional knowledge on IWRM and the planning process to stakeholders. Wider consultations were complemented by a suite of awareness raising materials in the form of brochures, posters and radio PSAs. This provided the foundation on which the IWRM Policy and Plan were synthesised.

Data collected on the IWRM awareness at the national level during the study are summarised and presented below **(Table 7.4.1)**.

Table 7.4.1 Stakeholder IWRM awareness

Level of awareness on the philosophy, concepts, principles and practices of IWRM for the following groups: (Rating: 0 = none; 1 = to a little degree; 2 = to a reasonable degree; 3 = fully)				
Stakeholders	**Rating**			
	0	**1**	**2**	**3**
➢ National level politicians				
➢ Local level politicians				
➢ High level policy/Decision Makers (National Level)				
➢ Decision makers in agencies responsible for water resources management				
➢ Decision makers in agencies within the water use and water related sectors				
➢ Professionals in agencies responsible for water resources management				

➢ Professionals in agencies within the water use and water related sectors				
➢ Major Water Users (Industry, Agriculture, Tourism etc)				
➢ NGOs in the water sector				
➢ CBOs in the water sector				
➢ Local/community level decision makers				
➢ Water sector consultants				

7.4.1 Stakeholder assessment

The need for participation by as many stakeholders as possible in the IWRM planning process and for their contributions to the formulation of the IWRM plan is a prerequisite for ownership and commitment. The identification/screening of stakeholders is an important part of the process if key contributors are not to be left out. However, coordination of the planning process is the responsibility of a steering committee and process management team as espoused by the IWRM training manual (GWP, 2005).

Steering Committee

If a Steering Committee is established to direct the strategic planning initiative it should drive the plan through all stages of preparation, to ensure that the initiative is both managed effectively and is providing maximum benefit. It needs to include the various authorities and institutions involved in decision making in the water sector, together with a selection of other key stakeholders. The eventual make-up of the group to be consulted must be carefully balanced and requires a commitment at the outset from all participating organisations and entities (government, the private sector and civil society etc) acceptable to stakeholders.

Process Management Team

The key to effective performance is the establishment of a *secretariat/ coordinating body/ management team* acceptable to stakeholders, with sufficient authority and resources to coordinate the activities. Team members normally include senior planners from relevant sector agencies

for purposes of bringing different perspectives to the planning process but may also be comprised of consultants or staff seconded from certain agencies.

The role of the Team is to translate the requirements of the Steering Committee into practical measures for action, while at the same time informing the Steering Committee on progress and emerging key issues. The Team will be responsible for managing the participatory planning process and for guiding the activities required for preparation of the IWRM plan. Specific tasks of the team should include the following:

- Organizing and coordinating the overall strategy process;
- Planning specific activities and meetings;
- Procuring expertise and resources;
- Supporting working groups and other committees;
- Acting as a focal point for communication.

Data were collected during the assessment study to contribute to a stakeholder screening. The stakeholders were categorised and their priority and influence on the IWRM plan and process were estimated. The resulted are presented in **Table 7.4.1.1** below.

Table 7.4.1.1 Stakeholder screening results

Stakeholder	Interests	Priority Influence	Category (1-4)	Capacities	Potential roles in the IWRM Plan
MoA – LuD	Develop Plan	1	HH	Technical	Coordination/WPSC
MoA – FD	Watershed	1	HH	Technical	WPSC
MoA – Extension	Irrigation	1	HL	Technical	Agriculture input
NAWASA	Quality and Quantity	1	HH	Technical	WPSC
MoH – EHD	Quality and Quantity	1	HH	Technical	Health input
MoH – Environment	Environment	2	HL	Technical	WPSC/environmental

MoF – PPU	Developmental	1	HH	Technical	WPSC/developmental/supply protection
MoA – Veterinary	Supply	2	HL	Advisory	Animal husbandry
GAPE	Quantity and Quality	1	HH	Technical	WPSC/engineering
Ministry of Tourism	Quantity and Quality	1	HH	Technical	Tourism contribution
Grenada Hotel and Tourism	Quantity and Quality	1	HH	Advisory	Private sector tourism contribution
Grenada Tourist Board	Quantity and Quality	2	HH	Advisory	Tourism issues
Distiller Association	Quantity and Quality	2	LH	Technical	Industrial demand
Grenada Marina and Yacthing	Quantity and Quality	2	LL	Advisory	Interest of yachting sector
Farmers Association	Irrigation	1	HH	Advisory	Agricultural interest
Grenada Bureau of Standards	Quality and Quantity	2	LH	Advisory	Standards
Grenada Industrial Development Co.	Quantity and Quality	2	HH	Advisory	Industrial issues
Ministry of Social Affairs	Quantity and Quality	1	HH	Advisory	Poverty reduction and social development
Ministry of Works	Quantity	2	LH	Technical	Infrastructure projects and supply availability
Ministry of Education	Quality and Quantity	1	HH	Advisory	Awareness in schools and institutional availability
Grenada Ports Authority	Quality and Quantity	1	HH	Advisory	Water availability for marine purposes and water quality
Friends of the Earth	Environmental	2	HH	Advisory	Water allocation for ecological purposes

Stakeholder	Interests	Priority Influence	Category (1-4)	Capacities	Potential roles in the IWRM Plan
Agency for Rural Transformation	Community	1	HH	Advisory	Potable water supplies for rural developments
GrenCODA	Community	1	HH	Advisory	Water availability for community development
Fire Services	Quantity	2	LL	Advisory	Water availability for security purposes
Produce Chemist Lab	Quality	1	HL	Technical	Laboratory services
National Science and Technology	Scientific	1	HH	Technical	Cross-sectoral technical input
Chamber of Industry and Commerce	Private sector	1	HH	Advisory	Private investment interest

Stakeholder categories:

1. Those who will likely want to participate fully or whose active involvement will determine the credibility of the process;
   - *Those that should serve on the coordinating committee*
   - *Those that should be involved in the planning and development processes*
   - *Those that should be involved in the implementation process*
   - *Those that should be involved in the monitoring and evaluation processes*
2. Those who would likely play a more limited role;
3. Those who would wish simply to be kept well informed;
4. Those who would not want to be involved

Priority/influence rating:
HH – High Priority/High Influence
HL – High Priority/Low Influence
LH – Low Priority/High Influence
LL – Low Priority/Low Influence

Abbreviations
WPSC – Water Policy Steering committee
GAPE – Grenada Association of Professional Engineers

7.5 Existing institutional framework for the water sector

National Water and Sewage Authority

The National Water and Sewage Authority is the abstractor and regulator of the water resources according to Law. There are limited avenues for interactions with stakeholders apart from the requirement by the Act to collaborate with the Forestry Division on watershed and catchment areas protection. The Board of Directors of NAWASA **(Table 7.5.1)** has representation from key stakeholder agencies as outlined in the NAWASA Act (1990) in order to secure a multi-sectoral input in the water sector. This ensures that matters pertinent to water and water resources management are addressed and taken into account in the decision making process.

Table 7.5.1 Representation of NAWASA's Board of Directors

Composition of Board of Directors According to NAWASA's Act (1990)
General Manager of NAWASA
Ministry of Health and the Environment
Ministry of Agriculture
Ministry of Finance
Ministry of Works and Public Utilities
A private sector representative
Two persons from the general public (Appointed by Minister)
Chairman and deputy chairman are appointed by the Minister.
Current Composition of Board of Directors (2007)
General Manager NAWASA
Grenada Chamber of Industry and Commerce
Representative from Carricou
Gravel and Concrete Corporation
3 Private sector representatives
Ministry of Health and the Environment
The Board is rotated every 2 years

Water Quality and Health

Collaboration with the Ministry of Health is done on issues relating to water quality, treatment and disposal of liquid waste. The quality of the potable water supplies at the national level is monitored by NAWASA on a monthly basis and the results are produced and were submitted to the Ministry of Health for review and action. This is facilitated by the use of NAWASA's laboratory facility which is available for quality testing. Furthermore, through a PAHO initiative in 1998 a programme and protocol for monitoring NAWASA's public supplies and non-NAWASA sources of drinking water were developed. Laboratory support for this programme was provided by the Produce Chemist Laboratory (PCL) of the Ministry of Agriculture. Extensive damage to the buildings and supporting infrastructure during the passage of Hurricane Ivan (2004) had incapacitated the laboratory support provided to these programmes on a regular basis. The recently passed Water Quality Act (2004) evolved to facilitate the export of fish to the EU and reinforced the mandate of the Ministry of Health for water quality.

Irrigation and Agriculture

The Ministry of Agriculture has the lead responsibility for water with respect to irrigation and other agricultural uses. Under the Special Framework of Assistance (SFA) programme for 1999 and 2000 the Ministry of Agriculture was mandated to establish an Irrigation Management Unit (IMU). This Unit is based and operated by personnel from the Land Use Division and currently runs the GoG funded On-Farm Irrigation programme. Through this programme irrigation equipment is provided to farmers on a contractual basis. Additionally, under the Agricultural Enhancement and Development Programme (AEDP) implemented by GoG through the MoA Extension Division, loans of XCD 40,000.00 are provided to farmers. This focuses on the development of fruit tree crops and where required irrigation is used.

In Carriacou, RWH for irrigated agriculture was recently promoted under a food security programme by the Ministry of Agriculture. Several 3600 to 4500 litres Polyvinyl Chloride (PVC) plastic tanks along with materials for the construction of the support platforms and catchments were distributed to some 20 farmers. RWH has been traditionally used in animal husbandry by strategically ponding run-off for provision of drinking water to herds, and in maintenance of sanitation. In Petite Martinique however, RWH for agriculture is practiced to a limited extent since agriculture is not a key activity and most of the food is imported. However, there is potential for expanding RWH for agricultural applications if the requisite investments are made.

The major challenges to RWH in agriculture lie in the acquisition and installation of facilities for storage, collection and distribution. Incentives to support the adoption of RWH should include access to financial assistance, training, concessions on equipment, supplies and materials and education. Emphasis should be placed on the protection and treatment of harvested water especially in food preparation and processing.

Hotel and Tourism

In 2005 Grenada recorded stayover visitors, averaging about 7.52 nights per visitor, of about 98,548 persons which represents a decline of 26.38% from the pervious year (GBT, 2005). This represents a visitor penetration ratio of about 1 which would suggest a significant demand on the potable water resources of Grenada. Furthermore, examination of tourism statistics indicates that visitor numbers during the dry periods do not vary significantly from the monthly average (8,200 persons) during the drier periods when water supplies become a critical issue. Statistics presented by the Grenada Board of Tourism (**Appendix IV**) for the last 10 years indicate the significance of tourism to the economic survival of the citizens of Grenada.

Historically, the hoteliers of Grenada have voiced concern with the reliability of the public water supply and have resorted to obtaining small

desalination plants for the provision of adequate volumes of freshwater to their facilities. In recent times, with the introduction of the metering programme, upgrade and extension to the water storage, treatment and distribution systems by NAWASA, public water supplies have been more reliable.

8.0 Capacity needs for IWRM

8.1 Private and public sectors

Institutional capacity for IWRM was found to be a challenge at the national level. The data collected were collated and are presented in **Table 8.1.1** below.

Table 8.1.1 Capacity for water resources management at the national level

CAPACITY FOR WATER RESOURCES MANAGEMENT								
(Rating: 0 = no capacity; 1 = little capacity, needs to be built; 2 = some gaps but is workable; 3 = capacity fully exist)	**Public Sector**				**Private Sector**			
	0	**1**	**2**	**3**	**0**	**1**	**2**	**3**
Policy formulation								
Drafting of laws & regulation								
Preparation of WR assessments								
Preparation of EAs								
Preparation of socio-economic assessments								
Monitoring of water quality								
Monitoring of water availability								
Monitoring of aquatic ecosystems								
Monitoring of pollution loads								
Monitoring of water use								
Resource use planning, protection and conservation								
Water demand management								
Water allocation								
Conflict mediation								
Information generation, collection, analysis								
Laboratories for testing								
Measuring impacts								
International negotiations								

The Table shows that some capacity exists in both the public and privates sectors; however, there is a need for improvement.

8.2 General public

Among the general public of Grenada there is definitely a need to develop capacity in IWRM. The historical norm that management of water is the responsibility of the national water provider utility is still embedded in and foremost in the minds of people. Hence, obtaining public support for, and appreciation of, the concept, principles and values of IWRM requires:

- An extensive public awareness programme utilising various media to cover the various strata of the society;
- Grass roots-level consultation, allowing for extensive dialogue on the subject;
- Consultation on a sectoral basis to obtain views on the critical aspects of water resource management pertinent to the sectors;
- Developing programmes and systems for the resolution of conflict and reaching compromise between the various resource users.

9.0 Strategic directions for IWRM development – The "Roadmap"

9.1 Aim and principles of the IWRM plan

There are three main aims of an IWRM Plan. These are:

- To **heighten awareness** and understanding of the value and benefits of integrated water resources management and vulnerability of human health and the environment from poor Water resources management;
- To **identify and implement actions** to address specific causes of negative impacts and threats on human health and the environment from poor water resources management practices;
- To **mobilize resources and partners**, including the private sector, for implementation of specific projects to address the negative impacts and threats on human health and the environment from poor water resources management practices.

There are some general principles that apply to all IWRM Plans.

Content

- The plan should incorporate a commitment to integrated water resources management and set out how this could be effectively implemented;
- The plan should be comprehensive in scope, reflecting the interdependence and indivisibility of water resources management;
- The plan should be action-oriented;
- A successful IWRM Plan should be selective in the planning phase and focused on a few specific strategies appropriate for the country, rather

than addressing all possible strategies. In particular, for those countries with limited resources, an incremental approach to the development of an IWRM plan is considered more realistic and effective (start small and increase gradually);
- Adequate, timely, and sustainable budgets originating from diverse sources are crucial in implementing an IWRM plan;
- An IWRM plan will have international dimensions.

Process
- Process and outcome are equally important;
- Continued high-level political commitment throughout the development and implementation phases. This includes having an influential agency or ministry to lead the process for developing the plan as well as having a high profile patron or advocate to promote it such as the Prime Minister or other Minister;
- An intersectoral coordinating committee is crucial in putting the plan into practice. Members of such a committee must participate regularly in meetings and have authority to delegate appropriate activities in their sectors;
- Effective monitoring and review of implementation is essential.
- The process should be continuous, with the conclusion of one component of the plan leading to the commencement of another.

Participation
- There should be a broad and intensive consultation process with civil society and the general public

Transparency
- The plan should be a public document

There are four main stages in developing an IWRM Plan **(Figure 9.1.1)** for which an outline of the planning process is depicted in **Figure 9.1.2**.

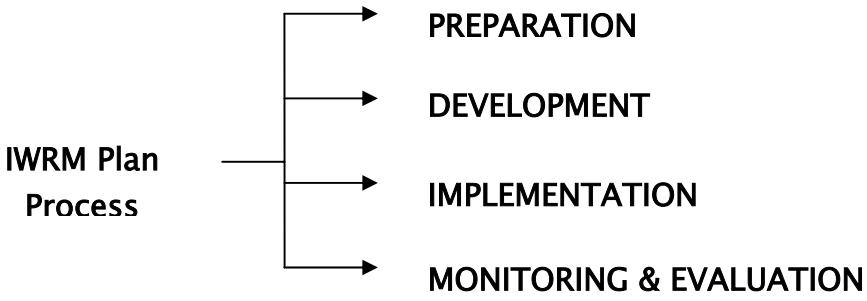

Figure 9.1.1 Stages in development of the IWRM

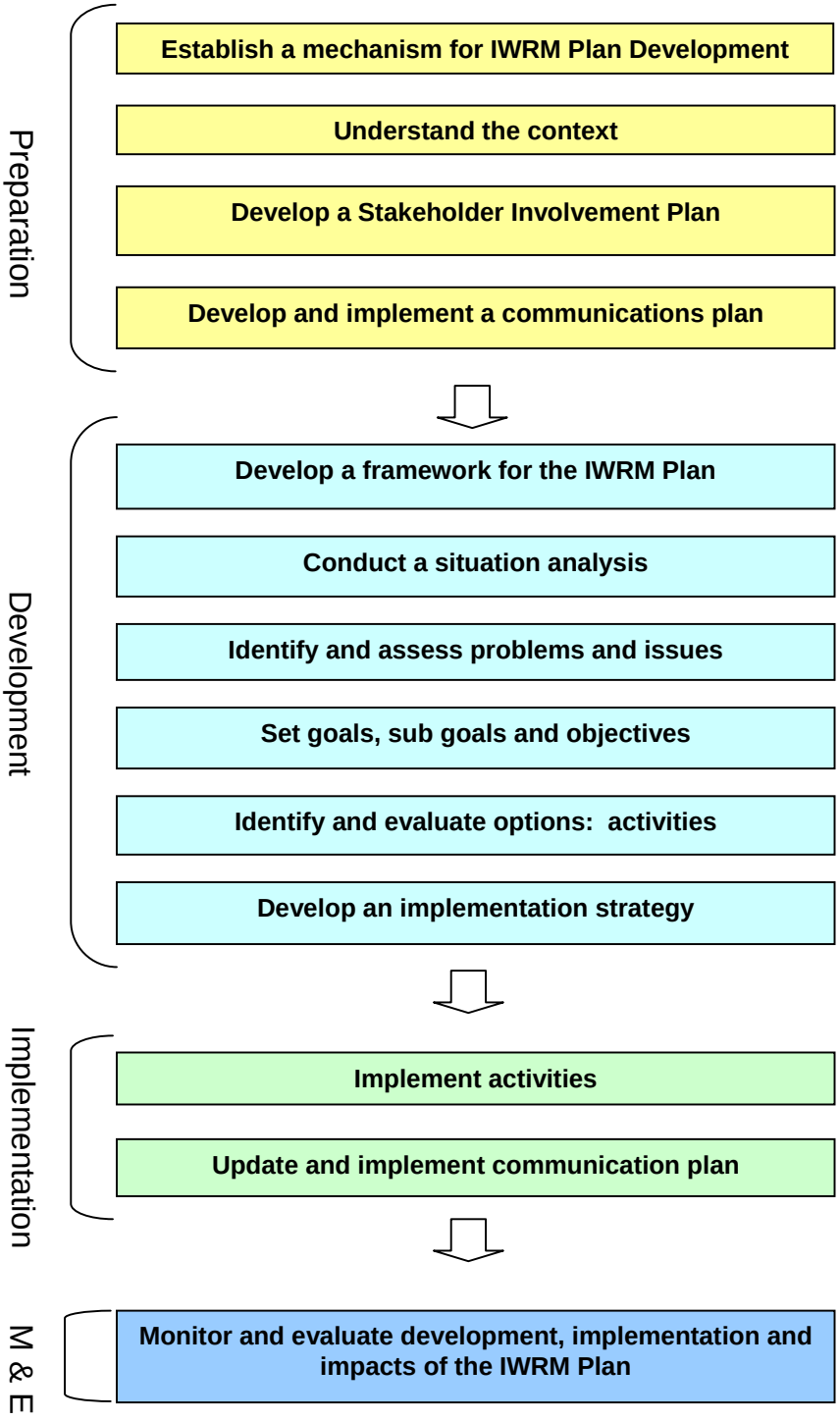

Figure 9.1.2 Overview of the IWRM planning process

9.2 Context for IWRM planning in Grenada

Data were collected from stakeholders, collated and adjusted based on technical knowledge to provide an overview of the context for IWRM planning in Grenada. The findings are provided in **Table 9.2.1** below.

Table 9.2.1 Context for IWRM planning in Grenada

CONTEXT FOR IWRM PLANNING	
• What mechanisms are in place for interaction with stakeholders at the national level?	Consultations at various levels and through the Cabinet appointed Water Policy Steering Committee
• What mechanisms are in place for interaction with stakeholders at the local/community level?	No formal mechanism exists but consultations are arranged in various communities
• How have other National Plans been established?	Inter-ministerial, inter-agency, sectoral and national consultations
• What are the decision-making arrangements for strategies and plans within different ministries?	Once adopted by Cabinet of ministers, implementation is through the Permanent Secretaries and executed by staff
• Who will need to endorse an IWRM Plan?	Cabinet and stakeholders
• Which government ministry and/or designated agency will have the central role to play in the development of the IWRM Plan	Ministry of Agriculture and NAWASA
• What are the levels of support for the IWRM Philosophy at the political level?	Medium
• What are the levels of support for the IWRM Philosophy at the policy/technical levels?	High

• What are the levels of support for the IWRM Philosophy at the general population level?	Low. Limited due to lack of awareness among general population
• What is the level of political will in ratifying and implementing regional or international obligations related to water resources management?	High. Political directorate is readily willing to show support at these levels
• Is there political support to develop a holistic IWRM Plan, or is it necessary to focus on one or two key topics?	Support exists for a holistic plan but implementation needs to be phased focusing on specific areas
• Are there interested parties in government to develop an IWRM Plan?	Yes
• What are the likely resources available to develop an IWRM Plan?	Both human and financial resources limited
• Which areas of action will be able to attract sustainable forms of financing?	Agrochemical management and pollution control

9.3 IWRM Strategic Directions for Grenada

Implementing IWRM in Grenada will involve a change in the way in which water resources are managed. The existing sectoral and piecemeal system needs to be replaced by a central coordinating agency which will be responsible for the management of water resources in a holistic manner. This will ensure that due consideration is given to the various conflicting uses and allocation of water resources. Successful models already exist in the Caribbean, of which the Water Resources Agency (WRA) of Jamaica is a good example. The newly formed Water Resources Authority, Water Resources Management Act and the Water Policy of St. Lucia provide a template which can be built and tailored to meet the needs and expectations with regard to IWRM in Grenada. Networking with Caribbean states which have begun the process of implementing IWRM principles at the national level can provide an avenue for technical cooperation amongst countries of the region.

Additionally, attaining the goal of implementing IWRM in Grenada will involve four fundamental and required elements:

- A holistic and comprehensive national policy and plan for the management of water resources;
- Development of the legal and regulatory framework for the management of water resources;
- Improving and where necessary developing the institutional and administrative framework for water resources management;
- Enhancing the capacity and capability for the management of water resources.

These elements are outlined, detailed and subdivided into the various components necessary for attaining IWRM at the national level in **Table 9.3.1** below.

Table 9.3.1 IWRM strategic directions for Grenada

Overall Goal: Implementation of IWRM in Grenada		
Indicators for overall goal		**Means of Verification**
1	Agency for the management of water resources developed and functional	Agency report
2	Adoption of cross-sectoral approaches to the management of water resources	WRM committee meeting reports
Objectives/Results		
1	**A holistic and comprehensive national policy and plan for the management of water resources in Grenada**	
2	**Legal and regulatory framework for the management of water resources developed and enforced**	
3	**Institutional and administrative framework for water resources management improved**	
4	**Capacity and capability for the management of water resources enhanced**	
Result #1: A holistic and comprehensive national policy and plan for the management of water resources in Grenada		
Indicators		
No	**Objectively Verifiable Indicators (OVI)**	**Means of Verification (MOV)**

1	All sectors in Grenada incorporate elements of the Integrated Water Resources Management policy and plan within their own policies, plans and programme by end 2008	Sectoral policies and plans modified
2	Annual budgetary allocation for implementation of the IWRM policy and plan	Annual budget

	Activities	Responsibility	Time Period	Resources	Assumptions
1.1	**Establish mechanisms for the development and implementation of IWRM in Grenada**	**MoA, Land Use Division**	**6 months**	**Human and Financial**	**Willingness to improve WRM using cross-sectoral approach**
1.1.1	Assess country-specific mechanisms that have been used in similar type activities		2 weeks	Human	Forestry policy and NEMS development process accessible
1.1.2	Determine who should initiate the process			Human	Decision made by political directorate
1.1.3	Establish a lead agency to function as the Secretariat				Decision made by political directorate
1.1.4	Establish a National Implementing Committee (NIC) for overseeing the development and implementation of IWRM policy and plan (**Guidelines Appendix V**)			Human	Potential members of the NIC are willing to be involved in the development and implementation

1.1.5	Develop and Issue TOR to the NIC	MoA/CEHI/IWCAM		Human & Financial	
1.1.6	Establish strategy and protocols for consulting on the development and implementation of the Policy and Plan	MoA/CEHI/IWCAM		Human & Financial	
1.2	**Develop and implement mechanisms for mobilizing and securing financial and technical resources for the development and implementation of the IWRM policy and plan for Grenada**	**MoA**	**1 month**	**CEHI/IWCAM/ GWP/ EU**	**GoG and/or Donor are willing to fund the development and implementation the IWRM Policy and Plan**
1.3	**Assess the context for the IWRM Policy and Plan**	**NIC**	**1 months**	**NIC representatives**	**Willingness to improved the management of water resource using a holistic approach**

1.3.1	Undertake a comprehensive review of Grenada's regional and international obligations for water resources management			MoA, NIC Consultant	
1.3.2	Review existing national and sectoral policies and plans with a view to harmonization with respect to IWRM			NIC Consultant	
1.3.3	Identify key issues that are of public or political interest and other related initiatives			NIC Consultant	
1.3.4	Determine levels of political support for developing and implementing a national policy and plan			NIC Consultant	

1.3.5	Identify national level stakeholders who are likely to be involved			NIC Consultant	
1.3.6	Identify available resources			NIC Consultant	
1.4	**Develop a Stakeholder Involvement Plan (including the private sector and population at large) for the development and implementation of the IWRM policy and plan**	**NCC**	**1 month**	**NIC Consultant**	
1.4.1	Identify partners within government whose mandates are directly related to the issues of WRM			NIC Consultant	
1.4.2	Identify stakeholders outside government			NIC Consultant	

1.4.3	Conduct a stakeholder analysis	CEHI/MoA		Human/Financial	
1.4.4	Summarize Stakeholder Involvement Plan			NIC/CEHI Consultant	
1.5	**Develop and Implement a Communications Plan for the development and implementation of the IWRM Policy and Plan**	**MoA/IWCAM**	**On-going throughout the development and implementation of the policy and plan**	NIC IWCAM	
1.5.1	Determine the communication objectives				
1.5.2	Create a communications map				
1.5.3	Prioritize communications stakeholders				

1.5.4	Develop appropriate communications strategies, messages and materials				
1.5.5	Implement communications strategies				
1.5.6	Develop Communications monitoring indicators				
1.5.7	Conduct on-going assessment of the Communications Plan, including revision				
1.6	**Develop draft policy IWRM**	**NIC**	**3 months**	**MoA/NIC Consultant**	**Stakeholders are willing to assist in the development of the National IWRM Policy**
1.6.1	Develop a framework for the development process for both the Policy and Plan				

1.6.2	Conducting a Situation Analysis	CEHI/MoA			
1.6.3	Identify Problems and establish priorities to be address in the policy and plan				
1.6.4	Set management goals, and objectives for the Policy and plan				
1.6.5	Develop a mechanism for ensuring participation and reaching consensus in the development and implementation of the Policy and Plan				
1.6.6	Document the draft policy				
1.6.7	Conduct stakeholder consultation for review and modification of draft policy	MoA NIC			

1.6.8	Develop and implement a programme for adopting and implementing the Policy at the national level including political commitment				
1.6.9	Develop and implement a monitoring and evaluation programme for implementing the national policy		On-going throughout the development and implementation of the Policy		
1.7	**Develop National IWRM Plan based on the National IWRM Policy**	**NIC**	**2 months**	**NIC and other key stakeholders Consultant**	**Stakeholders are willing to assist in the development of the National Plan for IWRM**
1.7.1	Identify and evaluate activities that would give effect to the National Policy on IWRM				

1.7.2	Set targets and indicators for identified activities in the National IWRM Plan				
1.7.3	Developing an Implementation Strategy for the National Plan • Develop a time-line • Define resource requirements • Select milestones • Allocate responsibilities				
1.7.4	Document the National Plan				
1.7.5	Develop and implement a monitoring and evaluation programme for developing the national plan		On-going throughout the development of the Plan		

1.7.6	Develop and implement a programme for adopting and implementing the Plan at the national level including political commitment				
1.8	**Implement the National Plan for IWRM**	**NIC**	**On-going**	**Key Stakeholders Start-up cost $ Recurrent cost $ Annually**	**Identified stakeholders are willing to participate in the implementation of the National Plan for IWRM**
1.8.1	Develop and implement a programme for enabling key stakeholders to implement the National Plan				
1.8.2	Implement the Plan				

1.8.3	Develop and implement a programme for monitoring and evaluating the implementation of the National Plan		On-going throughout the development and implementation of the Plan		

Result #2: Legal and regulatory framework for IWRM developed and enforced					
Indicators					
No	**Objectively Verifiable Indicators (OVI)**				**Means of Verification (MOV)**
1	Legal and regulatory instruments for IWRM in Grenada developed and executed				Available laws
2	Supporting consultative process conducted				Reports
3	Cross-sectoral management of water resources				Reports
	Activities	**Responsibility**	**Time Period**	**Resources**	**Assumptions**
2.1	**Develop the legislative and regulatory framework to give effect to the National IWRM Policy and plan**	**MoA/NIC**	**18 months**	**NIC/ Consultants/Legal Draftsman**	**There is a political will to harmonized the legislative framework**
2.1.1	Review with a view of harmonizing the existing legislation and regulation within	MoA	1.5 months	Consultant	

	the framework of IWRM management policy (This would include the international and regional obligations)				
2.1.2	Document the draft legislative and regulatory framework		2 weeks	Consultants	
2.1.3	Conduct stakeholder consultations on the draft legal and regulatory framework with a view to implementation		1 months	Consultants	
2.1.4	Develop and implement a programme for promoting the revised legal and regulatory framework with a view towards implementation and		6 months	NIC/Consultants	

	gaining political will and support				
2.1.5	Revise, amend and draft where necessary legislation and regulations to give effect to the IWRM policy within the context of the revised legislative and regulatory framework		18 months	Consultants/Legal Draftsman	
2.1.6	Develop and implement a programme to support the enactment of the revised legislation and regulations for IWRM		9 months	NIC/consultants	

2.2	**Develop and implement a programme for the effective and efficient enforcement of the revised legislation and regulation for IWRM**	**MoA/NIC**	**2 yrs**	**NIC**	**Resources are made available for the effective enforcement of the revised legislation and regulations for IWRM**
2.2.1	Evaluate the environment for enforcing the legislation and regulations for IWRM		1 month	NIC Consultants	
2.2.2	Develop a programme for building capacity for enforcement of the legal framework for IWRM		2 weeks	Consultants	

2.2.3	Develop a programme for mobilizing and securing resources for building capacity for enforcing the legislative and regulatory framework for IWRM		On-going	NIC	
2.2.4	Implement the programme for building capacity for enforcement of the legal framework for IWRM		On-going	NIC/consultants	
2.2.5	Develop and implement a programme for monitoring and evaluating the enforcement of the legislation and regulations for IWRM		On-going	NIC	

Result #3: Institutional and Administrative Framework for IWRM established					
Indicators					
No	**Objectively Verifiable Indicators (OVI)**			**Means of Verification (MOV)**	
1	Water Resource Agency (WRA) Institution developed and functional			Reports	
2	Joint IWRM programming by stakeholder agencies			Implementation programme status reports	
3	Annual report by institution			Review of annual WRA reports	
	Activities	**Responsibility**	**Time Period**	**Resources**	**Assumptions**
3.1	**Establish Water Resources Agency**	**MoA/NIC**	**5 months**		**Directed by legislation**
3.1.1	Recruit Director	MoA/NIC	2 months		Funds available
3.1.2	Recruit technical and support staff	Director/NIC	3 months		Funds budgeted
3.2	**Develop and implement mechanisms for coordination,**	**WRA/MoA/NIC**	**5 months**	**NCC**	**1. Key stakeholders are willing to**

	cooperation and collaboration among key stakeholders responsible to achieve IWRM at the national level				**participate** **2. A National Policy and Plan for IWRM developed and is been implemented**
3.2.1	Develop and implement a programme for continued sensitizing of key stakeholders to the need for the integrated approach and their involvement in IWRM		2 months	NIC/Consultants	
3.2.2	Review the various		2 weeks	NIC/Consultants	

	options/approaches for coordination, cooperation and collaboration among key stakeholders responsible for IWRM (internationally, regionally and locally)				
3.2.3	Document guidelines and protocols for coordination, cooperation and collaboration among key stakeholders responsible for IWRM		2 weeks	NIC/Consultants	
3.2.4	Promote the guidelines and		2 months	NIC/Consultants	

	protocols coordination, cooperation and collaboration among key stakeholders responsible for IWRM				
3.2.5	Develop and implement a programme for monitoring and evaluating coordination, cooperation and collaboration among key stakeholders		On-going	NIC	
3.2	**Develop Contingency Plans for Water Related Disaster**	**WRA/NIC/NaDMA**	**1 yr**	**NaDMA/Consultant NIC**	

	Management				
3.2.1	Conduct National, sectoral and community stakeholder consultations with a view to developing contingency plan for flooding and water sector utility with respect to disaster management		3 months	Consultant MoA/NIC	
3.2.2	Develop the framework, guidelines and elements of the contingency plans for disaster related to water			NaDMA/Consultant	
3.2.3	Mobilize and secure resources for the implementation of			NIC/MoA	

	the contingency plans for water sector disaster management				
3.2.4	Build capacity among key stakeholders for implementing the contingency plans for water sector disaster management and floods			Consultant	
3.2.5	Develop and implement a programme for monitoring and evaluating the implementation of the water sector and floods disaster management		On-going	NIC	

3.3	**Develop and implement a comprehensive, integrated information system for WRM to support the work of the WRA, key stakeholders, researches**	**WRA/NIC**	**9 months**	**Consultant**	**Key Stakeholders are committed to providing access to their information on water resources to other users**
3.4.1	Conduct an Information and Information Systems Assessment and Audit for water resources in Grenada		1.5 months	Consultant	
3.4.2	Conduct Stakeholder		1 week	WRA/NIC/Consultant	

	Consultation on the Finding of Information and Information Systems Assessment and Audit for water resources				
3.4.3	Conduct Systems Analysis and Design for a comprehensive, integrated information system for water resources to support the work of the WRA, key stakeholders and other researches		1.5 months	Consultant	
3.4.4	Develop the Information system based on		1.5 months	Consultant	

	design specifications				
3.4.5	Conduct User Training for the System		1 week	Consultant	
3.4.6	Commission the System			WRA/MoA/Consultants	
3.4.7	Conduct Post-implementation Audits of the System		6 months (after commission of the system)	Consultant	
3.5	**Develop and implement monitoring programmes for ambient, recreational and potable water supplies to determine impacts on human health**	**WRA/MoH/NAWASA**	**On-going**	**WRA/MoH/NAWASA/Consultant**	

	and the environment				
3.5.1	Design the monitoring programme for impacts on Human Health		2 weeks	WRA/MoH NAWASA	
3.5.2	Design the monitoring programme for impacts on the environment		2 weeks	WRA/MoHConsultant NAWASA	
3.5.3	Mobilize and secure resources for implementation of the monitoring programmes			WRA/NIC	
3.5.4	Train key stakeholders to conduct the monitoring			Consultants 5 persons days	
3.5.5	Implement the Monitoring		On-going During the	WRA/MoA/MoH NAWASA	

	Programme		first year		

Result #4: Capacity and capability for IWRM enhanced					
Indicators					
No	Objectively Verifiable Indicators (OVI)				Means of Verification (MOV)
1	All technical and managerial personnel in the WRA trained in IWRM within 2 years of establishment				Reports/Audits
2	Inter-sectoral and stakeholder training in IWRM				Reports
3	National level IWRM awareness programme				Existing programmes
	Activities	Responsibility	Time Period	Resources	Assumptions
4.1	**Develop and implement a programme for training of personnel from WRA and key sectors in IWRM.** • WRA to undertake the implementation of the requirement of the IWRM Act • NaDMA	**WRA**	**On-going**		**Resources available and agencies willing to cooperate**

	• MoA/MoH/MoW • NAWASA • Others				
4.2	**Develop and implement a comprehensive PA/PE programme on IWRM focusing on key stakeholders and the public**	**WRA/NIC**	**On-going**	**WRA/NIC**	
4.3	**Develop and implement training programmes on key aspects of IWRM**	**WRA/NIC**	**On-going**	**WRA/GWP-C/ Consultant**	
4.3.1	Develop training materials on IWRM that can be included in the science curriculum of secondary and primary schools	WRA	1yr	WRA/GWP-C/Consultant	
4.3.2	Develop and	WRA	2 yrs	CEHI/NaDMA/CDERA /PAHO	

	implement training for District Emergency Management Officers and EHOs in flood management			consultant 15 person days US $5,000	
4.3.3	Develop and implement training for Fire Services and security services in recovery and rescue for floods	WRA	1 yr	NaDMA/CDERA	
4.3.4	Develop and implement training for agricultural and industry worker in water efficiency and IWRM	WRA/MoA	1 yr	MoA/GWP-C/WRA/ FAO/IICA	
4.4	**Develop and Implement a programme for research focusing on health, gender and**	**WRA/NIC**	**On-going**	**MOH/CEHI**	

	environmental aspects of IWRM				
4.5	Develop and Implement a programme for research focusing on water availability, supply and demand, water balance and water security	WRA/NIC	On-going for the first 2 years	GWP-C/NAWASA/MoW/WRA	

10.0 Conclusions

Implementing IWRM at the national level is an essential ingredient and prerequisite and sustainable development. Hence, the initiative by Grenada to develop and policy and plan based on the principles of IWRM to manage the water resources is both timely and appropriate. The Ministry of Agriculture and the Land Use Division is providing the node, nucleus, leadership and champion for the process. This is advantageous in that the has responsibility for a wide range of cross-cutting issues which include *inter alia*: planning and development, water resources, irrigation, watersheds, rainfall stations, land management , land information system, rainfed and irrigation agriculture and public awareness. The Cabinet appointed Water Policy Steering Committee to advise, guide and develop the water policy demonstrates political will and awareness among the political directorate to the need to implement IWRM in the interest of sustainable development of the State.

Notwithstanding the thrust towards the development of the IWRM policy and plan for Grenada challenges are evident principal among which are dispersed responsibilities among a number of governmental departments and agencies for various aspects of water resource management with no formal means of collaboration. The absence of data and limited research on water resources were evident during the assessment study and need for awareness among decision makers and the general public on IWRM were evident. However, Grenada is fortunate in that experiences in the consultative process, a key component of and the basis of IWRM planning, are available nationally from projects which can have an input in IWRM such as the Forest Policy and Strategy and Physical Development and Environmental Management Plan. Additionally, some capacity exist among the private and public sectors in IWRM which can be tapped on to expedite the planning process and provide significant input to guide the policy and plan so as to ensure appropriateness to Grenada.

Finally, the assessment study conducted elucidate the need digress from the abstractor oriented sectoral responsibility for water develop a collaborating agency with a mandate to implement and execute IWRM as guided by the policy and plan. This will involve the synthesis of the institutional and administrative framework, based on existing models with demonstrated track record of success based on the socio-political, economic and cultural climate, supported by the legislative instruments. Raising awareness and education in IWRM at all levels will be important ranging from the high level decision makers to the general public. Building capacity within the central agency and among all collaborating agencies and departments that have an input in water resources management is also of utmost importance to enhance sustainability and functionality.

References

BSAP, 2000. Grenada Biodiversity Strategy and Action Plan.

CAP-NET: IWRM Tutorial: http://www.cap-net.org/iwrm_tutorial/3_1.htm

CAP-NET, 2005: Integrater Water Resources Management Plans Training Manual and Operational Guide.

CEHI, 2006: National Rainwater Harvesting Programme for Grenada

Daniel and Daniel Engineering, 2004: Environmental Impact Assessment for the Proposed Woodford Quarry.

FAO, 1995. Dimensions of Need. An Atlas of Food and Agriculture. Water - A Finite Resource. Corporate Document Repository. Available on-line at http://www.fao.org/documents/show_cdr.asp?url_file=/docrep/U8480E/U8480E0c.htm

GEF, 2001 National Report - Integrated Watersheds ad Coastal Areas Management. Global Environment Facility.

GoG. 1958, 1990. Public Health Act. Government of Grenada.

GoG, 1989. Grenada Standards Act. Government of Grenada.

GoG, 1990 Grenada National Water and Sewerage Authority Act. Government of Grenada.

GoG, 1999. Medium-Term Economic Strategy. Government of Grenada.

GoG, 1999. NAWASA Water Tariff Regulations. Government of Grenada.

GoG, 2000 National Report – Integrating Management of Watersheds and Coastal Areas – Grenada. Government of Grenada

GoG, 2000 Grenada's Initial Communication to the UNFCCC. Government of Grenada

GoG. 2002. Physical Planning and Development Control Act. Government of Grenada.

GoG, 2005. National Environmental Policy and Management Strategy for Grenada. Government of Grenada.

GoG, Undated. Grenada's Initial Communication to the UNFCCC. Government of Grenada.

GoG/FAO, 2005. Grenada Land Information System. Land Use Division, Ministry of Agriculture.

Grenada Board of Tourism 2005: Annual Statistical Report. http//www.mainlib.uwi.tt/divisions/wi/collmain/archives/grenadastats/AnnualGrenadaStats2005.pdf

GWP (2001). Supporting Countries in the Sustainable Management of their Water Resources. Available Online at http://www.emwis.org/documents/presentations/Madrid_2001-11_GWP_en.pdf

GWP-TEC, 2005: How IWRM will contribute to achieving the MDGs: www.gwpforum.org/gwp/library/policy_brief_4_MDGs.pdf

Hydrological Cycle Model.
Available at: www.aquatic.uoguelph.ca/ general/page34.htm

OECS, 2005. Grenada: Macro-Socio-Economic Assessment of the Damage Caused by Hurricane Emily July 14, 2005. Organisation of Eastern Caribbean States.

UNCED, 1992: Report of the United Nations Conference on Environment and Development Chapter 18. A/CONF.151/26 (Vol. II) http://www.sovereignty.net/p/sd/a21/a21_18.txt

UNDP, 2004: Impacts of Hurricane Ivan on Grenada. Available Online at: http://www.un.org/pubs/chronicle/2005issue3/0305p07.html

UNDP, 2005: Impacts of Hurricane Ivan On Grenada. Available Online at http://www.un.org/Pubs/chronicle/2005/issue3/0305p07.html

UNEP, 1996. Source Book of Alternative Technologies for Freshwater Augmentation in Latin America and the Caribbean, United Nations Environment Programme.

USAID, 2005. What is Integrated Water Resources Management? Available Online at http://www.usaid.gov/our_work/environment/water/what_is_iwrm.html

Appendices

Appendix I: Grenada IWRM Policy and Planning Meeting Notes

Appendix II: Data Collection Form

Appendix III: IWRM Assessment Meeting Schedule

Appendix IV: Tourism Statistics

Appendix V: Guidelines for National Implementing Committee (NIC)

Appendix I: Grenada IWRM Policy and Planning Meeting Notes

Grenada IWRM Policy and Planning Meeting

Wednesday 28th February 2007

Ministry of Works Conference Room, St. Georges, Grenada

MEETING NOTES

The meeting began at 9:25 a,m.

See Appendix I for Agenda and Appendix II for the List of Participants.

Agenda Item 1: Welcome

Ms. Lana McPhail, Permanent Secretary, Ministry of Agriculture, Grenada, welcomed those present and underlined the significance of the meeting for Grenada. There is, she said, worldwide recognition of the need for IWRM policy and there was a need locally to involve a wide group of key players, such as NAWASA, which had hitherto not been involved, in this important exercise. Cabinet had appointed a Committee to lead this process and hoped that stakeholders would give input. The European Union (EU) had approved a project for the development of water resources in the southern part of Grenada for which 6.7 million Euros was available. However, as part of the agreement to access the funds Grenada must have a water policy in place and this must be completed within 6 months. She hoped to use the expertise of regional partners present.

Agenda Item 2: The Global Water Partnership in the Caribbean (GWP-C) and Establishing Country Water Partnerships

Paul Hinds of the GWP-C, referring to CAPNET materials on the GWP-C website, introduced IWRM and the main issues faced in water management. He made reference to the Millennium

Development Goals (MDGs) and the need to secure water for food production. He stressed the participatory approach and the need to value water both economically and as a social good. He reviewed the process involved in IWRM and stressed its value as a management instrument guided by the three Es: Economic Efficiency; Equity and; Environmental Sustainability.

Dr. Lester Forde, of Forde Engineering Consultants, also representing the GWP-C, gave the history of the GWP as a reaction to the sectoral approach to water resources management. There is no such thing as "upstream-downstream" in small islands he said. Governance is the key to operationalizing IWRM; in fact the enabling environment is all about governance. The way forward for the Caribbean would depend upon its ability to institutionalize and operationalize IWRM via multi-stakeholder partnerships. Country Water Partnerships can enable participation by various stakeholders and partners.

Agenda Item 3: IWRM, IWCAM and the Benefits of Having a National Water Policy presented by Chris Cox of the Caribbean Environmental Health Institute (CEHI) and Donna Spencer of the Integrating Watershed and Coastal Areas Management in Caribbean Small Island Developing States (IWCAM) Project

Dr. Christopher Cox of the Caribbean Environmental Health Institute (CEHI) defined IWRM – stressing that integrated management means that all the different uses of water resources are considered together. He described an IWRM plan as a strategy for change defined in the context of institutional roles, the enabling environment and management instruments. It is important that an IWRM plan be linked to other strategies and plans. He covered the elements of an IWRM plan and what it should look like in its final form. It should include: a description of the existing water management approach; a description of the current water resources situation in the country and; should address a number of issues. The plan itself would consist of a description of the scope, how we plan to achieve the vision, goals, aims and objectives, links to other national processes and plans, and, the resource requirements to implement the plan. An IWRM Roadmap is the planning component of a cyclical process of IWRM planning, development and execution. Finally he stressed the benefits of having an IWRM Plan:

- improves access to funding;
- partnership;
- technical support;
- improved management of water resources;
- monitoring of the environment;
- sewage treatment;
- greater environmental awareness and cooperation and;
- exchange of information.

Donna Spencer, of the Integrating Watershed and Coastal Areas Management in Caribbean Small Island Developing States (IWCAM) Project then introduced participants to the Project. The objective of the Project is to assist Caribbean SIDS to adopt an integrated approach to watershed and coastal area management. Grenada is one of thirteen participating countries which will benefit from a number of activities. In 2007 key IWCAM activities are: the conduct of a Legislative, Policy and Institutional Inventory and Recommendations; the conduct of a Capacity Assessment of Geographic Information Systems (GIS) Capabilities; IWCAM Indicator Development; Communications and Public Awareness; the implementation of 9 Demonstration Projects in 8 of the participating countries and; support for the preparation of national IWRM Plan Development.

Agenda Item 4: Issues in Water Resources Management in Grenada presented by Trevor Thompson, Land Use Officer, Land Use Division, Ministry of Agriculture, Grenada.

Mr. Thompson outlined the issues in water resources management facing Grenada as follows:

- The water supply is not as infinite as Grenadians think it is
- The need for comprehensive policy and integrated management
- The lack of comprehensive legislation and regulations
- Environmental degradation is affecting both surface and groundwater quality, quantity and availability
- Changing land use is affecting quality, quantity, supply systems, and distribution patterns (making it more expensive)
- The need for a water census to value the total resource is critical
- Planning for water in disasters such as hurricanes, flooding and drought
- Deforestation, poor agricultural practices and management of land and water
- changing and inadequate land use panning, zoning etc.
- competition from housing and tourism
- Lack of coordination, cooperation and integration of stakeholders
- Poor project planning, design and implementation
- Lack of a management plan encompassing all stakeholders
- Sidelining of the role of women in water management and use
- Lack of education in best management practices for land and water conservation
- Privatization

Grenada's water resources are managed by a range of ministries and institutions which he detailed. There are no clear lines of responsibility for management of the water sector as a whole. Furthermore there is a lack of monitoring and conservation of natural water resources such as Grand Etang Lake, River Antoine, Levera and the Great River Basin. He identified the following needs: an up-to-date hydrological study; better water quality monitoring (including beaches, swamps and lakes); data collection, processing and analysis; policy; legislative review and reform and; education. Finally, he stressed the need to clarify which will be the lead responsible national agency for coordination of IWRM in Grenada.

Agenda Item 5: Guidelines for Developing IWRM Plans presented by Lyndon Robertson of CEHI

After providing institutional background on CEHI, Mr. Robertson briefly noted that Grenada has had significant experience in the development of policies, plans and strategies dealing with natural resources. These included its Forest Policy, the Biodiversity Strategy and Acton Plan, the National Physical Development Plan and the National Environment Policy. The process of formulating Grenada's Forest Policy had been particularly participatory. He then went on to stress that the development of a Roadmap is important because it provides the basis for moving from Vision to Plan. Such IWRM Roadmaps had, since the IWRM Partnership Session at the Caribbean Environment Forum (CEF-3) held in Antigua in 2006, been promoted as mechanisms to assist countries in moving forward.

National Workshops such as this one, could contribute to determining the Vision. They are important for conceptualization, awareness building and increasing public/stakeholder participation. The Workshops would also result in: greater understanding of the importance of IWRM; greater understanding amongst stakeholders of their role in the process; wider input into the process; a feeling of ownership of the outcomes and; develop a common vision for IWRM at the national level. Needed are: the involvement of all stakeholders; emphasis on policy makers and the political directorate; a champion to rally support at the national level and; a multi-stakeholder steering committee – institutional drivers**.**

A Situation Analysis should be conducted. This would begin with focus group meetings for technical input as well as gathering of information. A questionnaire would be used to collect

additional information and a detailed assessment would be compiled. National workshops would assist information capture and increase awareness. The output would be a comprehensive national document identifying the state of water resources management in Grenada which could be used as a guide or reference for the decision-making process with respect to IWRM planning, or in the development of an integrated water policy. Outputs of the entire process would include: a Policy, Plan or Strategy; Regulations; Capacity Building; Best Practices; a Projects Portfolio and; Resource Mobilization.

Agenda Item 6: Discussion – The Way Forward

Chaired by Trevor Thompson and facilitated by Christopher Cox.

Q. Jocelyn Paul, Ministry of Finance: What is the time frame for implementation and who will be doing the work?
R. P.S.: Three weeks ago a Steering Committee was approved by Cabinet. They would need to meet to decide the framework for development but there would be need for a consultancy.

Q. Christopher Cox: Is the Water Policy a requirement for the European Union funding?
R. P.S.: Yes and there is a 6-month window to develop it.

Q. Sandra Ferguson, Agency for Rural Transformation: While NAWASA has the mandate for distributing water, we never hear about "managing' water. I hope to see a paradigm shift. For instance recently a new aquifer has been tapped into but no one has asked where the water is coming from…are we looking at replenishing this water?
Comment: Christopher Cox: Levels of responsibility will be described in the policy.

Q. Cosmos Joseph, Inter-American Institute for cooperation in Agriculture (IICA): (directed to the PS) Is there a natural resource management policy?
R. P.S.: No.
Comment: Cosmos Joseph: Then can we talk about a water policy in isolation? There is need for an umbrella policy and then a water policy to fit under this umbrella. CEHI should encourage more governments to have these in place and we should act on the basis of need for such policy. For example, the work of the Physical Development Unit of the Ministry of Works and Communications should have related actions. There should be some kind of strategy or overall policy to guide these.
Response: Lester Forde, CWP-C: The development of IWRM promotes interrelation; it is an integrated process. It is also important to note the importance of natural resources. Visioning is at present not total.

Comment: Judy Williams, Grenada Community Development Agency (GRENCODA): I have spent the past four days attending workshops looking at policies – a review of NEMS and the revision of the St. Georges Declaration, a review of Forest Policy and a UNFCCCD review…suffering from "workshop fatigue". Since 1983 when the beautiful process of developing a national Forestry Policy began I have been involved. In 2007 we are still waiting for a National Land Use Policy. Now we are doing this because we need a National Water Policy to access EU funds. I don't see how it can be meaningfully done in 6 months. I disagree that we have a wide cross-section of stakeholders here.

Comment: Desmond John, European Development Fund: The water policy is not being done only to access EU funds but because it is needed for sound economic reasons. The critical question is that the policy be not only written but implemented; that it be developed with the fullest participation of all stakeholders and is a document which has support. Water policy is also good management practice. In reality, international donors require critical policy frameworks but the country benefits. A land use policy is critical. We as a responsible people must put the necessary frameworks in place for development.

Comment: Chris Joseph, Ministry of Health and the Environment: Re. the status of the land use policy - it was transferred to the agency with responsibility for reconstruction and development. Re. overarching policy for natural resource management, there is the National Environmental Management Strategy (NEMS) which does provide a broad framework. In the context of environmental management and sustainable development, there are a number of concerns, gaps and constraints re. water policy. E.g. farming and rates of erosion, safe disposal of chemicals, how to compensate farmers for best practices (a vitally important issue). Re. the strengthening of institutions and the impact of climate change, we need to put monitoring regimes in place. Re. the agricultural sector, the use of recycled water should be promoted. Analysis is therefore needed to identify needs and opportunities for developing the water sector.

Comment: Michael Mason, Land Use Division, Ministry of Agriculture: Re. climate change, the Ministry has provided equipment for NAWASA to use for monitoring water levels in rivers.

Q. Jocelyn Paul: This project is timely. Re. the questionnaire presented by Lyndon Robertson, I am concerned re. whether changes can be made to it or questions can be added, with regard to climate change in particular.
R. Lyndon Robertson, CEHI: Yes, this can be considered.

Bernard McIntosh, Carriacou: This is timely; thank you for remembering Carriacou. A few years ago NAWASA had stated that they would be measuring cisterns and use of water but I don't know what became of it, time frame etc. Do we have people in place to do these things? And what are the implications for Carriacou? There has not been much emphasis on the Rainwater Harvesting Workshop which took place in Carriacou but it should be part of the discussion, especially re. southern Grenada, Carriacou and Petit Martinique.

Lazarus Joseph, Grenada Port Authority: Expressed concern about the focus here on the "land-side" and not on the coastal zone.

Alphonsus Daniel, Daniel and Daniel Engineering: (mentioned appointed as a member of the Steering Committee) Hope to be able to arrive at a Water Policy in 6 months. Referring to management of the recently discovered La Sagesse aquifer – a lot of the water down there was formed over millions of years but so many things have happened in the immediate catchment area, so this may affect water recharge rates and water quality in the future. Re. the paradigm shift referred to, the fact that this meeting is taking place is testimony of this. While glad to see the Ministry of Agriculture spearheading this, we need to have more stakeholders involved.

Q. P.S.: (directed to Mr. Shillingford) Re. NAWASA and the Bedrock Agreement – what is its status?
R. Damian Shillingford: The Bedrock Agreement is dormant; there are some concerns. Re. the aquifer at La Sagesse, the water quality has been tested and is of good quality. Water resources management is zero in Grenada. NAWASA has a responsibility and while data is collected, nothing is done with the data. NAWASA should deal with the distribution of water and waste management collection only. We are working to figure out how to meet the requirements of the EU. It is practical to have conditions imposed because the EU wants to make sure that there are improvements and for this a policy framework is needed. NAWASA cannot be the regulator of itself.

P.S.: Wherever you put it, it will be the regulator. She gave the example of GRENLEC.

Lester Forde: Stated that based upon his experience as a former Director of Water Resources in Trinidad and Tobago, any self-regulator must be prepared to answer questions.

Desmond John: Underscored the importance of the Committee looking at the economic value of water versus the social value because it is integral to the water policy (impacts, water usage and water discipline).

Lester Forde: Agreed with last point made adding that indigenous experience must also be valued. People, e.g. farmers need to be educated re. wise water use. A strong case made for public education and awareness.

Q. Imhotep Mawuto, Forestry and National Parks Division, Ministry of Agriculture: What will be the difference this time…to make sure that this policy is actually implemented?

R. Lester Forde: The PS can pull out all past recommendations, review and assess them.

R. Lyndon Robertson: Re. implementation, there are some regional models which have worked e.g. Jamaica.

The facilitator then sought to extract from this discussion the issues which participants want to see addressed by Grenada's National Water Policy. The following is a summary:

Issues to be Addressed by Grenada's Water Policy:

3. **Guiding Principles of the Policy**

   These will be elaborated upon by the Cabinet-Appointed Steering Committee, largely informed by this discussion (Visioning exercise) and additional consultation with stakeholders.

4. **Governance – who takes the process forward? (champion)**

   a. The Cabinet-Appointed Steering Committee would constitute the core group responsible for guiding the process. The Ministry of Agriculture will be the lead agency. Other relevant committees might already exist and be able to undertake certain responsibilities. E.g. a National Environmental Committee exists. What would the relationship between this Committee and the new Steering Committee for a National Water Policy be?
   b. Terms of Reference are needed for this core group.
   c. The reporting protocol to be followed by the core group is to be decided. Should reports go to the focal point in the Ministry of Health (the Environmental Committee)?
   d. The Country Water Partnership encourages broad participation and a democratic process for inclusion. It is a means by which a wider group of persons can be involved in the development of the water policy as well as IWRM development.
   e. Meetings with groups by sectors would be necessary next steps.

5. **Driving forces**

   a. Need for more integrated management of the country's water resources.
   b. Need to ensure a safe and adequate water supply.
   c. Need to ensure greater economic efficiency, equity and environmental sustainability in the way that water resources are managed.

d. Need to involve more stakeholders in development and implementation of a water policy as well as in IWRM.
e. The need to urgently formulate a water policy which meets all of the above in time to access EU funding for the water infrastructure upgrade in southern Grenada.

6. Expectations

a. Greater awareness of water resource management, watershed and coastal resources.
b. Building of capacity in the areas of water conservation, management, utilization, production (including rainwater harvesting) with available assistance (including the GWP, CapNet etc.).
c. Clarification and harmonization of roles/responsibilities at all levels (public, private sector, civil society).
d. Greater consistency between various Natural Resource Management policies, national as well as to which Grenada is obligated (e.g. Forestry Policy, RAMSAR, MGDs, SDGs, the Cartagena Convention [LBS] Protocol, others
e. The appropriate valuation of water in all its uses (Public/private debate).
f. An enabling environment – introduction of the necessary legislation, regulations and guidelines.
g. Improved information sharing.
h. Proper management of data and information towards well-informed decision-making.
i. A holistic approach to Water Resources Management in Grenada.
j. An approach to WRM which ensures greater continuity, implementation and sustainability.
k. Improved resource mobilization, funding.
l. Greater discipline by users and greater responsibility in water management.
m. That issues of salination due to irrigation and salt water intrusion due to pumping of coastal aquifers be addressed.
n. That pollution mitigation in the freshwater and marine environment and public health (sanitation, disease control) be addressed.
o. Clear and easily assessable indicators.
p. Institutional strengthening (personnel and equipment).
q. The review of existing regulatory mechanisms, and revision as necessary to meet goals.
r. Consideration of who, if anyone, “owns” water.
s. Proper valuation of water resources and system of paying for its use.

Closing Remarks:

The P.S. stated that they were clearer now in what they need to do. She thanked the participants for their contributions, reminding them that while she hoped that in six months there would be a Draft Water Policy to present, the need to access the EU funding was not the main reason for having a water policy – there are, as discussed throughout the proceedings, many good reasons to have one.

The meeting ended at 1:50 p.m.

After the lunch break, a small group reconvened for an informal meeting to agree upon the next steps.

APPENDIX I

Grenada IWRM Policy and Planning Meeting

Wednesday 28th February 2007

Ministry of Works Conference Room, St. Georges, Grenada

AGENDA

Chair: Trevor Thompson, Land Use Division, Ministry of Agriculture, Grenada

a.m.:

9:00 a.m. **Welcome** - Permanent Secretary, Ministry of Agriculture, Grenada

9:10 a.m. **The Global Water Partnership in the Caribbean and Establishing Country Water Partnerships** - Paul Hinds and Dr. Lester Forde, Global Water Partnership - Caribbean

9:30 a.m. **Introduction to IWRM, IWCAM and the Benefits of having a National Water Policy** - Chris Cox, CEHI and Donna Spencer, IWCAM

9:50 a.m. **Issues in Water Resources Management in Grenada** - Trevor Thompson, MoA

10:20 a.m. **BREAK** (Refreshments)

10:30 a.m. **Guidelines for Developing IWRM Plans** - Lyndon Robertson, CEHI

10:50 a.m. **Discussion: The Way Forward** (chaired by Trevor Thompson; facilitated by Chris Cox)

11:50 a.m. **Wrap-Up/Summary**

12:00 noon End of Session

12:00 – 1:00 p.m. **LUNCH**

APPENDIX II

PARTICIPANTS

NAME	ORGANIZATION	CONTACT DETAILS
Damian Shillingford	NAWASA	440-2155 NAWASAGM@spiceisle.com
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Mericia Mitchell	GBT-C'cou	(473) 443 7948 carrgbt@spiceisle.com

Appendix II: Situation Analysis Data Collection Form

Information Template for Developing IWRM Roadmaps, Policy and Plans in Caribbean SIDS

G Instrument

Grenada, March 2007.

Table of Contents

Section B

Reporting Country:

Completed By:

Date Completed:

1 PROCESSES AND MILESTONES LEADING TOWARDS IWRM

A. NATIONAL WATER RESOURCES MANAGEMENT VISION					
What is the National Water Resources Management Vision for your Country?					
What level of support is there for the Vision at:	**Very High**	**High**	**Medium**	**Little**	**None**
➢ **Political**					
➢ **High Level Policy/Decision making**					
➢ **Technical**					
➢ **Key Stakeholders**					
➢ **General Population**					
What level of awareness is there for the Vision at following Levels:	**Very High**	**High**	**Medium**	**Little**	**None**
➢ **Political**					
➢ **High Level Policy/Decision making**					
➢ **Technical**					
➢ **Key Stakeholders**					
➢ **General Population**					

B. AWARENESS ON IWRM				
What is the level of awareness on the Philosophy, concepts, principles and practices of IWRM for the following groups: (Please use a rating of 0 = none; 1 = to a little degree; 2 = to a reasonable degree; 3 = fully)				
Stakeholders	**(Check (✓) the rating that best applies)**			
	0	**1**	**2**	**3**
➢ National level politicians				

➢ Local level politicians				
➢ High level policy/Decision Makers (National Level)				
➢ Decision makers in agencies responsible for water resources management				
➢ Decision makers in agencies within the water use and water related sectors				
➢ Professionals in agencies responsible for water resources management				
➢ Professionals in agencies within the water use and water related sectors				
➢ Major Water Users (Industry, Agriculture, Tourism etc)				
➢ NGOs in the water sector				
➢ CBOs in the water sector				
➢ Local/community level decision makers				
➢ Water sector consultants				

C. IWRM PLAN

Is there a National Water Plan? (Check (✓) the appropriate one)

	✓		
Existing		Date of Approval:	Title:
Being Developed		Est. Completion Date:	
To be developed in the near future		Est. Start Date:	Expected Period for Preparation
No decision on its development			

If Plan Exists

Who were the main stakeholders involved in it preparation?	
Who has responsibility for coordinating its implementation?	
Who has responsibility for M&E?	

	Yes	No	Comment
Is there a portfolio of projects to implement the Plan?			
Is there a programme for capacity building?			
Is there a strategy for sustainable financing of the Plan?			

D. NATIONAL PROGRAMMES AND PROJECTS							
Are there Programmes and Projects that may impact on IWRM?							
Name of Programme/ Project	**Focus of Programme/ Project**	**Area of focus on IWRM**	**Harmonized with Water Policy/Plan**		**Agencies Responsible for Implementation**	**Funding Source**	**Comments**
			Yes	**No**			
Existing Programme/ Project							
Being Developed/ Contemplated							

E. OTHER NATIONAL PLANS THAT ARE LIKELY TO CONTRIBUTE TO IWRM						
Are there other Plans that may impact on IWRM?						
Name of Plan	**Focus of Plan**	**Area of focus on IWRM**	**Harmonized with Water Policy/Plan**		**Agencies Responsible for Implementation**	**Comments**
			Yes	**No**		
Existing Plan						
Being Developed						
Being Contemplated						

F. CONTEXT FOR IWRM PLANNING	
• What mechanisms are in place for interaction with stakeholders at the national level?	
• What mechanisms are in place for interaction with stakeholders at the local/community level?	
• How have other National Plans been established?	
• What are the decision-making arrangements for strategies and plans within different ministries?	
• Who will need to endorse an IWRM Plan? •	
• Which government ministry and/or designated agency will have the central role to play in the development of the IWRM Plan	
• What are the levels of support for the IWRM Philosophy at the political level?	
• What are the levels of support for the IWRM Philosophy at the policy/technical levels?	
• What are the levels of support for the IWRM Philosophy at the general population level?	
• What is the level of political will in ratifying and implementing regional or international obligations related to water resources management?	
• What are the key issues or concerns related to Water Resources management?	
• Is there political support to develop a holistic IWRM Plan, or is it necessary to focus on one or two key topics?	
• Are there interested parties in government to develop an IWRM Plan?	
• What are the likely resources available to develop an IWRM Plan?	
• Which areas of action will be able to attract sustainable forms of financing?	

G. CHALLENGES AND CONSTRAINTS TO IWRM				
Challenges/Constraints **(Rate the following challenges/constraints using the following:** **0 = Not relevant; 1 = Not Severe; 2 = Severe; 3 = Very Severe)**	**Rating (Check (✓) the rating that best applies)**			
	0	**1**	**2**	**3**
Lack of Good Water Governance				
Fragmented Approach to IWRM:				
➢ Multiple institutions, each with their own piece of legislation and Mandate, none of which is broad and deep enough				
➢ Assign responsibilities for planning; management and operations affecting quantity to units separate from those responsible for quality management				
➢ Poorly defined responsibilities for departments/section				
➢ Overlap of responsibilities, resulting in duplication				
➢ Cost trade-off between the pollution control and water supply treatment in the same watershed is not evaluated, thus the national investment policies and programmes do not reflect the interrelationships between quality and quantity.				
Lack of effective integration and coordination hampered by:				
➢ The absence of sound and comprehensive national policies on water resources				
➢ The multiplicity of institutions that deal with the management of the resources				
➢ The multiplicity of laws, each dealing with separate aspects of the management of the resources, thus encouraging compartmentalization				
➢ Institutionally divided approach to dealing with environment and development				
➢ Poor management of the dynamics of water supply and demand.				
➢ Inadequate legal and regulatory frameworks for managing the resources.				
➢ The absence of a credible framework for involving civil society in the management process				

➢ The lack of a proper understanding and awareness of the principles of sustainable development and an appreciation of the inseparable linkages between environmental, social and economic issues.					
➢ Institutional arrangements for integrated water resources management are weak/ non-existent.					
Lack/inadequate institutional resources					
➢ Lack/inadequate human resources					
➢ Inadequate of equipment					
➢ Inadequate financing					
➢ Weak technical capabilities/lack of a critical mass for water resources management					
➢ Inadequate Research and Technology					
➢ Inadequate Data and Information Management Infrastructure					
Conflict between water supply and demand					
Poor land use planning and soil management in watersheds					
Poor pollution prevention and control					
Limited/poor Stakeholder Participation					
Limited/little Public Awareness and Education					
Lack of Promote the economic, social and ecological values of water					
Impact of Climate Change and Sea level Rise					

2 WATER POLICY

A. POLICY ENVIRONMENT			
Is there a National Water Policy? (Check (✓) the appropriate one)			
	✓		
Existing		Date of Publication:	Title:
Being Developed		Est. Completion Date:	
To be developed in the near future		Est. Start Date:	Expected Period for Preparation:
No decision on its development			

B. POLICY COVERAGE		
Area of Coverage (Check all that are relevant)	✓	**Comment**
Water Resources Management		
Water Supply and other Uses		
Promotes the principles of IWRM		
Defines IWRM		**Please state the definition:**
Identifies roles for the Private Sector and Civil Society (NGO, CBO, others)		**Please outline these roles:**
Promotes the Polluter pays principle		
Promotes the user pays principle		

C. OTHER POLICIES IMPACTING ON IWRM					
Are there other policies that may impact on IWRM?					
Name of Policy	**Area of Focus of Policy**	**Area(s) of focus on IWRM**	**Harmonized with Water Policy**		**Comments**
			Yes	**No**	
Existing Policy					

Being Developed					
Being Contemplated					

3 NATIONAL WATER LEGISLATION

A. WATER LEGISLATION			
Is there one or more specific Water Laws/Water Code? (Check (✓) the appropriate one)			
	✓		
Existing		Date of Publication:	Title:
Being Developed		Est. Completion Date:	
To be developed in the near future		Est. Start Date:	Expected Period for Preparation:
No decision on its development			

B. COVERAGE OF EXISTING OR PROPOSED WATER LAWS		
For Existing or Proposed Water Laws give the Areas of Coverage (Check (✓) all that are relevant)	✓	**Comment**
Public Hearings		
Stakeholders Participation in IWRM		
Principle of Subsidiarity (Management at the lowest appropriate level)		

Separation been resources management and water service provision		
Participation of Women and other Vulnerable Groups in IWRM		
Private Sector and Civil Society (NGO, CBO, others) participation in IWRM		Please outline how they are expected to participate:
Promotes the Polluter pays principle		
Promotes the user pays principle		
Water Use Efficiency		

C. REGULATIONS SUPPORTING THE EXISTING WATER LAWS					
Title of Regulations	**Focus of the Regulations**	**Are these Effective? Check (✓) the response that best applies**			**Comment**
		Yes	**No**	**Some What**	

For those Regulations that are not or some what effective, check (✓) one or more of the following reasons		
Reasons	**(✓)**	**Comment**
Regulations insufficiently known by users		
Regulations insufficiently known by the enforcers		
Too complicated to be operational		
Regulations contradict each other		
Sanctions not applied in cases of non-compliance		
Sanctions are inadequate		
Enforcement capacity inadequate		
Monitoring capacity inadequate		
Regulations conflict with traditional, social and cultural norms and values		
Regulations conflict with other laws		
Other:		

D. OTHER LEGISLATION IMPACTING ON IWRM						
Are there other Legislation that may impact on IWRM?						
Name of Legislation: (Title, No. and Year)	**Focus of Legislation**	**Area of focus on IWRM**	**Harmonized with Water Laws**		**Agencies Responsible for Implementation**	**Comments on effectiveness of the Monitoring, enforcement and resource allocation**
			Yes	**No**		
Existing Legislation						
Being Developed/ Contemplated						

4. INSTITUTIONAL FRAMEWORK FOR THE WATER SECTOR

A. REGIONAL AND INTERNATIONAL ENVIRONMENT	
What are the driving forces for action at the international level?	
What are the driving forces for action at the regional level?	

C. INSTITUTIONAL AND ADMINISTRATIVE FRAMEWORK		
Which Institution has lead responsibility for IWRM?		
Name of Institution	Mandate	Key Responsibilities for IWRM
Which other Institutions have some responsibilities for IWRM?		
Name of Institution	Mandate	Key Responsibilities for IWRM

C. INTER-SECTORAL COORDINATION					
Are there any inter-ministerial commissions, committees or coordinating mechanisms among the institutions involved in IWRM?					
Name of Committee	Secretariat	Mandate	Composition of Committee	Frequency of Meetings	Comments

Are there any inter-ministerial commissions, committees or coordinating mechanisms among the institutions whose work may impact on IWRM?					
Name of Committee	**Secretariat**	**Mandate**	**IWRM Representation**	**Area of Focus on IWRM**	**Frequency of Meetings**

D. CAPACITY FOR WATER RESOURCES MANAGEMENT								
(Please rate using the following 0 = no capacity; 1 = little capacity, needs to be built; 2 = some gaps but is workable; 3 = capacity fully exist)	**Public Sector (Check (✓) the rating that best applies)**				**Private Sector (Check (✓) the rating that best applies)**			
Policy Formulation								
Drafting of laws & regulation								
Preparation of WR Assessments								
Preparation of EAs								
Preparation of Socio-economic Assessments								
Monitoring of Water Quality								
Monitoring of Water Availability								
Monitoring of aquatic ecosystems								
Monitoring of Pollution loads								
Monitoring of Water Use								
Resource Use planning, protection and conservation								
Water Demand Management								
Water Allocation								
Conflict mediation								
Information generation, collection, analysis								
Laboratories for testing								
Measuring impacts								
International Negotiations								

E. TECHNICAL ASSISTANCE FOR IWRM			
Are there any on-going technical assistance programmes/projects that relate to IWRM?			
Name of Programme	**IWRM Focus of the Programme**	**Financing (Amount and Source)**	**Duration**

F. TRAINING		
Are there any on-going Training Programmes that are related directly to IWRM?		
Name of Programme	**IWRM Focus of the Programme**	**Duration**
Secondary Level		
Technical		
Tertiary		
Post-Graduate		

G. STAKEHOLDERS SCREENING

The following questions must be borne in mind when completing the Stakeholders' Matrix:

- Who are the main stakeholders that would need to be involved in development and implementation of an IWRM plan?
- What are the benefits of stakeholder involvement?
- What are the possible implications of *not* involving stakeholders?
- Which partners within government have the potential to become involved in the IWRM plan process?
- Who has a mandate that is directly related to issues that are likely to be addressed in the IWRM plan?
- Are there partners for whom the relationship is not immediately obvious? **For example**, officials from a Ministry of Finance may have no direct mandate relating to water resources management, but may make decisions that have profound implications for the success of an IWRM plan such as budget allocation and taxes.
- Who might be affected by the IWRM plan?
- What are their interests and positions?
- Who has information and expertise that might be helpful?
- Who has been/is involved in similar initiatives or planning?
- Who has expressed interest in being involved in similar initiatives/efforts before?
- Who else might be interested in preparing the IWRM plan?
- Are there stakeholders who might want to be fully involved, but for some reason can't be involved to the extent that they would like to be? What are those reasons?

You should classify the stakeholders according to the four groups below (1 – 4) and enter this in the Matrix under Category

5. Those who will likely want to participate fully or whose active involvement will determine the credibility of the process;
    - *Those that should serve on the coordinating committee*
    - *Those that should be involved in the planning and development processes*
    - *Those that should be involved in the implementation process*
    - *Those that should be involved in the monitoring and evaluation processes*
6. Those who would likely play a more limited role;
7. Those who would wish simply to be kept well informed;
4. Those who would not want to be involved

For each stakeholder, enter one of the following rating under Priority/Influence:
HH – High Priority/High Influence
HL – High Priority/Low Influence
LH – Low Priority/High Influence
LL – Low Priority/Low Influence

Stakeholder	Interests	Likely impact of the IWRM Plan	Priority – Influence (HH, HL, LH, LL)	Category (1-4)	Capacities	Potential roles in the IWRM Plan

5 RESOURCE ANALYSIS

A. WATER RESOURCES				
Source – Present Situation				
Source	**Availability**	**Production**	**Consumption**	**Comment**
Surface				
Groundwater				
Desalination				
RW				
Wastewater Recycled				
Other Supply Augmentation				
Source – Projected (15 years)				
Source	**Availability**	**Production**	**Consumption**	**Comment**
Surface				
Groundwater				
Desalination				
RW				
Wastewater Recycled				
Other Supply Augmentation				

Consumption – Present Situation					
Source	**Domestic**	**Industrial**	**Agriculture**	**Tourism**	**Environmental Services**
Surface					
Groundwater					
Desalination					
RW					
Wastewater Recycled					
Other Supply Augmentation					
Consumption – Projected 15 years					
Source	**Domestic**	**Industrial**	**Agriculture**	**Tourism**	**Environmental Services**
Surface					
Groundwater					
Desalination					
RW					
Wastewater Recycled					
Other Supply Augmentation					

B. WATER OWNERSHIP			
	Yes	**No**	**Comment**
Water is a common good			
Water is the Property of the State			
Water is a private property			
Ownership can be variable			
Others			

C. WATERSHED/CATCHMENT										
Name of Watershed	Area	Shared?		Availability	Production	Main Activities in Watershed	Management Arrangement			
		Yes	No				Public	Private	CBO/ NGO	Co-Managed

B. NATIONAL STATUS OF REGIONAL & INTERNATIONAL AGREEMENTS, CONVENTIONS, OBLIGATIONS AND INITIATIVES FOR IWRM										
Initiative	Date Signed	Date Ratified	Plans for Implementation		Implementing Agency	IWRM Area of Focus (Both in the Initiatives and the Plan)	Harmonized within Legal Framework			Comments progress to implementa
			Yes	No			Yes	No	Partly	

Appendix III: IWRM Assessment Meeting Schedule

Integrated Water Resources Management Policy and Plan for Grenada
Awareness and Data Collection Meeting Schedule for Agencies:

Agency	Date	Time	Person	Venue
PPU	March 19, 2007	9:00 am – 10:30 am	LR	PPU
Economic Affairs	March 19, 2007	9:00 am – 10:30 am	LR	PPU
PIU	March 19, 2007	9:00 am – 10:30 am	LR	PPU
CSO	March 19, 2007	9:00 am – 10:30 am	LR	PPU
NAWASA	March 19, 2007	9:00 am – 10:30 am	TT	NAWASA
Distillers Assoc.	March 19, 2007	9:00 am – 10:30 am	TT	NAWASA
Bottle Water Assoc.	March 19, 2007	9:00 am – 10:30 am	TT	NAWASA
Water Trucking	March 19, 2007	9:00 am – 10:30 am	TT	NAWASA
Forestry Division	March 19, 2007	10:45 am – 12:30 am	LR	MoA
MoA Extension	March 19, 2007	10:45 am – 12:30 am	LR	MoA
MoA Veterinary	March 19, 2007	10:45 am – 12:30 am	LR	MoA
Lands and Surveys	March 19, 2007	10:45 am – 12:30 am	LR	MoA
Fisheries Division	March 19, 2007	10:45 am – 12:30 am	LR	MoA
Land use Division	March 19, 2007	10:45 am – 12:30 am	LR	MoA
GHTA	March 19, 2007	10:45 am – 12:30 am	TT	GTB
Min. of Tourism	March 19, 2007	10:45 am – 12:30 am	TT	GTB
Yachting Assoc.	March 19, 2007	10:45 am – 12:30 am	TT	GTB
Tourist Board (GTB)	March 19, 2007	10:45 am – 12:30 am	TT	GTB
Tour Operators	March 19, 2007	10:45 am – 12:30 am	TT	GTB
Marina Assoc.	March 19, 2007	10:45 am – 12:30 am	TT	GTB
EHD	March 19, 2007	2:00 pm – 4:00 pm	LR	MoH
Epi. Unit	March 19, 2007	2:00 pm – 4:00 pm	LR	MoH
Env. Affairs	March 19, 2007	2:00 pm – 4:00 pm	LR	MoH
Bureau of Standards	March 19, 2007	2:00 pm – 4:00 pm	LR	MoH
Fish Exporters	March 19, 2007	2:00 pm – 4:00 pm	TT	MEDU
Farmers Assoc.	March 19, 2007	2:00 pm – 4:00 pm	TT	MEDU
MEDU	March 19, 2007	2:00 pm – 4:00 pm	TT	MEDU
Hunters Association	March 19, 2007	2:00 pm – 4:00 pm	TT	MEDU
SADO	March 19, 2007	2:00 pm – 4:00 pm	TT	MEDU
GRENCODA	March 20, 2007	8:30 am – 10:00 am	LR	GRENCODA
FoE	March 20, 2007	8:30 am – 10:00 am	LR	GRENCODA
SJDO	March 20, 2007	8:30 am – 10:00 am	LR	GRENCODA
ART	March 20, 2007	9:00 am – 10:30 am	TT	ART

Agency	Date	Time	Person	Venue
Min Social Affairs	March 20, 2007	9:00 am – 10:30 am	TT	ART
Min of Education	March 20, 2007	9:00 am – 10:30 am	TT	ART
Gravel and Concrete	March 20, 2007	11:00 am – 12:30 pm	LR	MoW
MoW	March 20, 2007	11:00 am – 12:30 pm	LR	MoW
GPA	March 20, 2007	11:00 am – 12:30 pm	LR	MoW
GSWMA	March 20, 2007	11:00 am – 12:30 pm	LR	MoW
GAPE	March 20, 2007	11:00 am – 12:30 pm	TT	GIDC
GIDC	March 20, 2007	11:00 am – 12:30 pm	TT	GIDC
Bar Assoc.	March 20, 2007	11:00 am – 12:30 pm	TT	GIDC
NHC	March 20, 2007	11:00 am – 12:30 pm	TT	GIDC
GCBA	March 20, 2007	2:00 pm – 4:00 pm	LR	GCNA
GCB	March 20, 2007	2:00 pm – 4:00 pm	LR	GCNA
GCNA	March 20, 2007	2:00 pm – 4:00 pm	LR	GCNA
GFS	March 20, 2007	2:00 pm – 4:00 pm	TT	FS
RGPF	March 20, 2007	2:00 pm – 4:00 pm	TT	FS
Cadets	March 20, 2007	2:00 pm – 4:00 pm	TT	FS
IICA	March 21, 2007	9:00 am – 10:30 am	TT	PCL
CARDI	March 21, 2007	9:00 am – 10:30 am	TT	PCL
PCL	March 21, 2007	9:00 am – 10:30 am	TT	PCL
Biotechnology Lab	March 21, 2007	9:00 am – 10:30 am	TT	PCL
EHD	March 21, 2007	11:00 am – 12:30 pm	LR	MoA C'cou
Forestry C'cou	March 21, 2007	11:00 am – 12:30 pm	LR	MoA C'cou
Extension C'cou	March 21, 2007	11:00 am – 12:30 pm	LR	MoA C'cou
MCPA	March 21, 2007	11:00 am – 12:30 pm	LR	MoA C'cou
PMCC	March 21, 2007	11:00 am – 12:30 pm	LR	MoA C'cou
GTB C'cou	March 21, 2007	11:00 am – 12:30 pm	LR	CEC
DownIsland	March 21, 2007	1:30 pm – 3:15 pm	LR	CEC
Sust. Grenadines	March 21, 2007	1:30 pm – 3:15 pm	LR	CEC
Bougles Group	March 21, 2007	1:30 pm – 3:15 pm	LR	CEC
CEC	March 21, 2007	1:30 pm – 3:15 pm	LR	CEC
GSTC	March 21, 2007	11:00 am – 12:30 pm	TT	GSTC
GSDC	March 21, 2007	11:00 am – 12:30 pm	TT	GSTC
GNT	March 21, 2007	11:00 am – 12:30 pm	TT	GSTC
GHS	March 21, 2007	11:00 am – 12:30 pm	TT	GSTC

PIU–Project Implementing Unit; **CSO**–Central Statistics Office; **MoA**–Ministry of Agriculture; **GHTA**–Grenada Hotel and Tourism Association; **GTB**–Grenada Tourist Board; **EHD**–Environmental Health Association; **MEDU**–Micro-Enteprise Development Unit; **MoH**–Ministry of Health; **FoE** – Friends of the Earth; **SADO**–St Andrews Development Organisation; **SJDO**–St.

John's Development Organisation; **MoW**–Ministry of Works and Public Utilities; **GPA**–Grenada Ports Authority; **Epi.** – Epidemiological; **Env.** – Environmental; **GAPE**– Grenada Association of Professional Engineers; **GIDC**–Grenada Industrial Development Corporation; **GCBA**-Grenada Cooperative Banana Association; **GCB**-Grenada Cocoa Board; **GFS**-Grenada Fire Service; **PCL** – Produce Chemist Laboratory; **MCPA**-Ministry of Carriacou and Petite Martinique Affairs; **PMCC**- Petite Martinique Church Council; **CEC**-Carriacou Environmental Committee; **GSDC**-Grenada Sustainable Development Council; **GSTC**-Grenada Science and Technology Council; **GNT**-Grenada national Trust; **GHS**-Grenada Horticultural Society; **LR**-Lyndon Robertson; **TT**-Trevor Thompson.

Appendix IV: Tourism Statistics

Grenada Board of Tourism, 2005

TABLE 1			
Summary Presentation of Comparative Monthly Aggregates Total Visitors - Stayover and Same day 2004 & 2005			
Months	**2004**	**2005**	**% Change**
January	12,767	10,114	-20.78%
February	13,534	8,861	-34.53%
March	12,887	9,425	-26.86%
April	15,491	8,040	-48.10%
May	11,217	7,578	-32.44%
June	10,010	7,747	-22.61%
July	16,940	10,268	-39.39%
August	16,901	10,900	-35.51%
September	7,749	5,506	-28.95%
October	7,219	7,273	0.75%
November	6,737	7,968	18.27%
December	8,558	10,691	24.92%
TOTAL	**140,010**	**104,371**	**-25.45%**

TABLE 2			
Summary Presentation of Comparative Monthly Aggregates Stayover Visitors - By Air & Sea 2004 & 2005			
Months	**2004**	**2005**	**% Change**
January	12,486	9,260	-25.84%
February	13,012	8,173	-37.19%
March	12,546	8,852	-29.44%
April	15,090	7,481	-50.42%
May	10,821	7,013	-35.19%
June	9,380	7,115	-24.15%
July	16,580	9,838	-40.66%
August	16,629	10,614	-36.17%
September	6,724	5,299	-21.19%
October	6,634	6,886	3.80%
November	6,220	7,780	25.08%
December	7,743	10,237	32.21%
TOTAL	**133,865**	**98,548**	**-26.38%**

TABLE 12									
Comparison of Monthly Estimates of Expenditure (EC dollars) of Stayover Arrivals (Air and Sea) and Monthly Breakdown of Modes of Entry									
MONTHS	**ESTIMATED EXPENDITURE EC$**			**AIR ARRIVALS**			**SEA ARRIVALS**		
	2004	**2005**	**% Change**	**2004**	**2005**	**% Change**	**2004**	**2005**	**% Change**
January	$41,516,189	$20,539,368	**-50.53%**	11,748	8,464	**-27.95%**	738	796	**7.86%**
February	$42,956,906	$19,835,952	**-53.82%**	12,022	7,505	**-37.57%**	990	668	**-32.53%**
March	$39,581,386	$21,288,288	**-46.22%**	11,616	8,240	**-29.06%**	930	612	**-34.19%**
April	$43,759,854	$17,324,226	**-60.41%**	14,413	6,965	**-51.68%**	677	516	**-23.78%**
May	$30,671,657	$15,802,686	**-48.48%**	10,100	6,530	**-35.35%**	721	483	**-33.01%**
June	$27,374,071	$16,076,184	**-41.27%**	9,132	6,800	**-25.54%**	248	315	**27.02%**
July	$57,471,603	$25,808,826	**-55.09%**	16,222	9,664	**-40.43%**	358	174	**-51.40%**
August	$55,049,066	$23,353,032	**-57.58%**	16,223	10,384	**-35.99%**	406	230	**-43.35%**
September	$15,671,190	$10,449,330	**-33.32%**	6,556	5,201	**-20.67%**	168	98	**-41.67%**
October	$10,439,450	$14,001,012	**34.12%**	6,425	6,703	**4.33%**	209	183	**-12.44%**
November	$13,938,444	$18,759,972	**34.59%**	5,995	7,502	**25.14%**	225	278	**23.56%**
December	$20,949,828	$28,756,632	**37.26%**	7,467	9,675	**29.57%**	276	562	**103.62%**
TOTAL	**$399,379,644**	**$231,995,508**	**-41.91%**	**127,919**	**93,633**	**-26.80%**	**5,946**	**4,915**	**-17.34%**

TABLE 35			
Annual Breakdown of Visitor (Cruise & Stayover) Expenditure			
Years	**Expenditure Cruise Passengers**	**Expenditure Stayover Arrivals**	**Total**
1996	$13,215,611	$147,134,535	**$160,350,146**
1997	$19,728,960	$378,911,874	**$398,640,834**
1998	$21,270,000	$394,044,488	**$415,314,488**
1999	$19,636,880	$437,925,350	**$457,562,230**
2000	$14,424,400	$466,041,214	**$480,465,614**
2001	$11,790,480	$427,147,840	**$438,938,320**
2002	$10,804,880	$457,671,194	**$468,476,074**
2003	$11,754,000	$457,760,388	**$469,514,388**
2004	$18,384,000	$399,379,644	**$417,763,644**
2005	$22,006,560	$231,995,508	**$254,002,068**
Total	**$163,015,771**	**$3,798,012,035**	**$3,961,027,806**

TABLE 34										
A Compendium of Annual Statistics										
Visitor Arrival Methods	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
By Air	95,372	98,217	104,151	114,540	118,426	111,876	121,074	133,724	127,904	93,633
By Sea	12,859	12,531	11,643	10,749	10,438	11,475	11,342	8,631	5,961	4,915
By Cruise Ship	266,982	246,612	265,875	245,461	180,305	147,381	135,061	146,925	229,800	275,080
Same Day Visitors	10,800	11,057	10,011	8,202	7,359	6,825	3,917	4,931	6,145	5,823
TOTAL	**386,013**	**368,417**	**391,680**	**378,952**	**316,528**	**277,557**	**271,394**	**294,211**	**369,810**	**379,451**
USA	30,380	29,320	31,640	34,694	32,541	32,219	36,508	35,191	30,127	25,181
Canada	4,205	4,977	5,343	6,136	4,849	5,442	4,684	5,599	5,309	4,341
United Kingdom	19,583	21,350	23,338	26,234	32,236	28,488	29,760	33,286	28,232	15,605
Germany	7,004	5,004	4,019	4,319	4,586	3,665	2,981	3,533	2,701	2,809
Other Europe	11,002	11,442	10,778	10,078	9,547	8,029	6,227	6,324	5,244	3,970
Caribbean	14,357	16,407	18,725	21,998	23,774	27,160	32,303	38,396	40,064	28,067
G'dians Residing Abroad	17,030	16,922	18,743	18,339	18,068	14,956	14,836	16,715	19,076	15,907
All Others	4,670	5,326	3,208	3,491	3,263	3,392	5,117	3,311	3,112	2,668
TOTAL	**108,231**	**110,748**	**115,794**	**125,289**	**128,864**	**123,351**	**132,416**	**142,355**	**133,865**	**98,548**
Cruiseship Calls	393	323	328	369	360	288	259	267	249	260
Yacht Calls	5,355	5,292	4,583	5,354	5,361	5,610	3,966	4,157	3,177	2,989
Visitors to Carriacou	7,266	7,203	6,743	6,718	5,464	6,887	5,408	5,132	4,153	3,177
Hotel Occupancy	61.11%	62.10	62.31%	64.77%	71.00%	67.00%	71.00%	N/A	N/A	N/A
Visitors Rooms Available	1,669	1,775	1,802	1,800	1,822	1,734	1,734	1,758	860	1,628
Average length of stay	7.54	7.43	7.36	7.32	7.20	7.23	7.32	7.65	7.53	7.42

Appendix V: Guidelines for the National Implementing Committee

Guidance Document for Grenadian Water Steering Committee (WSC) / National Intersectoral Committees (NICs)

This document is intended to provide guidance to Grenada in the establishment of its Water policy Steering Committee (WSC) / National Intersectoral Committee (NICs) as it relates to the development of a national water policy and the IWCAM Project.

The WSC is a multi-sectoral committee to address issues related to integrating watershed and coastal area management and the development of a water policy at the national level. The WSC is established and chaired by the Permanent Secretary Ministry of Agriculture. The WSC is responsible for:

- Guiding the process of development and implementation of a National Water Policy and plan
- Ensuring full stakeholder participation at the national level in National Water Policy and development
- Ensuring full multisectoral cooperation and coordination within government departments
- Integrating the National Water Policy and plan, IWRM and IWCAM activities with other related policies and strategies, including the National Environmental Management Strategy (NEMS)
- Promoting the implementation of IWRM at the national and regional levels
- Overseeing the development of PA/PE materials and providing guidance as to relevance and appropriateness
- Overseeing and guiding the process of development of the water policy and plan and IWRM in Grenada
- Responsible for the periodic measuring and evaluation of the progress of the policy and plan development process
- Implementation of the policy and plan
- Responsible for M&E of the implementation of the policy and plan at the national level
- Sourcing financial and human resources required for the development of the policy and plan
- Ensuring that consultations are held in a timely manner and dedicating responsibility to various agencies and personnel

- Finalisation of the policy and plan and presentation to cabinet for approval

The WSC should be made up of key representatives of government, NGOs, and the private sector. For example:

- Relevant Ministries and Departments (e.g. Agriculture, Health, Environment, Fisheries, Tourism, Forestry, Planning, Finance)
- Related projects (e.g. national projects on land, water or coastal zone management)
- Environmental, Community Development, or Private Sector Non-Governmental Organisations
- Civic Organisations (e.g. Chamber of Commerce, Rotary Club)
- Local Academic Institutions
- Others

Whenever possible the WSC should link with other projects, programmes, initiatives and groups in order to avoid duplication of effort. For example, the WSC / NIC and Country Water Partnerships, which are being established by the Global Water Partnership-Caribbean (GWP-C).[3]

In its first year of existence, the WSC should meet at least monthly, to guide the formation of a National Water Policy. Later it will meet quarterly/semi-annually and more often if necessary to address implementation of the policy and the progress and direction of the IWCAM project. Minutes from WSC / NIC meetings should be forwarded to the IWCAM PCU. Summaries prepared by WSC / NICs may be sent to the IWCAM PCU for inclusion on the IWCAM web-site.

[3] See attached Country Water Partnership Guidelines.