UNITED NATIONS DEVELOPMENT PROGRAMME
COUNTRY: REGIONAL
PROJECT DOCUMENT

Project Title: Integrating Water, Land and Ecosystems Management in Caribbean Small Island Developing States (IWECO)

UNDP Strategic Plan Environment and Sustainable Development Primary Outcome: **Outcome 7:** Development debates and actions at all levels prioritise poverty, inequality and exclusion, consistent with our engagement principles. **Output 7.7:** Mechanisms in place to generate and share knowledge about development solutions.

UNDP Strategic Plan Secondary Outcome: Outcome 1: Growth and development are inclusive and sustainable, incorporating productive capacities that create employment and livelihoods for the poor and excluded. **Output 1.3**: Solutions developed at national and sub-national levels for sustainable management of natural resources, ecosystem services, chemicals and waste.

Executing Entity/Implementing Partner: UNOPS

Programme Period: 2014-2019	Total resources required **88,739,763**
Key Result Area (Strategic Plan): MFA	• GEF 1,500,000
Atlas Award ID: 00082779	• UNEP 19,222,572
Project ID: 00091543	• Other Co financing 68,017,191
Start date: July 2015	
End Date Dec 2019	
UNDP PIMS 4873	
PAC Meeting Date 19 June 2015	
Management Arrangements: Agency Execution	

Brief Description

The challenges Caribbean SIDS face on account of small landmasses, vulnerable economies, and heavy dependence on external energy resources, with rising populations means that concerted efforts must be made in translating the concept of sustainable development to reality in practice. It is accepted that climate change will affect SIDS more directly that other regions of the globe in terms of scope and intensity of impact, hence governments must continue to hasten the process to safeguard the natural resource base so as to make communities and ecosystems resilient to the impacts of climate change. In spite of progress made on many fronts, many barriers remain in respect of water, land and biodiversity resource management.

The **Integrating Water, Land and Ecosystems Management in Caribbean Small Island Developing States (GEF-IWEco Project)** will apply a "Ridge to Reef" approach integrating watershed and coastal areas management in small islands for addressing the multiple challenges of sustainable water, land (including forests) and biodiversity management and conservation within the spatial framework of the watershed unit. The project will support policy, institutional and legislative reforms, will contribute to the implementation of effective appropriate technologies to accelerate contribution to global targets on access to safe and reliable water supplies and improved sanitation, and will help to improved ecosystem functioning in the Caribbean.

The project is a five-year multi-focal area regional intervention that will be financed from (i) country GEF STAR allocations under Land Degradation and Biodiversity portfolios for national interventions and supported by (ii) funding from the GEF International Waters and Sustainable Forest Management portfolios for regional-level actions. A total of ten Caribbean countries will be participating in the project. UNEP will be the lead Implementing Agency for national and regional sub-projects with UNDP having an implementation role for some activities under the Knowledge Management regional sub-

project and community-based livelihoods support opportunities associated with the national sub-projects through the GEF-Small Grants Programme. UNEP Car/RCU in partnership with the Caribbean Public Health Agency (CARPHA) will serve as co-Executing Agencies. The project has **four components**; **(1)** Development and Implementation of Integrated Targeted Innovative, climate-change resilient approaches in sustainable land management (SLM), integrated water resources management (IWRM) and maintenance of ecosystem services; **(2)** Strengthening of the SLM, IWRM and ecosystems Monitoring, and Indicators framework; **(3)** Strengthening of the Policy, legislative and institutional reforms and capacity building for SLM, IWRM and ecosystem services management taking into consideration climate change resilience building and **(4)** Enhancing knowledge exchange, best practices, replication and stakeholder involvement. The project will be implemented through a network of international, regional and national partners in accordance with their comparative advantage.

The **long-term goal** of the project is to enhance the sustainable flow of ecosystem services and their contribution to sustainable socio-economic development in the Caribbean.
The **global environment objective** is to promote innovative systemic methodologies and approaches for the integrated sustainable management of water, land and globally threatened biodiversity resources that are relevant, replicable and up-scalable for small island developing states (SIDS). These efforts will mitigate further environmental degradation and create enabling conditions for environmentally sustainable development of the Caribbean region.
The **Project Objective** is to contribute to the preservation of Caribbean ecosystems that are of global significance and the sustainability of livelihoods through the application of existing proven technologies and approaches that are appropriate for small island developing states.

The expected impacts to be delivered from the project are as follows:

- *Measurable stress reduction at project sites across the eight participating countries through appropriate sustainable water, land and ecosystems management interventions that account for climate change.*
- *Enhanced livelihood opportunities and socio-economic co-benefits for targeted communities from improved ecosystem services functioning.*
- *Strengthened national and regional systems for monitoring of environmental status with respect to key international agreements.*
- *Strengthened policy and legislation for the effective management of water, land and ecosystems resources that account for climate change.*
- *Strengthened capacity of national and regional institutions and other stakeholders for water, land, and ecosystems management that accounts for climate change.*
- *Improved engagement and information access for practitioners and other stakeholders through targeted knowledge sharing networks.*

The GEF contribution will lay the basis for continued investment in environmental resource management in Caribbean SIDS building on the lessons from the predecessor GEF-IWCAM Project. The knowledge and experience amassed will allow for the improved targeting of future GEF and other external donor resources in assisting Caribbean countries and SIDS elsewhere in addressing ecosystem degradation.

Agreed by Government of Antigua and Barbuda:

Date:

Agreed by Government of Barbados:

Date:

Agreed by Government of Cuba:

Date:

Agreed by Government of Dominican Republic:

Date:

Agreed by Government of Grenada:

Date:

Agreed by Government of Jamaica

Date:

Agreed by Government of St Kitts and Nevis

Date:

Agreed by Government of St. Lucia

Date:

Agreed by Government of Trinidad and Tobago

Date:

Agreed by Government of St. Vincent and Grenadines

Date:

Agreed by UNOPS:

Date:

Agreed by UNDP:

Adriana Dinu, UNDP – GEF Executive Coordinator

Date: 07/16/2015

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ACRONYMS **AND ABBREVIATIONS**

BPOA	Barbados Programme of Action for the Sustainable Development of SIDS
BD	Biodiversity
CANARI	Caribbean Natural Resources Institute
CARDI	Caribbean Agricultural Research and Development Institute
CARICOM	Caribbean Community
CCCCC	Caribbean Community Climate Change Centre
CARPHA	Caribbean Public Health Agency
CAWASA	Caribbean Water and Sewerage Association
CDB	Caribbean Development Bank
CEP	Caribbean Environment Programme
CIMH	Caribbean Institute of Meteorology and Hydrology
CWWA	Caribbean Water and Wastewater Association
CXC	Caribbean Examinations Council
DSS	Decision support systems
FAO	Food and Agriculture Organisation of the UN
GEF	Global Environment Facility
GEMS-Water	Global Environmental Monitoring System-Water Programme
GEO	Global Environment Outlook
GPA	Global Programme of Action for the Protection of the Marine Environment from Land-based Activities
GRID	Global Resource Information Database
GWP-C	Global Water Partnership-Caribbean
IADB	Inter-American Development Bank
IAEA	International Atomic Energy Agency
IICA	Inter-American Institute for Cooperation on Agriculture
IUCN	International Union for Conservation of Nature
IW	International Waters (GEF)
IWCAM	Integrated Watershed and Coastal Area Management
IW:LEARN	International Waters Learning Exchange and Resource Network
M&E	Monitoring and Evaluation
MEA	Millennium Ecosystem Assessment
MSP	Medium Size Project (GEF)
NFP	National Focal Point
NGO	Non-governmental Organization
NOAA	National Oceanic and Atmospheric Administration (USA)
OAS	Organization of American States
OECS	Organisation of Eastern Caribbean States

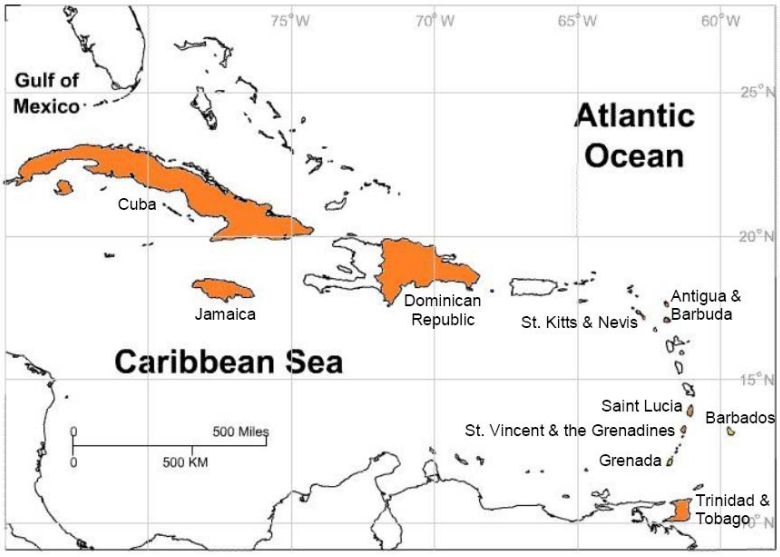
PCU	Project Coordination Unit
PIR	Project Implementation Review (of GEF)
PMS	Project Management System
PSC	Project Steering Committee
REDD+	Reducing Emissions from Deforestation and Forest Degradation
RSP	Regional Seas Programme
SAP	Strategic Action Programme (GEF)
SFM	Sustainable Forest Management
SIDS	Small Island Developing States
SLM	Sustainable Land Management
SMART	**S**pecific; **M**easurable; **A**chievable, **A**ttributable; **R**elevant; **T**ime-bound, **T**rackable
TNC	The Nature Conservancy
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNESCO-IHP	International Hydrological Programme (of UNESCO)
UNU-INWEH	United Nations University Institute for Water, Environment & Health
UWI	University of the West Indies

I. SITUATION ANALYSIS

1.1 Environmental and socio-economic context

1. **Location and geography:** The Caribbean Region lies between the North and South American sub-continents between 10° and 23° north latitude and 59° and 80° west longitude with countries within the region bordering the Caribbean Sea, itself being one of Earth's largest seas covering an area of about 2,754,000 km². Cuba has the largest area of 110,900 square kilometres, followed by Hispaniola [1] with an area of 76,480 km² and Jamaica with a land area of 10,831 km². The islands of the Eastern Caribbean are substantially smaller, the largest of these (not including the French overseas Departments of Martinique and Guadeloupe) being Dominica at 750 km² while St. Kitts and Nevis is the smallest independent state with a land area of 269 km². The Caribbean islands have varying geological and topographical characteristics ranging from predominantly low-lying coral limestone formations (e.g. Barbados) to mixed volcanic and sedimentary limestone formations (e.g. the larger islands such as Jamaica and Cuba), to rugged volcanic formations where the elevations exceed 900 metres. The interior landscapes of Jamaica and Hispaniola are also very rugged with high mountain ranges of over 2,000 metres in elevation.

Figure 1. Participating countries in the IWEco Project.



[1] Made up of the Dominican Republic which has a total area of 48,700 square kilometers, and Haiti with an area of 27,800 square kilometres

2. **Demographics and economy and vulnerabilities:** The populations of the Caribbean countries vary mainly in relation to size[2]; Cuba - 11.3 million, Dominican Republic – 9.5 million; Jamaica – 2.7 million; Barbados – 273,000; Saint Lucia – 160,000; Saint Kitts & Nevis - 49,300. The larger islands of the Greater Antilles have relatively higher population densities with more diversified economies with a high proportion dedicated to farming and other agricultural practices. The smaller eastern Caribbean (Lesser Antilles) islands are characterized by relatively lower population densities and agriculture and other small-scale industries confined to the narrow coastal zones. Caribbean economies have been gradually transitioning away from agriculture, which was the traditional mainstay, to manufacturing, tourism and financial services.

3. The tourism sector is significant to Caribbean economies, contributing approximately 20% of overall foreign exchange earnings, and about 12% of total employment[3], and in several of the smaller countries, tourism contributions by far exceeds that of other sectors. The World Travel and Tourism Council (2007) report ranked the Caribbean first out of thirteen regions in terms of the contribution of the industry to the regional economy. The region was ranked first on a global scale for capital investment and government expenditure on tourism. Travel and tourism demand in the Caribbean is forecast to increase to an estimated US$107.3 billion by 2017. The WTTC report cited an estimated 806,000 jobs in the industry and a total of 2,447,000 jobs (14.8% of total employment) when industry-related jobs are taken into consideration.

4. Investment in agriculture has continued to decline in most Caribbean countries as traditional markets have changed, particularly in the traditional banana and sugar cane industries, as a result of the dismantling of preferential trade agreements the Caribbean islands previously enjoyed with former European colonial powers. Many of the island economies have diversified away from agriculture although some of the larger countries still maintain a vibrant agricultural economy which includes value added such as agro-processing and manufacture at larger commercial scales. In the main however, the reduction in local production output previously built around the agricultural sector, notwithstanding the growth in tourism, juxtaposed with increasing populations and growth of the commercial sectors that are reliant on high-cost fuel imports to drive the economies, has meant a widening gap in the balance of trade and reduced net foreign exchange earning capacity. This has placed the small Caribbean economies in very vulnerable fiscal positions. The smallness of economies render them highly vulnerable to external shocks especially given the concentration of investment in tourism which in turn is vulnerable to the state of the economies in target market countries. Heightening this vulnerability is the threat posed by climate change and associated sea level rise, compounded by increased hurricane occurrence and damaging storm surges that are expected to negatively impact investments and economies.

[2] 2005 data sourced from databases from the Caribbean Development Bank the World Bank and the United Nations Development Programme; referenced in the Caribbean Position Paper to the 5th World Water Forum
[3] World Travel and Tourism Council. 2007

5. **Urbanization and resource pressures:** Ultimately the land resource is the most important asset that forms the basis of socio-economic productivity and security of livelihoods, and consideration of land issues is a significant issue in SIDS. Most of the smaller Caribbean islands are dominated by rugged topographies with narrow strips of coastline where much of the human settlement and economic activity occur. These small land masses with corresponding high population densities and competing uses for land among the various sectors have put pressure on critical ecosystems and further threatened the already fragile and vulnerable natural resource base. The shift from agricultural-dominated economies has meant that the nature of land resource exploitation has changed, where conversion to non-agricultural use is rapidly altering landscapes with ecosystem fragmentation and degradation. Population growth has slowed in most of the participating territories averaging 0.49% annually (Wikipedia) over the last five years. However population density continues to increase ranging from 100 persons per km^2 in Cuba to 319 in Grenada and 668 persons per km^2 in Barbados (2011 estimates, World Stat). Approximately three quarters of the population of each country live in urban areas.

6. The Pan-American Public Health Organization (PAHO/WHO) (2010) in its Caribbean Sub-regional Cooperation Strategy (SCS)[4] noted that urbanization has been progressively increasing in the region with implications particularly with respect to problems in sanitation, inadequate housing, overcrowding, unemployment, violence and urban poverty, especially in peripheral squatter neighbourhoods. Urban population averages 45.7% although this varies widely between countries. The pressures of increasing urbanization are not always accompanied by increase in the necessary health care resources to satisfy increased demand in the growing urban population.

7. The poverty dimension is an important consideration as in many countries in respect to linkages with environmental services, notably access to safe water and sanitation and natural resources upon which communities depend. The incidence of poverty, which between countries is variable and clustered in pockets, tends to be high among the rural population, young females, and the elderly. PAHO (2010) further noted that rural poverty typically translates to lack of access to physical and financial resources, production support facilities, and social and infrastructure services such as electricity, water, sanitation, and roads and transportation. Urban poverty is related to overcrowding, the emergence of squatter settlements, and poor sanitation and waste disposal practices. Where environmental resources upon which impoverished communities rely are degraded, economic opportunities are diminished. Degraded environments within physical proximity to poor communities often translate to lowered

[4] Caribbean Sub-regional Cooperation Strategy (SCS) online at https://www.google.com/url?q=http://www.paho.org/hq/index.php%3Foption%3Dcom_docman%26task%3Ddoc_download%26gid%3D14981%26Itemid%3D&sa=U&ei=rtOIUueoL47qkAek6oGoDQ&ved=0CAYQFjAA&client=internal-uds-cse&usg=AFQjCNFyF0Th9fu_Ld3tNMzh-mCg-EtA6w

resilience to natural disasters; landslides, floods, storm surge inundation, a serious concern in respect of climate change impacts.

8. **Water, land and ecosystem resources and contribution to development:** Rainfall across the Caribbean varies where annual averages range from less than 1,000mm for the smallest low-lying islands to in excess of 3,000 mm in high interior elevations of some countries. Based on precipitation inputs and population the Internal Renewable Water Resources (IRWR) varies widely between countries. The FAO estimates IWRWs of 293, 584 and 3,431 m^3/capita/annum for Barbados, Antigua & Barbuda and Jamaica respectively (FAO Aquastat 2012). A country is considered as water scarce at water availabilities of less than 1,000 m^3/capita/annum. **In consideration of the foregoing many of the Caribbean islands rank among the most water scarce SIDS in the world.** Countries heavily reliant on groundwater resources include Antigua & Barbuda and Barbados. The larger countries including Cuba, The Dominican Republic and Jamaica rely on a mix of ground and surface water sources, depending on the geology of local water supply regions. In the majority of the smaller islands surface water abstractions (rivers and reservoirs) dominate. Rain water harvesting is practiced in some of the smaller islands and in islands where topographic constraints limit access to the public distribution system in some locations. Desalination technologies although expensive in terms of production costs are seeing increased application in the more water-stressed Caribbean countries. In the larger countries significant volumes of water are used in irrigation while in the smaller countries the larger proportion of water abstracted is allocated to drinking water supply.

9. Although in many countries access to potable water supplies have reached the MDG targets, there are serious challenges in the quantity and distribution of water in many communities over the course of the year. This impacts not only water security and health of communities but presents challenges to economic output where commercial, industrial and agricultural production is curtained by short-falls in water supply. The problems are acute in particular areas on Antigua & Barbuda, Jamaica, Saint Lucia and Grenada. Access to improved sanitation remains a challenge for lower-income communities across all the countries in the Caribbean with implications for maintenance of adequate health standards and occurrence of water-borne disease in particular. Poorly managed and treated human effluent not only poses a direct risk for communities but also within recreational coastal waters.

10. The Caribbean Sea constitutes the coastal waters of the region and is the economic basis for the tourism and fisheries sectors in the region. The importance of protection of marine ecosystems of the Caribbean, particularly coral reefs cannot be understated. The Caribbean Sea harbours 10% of the world's coral reefs and 1,400 species of fish and marine mammals (TNC, 2013). The World Resources Institute (WRI) recently estimated that coral reefs in the region currently provide upwards of US$100 million per year in benefits associated with tourism, US$18 to 33 million in shoreline protection, and another US$1million in benefits to fisheries. The Caribbean Sea Ecosystem (CARSEA)

Assessment (UWI and the Cropper Foundation, 2006) noted that relative to its size, the Caribbean's population is more dependent on income from tourism than that of any other part of the world, in 2004 contributing US$28.4 billion to GDP. Land-based pollution and over-extraction of marine resources has taken its toll on the quality of marine biodiversity and consequent impacts on economies of coastal communities in terms of reduction or loss of fisheries resources and reduction in recreational diving economic opportunities.

11. The majority of countries in the region possess residual forest cover that is now mainly confined to the more inaccessible interior regions of the countries. The forested areas constitute not only important reservoirs for the bulk of remaining indigenous biological resources but are vital for watershed and aquifer protection and supply of water. According to the FAO the average extent of forest cover approximates 25% (based 2000 data) of total land mass area; although on a country basis this varies widely. Forest cover ranges from 30% in the case of Jamaica to 21% for Cuba to less than 15% for the islands of Saint Kitts and Nevis, Saint Lucia and Saint Vincent and the Grenadines. Recent empirical evidence suggests that the rates of deforestation associated with agriculture are slowing down although land use conversions are seeing more intensive impacts associated with other uses (e.g. mining and quarrying). In most countries residual forest are often fragmented or oriented along narrow ridgelines depending on the pattern of historic land development that has taken place around the margins of forests. Areas that faced extensive denudation in the past still remain vulnerable to slope failure and chronic erosion during heavy rainstorms with associated flooding where watercourses become sedimented.

12. **Summary:** The challenges Caribbean SIDS face on account of small landmasses, vulnerable economies, heavy dependence on external energy resources, with rising populations means that concerted efforts must be made in translating the concept of sustainable development to reality in practice. It is accepted that climate change will affect SIDS more directly that other regions of the globe in terms of scope and intensity of impact, hence governments must continue to hasten the process to safeguard the natural resource base so as to make communities and ecosystems resilient to the impacts of climate change. In spite of progress made on many fronts, many barriers remain in respect of water, Land and biodiversity resource management, and the IWEco Project will build on the work of prior initiatives, and most directly the GEF-IWCAM Project is addressing removal of these barriers. Discussion of the threats and barriers are elaborated in Section 2.3.

1.2 Global significance

13. From a socio-economic perspective the unique natural assets of the Caribbean Sea basin makes it a globally important region. Offshore oil and natural gas reserves around Trinidad and Tobago and off the northern coast of South America, minerals production particularly in the larger islands of Cuba, Hispaniola and Jamaica (notably nickel in Cuba

and bauxite in the latter two), ocean transportation through the Panama Canal hub, tourism, agricultural and fisheries commodities and branded niche products such as rum all contribute not only to economies in the Caribbean but global markets farther afield. The Florida-Caribbean Cruise Association (FCCA) noted that the Caribbean ranks as the dominant cruise destination in comparison to other global destinations, in 2010 accounting for 41.3% of all itineraries, a trend that will likely grow given larger cruise ship capacities. The FCCA also adds that based on a 2009 Economic Impact Study cruise-related expenditures generated 56,000 jobs throughout the Caribbean and that cruise-generated jobs paid US$720 million in wage income to Caribbean residents [5].

14. The Caribbean Sea Basin is globally significant as having been designated as one of the 34 biodiversity hotspots in the world due to its high endemicity and threat risk (Ecosystem Profile - The Caribbean Island Biodiversity Hotspot – CEPF 2010) and according to Conservation International (CI), the Caribbean Islands 'hotspot' support exceptionally diverse ecosystems. The Hotspot has dozens of highly threatened species, and also remarkable for the diminutive nature of much of its fauna, boasting the world's smallest bird (the tiny bee hummingbird, endemic to Cuba) and smallest snake found on St. Lucia. The region contains some 6,550 endemic plant and just over 200 threatened endemic bird, reptile and amphibian species. BirdLife International (2010) notes that of 11,000 plant species, 72% are endemic; 95% of the reptile and 100% of the amphibian species are endemic to the Caribbean. Birdlife International (2010) adds that roughly 8 to 35% of species within the major marine taxa found globally are endemic to the Caribbean hotspot. Many of the biodiversity conservation programmes have been built around protection and conservation of existing reserve areas. Efforts have been made to expand and designate new protected area and reserves and to develop management plans for protected areas.

15. Although carbon sequestration from terrestrial forest ecosystems may be relatively small on the global scale, contributions from yet to be comprehensively qualified 'blue forest' coastal ecosystems can add significantly to overall contributions to carbon fluxes.

16. The Caribbean SIDS and other SIDS globally are characterized by similar geography, susceptibility to natural disasters, notably cyclonic activity in the case of many, small populations and socio-economic challenges associated with smallness of land mass and limited resources that make them very vulnerable to external market shocks and other global pressures. The changing climate will heighten vulnerabilities of these countries both in terms of impacts on the biophysical environment and on communities and livelihoods. In meeting these challenges the Caribbean, along with the Pacific, Atlantic, Mediterranean and Indian Ocean SIDS through fora such as AOSIS will need to continue to advocate the common position on restricting global GHG emissions on the global stage through political processes through relevant conventions and treaties. To support

[5] Florida-Caribbean Cruise Association Cruise Industry Overview – 2011 on-line at http://www.f-cca.com/downloads/2011-overview-book_Cruise%20Industry%20Overview%20and%20Statistics.pdf

of the political process SIDS will also need to collaborate at the technical level to share approaches, technologies and lessons. Should SIDS be unable to cope with these challenges this will mean erosion of the character of globally unique cultures, displacement of communities with potentially significant economic fall-out not only on impacted countries but neighbouring countries.

1.3 Institutional context

17. The following is an account of the two regional political governance mechanisms for at the Caribbean Community level and at the Eastern Caribbean sub-regional level within the OECS Union and contributions to environmental resource management.

18. The **Caribbean Community (CARICOM)** is a regional socio-economic governance organisation that seeks to promote economic integration and cooperation among its members, to ensure that the benefits of integration are equitably shared, and to coordinate foreign policy. The Community comprises of 15 Member States (fully independent) and 5 Associate Members (British Overseas Territories). Through the Secretariat and its various institutions, and following the provisions of the Revised Treaty of Chaguaramas[6] it engages in provision of harmonized policy direction, facilitating project and programme development in a range of thematic areas, and fosters trade and the development and growth of a regional single market and economy amongst its Members.

19. Environmental policy matters at the Community level are dealt with primarily through the Ministerial Organ, the **Council for Trade and Economic Development (COTED)**, but where health issues are impacted, through the **Council for Human and Social Development (COHSOD)**. The work of the Community is also assisted by a quasi-cabinet of individual Heads of Government to spearhead action in sectors critical to the Region's integration in line with the Treaty and vision of development. In this regard, the area of natural resources management falls under the Sustainable Development portfolio which includes Environment and Disaster Management and Water. Under the Revised Treaty of Chaguaramas matters pertaining to environmental protection are embedded within the various related clauses to support the productive sectors and treated specifically under Article 65 pertaining to Environmental Protection. A regional environmental policy is under development and the consultative processes should commence during 2014. The CARICOM Secretariat has been charged with the formulation of a **Common Water Framework** following a COTED decision of 2008; however very limited progress has been made.

20. In respect of linkages to environmental health in the human dimension within CARICOM, the **Regional Caribbean Cooperation Strategy Phase 3 (or the Caribbean Cooperation**

[6] The Revised Treaty of Chaguaramas is on the CARICOM Secretariat website at http://www.caricom.org/jsp/community/revised_treaty-text.pdf

in Health Initiative III)[7] is a regional cooperation framework that seeks to optimize the utilization of resources, promote technical cooperation among member countries, and to develop and secure funding for the implementation of projects in priority health areas. CCH III builds on two previous regional health strategies (CCH and CCHII) first adopted by CARICOM Health Ministers in 1984. Among the goals of CCH III of relevance to environmental management include the '*Creation of a Healthy Caribbean environment conducive to promoting the health of its people and visitors*'. Environmental Health is identified among the CCH III Priority Areas. The Caribbean Public Health Agency (CARPHA) is the key delivery mechanism for CCH III.

21. Under the CARICOM framework, there are several agencies that work to varying extents in the area of environmental management. The following is a brief overview of the roles of each agency:

- Within the CARICOM Secretariat, the **Sustainable Development Programme** has primary responsibility for coordination of policy and actions between the agencies of the Community as related to formulation of harmonized positions in relation to the Revised Treaty.
- The **Caribbean Public Health Agency (CARPHA) - Environmental Health and Sustainable Development Department** (formerly the Caribbean Environmental Health Institute) has the core mandate for environmental health and environmental management in provision of technical advisory services, conduct of environmental assessments, policy development and research on behalf of the countries in the areas of water, land/watershed resources management, wastewater, chemicals (pesticides and hazardous chemicals) and solid waste management. The Department is a training centre for environmental laboratory diagnostics services through its accredited laboratory facility.
- The **Caribbean Institute of Meteorology and Hydrology (CIMH)** has the core mandate for provision of technical advisory services, research, capacity building, data archiving and analysis of hydro-meteorological data for Community Members States.
- The **Caribbean Community Climate Change Centre (CCCCC)** serves as the focal point agency with responsibility for coordinating the region's response to climate change and the assistance programmes on climate change resilience strengthening from the donor community.
- The **Caribbean Regional Fisheries Mechanism (CRFM)** has the mandate for regional coordination and policy development for the sustainable management of fisheries resources across the Caribbean Community Member States.
- The **Caribbean Disaster Emergency Management Agency (CDEMA)** is responsible coordinated responses to disastrous events affecting Caribbean Community Member States (on requests such assistance), establishing and maintaining on a sustainable basis, adequate disaster response capabilities among Participating

[7] The Summary of the Caribbean Cooperation in Health III is online at http://www.caricom.org/jsp/community_organs/health/cch_iii_summary.pdf

States and mobilizing and coordinating disaster relief from governmental and non-governmental organizations.

22. A significant benchmark of achievement was the articulation of the CARICOM Regional Framework for Achieving Development Resilient to Climate Change and its Implementation Plan (IP) . The IP lays out a framework for enhancing environmental management so as to improve coping mechanisms particularly in the area of water and land resources management and in the areas of food security within the agriculture and fisheries sectors.

23. The **Organisation of Eastern Caribbean States (OECS)** was established in June 1981 through the Treaty of Basseterre to promote cooperation, unity and solidarity among the signatory countries of the Eastern Caribbean sub-region. The OECS has a membership of six independent Eastern Caribbean countries and three British - dependent territories and the terms of cooperation is guided by the Revised Treaty of Basseterre (June 2010)[8]. The revised Treaty establishes the OECS economic union, governing the creation of a single financial and economic space, harmonization of monetary and fiscal policies and promoting common approaches to trade, health, education and environment, and development of the productive sectors (agriculture, tourism and energy).

24. Matters pertaining to the environment within the OECS are framed within the Principles for Environmental Sustainability in the OECS known as the St. George's Declaration[9]. The 21-point Principles establishes policy positions upon which Member State governments are to mainstream into national policies, laws and regulations. Further support through the OECS Secretariat was provided to countries in the development of National Environmental Policies (NEPs) and National Environmental Management Strategies (NEMS) built around the SGD. Environmental Sustainability within the OECS Union is outlined in Article 24 of the Revised Treaty of Basseterre. The environmental agenda of the Union is channelled through the Social and Sustainable Development Division of the Secretariat and guided through a Technical Advisory Committee mechanism.

25. Through donor-financed initiatives the Secretariat has been able to channel resources to further environmental policy and strategy development. Under the OECS Protected Areas and Associated Livelihoods (OPAAL) Project the Secretariat developed an OECS Policy on Protected Areas Systems along with an OECS Model Protected Areas System Act to govern the institutional arrangements for protected areas management in the

[8] Revised Treaty of Basseterre online at http://www.oecs.org/publications/doc_download/506-revised-treaty-of-basseterre-establishing-the-oecs-economic-union
[9] OECS Principles for Environmental Sustainability in the OECS - St. Georges Declaration available online at http://www.oecs.org/st-george-s-declaration

sub-region[10]. Under the present USAID-funded project, Reducing Risk to Human and Natural Assets Resulting from Climate Change (RRACC) which seeks to enhance capacity of the sub-region to respond to and strengthen resilience to climate change, model policy and legislation of integrated water resources management has been developed through a collaborative effort with CARPHA.

26. The **Association of Caribbean States (ACS)** is a membership organization comprising 28 Contracting States, Countries and Territories of the Greater Caribbean to identify areas of common interest and concern for redress through cooperation and solutions at the regional level. The ACS has identified 5 areas of concern, key of which includes the preservation and conservation of the Caribbean Sea. The ACS is governed by a Ministerial Council supported by an Executive Board which provides guidance and coordination in work implementation. Under the ACS, the Caribbean Sea Commission was established in 2008 to promote and oversee the sustainable use of the Caribbean Sea. The Commission has its own governance structure which includes Legal, Scientific and Technical, Governance, Public Information and Outreach Sub-Commissions. The Secretariat of the Cartagena Convention (UNEP CAR RCU) is a member of the Scientific and Technical Committee and works closely with the ACS in the development of new projects and activities to enhance synergies and reduce potential overlap and duplication.

27. The project is consistent with the political and socio-economic agendas of CARICOM, OECS and ACS since the proposed activities will contribute to harmonizing policies and identify common practices for the integrated water resource management in the Contracting States with the long term goal of promoting the conservation and sustainable management of the Caribbean Sea. The regional environmental and sustainable development policy frameworks, including those related to environmental health, fisheries and climate change, will guide project interventions enhancing national and local capacities to respond to model policy and legislation of integrated water and natural resources management.

1.4 Policy and legal context

27. All the IWEco Project participating countries implement legislative instruments, policies and strategic plans that are of relevance to the GEF focal areas being addressed under the project. These instruments are highlighted in the national sub-projects. In the main, these national instruments span most of the environmental governance issues, however in the majority of the countries the extent to which they are effectively exercised is highly variable in consideration of implementation capacity deficits. These deficits are highlighted in Table 3.

[10] OECS Model Protected Areas policy and model law, available online at http://www.oas.org/dsd/IABIN/Component1/ReefFix/Grenada%20Book/OECS%20Protected%20Areas%20Policy%20and%20Model%20Law.pdf

28. The following is an account of the primary MEAs that the countries are signatory to and status in respect to meeting obligations. The treaties discussed are the Cartagena Convention and its protocols, the UN Conventions on Biological Diversity (CBD), Desertification and Land Degradation (UNCCD) and Climate Change (UNFCCC).

29. The **Caribbean Environment Programme (CEP)** is one of the UNEP-administered Regional Seas Programmes and managed by and for the countries of the Wider Caribbean Region through the Caribbean Action Plan (1981) outlining regional environmental challenges. The Action Plan led to the 1983 adoption of the **Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention)**[11], which provides the legal framework. The Convention, which entered into force in 1986 is a comprehensive, umbrella agreement for the protection and development of the marine environment. This regional environmental convention provides the legal framework for cooperative regional and national actions in the WCR. The Convention has been ratified by 25 Member States in the Wider Caribbean Region and its area of application comprises the marine environment of the Gulf of Mexico, the Caribbean Sea and the areas of the Atlantic Ocean adjacent thereto, south of 30^{o} north latitude and within 200 nautical miles of the Atlantic Coasts of the States.

30. Under the Convention, Parties are required to take appropriate measures to protect and preserve rare or fragile ecosystems, as well as the habitat of depleted, threatened or endangered species and to develop technical and other guidelines for the planning and environmental impact assessments of important development projects in order to prevent or reduce harmful impacts on the area of application. The Convention is supplemented by three Protocols; (i) the **Protocol Concerning Co-operation in Combating Oil Spills** in the Wider Caribbean Region which was also adopted in 1983 and entered into force on 11 October 1986; (ii) **Protocol Concerning Specially Protected Areas and Wildlife (SPAW)** in the Wider Caribbean Region which was adopted on 18 January 1990. The Protocol entered into force on 18 June 2000, and (iii) **Protocol Concerning Pollution from Land-Based Sources and Activities** which was adopted on 6 October 1999. The Protocol entered into force on 13 August 2010.

Table 1. Status of the Cartagena Convention ratification of its Protocols amongst Caribbean SIDS.

[11] Text of the Convention online at http://www.cep.unep.org/cartagena-convention/cartagena-convention.pdf

Country	Cartagena Convention	Oil Spill		SPAW		LBS	
	Ratified / Acceded	Date of Signature	Ratified / Acceded	Date of Signature	Ratified / Acceded	Date of Signature	Ratified / Acceded
Antigua and Barbuda	1986		1986	1990			2010
Bahamas**	2010		2010				2010
Barbados	1985	1984	1985		2012		
Cuba	1988		1988	1990	1998		
Dominica*	1990		1990				
Dominican Republic	1998		1998		1998	2000	2013
Grenada	1987	1983	1987		2012		2012
Haiti*							
Jamaica	1987	1983	1987	1990			
St. Kitts and Nevis	1999		1999				
Saint Lucia	1984	1983	1984	1990	2000		2008
St. Vincent and the Grenadines	1990		1990		1991		
Trinidad and Tobago	1986		1986	1990	1999		2003

* Non-participant countries in the IWEco Project
** Anticipated participation through a MSP in association with the IWEco FSP
Source: UNEP CEP http://www.cep.unep.org/cartagena-convention

31. UNEP-CAR/RCU is the Secretariat of the Cartagena Convention, with technical support from Regional Activity Centres (RACs) within regional centres of excellence.

32. **UN Convention to Combat Desertification and Land Degradation (UNCCD):** Cuba (2003), Dominica Republic (2007), Grenada (2006), Jamaica (2002) and Saint Kitts and Nevis (2007) have completed their National Plans of Action; the remaining countries have prepared draft NAPs and are in the process of finalizing. In the main, the majority of the countries cite similar issues in their NAPs with respect to land degradation with noted concerns associated with historical land denudation for agriculture, timber and fuel wood and the more recent challenges associated with encroachment of other types of land use activities in previously forested areas with the influx of point and non-point source pollution. The pattern of land degradation and the impacts, particularly in terms of alteration of the hydrologic functioning of watersheds with uncontrolled runoff and heightened flood risks is a common theme. Actions under the NAPs all address these main concerns, including issues such as overgrazing and combating the spread of alien invasive species and particularly in the drier islands, degradation associated with forest fires. Most countries in the Caribbean have submitted their 4th Reporting and review cycle under the Performance Review and Assessment of Implementation System (PRAIS). The profile of the countries are available on the UNCCD Convention site at http://www.unccd.int/Lists/SiteDocumentLibrary/Regions/LAC/CountryProfilesLACRegion_29-11-2011.doc

33. The NAPs are generally consistent with national development frameworks, strategies and policies pertaining to land management where formal pronouncements or policies exist. In most of the countries, policies relating to land management and sustainable forestry management are only enshrined in laws and regulations that tend not to allow for integrative resource management across sectors. Most countries have town and country planning legislation which tends to be applied to control building infrastructure development rather than integrated land planning inclusive of agricultural and forestry development. Cuba however, has developed several policy instruments related to land management. Grenada has an approved forest management policy while that of Jamaica remains as a draft. Countries are at varying stages in stakeholder discussions toward eventual formulation of integrative land management including (forest management and water resource management policies) that will give sustained effect to their NAPs.

34. A Caribbean Sub-Regional Action Plan (SRAP) aligned to the UNCCD 10-year Strategy that covered the period 2011 to 2014[12] was formulated in 2011. Inputs to the SRAP were made by the UNCCD national focal points which articulated key issues for attention through a joint regional programming approach. Supporting the SRAP process was a Partnership Initiative on Sustainable Land Management (PISLM), a consortium of national, regional international support agencies engaged with SLM in the region. The Caribbean Network for Integrated Rural Development (CNIRD) as the designated support office for the PISLM was mandated to facilitate the coordination NAP Alignment in the Caribbean Sub-region and circulate the draft SRAP for comment and feedback for final approval by the Council on Trade and Economic Development (COTED)[13], the main CARICOM organ with responsibility for sustainable development and environment in the Caribbean. The SRAP implementation requires strengthened support.

35. **UN Convention on Biological Diversity (CBD):** The majority of Caribbean countries have developed National Biodiversity Strategies and Action Plans (NBSAPs) and are at various stages of implementation. Cuba is the only country in the region to have revised its NBSAP (2006). Saint Lucia's NBSAP is under revision. Other countries with completed NBSAPs (pending revision) include Barbados, Grenada, Jamaica, Saint Kitts and Nevis and Saint Vincent and the Grenadines. The Dominican Republic is developing its first NBSAP. A draft NBSAP for Antigua and Barbuda is available. The NBSAPs all speak to conservation of national biological resources with key actions that include capacity building and appropriate institutional and legislative reforms, expansion and protection of terrestrial and marine protected areas,

[12] Caribbean UNCCD SRAP http://cnirdregional.org/wp-content/uploads/2011/11/Sub-Regional-Action-Programme-to-Combat-Land-Degradation-in-the-Caribbean.pdf
[13] Report of NAP alignment in the Caribbean http://www.unccd.int/Lists/SiteDocumentLibrary/actionProgrammes/Report%20on%20the%20Sub%20region%20capacity%20building%20workshop%20on%20the%20NAP%20held%20in%20Trinidad%202013.pdf

institution of self-financing mechanisms for biodiversity conservation and ensuring equitable sharing of benefits. Management of alien invasive species is also featured in many of the NBSAPs. The majority of the countries have completed their 4th National Communications. Full details of the country profiles and the NBSAPs are available at the convention website at http://www.cbd.int/countries/

36. The NBSAPs are generally congruent with the national forestry, wildlife and where applicable, fisheries legislation; where these legislative instruments tend to speak to the main elements in the NBSAPs, many of these laws are outdated relative to the challenges that are currently faced in terms of threats to biodiversity. National biodiversity polices on their own tend to be lacking for most of the Caribbean countries. Cuba has an overarching policy framework that covers environmental management in general and includes biodiversity considerations. The Barbados Fisheries Management Plan and the Integrated Coastal Management Plan have elements of the NBSAP integrated within these instruments. Countries are at varying stages in stakeholder discussions toward eventual formulation of integrative natural resources management policies that will include critical elements of biodiversity conservation, which tend to be closely linked to sustainable resource use through fisheries and forestry management plans.

37. **UN Framework Convention on Climate Change (UNFCCC):** All of the Caribbean countries have submitted their 1st and/or 2nd National Communication (NC) and that these NCs generally all speak to the challenges associated with the smallness of the island landmasses and vulnerability to sea level rise, the threat of more severe hurricanes and more intense drought episodes. The impacts on water resources occupy a central theme in the context of rainfall patterns and drought events, in terms of the effects on the agricultural sector, domestic water supply and biodiversity. With more intense hurricanes and rainfall events, the issues of flooding and land degradation through accelerated soil erosion is of concern. In the context of climate and land/water resources management, urgent interventions are needed to make ecosystems and the services they provide more resilient through on-ground investments, changes in policy and institutional frameworks, adjustments in the incentives regimes and capacity building.

38. The **Ramsar Convention on Wetlands** has been ratified by most Caribbean States with these countries designating one or more Ramsar sites. To date some 20 wetlands of International Importance have been designated across the contracting Caribbean Parties. Under the obligations of the convention countries are to undertake inventories of the biophysical assets of the wastelands and implement activities to safeguard the ecological integrity through promotion and advocacy. The Caribbean Regional Initiative of Wetlands (CARIWET)[14] seeks to advance

[14] Ramsar CARIWET initiative online at http://www.ramsar.org/pdf/regional-initiatives/Americas/Americas_caribbean-wetlands.pdf

implementation of the Ramsar Convention in the Caribbean, through the development of a Regional Strategy that engages participation at the national level - governmental agencies, communities, the private sector, NGOs, academic and research institutions. The development of the strategy was undertaken in collaboration with the Convention on Biological Diversity (CBD), the Cartagena Convention, international partners of the Ramsar Convention, and technical networks in the region.

Table 2. Status of international treaty ratification amongst Caribbean SIDS of relevance to the GEF-IWEco Project.

Convention	Antigua & Barbuda	Bahamas**	Barbados	Cuba	Dominica*	Dominican Republic	Grenada	Haiti*	Jamaica	St. Kitts & Nevis	Saint Lucia	St. Vincent & Grenadines	Trinidad & Tobago
Convention for the Prevention of Pollution From Ships (MARPOL)	X	X	X	X	X	X			X	X	X	X	X
Convention on Biological Diversity (CBD)	X	X	X	X	X	X	X	X	X	X	X	X	X
UN Convention to Combat Desertification and Land Degradation (UNCCD)	X	X	X	X	X	X	X	X	X	X	X	X	X
UN Framework Convention on Climate Change (UNFCCC)	X	X	X	X	X	X	X	X	X	X	X	X	X
UN Convention of the Law of the Sea (UNCLOS)	X	X	X	X	X	X	X	X	X	X	X	X	X
Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (CNWH)				X		X		X					X
RAMSAR Convention on Wetlands	X	X	X	X		X	X		X		X		X
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)	X	X	X	X	X	X	X		X	X	X	X	X
Basel	X	X	X	X	X			X		X	X	X	

S = Signatory, ratified, contracting party to Convention or Protocol

* Non-participant countries in the IWEco Project
** Participation through a MSP in association with the IWEco FSP

39. The key policy frameworks for environmental management at the global SIDS level include the Barbados Programme of Action for Small Island Developing States, the Mauritius Strategy of Implementation, the pending Outcome of the Third International Conference on Small Island Developing States (Samoa), the Millennium Development Goals, specifically Goal 7 to Ensure Environmental Sustainability and the emergent Post-2015 Sustainable Development Agenda.

40. **Barbados Programme of Action (BPOA, 1994) and the Mauritius Strategy of Implementation (MSI, 2004):** This overarching framework provided the backdrop for many of the regional and sub-regional programmes outlined above. Coping with climate change, sustainable management of terrestrial and marine biodiversity with

special reference to coral reefs vulnerabilities, innovative ways for waste management through reuse and recycling, adoption of integrated water resources management (IWRM) approaches and promotion of sustainable tourism are all well-featured in not only the regional treaties and conventions, but are elaborated to variable extents in national policies and programmes. Countries are fostering alignments between the objectives of the BPOA, international treaty obligations and national development agendas. Countries are also making policy pronouncements based on the BPOA platform to integrate many sectoral development issues within the Green Economy framework.

41. There have been rounds of Inter-Regional Preparatory Meetings in the lead-up to the review of the BPOA into its 20th year in 2014. At the 3rd preparatory meeting held in Barbados in 2103 that resulted in the Needhams Point Bridgetown Declaration, the need for the global community to consider the special vulnerabilities of SIDS particularly in the context of the threats from climate change and the impacts of the prevailing economic environment on economies of SIDS were highlighted. The Declaration affirmed the continued need for political commitment by all countries to effectively address the needs and vulnerabilities of SIDS through concrete action, and continue to mobilize resources for addressing the challenges and strengthening of collaborative partnerships between SIDS and the international community. The year 2014 will be designated International Year of Small Island Developing States to raise awareness of the special case of SIDS and to mobilize international support for sustainable development of SIDS[15] [16] in the run-up to the Third International Conference on Small Island Developing States to be held in Samoa in September 2014.

42. **Millennium Development Goals: Goal 7 – Ensuring Environmental Sustainability:** Caribbean countries have been making progress in meeting this MDG through actions to strengthen policies and regulations and in meeting obligations of regional and international environmental treaties the countries are signatory to as outlined above. In respect of **MDG Target 7 A: Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources**, there has been slow progress in most of the countries with the ratification of environmental treaties and protocols and the formulation of action plans and legislative frameworks. Full-scale implementation remains a challenge for the most part on account of resource limitations and private sector and societal buy-in. The heightened policy attention on climate change issues and rising energy costs are driving increased attention at the policy level to sustainable development in the context of strengthening climate resilience.

[15] The text of the declaration is found on the UNDESA, Division for Sustainable Development website at http://www.sids2014.org/content/documents/266Needhams%20Point%20Bridgetown%20Declaration.pdf
[16] A summary of the meeting dialogue can be found on the International Institute for Sustainable Development (IISD) website at http://www.iisd.ca/vol08/enb0852e.html

43. **MDG Target 7.B: Reduce biodiversity loss, achieving, by 2010, a significant reduction in the rate of loss.** In all Caribbean countries threats to biodiversity continue to be associated with the conversion of landscapes as a result of development expansion. Ecosystems along coastal areas have been particularly vulnerable, subject to higher rates of biodiversity loss, given the relative accessibility of these areas. In the more mountainous countries, remote interior areas remain the main reserves of indigenous biodiversity. There is no comprehensive data that assesses this specific MDG target for the Caribbean, but there is continued concern over the status of threatened endemic species in relation to habitat fragmentation (in terms of terrestrial ecosystems) and pollution.

44. **MDG Target 7.C: Halve, by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation.** In most of the countries of the Caribbean with the exception of Haiti, this goal, in accordance with the accepted interpretation of 'access', has been substantially achieved. However an important differentiation must be made in that while there is good coverage in terms of municipal water supply that approaches 90% and in some cases near 100% such as in Barbados, the reliability of supply is erratic in many communities on account of limited water availability and inadequate supply infrastructure. Access to sanitation fall behind access to water and varies across the countries. Given the scale and pattern of settlement in the islands, on-site sanitation dominates, whoever the acceptability of treatment and impacts on the human and natural environment are of concern, particularly in lower-income communities.

45. The **Post-2015 Sustainable Development Agenda** is being framed against the outcomes of the Rio+20 Conference where there was agreement by Member States to launch a process to develop a set of Sustainable Development Goals (SDGs), to build on the Millennium Development Goals. Proposed goals and targets intend to define national and global action leading to 2030. A Zero Draft[17] lays out a total of 17 development goals, the top of which is to end poverty everywhere, which will form the basis of attainment of many of the goals including these related to sustainable resource management. Those of direct relevance (recognizing all being indirectly related) to outputs and outcomes of the GEF-IWEco Project include; **Goal #6** Ensure availability and sustainable use of water and sanitation for all; **Goal #12** Promote sustainable consumption and production patterns; **Goal # 13** Tackle climate change and its impacts; **Goal #14** Conserve and promote sustainable use of oceans, seas and marine resources and **Goal #15** Protect and promote sustainable use of terrestrial ecosystems, halt desertification, land degradation and biodiversity loss.

[17] Post-2015 Sustainable Development Agenda Zero Draft text at: http://sustainabledevelopment.un.org/focussdgs.html

Baseline Analysis

46. The following is a discussion on the threats to water resources in the context of water security and water-based pollution, land resource, ecosystem and biodiversity resource degradation in the Caribbean.

1.5 Threats to human and ecosystem health

Water security, human and ecosystem health

47. While the Caribbean falls within the humid tropics, the natural water regimes as determined by topography and geology influences water availability. This combined with increasing population and demands translates some of the islands into water-scarce in the context of available water per capita. Antigua and Barbuda, Barbados and the Bahamas rank among some of the most water-scarce countries across the SIDS globally. Barbados for example has only 293 m^3/capita per annum, well below the threshold of 1,000 m^3/person/annum that is considered for a situation of water-scarce. In many other countries that may not be considered water-scarce by population or geography (or a combination thereof), inadequacies in the water supply systems render communities water-scarce, where water reliability both in terms of quantity and quality fall below acceptable service standards. In many of these cases municipal water supply systems are antiquated and inadequate to satisfy the demands of the communities and users they are now required to serve. This issue, factored with generally limited investments in the water sector on account of challenging economic circumstances means that the water supply can be highly erratic, thereby placing affected communities at high risk for disease outbreaks. The situation is often made worse by impacts of severe drought or catastrophic storms when the already-stressed systems are taxed further. This vulnerability has been well-documented in many countries in the region based on data obtained on outbreaks of water-borne diseases such as gastroenteritis, typhoid fever, dysentery, Hepatitis A, parasites particularly following extreme weather events.

48. Besides human health, environmental or ecosystem health in the context of water abstraction and the impacts on environmental flows is of concern. In many countries, where water is extracted from surface or ground water sources, little attention is paid to the effects of such abstractions to the natural system. This will be the case for abstraction for domestic use, irrigation, commercial/industrial purpose and for hydro-power. The problem becomes apparent during dry months (January to June) when baseflows in the rivers are low and then further subject to reductions due to extraction. This has the effect of degrading the quality of aquatic ecosystems through the concentration of pollutants and impairment of flushing flows.

49. Climate change is expected to the have a major compounding impact on freshwater resources in the Caribbean. The Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) states that by mid-century, climate change is expected to reduce rainfall accumulation, thereby altering surface and aquifer recharge with a consequent reduction in the volume of water resources in many small islands including the Caribbean. Down-scaled climate models predict reductions in rainfall accumulations, spelling possible severe challenges in meeting demands particularly during low-rainfall periods if adaptation measures particularly in water supply, are not affected. Climate modelling and scenarios for the Caribbean region (Karmalkar et al, 2013) are in line with global trends and predict decreases in average precipitation, increases in the occurrence for extreme rainfall and drought events, along with increase in temperature, increase in frequency and intensity of hurricanes and tropical storms, all of which will lead to heightened vulnerabilities of communities to the impacts of global climate change. By extension, changes in the water and temperature regimes will have as yet poorly-understood impacts on both aquatic (freshwater and marine) and terrestrial ecosystems that may be manifested in proliferation of e opportunistic invasive species, changes in species richness and abundance within critical ecosystems, constriction of ranges of habitats and impairment of ecosystems functioning and provisioning.

Land-based sources of pollution and human and ecosystem health

50. Pollution of fresh and coastal waters from a wide range of point and non-point sources continues to be a significant threat to socio-economic development in the Caribbean in the context of the wide-ranging impacts to terrestrial and aquatic ecosystems. Expanding development pressures across many Caribbean countries have seen the dramatic increase in the generation of land-based sources of marine pollution. UNEP (TR-52 report, 2010[18]) estimates that as much as 60% of wastewater entering the Caribbean Sea is currently untreated. The Pan American Health Organization (PAHO) estimated in 2001 that 51.5 % of households in the Caribbean Region lacked sewer connections of any kind (many rely on on-site septic/soak away systems); only 17 % of households were connected to acceptable collection and treatment systems (anecdotal evidence suggests that these figures have improved somewhat since 2001 but the overall situation remains inadequate). In coastal communities that rely on use of septic systems, these often are not effective due to the high water table; the result is discharge of untreated sewerage into the nearshore environment. Wastewater management has traditionally been on the lower end of national priorities; a common perception is that the marine environment has the absorptive capacity to accommodate effluents. Inadequately treated sewage waste contributes to health-related problems, both through contamination of drinking water supplies, and through the presence of pathogens in the watershed and coastal water environment as a whole. Local public health

[18] See report online at: http://www.cep.unep.org/publications-and-resources/technical-reports/technical-reports

agencies have documented increases by in reports of ear, nose and throat infections from tourists and residents alike as the quality of coastal waters degrade.

51. Key point and non-point pollution sources are mainly related to nutrient (nitrogen and phosphorous) loading from discharges of grey and untreated black water, and runoff from agricultural areas, the discharge of toxic effluents, sedimentation from erosion in upper watershed areas and within watercourses and along the coastal zone, and improper solid waste disposal. The poor disposal of sewage sludge from both on-site domestic and other water treatment systems is also of concern. It is well-known that wastewater sludges are often disposed of illegally in watercourses or in and around landfill areas thereby posing further risks to the downstream environment.

52. Pollution and land degradation impacts are manifested in the near-shore coastal environment resulting in impairment of ecosystems functioning, loss of productivity of near-shore fisheries - with an increase in catch effort from having to exploit deeper water resources, degraded beaches and recreational areas with adverse health risks and compromised quality of touristic investments. The receiving coastal environments off many industrial/commercial centers and commercial ports, particularly within enclosed bays have become anoxic or 'dead zones' devoid of aquatic productivity. Climate change is expected to result in further compounding detrimental impacts through rising sea temperatures, bleaching events and ocean acidification.

53. The UNEP TR-52 Report cites nutrient load rates as follows; for the Eastern Caribbean region the annual estimated discharge of total nitrogen of 200 $t.yr^{-1}$ and total phosphorous of 40 $t.yr^{-1}$. For the North Eastern region that includes the large islands, total annual nitrogen discharges were estimated at 16,500 $t.yr^{-1}$ with total phosphorus loads at 5,600 $t.yr^{-1}$.

54. Solid waste disposal presents a major challenge in Caribbean SIDS given the lack of availability of land space; this, in light of the high competition of lands for alternate urbanization and commercial development. In some countries there are limited tracts of government lands within which expanding operations can be possible. In several countries existing landfill operations are near the end of their cycle and governments are under pressure to find alternatives in the short-term. Management of plastics is among the highest priorities, as significant volumes are entering the landfills and with large volumes making their way into the natural environment. Tyres also represent a significant concern as they are stockpiled and pose high risks for fire and air pollution. An additional concern is the fact that waste generation from the tourism industry is estimated at twice the amount per capita than that from local residents (A. Binger, 2011).

Land degradation, human and ecosystems health

55. **Unsustainable land management** particularly within upland watershed areas and in proximity to watercourses has negatively impacted terrestrial resources in virtually all the countries of the Caribbean. Over the many decades leading up to the late 1990s, agriculture was the principal contributor to land degradation as cultivation - mainly sugarcane and bananas - often without appropriate safeguards for soil and water conservation led to both acute and chronic loss of soil, impacts to surface water resources and erosion of biodiversity resources. As economies transformed from agrarian-based with the decline of traditional agricultural industries, to more service industry-oriented industries, growth of the commercial and industrial sectors have grown. Land degradation is now increasingly associated with road construction, drainage works, quarrying, coastal/shoreline development, general land modification for urban settlement. During construction phases, land may be subject to intensive erosion, particularly as lands are being developed at higher altitudes on steeper slopes.

56. The range of negative outcomes on land resources include direct soil loss and consequent sedimentation of watercourses, reducing hydraulic capacities and resulting in heightened flood risk downstream, nutrient loss and reduced soil fertility and crop support and alternation of soil chemical and physical characteristics due to physical modification and chemical/pollutant contamination. Improper solid waste disposal also contributes to land and water resource degradation with accumulation of contaminants that are associated with discarded material. These influences are most evident during the rainy hurricane season between June and November when intense storm events result in extreme land degradation marked by landslides and mass wasting. Flood events also carry vast quantities of indiscriminately discarded solid waste, notably plastics into the near-shore marine environment. The more mountainous countries notably impacted by land degradation include Jamaica, the Dominican Republic, St. Kitts and Nevis and the Windward Islands of Grenada, Saint Lucia and St. Vincent and the Grenadines.

57. **Heavy sedimentation of coral reefs** as a result of soil loss directly impact reef health from direct smothering and blocking of light required for photosynthesis. The World Resources Institute (WRI) project Reefs at Risk noted that sediment loading presented a very significant risk to the health and productivity of reefs across the Caribbean region. UNEP/GPA (2006) noted that for the Wider Caribbean (countries surrounding the Caribbean Sea) annual sediment loads are estimated at 1 gigatonne, or approximately 12% of global sediment input from rivers. In the UNEP TR-52 report on pollution in the Caribbean, estimates of total suspended solids (TSS) from the Eastern Caribbean region stood at 2,600 t/yr. of (with most contributed from Trinidad and Tobago) to 7 million tons per year for the North Eastern region that included Cuba, Jamaica and the Dominican Republic.

58. **Conversions of forest and coastal/aquatic ecosystems have triggered loss of species richness and diversity** in all the countries of the Caribbean. As lands and coastal ecosystems have been cleared for development habitat fragmentation results in diminished ecological viability of remaining forest fragments, often left without connecting biological corridors. In many of the islands, fragmented populations survive only in pockets within inaccessible high-elevation forests, or in areas that remain isolated due to lack of development investments. Further, changes in the vegetation composition sometimes favour proliferation of other opportunistic species and in many cases alien invasive species that out-compete native flora and fauna. Species with high specialization within niche habitats such as those in high-elevation forest ecosystems have been severely impacted in terms of population numbers and distribution. Parrots of the *Amazona* genus, which are endemic to individual islands are of note, along with particular species of amphibians and reptiles. The West Indian Manatee, once widespread across the Caribbean has greatly diminished in range due to loss of coastal mangrove habitat. According to Conservation International, of the original extent of hotspot vegetation of 229,549 km², only some 22,955 km² remains. CI notes that based on reliable records, at least 38 Caribbean species have been declared extinct. This underscores the global importance of Caribbean ecosystems and the need for critical conservation interventions.

59. All across the Caribbean wetland ecosystems have dramatically declined in areal coverage and quality and according to Polidoro et al. (2010)[19], after the Indo-Malay Philippine Archipelago, the Caribbean region has the second highest mangrove area loss relative to other global regions, with approximately 24% of mangrove area lost over the past quarter-century. The authors note that 'several surveys of Caribbean mangroves report significant regional declines due to a myriad of threats including coastal development, upland runoff of pollutants, sewage, and sediments, petroleum pollution, storms and hurricanes, solid waste, small-scale extraction for fuelwood and minor clearcutting, conversion to aquaculture, conversion to landfills, conversion for terrestrial agriculture, tourism (involving construction of boardwalks and moorings, as well as boat wakes), and prospecting for pharmaceuticals.'

Management of plastics is among the highest priorities, as significant volumes are entering the landfills and with large volumes making their way into the natural environment. Tyres also represent a significant concern as they are stockpiled and pose high risks for fire and air pollution.

60. The baseline analysis is presented separately for the project focal areas (i) water resources management, (ii) land resource management and (iii) ecosystems and

[19] Polidoro BA, Carpenter KE, Collins L, Duke NC, Ellison AM, et al. (2010) **The Loss of Species: Mangrove Extinction Risk and Geographic Areas of Global Concern**. Online at http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0010095

biodiversity resource management (including sustainable forest management). The gap analysis is presented as an integrated summary of the critical issues at the country level that needs to be addressed across the focal areas.

1.6 Baseline analysis for national and regional-level actions for water, land and ecosystems management in the Caribbean

Baseline analysis for water resources management - Regional actions:

61. Under the **GEF-IWCAM Project** which ran between 2006 and 2011, with GEF contributions of US$14.4 million and some US$98.3 estimated co-financing, a range of actions at the national level were supported. The **national demonstration projects** promoted best practices and approaches for enhanced water security and pollution control. Nine demonstration projects were implemented in eight different countries. These demonstration projects provided a wealth of experience and lessons learned in terms of practical approaches to integrated watershed and coastal areas management, and notably, tangible evidence of benefits of the approach. These interventions included:

- **Wastewater management and pollution control** in Elizabeth Harbour, Exuma, the Bahamas; McKinnons Pond, Antigua and Barbuda; the AuLeon community (Fond d'Or watershed), St. Lucia;
- **Integrative land use (good agricultural practices and sustainable land management), waste management and pollution control** in the Cienfuegos Watershed and coastal area, Cuba; in the Drivers River Watershed in East-Central Portland in Jamaica; and in the Courland Watershed and Buccoo Reef, Tobago. An integrated Land and Sea use Plan was developed for Andros Island in the Bahamas;
- **Industrial pollution control** in the lower Haina River basin, Dominican Republic;
- **Water security** within the Basseterre Valley aquifer (and eventual designation as a national park), St. Kitts and Nevis; on Union Island, St. Vincent and the Grenadines; Carriacou, Grenada, and within Fond d'Or watershed communities, St. Lucia

62. National IWRM policy statements were developed for Antigua and Barbuda and Dominica. Dominica's policy was a further refinement of an existing policy statement that was developed under an EU-financed institutional study of the Dominica Water and Sewerage Authority. National IWRM roadmaps were also developed for a number of countries under the project. An IWRM Roadmap is a guidance paper that outlines the various actions that should be undertaken by a country toward the formulation of national IWRM master plans. Roadmaps were prepared for Antigua & Barbuda, Barbados, Dominica, Grenada, Saint Lucia, Union Island (a Grenadine island of St. Vincent & the Grenadines). Additional support in national dialogues and awareness raising was provided to the Bahamas, Cuba, Jamaica, St. Kitts & Nevis,

Trinidad &Tobago. Strengthening of indicators monitoring was piloted in Barbados with support from the Barbados Water Authority.

63. Under the **CReW Project** funded by the GEF and implemented by the InterAmerican Development Bank (IDB) and UNEP, capacity building support is being provided for policy, institutional and legal reforms in the wastewater sector and to promote greater awareness and knowledge about wastewater management among the general public and decision makers. This project will build on those interventions in Antigua and Barbuda, Barbados, Jamaica, Saint Lucia, Saint Vincent and the Grenadines and Trinidad and Tobago and ensure integration of wastewater management issues into broader issues of environmental and integrated water resources management

64. Other national baseline interventions in water and wastewater resource management by country is summarized below. The national sub-project documents in Appendices 31 to 38 of the UNEP Project Document provide further information on the baseline as relevant to the country and the national project intervention.

65. **Antigua and Barbuda:** The key issue for the country is water scarcity against demands. This is as a consequence of very limited available natural surface and ground water resources. Another issue of concern is pollution of surface water bodies and coastal waters. . The Water Business Unit of the Antigua Public Utilities Authority (APUA) has lead statutory responsibility for water resource management, however this role is limited largely to water abstraction. The APUA invests approximately US$15.1 million in the operational cost and management of the Water Business Unit on an annual basis. The Environment Division supports technical and policy backstopping for water resources management with an estimated value of US$50,000 per annum. The Central Board of Health participates in this process by assuming responsibilities for water safety, conducting random sampling interventions on a monthly basis. Its annual investment in these programmes approximates US$200,000.

66. **Barbados:** The country is among most water-scarce SIDS in the world on account of its limited water availability and high population and demands. Pollution of its karstic aquifer is a major concern and high density development along the western corridor in particular. The lead agency for water resources is the Ministry of Environment and Drainage. The Barbados Water Authority has statutory responsibility for management of water resources although this role is more related to water supply and sewerage services provision. The Environmental Protection Department (EPD) and the Coastal Zone Management Unit (CZMU) contribute significantly to regulation, policy development and monitoring of the status of the environment in respect to the nexus between water and environment.

67. **Cuba:** Integrated water resource management is challenged by weak legal, political and social policy frameworks. Law 81, through Articles 110 and 111, defines the objectives of integrated watershed management and assigns to the National Watershed Council (CNCH for the Spanish acronym) the responsibility of enabling integrated watershed management activities, in coordination with other central government entities. The CNCH works to promote synergies among its members without assuming their functional responsibilities. In 1994, Cuba's Academy of Science, the National Commission for Environment and Natural Resources and the Executive Secretariat for Nuclear Energy were merged into the Ministry of Science, Technology and Environment (CITMA for the Spanish acronym). Today CITMA is the lead ministry in the country on proposing and implementing government policies in science, technology, environment and the use of nuclear energy, promoting their cross-sectoral coherent integration. CITMA chairs the National Watershed Council, with the National Hydrological Institute serving as the vice-chair of the CNCH.

68. **Dominican Republic:** The main water resources challenges are declining spring and river discharges, lake levels, shortage of water for irrigation and domestic uses (drinking) and deteriorating water quality. The lead agency with overall responsibility for water resources management in the country is the National Hydraulic Resources Institute (INDRHI). Watershed management is the responsibility of the Vice Ministry of Soil and Water and is supported by the National Hydraulic Resources Institute and Ministry of Health. During 2013 INDRHI had responsibility for implementation of projects with external financing amounting to US$467 million, in addition to the governmental allocation of US$25 million to support the work of the agencies. The most significant recent investments in water resources management in the country under INDRHI include the Monte Grande dam, with funding of US$250 million and the Guaigüí, with a US$88 million contribution, along with Project Azua II, with financing to the tune of US$70 million, and support to recovery efforts from tropical storms Noel and Olga (both occurring in the 2007 Atlantic hurricane season) valued at US$34 million. All these initiatives are financed by the World Bank.

69. **Grenada:** The country is facing challenges with maintaining a reliable supply of water especially during the drier months when demand exceeds supply and particularly at distal ends of the water distribution network. Carriacou and Petit Martinique are water-scarce since they have very limited ground water and no appreciable surface water on account of their small size. Pollution of freshwater surface and coastal waters are of increasing concern. A UN Division of Sustainable Development 2012 publication on climate change adaptation in Grenada identifies Grenada's water resources as a critical sector for priority adaptation action and for integration into national plans for sustainable development. Water resources management by statute continues to be the statutory responsibility of the National Water and Sewerage Authority (NAWASA). A 2007 FAO-funded initiative valued at approximately US$50,000 resulted in the development of a national policy for water

resources management along with recommendations for legislative changes. The legislative provisions are yet to be effected but the Land Use Division has in its workplan for 2014 efforts to pursue its movement to Cabinet and Parliament. The Land Use Division of the Ministry of Agriculture and the Forestry Department have responsibility for land-water resources use and watershed management, while the Environmental Health Department has responsibility for the health-water safety programme. The estimated annual value of support from the government in these areas is US$100,000. There are other local and regional programs from which the country benefits, with training and capacity building provided by regional organisations, such as CEHI (CARPHA), the OECS Secretariat, GWP-C, CIMH and the CCCCC. These contributions are augmented by local funding support to irrigation, sustainable land management and water quality analysis initiatives, along with support to NAWASA. A number of climate change adaptation measures in the water sector have been recommended including rainwater harvesting ponds, energy efficient irrigation systems.

70. **Jamaica:** The key issues in Jamaica are the spatial distribution of water resources relative to the demands and consequent localized water scarcity and acute degradation of surface and ground water due to pollution. The country has what can be described as a mature institutional and regulatory framework for water resources management. The Water Resources Agency (WRA) has lead responsibility of water resource management and service regulation is governed by the Office of Utility Regulation. The main service provider is the National Water Commission (NWC). The National Environmental and Planning Agency (NEPA) has responsibility over land and environment development regulation and assessment and watershed management. The Environmental Health Department has jurisdiction over water safety and human health. The Forestry Department also has a significant role in watershed protection. The estimated quantum of government support to water resources management amounts to approximately US$357,794,360[20] on an annual basis. The National Water Resources Master Plan for the country is under review and a drought policy remains in draft. Other interventions include the ground water recharge project funded by the International Atomic Energy Agency titled “Evaluating Ground Water Recharge in the upper Rio Cobre Basin” aimed at assessing the potential for water related developments and the resources capacity to meet present and future demand. It also extends to the continuous updating of the Master Plan. The project is valuated at US$130,120.

71. **St Kitts & Nevis:** The main issues of concern for water resources management is water quality degradation mainly from pollution as a result of settlement and commercial development encroachment. On St Kitts statutory responsibility for water resources management is assigned to the Water Services Department, while on Nevis it is the Nevis Water Department. The watershed and land management

[20] Estimates of Expenditure 2013-14. Ministry of Finance, Jamaica April 2013

aspects are shared between the Ministry of Public Works, Ministry of Planning and Ministry of Agriculture. On Nevis, a similar role is played by the Department of Physical Planning, Natural Resources and Environment under the Nevis Island administration. On both islands the Ministry of Health through the public health departments have responsibility for water quality and health-related aspects. On Nevis the CDB has been supporting the country in the water enhancement project inclusive of institutional strengthening and infrastructure supply upgrades. The value of the support is US$11 million.

72. **Saint Lucia:** Key water resources issues are declining water availability in the context of supply capacity (inadequate infrastructure in parts of the service areas) and pollution of ambient fresh and coastal waters. Under the European Union Special Framework of Assistance (SFA) programmes between 2000 and 2005, support to policy, legal and institutional strengthening for the water sector was provided. This effort, in parallel with the Water Sector Reform Project led to the creation of a Water Resources Management Agency (WRMA) with responsibility for resource management and a Water and Sewerage Commission as the regulator for water and wastewater service providers. Following the devastation by Hurricane Tomas in 2010, the country has received foreign assistance for building resilience in the sector. The Global Programme of Action (GPA) for the Protection of the Marine Environment from Land-Based Activities financed the development of a protocol for hotspot characterization and development of best management practices for LBS pollution. This initiative implemented by CEHI, and was completed in 2013. The Water Resources Management Agency has received support from AusAID toward the institutional strengthening of the Agency, strengthening of its data collection and information management systems. The Government of Saint Lucia supports watershed management programmes valued at approximately US$74,000 annually. A partnership between the CEHI and the US Centers for Disease Control and Prevention (US-CDC) provided support to WASCO in the formulation of a Water Safety Plan (WSP) for the Dennery and Mabouya Valley water supply systems. Saint Lucia is also participating in the Pilot Programme for Climate Resilience (PPCR) that is being implemented between 2011 and 2017 within the Disaster Vulnerability Reduction Programme (DVRP).

73. **St Vincent & the Grenadines:** Water management issues of concern on mainland St. Vincent are mainly associated with freshwater pollution and impacts to the coastal waters. This is particularly the case in the more developed southwest part of the island. The Grenadines are small and arid with very limited volumes of ground water making them water-scarce. Rainwater is the primary source of water for residents. The Central Water and Sewerage Authority has the lead responsibility for water resources management by statute. The St. Vincent Electricity Services shares access rights to water resources for hydropower generation. The Forestry Department has primary responsibility for watershed management and the Environmental Health Department has responsibility for water quality and pollution

control. The country benefitted from an US$1.9 million EU-financed National Water Resources Management Study (completed in 2009) that delivered a complete assessment of the water resources in the country with the development of appropriate policies and institutional frameworks.

74. **Trinidad & Tobago:** Understanding that Trinidad and Tobago is heavily industrialized due to oil and gas resources exploitation and infrastructurally development-centred, water resources are placed under significant risk of degradation where development controls and/or mitigative measures are poorly exercised. Some of the key water resources management challenges are outlined as follows. Watersheds and freshwater ecosystems are often impacted by increased soil erosion caused by deforestation due construction and agriculture on steep slopes, annual bush and forest fires in dry season, quarrying operations, poor logging systems and inability of authorities to monitor deforestation activities. The intensity and frequency of impacts vary, depending on location. Polluted discharges from industries (typical ones include petro-chemical, paint and metal finishing, agro-processing and distilleries) and improper liquid waste disposals (e.g. vehicle oils into open drains, leaking tanks, washings) foul fresh and coastal waters. Indiscriminate dumping of refuse, solid waste, agricultural and industrial waste, cleaning agents, animal offal, sewage from poorly constructed and overflowing septic tanks and cesspit latrines also present significant pollution hazards. Challenges to water resources use and management in relation to municipal supplies include the heavy draw-down on stressed aquifers particularly from industrial users, inefficient ageing water supply systems (with high water losses), poor coordination between water management and environmental agencies and challenges in implementing legislation. Climate change in terms of sea level and impacts on coastal aquifers is of concern.

75. The lead agency with overall responsibility for water resources management is the Water and Sewerage Authority (WASA). Watershed management is the responsibility of The Ministry of the Environment and Water Resources (which Forestry Division, WASA, The Water Resources Agency (WRA), the Environmental Management Authority (EMA), Institute of Marine Affairs (IMA) and Drainage Division among others fall under). It is supported by the agencies mentioned under the Ministry of the Environment and Water Resources, the Ministry of Health, The Tobago House of Assembly (THA), Town and Country Planning Division of the Ministry of Planning and Sustainable Development. The Government of Trinidad and Tobago provides annual support estimated at US$802.6 million across these agencies. The most significant recent investments in water resources management in the country include – demand side investments such as repairs to transmission mains to reduce leakage, initiation of metering programme and revenue collection drive, plans for wastewater treatment and recycling. Supply side investments such as protection and effective management of watersheds, initiation of zoning for activities, new investments into desalination technologies, initiation of groundwater

resources mapping, rainwater harvesting in rural areas and promotion of centralized wastewater treatment facilities. Estimated costs would range between US$50 to $100 million.

Baseline analysis for water resources management - Regional actions

76. At the regional level the, **GEF-IWCAM Project** focused on strengthening of capacity to implement the integrated approach to the management of watersheds and coastal areas (IWCAM) or "ridge to reef" through regional activities, equipping agencies and stakeholders with a series of tools to support reforms in policy, legislation and institutional arrangements in support of the IWCAM approach, but also through a series of discrete demonstration projects to test cost and feasibility of reducing the impacts of land based sources of pollution on freshwater and coastal environments. Through the regionally coordinated efforts IWRM governance regimes were strengthened and the capabilities of water and environmental diagnostic laboratories were enhanced. The project piloted the development of the GEF International Waters indicators framework and contributed to the legislative support process for implementation of the obligations of the LBS Protocol. The project fostered closer regional agency linkages through technical collaboration between the Caribbean Environmental Health Institute, the Global Water Partnership–Caribbean, the Caribbean Water and Wastewater Association, the Caribbean Water & Sewerage Association and the University of the West Indies. An Informal Working Group on Integrated Water Resource Management (IWRM) started by the Project contributed to the work of the CARICOM Consortium on Water, which was mandated by the Council of Ministers for Trade and Economic Development (COTED) in 2008.

77. The Cartagena Convention - **Protocol Concerning Pollution from Land-Based Sources and Activities (or LBS Protocol):** The LBS Protocol is a regional mechanism assisting the United Nations Member States in the Wider Caribbean Region to meet the goals and obligations of two international agreements: The United Nations Convention on the Law of the Sea (UNCLOS) and the Global Plan of Action for the Protection of the Marine Environment from Land-Based Activities (GPA). To date a total of 11 countries have ratified the Protocol bringing it into effect. The CEP Secretariat continues its assistance to countries in the implementation of the provisions of the Protocol whereby countries must commence mainstreaming the Protocol into national laws and regulations and work toward meeting effluent discharge quality standards over time. Approximately US$500,000 is contributed by Member Governments annually to the Secretariat to support the work of the Secretariat for the ratification and implementation of the Protocol through the Assessment and Management of Environmental Pollution Sub Programme.

78. The **OECS Secretariat** through the US-Aid funded OECS RRACC Project has supported the development of Model Policy and Legislation for the water resources

management sector in the OECS sub-region through collaboration with CEHI (CARPHA). The model policy and law, completed in 2013, will be used by six OECS Member States (Antigua & Barbuda, Dominica, Grenada, St. Kitts & Nevis, Saint Lucia and St. Vincent & the Grenadines) to either strengthen existing policies and legislation or contribute to new instruments. This work builds on existing contributions through the GEF IWCAM Project applying the IWRM principles following the IWCAM or ridge-to-reef approach for water resources management in SIDS.

79. In 2012 the **Caribbean Development Bank** launched a Regional Water Sector Review valued at US$275,000 to assess the state of the water sector in its Borrowing Member Countries (with the exception of Haiti). The review focused on valuating and rationalizing the major development challenges facing the sector so as to inform the bank's support strategies.

80. **GWP-Caribbean** has hosted a series of sensitization and capacity building workshops across the Caribbean that focused on various topics of relevance to professionals. GWP-C has been the lead host of the High-Level Session for Ministers for water in the Caribbean in partnership with the CWWA. Between 2009 and 2011 GWP-C partnered with the Caribbean Environmental Health Institute in the promotion of best practices for rainwater harvesting with the production of a toolkit and demonstration model. This collaboration was valued at US$29,800. GWP-C is implementing the Water, Climate and Development Programme (WACDEP) across the region, contributing to building resilience in the water sector. The overall programme for the Caribbean is valued at EUR 700,000 (US$ 947,500).

81. The **Caribbean Water and Wastewater Association** continues to promote networking and advocatory for improved water and wastewater resource management at the regional level through its annual conference. A feature of the conference has been the Ministerial High-Level Session (HLS) that has been co-hosted with the Global Water Partnership-Caribbean which focuses on policy themes in the sector for action by countries supported by ministers. The CWWA HLS in 2013 marked the 9th hosting of the HLS. Recent HLS sessions have focused on wastewater management through partnership and support by the GEF CReW Project.

82. The **Caribbean Water and Sewerage Association** completed a tariff study of the potable water rates across its member constituent utilities in 2009. The study was used to inform policy and restructuring of the rates to be more in line with operating costs. The organization has engaged into a partnership in year with the Global water Operators (GOWOPA) to assist with capacity building of water operators amongst its member utilities. CAWASA runs a training and certification programme for water operators and hosts its annual Caribbean water Operators Conference that features presentation and special training sessions for water operators.

Baseline analysis for sustainable land resources management - National actions

83. **Antigua and Barbuda:** The main issue relating to sustainable land management on mainland Antigua is land degradation associated with improper land development. This is mainly concentrated in urban areas but is also the main cause of chronic erosion in elevated areas. Another area of concern is land-based liquid and solid waste pollution sourced particularly from sewerage sludge and oily waste residues. On Barbuda, critical issues associated with unsustainable land management include sand mining, and improper sewage disposal. Land management in Antigua and Barbuda is controlled by many Government Agencies that are supported by various Acts of legislation. The lead agencies charged with the responsibility of land management and development include the Development Control Authority (DCA), Central Housing and Planning Authority (CHAPA), Lands Division, and the Surveys Division. The estimated value of government support to sustainable land management programmes through these agencies on an annual basis is approximately US$300,000. The main interventions on sustainable land management have been associated with the GEF full-sized project, the Sustainable Island Resource Management Mechanism (SIRMM) Project that included the development of a National Sustainable Land Zoning Plan, wastewater guidelines with regulations and a GIS-based management information tool were all developed. These allowed for the identification of priorities for intervention and capacity building. The value of that project was US$7million.

84. **Barbados:** The main land resources management concerns continue to be focused in the Scotland District in the northern part of the country that is particularly prone to erosion given the geology of the region. Development encroachment over the years has resulted in significant landscape modification and protective vegetative cover loss and there has been investments in promoting improved drainage and land stabilization. Land degradation concerns over the rest of the country are associated with quarrying and indiscriminate disposal of waste residues such as oily waste over the landscape. The key agencies charged with sustainable land resources management are Soil Conservation Unit within the Ministry of Agriculture and the Environmental Protection Department.

85. **Cuba:** The primary issues related to sustainable land management include degradation associated with intensive agriculture and grazing particularly and pollution from land based sources that include domestic and industrial waste discharges and polluted agricultural runoff. The lead agencies with responsibility for land resources management include the Ministry of Science, Technology and the Environment (CITMA), the Ministry of Planning and the Ministry of Agriculture. Recent interventions have been made in the National Reforestation Program, the National Program for Land Conservation and Improvement, and the National System of Protected Areas.

86. **Dominican Republic:** Priority sustainable land management interventions are directed at control of soil erosion and depletion, salinization, compaction and sterilization. The sustainable land management demonstration project upstream of Sabana Yegua addresses problems of land degradation in the Dominican Republic. The lead agency with responsibility for land resources management is the Ministry of Environment and Natural Resources via the Vice Ministry of Soil and Water, supported by other institutions including the National Hydraulic Resources Institute (INDRHI), the National Institute of Water and Sewerage (INAP), the Ministry of Public Works and Communications, the General Mining Bureau, the Ministry of Agriculture and the Water and Sewerage Corporations. Sustainable land management interventions in the country focus on integrated watershed management, protection, conservation and restoration of soils and inland waters, and the careful exploitation of minerals in compliance with environmental regulations and is supported through annual contributions from government at approximately US$12 million. It should be noted however that that exact national investment in SLM is difficult to isolate to due to the many different investments that are made in the areas of agriculture, irrigation and other activities, that also benefits land resource conservation; it is therefore likely that the overall national investments may be much higher. Other major initiatives have included the national Quisqeya Verde Program within the Ministry of Environment's "Green Border" initiative to promote conservation initiatives along the border zone with Haiti. The shared Artibonito Watershed with Haiti has been the focus of management interventions. These programmes are valued to the tune of about US$4.5 million.

87. **Grenada:** Main issues of concern on mainland Grenada include unsustainable land management associated with agricultural development and degradation of lowland coastal forests. Intensive grazing is of concern in the sister islands of Carriacou and Petit Martinique. The lead agencies charged with sustainable land management are the Ministry of Agriculture through the Land Use Division and the Forestry Department. Government's annual support to land management programmes amount to approximately US$100,000. Hurricane Ivan of 2004 severely impacted agriculture and forests within upper watershed areas and recovery has been of major focus in the years since then with interventions in land and forest rehabilitation estimated at US$2 million.

88. **Jamaica:** Areas of priority focus continue to be on abatement of land degradation in cultivated areas including the Blue and John Crow Mountain National Park and pollution control particularly from urban and industrialized environments that pose threats to surface and ground waters and the off-shore marine environment. The lead agency is the National Environment and Planning Agency (NEPA) with integrative responsibility, supported by the Forestry Department and the Water Resources Authority. Estimated annual government support to land degradation management programmes amount to approximately US$12,944,030. Special

projects on sustainable land management including the *EU/UNEP/GOJ Climate Change Adaption and Disaster Risk Reduction -Rehabilitated watersheds* through slope stabilization measures such as reforestation of denuded hillsides, *JA REEACH Forestry Project* within the Rio Bueno Watershed Management Unit and the *Integrated Management of the Yallahs-Hope Watershed Management Area*. The Forestry department recently completed a Sustainable Land Management Policy through funding received from the GEF/UNDP. It is anticipated that this SLM Policy will serve as the roadmap for the implementation of SLM techniques and methodology within the next few years.

89. **Saint Kitts and Nevis:** Current SLM focus is on soil conservation on former sugar production lands that are being converted into alternative uses, both agricultural and non-agricultural. Unsustainable quarrying and sand mining is also causing acute land degradation within ghauts and along shoreline areas in both islands. The lead agencies with responsibility for land management on Saint Kitts include the Ministry of Environment, Department of Agriculture and the Public Works Department. On Nevis lead responsibility falls to the Department of Physical Planning, Natural Resources and the Environment under the Nevis Island Administration. Government support to land management programmes amount to approximately US$107,000 annually.

90. **Saint Lucia:** Management focus remains on land degradation rehabilitation within agricultural peripheral areas around the forest reserve, particularly within water catchment areas that are sources for drinking water supply. Pollution and sedimentation of coastal ecosystems is of concern. The lead responsible agencies are the Ministry of Agriculture, The Forestry Department and the Water Resources Management Agency with support from the Ministry of Agriculture. Post-Hurricane Tomas (2010) rehabilitation efforts continue to address the significant watershed degradation associated with landslides and heavy siltation of rivers. Saint Lucia is also participating in the Pilot Programme for Climate Resilience (PPCR) that is being implemented between 2011 and 2017 within the Disaster Vulnerability Reduction Programme (DVRP).

91. **Saint Vincent and the Grenadines:** Land stabilization within steep agricultural zones remains a concern as well as land degradation from illicit cultivations on the slopes of the La Soufriere volcano in the north of the island. The lead agencies with responsibility for SLM are the Ministry of Agriculture and the Forestry Department. The St. Vincent Electricity Services Ltd and the Central Water and Sewerage Authority was at one time mandated to contribute to forestry conservation efforts related to the watershed services associated with hydropower generation and potable water abstraction. The approximate annual costs for investments by government stand at US$220,000.

92. **Trinidad and Tobago:** The priority SLM issues include deforestation, erosion, coastal erosion and accretion, land based pollution, poor agricultural practices, general and hazardous waste management, oil and gas-related spills, illegal quarries and lack of environmental controls in legal quarries, effects of flooding and land salinization. The lead agencies charged with management responsibility for SLM are the Ministry of Planning and Sustainable Development which houses the TCPD, Economic Development Board (EDB), Advisory Town Planning, National Transformation Unit, National Economic Policy and Planning, Central Statistical Office, Chaguaramas Development Authority (CDA) and East Port of Spain Development Company Limited. Other agencies and ministries include the Ministry of the Environment and Water Resources and its agencies, THA, Regional Corporations, Ministry of Housing and Urban Development and its agencies; the Housing Development Agency (HDC), the Urban Development Corporation (UDECOTT), the Land Settlement Agency (LSA), the Office of the Commissioner of State Lands and the Community-Based Environmental Protection and Enhancement Programme (CEPEP), the Ministry of Food Production and its agencies. Key interventions targeting land degradation include: land zoning and physical development planning policy development, sustainable forest resources policy development, regulation and reduction of illegal land management, sustainable management of oil and gas resources, sustainable management of quarry operations, sustainable agricultural practices options, integrated watershed management practices, national oil spill contingency planning, early warning systems implementation for flood, landslides and hazards, empowerment of enforcement agencies, community options and education.

Baseline analysis for land resources management - Regional actions

93. Enhancing the adaptive capacity of rural economies and natural resources to climate change in selected Caribbean small island and low lying coastal developing states: This project is a sub-component under the **Caribbean Aqua-Terrestrial Solutions (CATS) Programme** that is being implementation by the German Agency for International Cooperation (GIZ) and executed by The Environmental management Unit of CARPHA in behalf of CARICOM. This project valued at EUR 5.525 million (US$7.47 million) focusses on the management and protection of land based natural resources and agricultural production systems of the Caribbean small island and low lying coastal states. The participating CARICOM Member States are Belize, Dominica, Grenada, Guyana, Jamaica, St. Kitts & Nevis, Saint Lucia, St. Vincent & the Grenadines with implementation having commenced mid-2013. The proposed project duration is four (4) years.

94. The **Supporting the Eastern Caribbean States to Improve Land Policies and Management** financed by the Australian Government through UN-Habitat is being implemented by the OECS Secretariat. This project that targets the OECS Member States will develop OECS land policy guidelines and national land policies and will

include capacity enhancement and the use of relevant SLM tools. The value of this project is US$217,300 and will run into 2014.

95. The **Climate Change Adaptation and Sustainable Land Management in the Eastern Caribbean** is another SLM project that will be implemented by the OECS Secretariat in the sub-region. This US$6.5 million project financed by the European Union within Global Climate Change Alliance (GCCA) framework also aims to build institutional capacities and provide suitable technical tools and training to support SLM.

96. The **UNDP Mainstreaming Sustainable Land Management Project** commenced implementation over the majority of the Caribbean SIDS from 2007 into 2008 and has been winding down from 2011 in some countries up to present. Regional capacity building and sustainable financing workshops for national SLM focal points were held in 2006 and 2007 in association with technical support from CEHI. The FAO has been supporting countries in the Caribbean in tools for sustainable land management based on application of the **Land Degradation Assessment Methodology (LADA)**. The **GEF IWCAM Project**, through its national demonstration initiatives and regional and national capacity building efforts contributed to SLM in the context of improved watershed management.

Baseline analysis for biodiversity and ecosystems management - National actions

97. **Antigua and Barbuda:** Key threats to biodiversity include improper and unsustainable land use conversion, degradation and fragmentation of forested ecosystems particularly in lowland coastal areas, intensive grazing, land-based pollution into the littoral and coastal environments, and direct impacts on coral reefs from dredging and anchor mooring. In Barbuda, economic activities, such as sand mining and over fishing threaten the integrity of the coastal ecosystem. Proliferation of alien invasive species is also of concern, notably rats, mongoose, Giant African Snails, Cuban Frogs and the Lionfish. The Great Bird Island, offshore Antigua, is home to the Antiguan Racer (*Alsophis antiguae*) which is listed as critically endangered (IUCN) and protection of its habitat is of utmost priority to the country. The Environment Division has lead responsibility for biodiversity conservation and is supported by the Plant Protection Unit, the Fisheries Division and the Environmental Awareness Group (EAG). The estimated annual support from government is valued at US$60,000. The EAG is a non-governmental organization (NGO) that promotes environmental stewardship in the country. Recent major initiatives for biodiversity conservation has included the Fern Project which focused on the research and conservation of native ferns of Antigua, Barbuda and Redonda offshore island, and the Redonda Rat Eradication Project.

98. **Barbados:** Given the country's long settlement history and relatively gentle terrain that landed itself to intensive development, the island's native terrestrial ecosystems have been heavily modified and the biological diversity is relatively low

compared to its other island neighbours. Avian biodiversity is best represented. The key threats to biodiversity are land development and forest fragmentation, land based pollution and proliferation of alien invasive species. The Environmental Protection department has lead responsibility for biodiversity management in the country, supported by the Coastal Zone Management Unit.

99. **Cuba:** Given the size of the country Cuba is by far the most important island in the region in terms of biodiversity, particularly for plant diversity, with more than 6,500 vascular plants, of which about half are endemic. Cuba accounts for about 48 percent of the land area of the entire hotspot and is home to more than half of the region's endemic plants, making it a top conservation priority for the Caribbean[21]. The main threats to biodiversity in the country are associated with the direct encroachment of human activity into sensitive biological areas and the resultant impacts from deforestation, habitat fragmentation, pollution and proliferation of alien invasive species. The country has a system of National System of Protected Areas (SNAPs) and while well-established on paper, these designated landscapes are poorly managed due to insufficient funding, lack of trained manpower, and lack of understanding of the importance of protecting these ecosystems by the very populations who stand most to benefit from their proper management, conservation and sustainable use. The lead responsible agencies include Ministry of Science, Technology and Environment (CITMA) and the state forestry service of the provinces.

100. **Dominican Republic:** The large size of the country and the great elevation and topographic variability has translated to the evolution of many different ecotypes with a high level of biological diversity with over 2,830 endemic species of animals (mostly arthropods) and about 2,050 species of plants. The key threats to biodiversity resources continue to be land use conversion and habitat fragmentation, including land and water degradation through pollution. The lead agencies charged with biodiversity conservation in the country are the Vice Ministry of Protected Areas and Biodiversity, supported by the Coastal Marine Vice Ministry and Forest Vice Ministry. There are numerous targeted initiatives in the country related to implementation of national actions associated with the CBD, contributions to the legal, institutional and regulatory progress in the improved management of protected areas, management of marine and coastal resources, management of forest resources, implementation of actions in terms of scientific research and monitoring, and priority actions for in-situ and ex-situ conservation. The global Critical Ecosystems Partnership Fund (CEPF) executed by Conservation International and CANARI (the Regional Implementation Team for the Caribbean) has supported community-based action for biodiversity management in the country.

[21] Conservation International – Caribbean Islands, Unique biodiversity - http://www.conservation.org/where/priority_areas/hotspots/north_central_america/Caribbean-Islands/Pages/biodiversity.aspx

Grants have been awarded to Grupo Jaragua for a project titled Agroforestry Model for Biodiversity in Neighbouring Communities of the Jaragua and Bahoruco National Parks. Another CEPF grant is supporting Local Management Capacity and Conservation Plans to Save Endangered Frogs in Four High Priority Key Biodiversity Areas in Hispaniola through the support of the Zoological Society of Philadelphia.

101. **Grenada:** The key issues threatening biodiversity include climate change influences, invasive alien species proliferation, habitat degradation and fragmentation particularly in lowland forests, and pollution of freshwater and coastal receiving environments. The country has some 3 endemic animals (Grenada Frog *Pristimantis euphronides*, Grenada Dove *Leptotilla wellsi* and the Tree Boa *Corallus grenadensis*) and at least 5 endemic plants. The flagship specie that is most highly threatened is the endemic Grenada Dove (*Leptotila wellsi*). The lead agency charged with biodiversity management is the Forestry Department and is supported by the Division of the environment, Fisheries Division, the Land Use Division, St. Georges University, local NGO's and CBO's and regional/international NGO's such as TNC. In 2013 a US$20,000 CEPF grant was awarded to the Society for the Conservation and Study of Caribbean Birds for Building Capacity for Sustainable Tourism and Livelihoods for the Long-term Conservation and Management of Key Biodiversity Areas in Grenada. A review of the Biodiversity Strategy and Action Plan and preparation of Grenada's 5th National Report to the Convention on Biological Diversity is ongoing through a GEF Umbrella Project valued at US$274,000. The project will be completed by June 2014.

102. **Jamaica:** The country similarly harbours a wide diversity of biodiversity owing to its large size and highly varied geography. Jamaica has at least 719 species of animals and 923 species of plants that are endemic to the country. Some of the critically endangered species include leatherback turtle (*Dermochelys coriacea*) and the Jamaica Petrel (*Pterodroma caribbaea*) and threatened ecosystems include coral reef, mangrove forests and watershed areas such as the Dolphin Head Forest Reserve. Key threats include forest destruction and fragmentation for agriculture and development particularly outside protected areas, and land-based pollution. Watershed, areas of particular concern include Montego River, Rio-Bueno/White River, Orcabessa-Pagee, Wag Water, Buff Bay-Pencar, and the Rio Grande, and the least impacted WMUs were Lucea River, Plantain Garden and Deans. . The lead agencies with responsibility for biodiversity management include NEPA and the Forestry Department, supported by a number of NGOs that include the Jamaica Conservation Development Trust (JCDT), Jamaica Environment Trust, Negril Area Environmental Protection Trust (NEPT), Negril Coral Reef Preservation Society (NCRPS) among others. The value of government support programmes approximate US$11,499,760[22].

[22] Estimates of Expenditure 2013-14. Ministry of Finance, Jamaica April 2013

103. **St. Kitts and Nevis:** The terrestrial biodiversity on mainland St. Kitts is clustered within the St Kitts Central Forest Reserve, a designated protected area. On Nevis the Nevis Peak forest area harbours most of the terrestrial biodiversity. The marine ecosystems exhibit the high conservation value. Given the highly modified environments of the lowlands of the islands, concerns are related mainly to degradation of watercourses and the impacts to the marine environment due to sedimentation. On mainland St. Kitts the Southern Peninsula including the Salt Pond has been noted as having special conservation significance. The lead national agencies for biodiversity management include the Department of Physical Planning, Natural Resources and the Environment and the Department of Marine Resources on St. Kitts. On Nevis the lead agency is the Physical Planning, Natural Resources and Environment Department. The Nevis Historical & Conservation Society also plays a role in research and advocacy.

104. **Saint Lucia:** The country has significant biodiversity resources relative to the small size of the island. There are some 16 endemic animal (with a further 19 endemic sub-species) and at least 10 endemic plant species of which several are endangered. The country boasts the world's rarest snake, the Saint Lucia Racer (*Liophis ornatus*). The key threat to biological resources has been land conversion to agricultural development (in past decades) and more recently in the lower dry forest elevations for development. The Forestry Department has lead responsibility for biodiversity management supported by the Sustainable Development and Environment Division. The country is preparing a GEF full-sized proposal to implement the 'Iyanola - Natural Resource Management of the North East Coast Project' with financing expected in the latter part of 2014.

105. **St. Vincent and the Grenadines:** On mainland St. Vincent, the central forest reserves harbour the bulk of the indigenous biodiversity. In total, more than 1,150 species of flowering plants, 163 species of ferns, 4 species of amphibians, 16 species of reptiles, 111 species of birds, and 15 species of mammals have been identified in the country[23]. Conservation threats include land degradation along the margins of the higher elevation forest areas in Central Mountain Range that encompass the Colonaire and Cumberland Forest Reserves along with La Soufriere National Park, Mount Pleasant and Richmond Forest Reserves. In the Grenadines, the Tobago Keys is a national park of noted significance within the Eastern Caribbean. The lead local agencies responsible for biodiversity management are the Forestry Department and the National Parks, Rivers and Beaches Authority. The country is participating in the Critical Ecosystems Partnership Fund and has accessed a small grant valued at US$20,000 for an Ecotourism and Biodiversity Protection Project for the Kamacroubou Mountain and Diamond Village Community.

[23] The Fourth National Biodiversity Report of St. Vincent and the Grenadines to the UNCBD - http://www.cbd.int/doc/world/vc/vc-nr-04-en.pdf

106. **Trinidad and Tobago:** The proximity of the twin-island state so close to mainland South America has resulted in similar biodiversity as on the mainland although there are some 23 island endemic animals and at least 55 endemic plants. Of conservation concern are the Trinidad Piping Guan or Paw (*Papule pupil*), White-tailed Sabre Wing Hummingbird (*Campylopterus ensipennis*), Ocelot (*Leopardus pardalis*), West Indian Manatee (*Trichechus manatus*), Golden Tree Frog (*Phyllodytes auratus*), Bloody Bay Poison Frog (*Mannophryne olmonae*), Silky Anteater (*Cyclopes didactylus),* Scarlet Ibis (*Eudocimus ruber*), River Otter or Neotropical Otter (*Lontra longicaudis*), the five species of marine turtles, including the Leatherback, Green, Hawksbill, Olive Ridley and Loggerhead turtles. Also of conservation priority are all orchids, Stony Corals (*Scleractinia spp*) and Black Coral (*Antipathes atlantica*). Threatened ecosystems from land clearing for settlements, agriculture and other development on Trinidad include the Aripo Savannas Strict Nature Reserve, Matura National Park, Nariva Swamp Managed Resource Protected Area, Maracas, Las Cuevas, Blanchiceusse, Caroni Swamp, and Buccoo Reef, Speyside, and MainRidge on Tobago.

107. The main agency with responsibility for biodiversity management is the Ministry of the Environment and Water Resources and its agencies supported by the University of the West Indies, specific NGOs and CBOs, stakeholder management committees and Ministry of Agriculture. Core government contributions to the biodiversity management programmes approximates US$10 million annually. Significant biodiversity initiatives include an inventory of plant species for the country has been completed (under the Darwin Initiative), Designation of specific vulnerable species and threatened areas as Environmentally Sensitive Areas and Species under the Environmental Management Act Chapter 35:05 and the establishment of the National Green Fund facility for community and non-governmental environmental (biodiversity included projects). Important GEF-funded projects include Biosafety Regional Project for implementing National Biosafety Frameworks in the Caribbean Sub-Region, Mitigating the threats of Invasive Alien Species in the Insular Caribbean and Project for Ecosystem Services - ProEcoServ.

Baseline analysis for biodiversity and ecosystems management - Regional actions

108. The **Protocol concerning Specially Protected Areas and Wildlife (SPAW Protocol)** of the Cartagena Convention is tailored to address biodiversity issues in the Wider Caribbean and as such it is also a vehicle to assist with regional implementation of the broader and more demanding global Convention on Biological Diversity (CBD). The Protocol also assists with the promotion and linkages of the Ramsar and CITES Conventions. The Protocol seeks the protection of rare and fragile ecosystems and habitats, thereby protecting the endangered and threatened species residing therein. CAR/RCU facilitates through the Protocol, the establishment , proper management and strengthening of Protected Areas (PAs) and PA networks, promotes sustainable management (and use) of species to prevent their

endangerment and provides assistance to governments of the region in conserving their coastal ecosystems. Approximately US$700,000 is contributed to the work of the Protocol annually through the SPAW Sub Programme. Supported under the SPAW-CEP Secretariat is the Caribbean Marine Protected Area Management (CaMPAM) network established to strengthen management of marine protected areas (MPAs) and improve their effectiveness in the Wider Caribbean region.

109. **Caribbean Challenge (CCI)** initiative Phase II was launched in May 2013 at the Caribbean Challenge Summit in the British Virgin Islands, being supported by The Nature Conservancy (TNC) through the CCI Secretariat. The CCI is committed to by 10 governments (seven countries and three territories) countries in the Caribbean, seeks to facilitate the conservation of at least 20% of their nearshore marine and coastal environments in national marine protected areas systems by 2020 and trigger the creation of National Conservation Trust Funds. These national funds once established will be funded via the earnings from their national endowments managed under the Caribbean Biodiversity Fund (CBF), as well as funds raised by the national trusts. The CBF has been established and is currently managing US$20 million, with another US$23million to be provided via the GEF and TNC in the near-term. The UNEP-CEP supports Parties of the Cartagena Convention with their CCI objectives.

110. The **Ramsar Convention's Caribbean Regional Initiative of Wetlands (CARIWET)** is promoting the implementation of the Convention in the Caribbean, through the development of a Regional Strategy that engages participation at the national level governmental agencies, communities, the private sector, NGOs, academic and research institutions. CARIWET ran between 2009 and 2012.

111. **Critical Ecosystems Partnership Fund (CEPF)** is a global fund that finances initiatives to empower civil society to manage critically threatened Key Biodiversity Areas (KBAs). Eligible participating countries that can benefit from the US$6.9 million investment strategy within the Caribbean programme include Antigua and Barbuda, Barbados, The Bahamas, Dominica, Dominican Republic, Grenada, Haiti, Jamaica, St. Kitts and Nevis, Saint Lucia, and St. Vincent and the Grenadines. 45 priority key biodiversity areas and six priority conservation corridors have been identified across the Caribbean countries and the partnership seeks to improve protection and management of these KBAs and corridors, integrate biodiversity conservation into landscape and development planning and empower Caribbean civil society to gaining related economic benefits from conservation. The Caribbean Regional Implementation Team (RIT) for the CEPF is CANARI.

112. **Improving the Management of Coastal Resources and the Conservation of the Marine Biodiversity in the Caribbean Region:** This EUR 5 million (US$6.76 million) project falls within the Caribbean Aqua-Terrestrial Solutions (CATS) Programme that is being implemented by the German Agency for International Cooperation (GIZ) and

executed by The Environmental Management Unit of CARPHA on behalf of CARICOM. The initiative will support some eight countries (Belize, Dominica, Grenada, Guyana, Jamaica, St. Kitts & Nevis, Saint Lucia, St. Vincent & the Grenadines) to address marine resources management and strengthen capacity of stakeholders through a common institutional framework for management of marine protected areas (MPA) in the Caribbean Region. The project will also provide advice to local communities and relevant public and private stakeholders in selected member countries of CARICOM. Particular emphasis will be placed on improving the resilience and adaptation capacity of communities by implementing biodiversity and ecosystem conservation measures as well as the promotion of mechanisms for sustainable use of natural resources.

113. IUCN is implementing the **Biodiversity and Protected Area Management (BIOPAMA) Programme** which aims to address threats to biodiversity in African, Caribbean and Pacific (ACP) countries, while reducing poverty in communities in and around protected areas. BIOPAMA will contribute to improving data availability with capacity development to strengthen protected area management. It has two main components: one concerning protected areas, jointly implemented by the International Union for Conservation of Nature (IUCN) and the EC's Joint Research Centre (JRC), and another dealing with access and benefit sharing (ABS), implemented by the Multi-Donor ABS Capacity Development Initiative managed by the GIZ. The Programme is financed by the European Commission's (EC) 10th European Development Fund (EDF). The Caribbean component of the Programme is valued close to EUR 1.9 million (US$2.56 million).

114. The Centre for Resource Management and Environmental Studies (CERMES) of the University of the West Indies promotes and facilitates sustainable development in the Caribbean and beyond through graduate education, applied research and professional training and the implementation of innovative projects in natural resource management. In terms of biodiversity resource conservation the Centre has been involved primarily with marine conservation with the **Caribbean Large Marine Ecosystems Project, the Future of Coral Reefs in a Changing Environment (FORCE) Project, Adaptive capacity for MPA governance in the eastern Caribbean,** and **Socio-economic Monitoring for Caribbean Coastal Management**. The Centre plays an active role in the technical and advisory services to governments, NGOs and the private sector. In addition CERMES has active research projects in the field of water and land management with the **Sustainable Water Management under Climate Change in Small Island States of the Caribbean (Water-aCCSIS), Global-Local Caribbean Climate Change Adaptation and Mitigation Scenarios (GoLo CarSce)** and **Conset Bay Pilot Project**.

Long-term solution

115. Derived from the threats and barriers to effective natural resources management as outlined in the preceding baseline, the following (Table 3) is a summary of the critical deficiencies that need to be addressed towards improved water, land and biodiversity resources management at the country level. It should be noted that in many cases the gaps are cross-cutting over the various focal areas (note that some cross-cutting deficiencies such as access to financial resources is not included as common to all countries).

116. The IWEco Project will focus on a sub-set of these critical gaps as identified by the countries through the execution of the national sub-projects.

Table 3. Critical gaps by thematic area to be addressed for improved water, land and biodiversity resources management in participating countries and at the regional level. Those to be addressed by the IWEco Project signified by the highlighted component/sub-component number (national and/or regional levels)
C1 – national interventions/technical solutions; C2 – monitoring; C3 – policy/legislation & capacity building; C4 – knowledge management

Country	Policy gaps	Legislative and regulatory gaps	Institutional and capacity gaps	Technical gaps	Information gaps
Antigua and Barbuda	• No formally ratified water resources policy • Wastewater management strategy and policies not formally adopted or enforced. **C3** • No formally ratified policy on the national disposal of hazardous waste, such as oil. **C3** •	• Fragmented legislation on water management and reuse; statutory authority for WRM assigned to the water utility but not for reuse. C3 • No legislation for watershed management and protection; **C3** • Fragmented legislation on land management with several agencies across ministries controlling various elements of land development and use **C3** • No mechanism of certification for sewage and liquid waste operators **C3** • No established standards for discharge of waste water and effluent quality **C3**	• Lack of an institutional coordinating mechanism given that the management of water resource, protection, quality and reuse is fragmented. C3 • Lack of independent resource management and regulator as is currently responsibility of water utility. **C3** • National Land use Plan enacted but insufficient capacity to enforce • Inadequate enforcement of Forestry legislation to avoid indiscriminate clearing of land	• Wastewater solutions not adequate with water pollution hotspots **C1** • Operations personnel generally lacked the basic knowledge of wastewater to ensure that effluent was consistent. **C1,C3** • No design standards for septic tank or wastewater treatment systems **C1**	• No Public Awareness Strategy on liquid waste disposal **C4** • Lack of systematic ambient water quality and effluent quality monitoring **C2** • lack of monitor and enforcement protocol for the development and operation of wastewater management systems **C2,C3**
Barbados	• No formally ratified water resources policy	• Statutory authority for WRM assigned to the water utility;	• Need for more Corporate Social Responsibility (CSR) initiatives in private	• Significant work needed on demand side	• Need for long-termed sustained monitoring of productivity of the natural

Country	Policy gaps	Legislative and regulatory gaps	Institutional and capacity gaps	Technical gaps	Information gaps
	• Limited mainstreaming of natural resource management in all sectors. • Weak/inefficient coordination in formulation/execution of policies, plans, programmes and projects C3	• Absence of comprehensive Environmental Management Legislation and supporting regulations and standards. C3 • Absence of Statutory Rules and Orders necessary to effect purposes of various acts • Backlog of draft legislation within the Attorney General's Office. • Lack of environmental standards	sector, greater extra-governmental involvement in decision making, and specialised training for the business sector. • Lack of institutionalised capacity among Community Based Organisations (CBO) and Non-Governmental Organisations (NGO) to pursue environmental Stewardship C3 • Many of the agencies charged with responsibility for environmental matters are understaffed, lack the necessary tools and budgets to effectively and efficiently execute their duties • Weak enforcement of existing legislation relevant to the environment in all sectors	management for water supply services. • Lack of strategy approach to access and adopt clean technologies in the local manufacturing and industrial sector; results in inefficient use of resources (energy, water and waste) and hinders access to foreign markets due to compliance issues C3,C4 • Limited attention paid to in-situ and ex-situ conservation of economically and ecologically important species and the related intellectual property issues	resource base and the ecosystem services provided C2 • Inadequate collation, publication and dissemination of environmental information to decision-makers and the public at large C4 • Need for scientifically sound local research to characterize the state of the environment C2
Cuba	• Weak policy focus to highlight the importance of semi-deciduous forests with continued alteration, fragmentation and general impoverishment	• Poor regulation and institutional support to indigent communities that worsen unsustainable agricultural practices and other	• Weak overarching political, legal and social infrastructure to support prioritized plans and strategies that are mainstreamed throughout	• Insufficient implementation of Good Agricultural Practices and Best Environmental Practices throughout the country; C3	• Fragmented and inconsistent nature of data collection that impairs effective decision-making C2

Country	Policy gaps	Legislative and regulatory gaps	Institutional and capacity gaps	Technical gaps	Information gaps
	due to unsustainable agricultural and livestock practices. C3 • Inadequate policies to regulate the proliferation of exotic invasive species with deterioration in fauna diversity and ecosystem health C3	human activities triggered by subsistence-level food production driven by poverty. C3 • Inadequate regulatory provisions for existing Protected Areas and Ecological Reserves. C3 • Poor regulation over deforestation of riverine strips and other forest resources with associated impacts on freshwater resources. C3 • Weak regulatory control over degradation of coastal and beach environments with potential losses to tourism receipts and impacts to local livelihoods. C3 • Relatively weak coordination/ interconnection of political, legislative and economic institutions to create the required regulatory framework to foster integrated watershed and coastal area management C3	government agencies and research institutes C3 • Limited/inadequate resources to support the National System of Protected Areas with compromised ability to conserve or sustain the natural patrimony it is supposed to protect C3	• Inadequate application of modern technologies and systems to treat household and industrial wastes and remediation of fresh water resource pollution C1, C3 • Inadequate application of technologies and infrastructure to identify contaminants and clean up contaminated soils C1, C3 • Loss of ecosystem provisioning services (associated with critical vegetation losses) to mitigate the impacts of climate change C1,C2, C3	• Inadequate cadre of trained personnel to effectively monitor and evaluate biodiversity and overall ecosystem health C3 • Weak system of assessment and monitoring to inform corrective actions so mitigate effects of anthropogenic and climate induced changes to fragile and weakened ecosystems C2 • Uninformed social partners and civil society on the importance of biodiversity and ecosystem integrity in socio-economic values and climate change resilience C4 • Relatively weak systems for dissemination of data and information to support decision making particularly in territorial planning C4

Country	Policy gaps	Legislative and regulatory gaps	Institutional and capacity gaps	Technical gaps	Information gaps
Dominican Republic	• No National Strategy for Biodiversity Conservation and Plan of Action • Poor enforcement of environmental legislation and enforcement of penalties for offenses • Need for polices and strategies to reduce vulnerabilities to natural disasters • Environmental resource issues inadequately addressed in mainstream development planning **C3**	• current conservation program is inadequate for protecting the rich biodiversity **C3**	• Current management efforts are fragmented • Limited technical management and conservation of coastal marine ecosystems **C3** • Policy, legal and institutional frameworks inadequate for improving the implementation of integrated watershed and coastal area management, including the conservation and sustainable use of biodiversity **C3** • Roles and responsibilities of institutions involved in watershed and coastal area management overlap or lack sufficient clarity, leading to fragmented functions **C3**	• Inappropriate use of irrigation and drainage • Inefficient water distribution systems • Shortcomings in the implementation of anti-erosion measures and desertification • private sector industries have some level of installed wastewater treatment, but freshwater and estuarine environment contamination is heavy; more appropriate solutions needed **C1** • solutions needed for agriculture-based non-point sources of pollution **C1** • Many local communities do not have access to safe drinking water due to polluted surface waters and to being disconnected from public water systems • Solid waste management inadequate in many communities	• Structured baseline information is incomplete and/or inadequate **C4** • Inadequate strategies and programmes for environmental monitoring **C2** • Monitoring of biodiversity and water quality in wetlands and associated ecosystems is generally weak or non-existent **C2** • lack or poor level of knowledge required for supporting decision making • Little awareness of efforts to promote and undertake integrated watershed and coastal area management **C4** • availability of concrete information on benefits achieved and lessons learned from projects implemented in the country is limited **C4**
Grenada	• Absence of an integrated coastal and marine management regime **C3**	• Statutory authority for water resources	• Need independent water resource management and regulator as is currently	• Solid Waste Management is not adequate to deal	• Inadequate scientific data on environmental indicators **C2**

Country	Policy gaps	Legislative and regulatory gaps	Institutional and capacity gaps	Technical gaps	Information gaps
	• International Obligations from MEAs are not translated adequately at the local level to reflect the intended purposes C3 • Fragmented Policies C3	management assigned to the water utility • Pending adoption of water resources legislative review recommendations and parliamentary approval • Weak and/or inadequate laws C3 • Legislation adoption is weak and slow and some required regulations are absent	responsibility of water utility • Water Resources Unit needs to be established with appropriate staffing • Strengthening of Land Use Division and Forestry Dept needed to complement functioning of the WRU • Lack of clarity in executing institutional mandates C3 • Severe shortfall in capacity to pursue programmes relating to the environment • Weak enforcement of current environment legislation	with the emerging forms of waste • Equipment for Water Quality analysis needed C2	• Long term monitoring is absent C2 • Civil society partnership and ownership of resources are weak
Jamaica	• Environmental management continues to be implemented in an ad hoc, improvised manner with limited results C3 • Critical habitats inadequate for the conservation of targeted species; fragmentation of habitats continue to threaten the viability and sustainability of targeted species C1,C3 • Poorly and/or unplanned human settlement; farming	• General need for strengthening and enforcing existing laws against trespassing and illegal developments • Existing EPA regulations and management plan are inadequately structured with superfluous attainable goals which do not adequately respond to threats to biodiversity. C3 • Lack of comprehensive system of protected areas, including connecting	• Enforcement capacity limited C3 • Routine training and capacity building is limited due to resource constraints C3 • Memoranda of understanding between departments and agencies of Government - clarify roles and responsibilities C3 • Improving EIA process to better protect biodiversity; ensure	• Little information exists on the application and utility of selected hydrologic solutions applied in Jamaica C1,C2 • Adequate detailed descriptions of geophysical, climatic, vegetative and ecological characteristics as part of planning mine site developments C2 • Gaps in understanding regenerative capacity of the various flora and fauna	• Monitoring of biodiversity is generally weak or non-existent; difficult to make baseline assessments; lack or poor level of knowledge required for supporting decision making C2 • Local communities and stakeholders are inadequately informed of the social, economic and environmental benefits of biodiversity conservation and sustainable use C4

Country	Policy gaps	Legislative and regulatory gaps	Institutional and capacity gaps	Technical gaps	Information gaps
	in areas not conducive to such development (steep hillsides within water source areas); • Limit further deforestation and destruction of critical watersheds and wetlands; • Land tenure issues related to sustainable resource management not adequately addressed C3 • Need for improved agricultural policies and planning systems to provide a basis for sustainable use of resources; integrate agriculture policies and programmes with conservation policies and programmes • Need for comprehensive "Green Tourism and Ecotourism Policy • Incentives for private landowners to conserve biodiversity C3 • Land use zoning, control and enforcement measures to protect sensitive landscapes and species from inappropriate agriculture use and development C3	corridors -inadequate for conserving the biodiversity C3 • Need to complete regulations for the five types of protected areas • Unsettled land tenure issues continue to undermine ecosystem management and conservation C3 • Mechanism to modify Constitution to support biodiversity conservation, sustainable use of biological resources, and ownership of genetic resources • Economic incentives to promote sustainable use of biodiversity and ways and means to empower and support NGO's involved in environmental projects C3 • Need strengthened regulation over importation of agricultural plants and animals to prevent introduction of harmful alien species • Regulatory instruments to prevent over-fishing, poaching	monitoring of the construction and operation processes; and to ensure public participation in the EIA process C3 • Improving collaboration among all sectors to reduce conflicts C3 • Improving awareness among tourism operators and tourists • Financial resources and expertise - development and implementation of recovery plans for threatened species • Mechanisms to more easily address environmental crimes and recover costs for remedial action • Increasing number of trained personnel in the public and private forest sector to ensure the sound management of forest resources C3	communities affected by mineral extraction activities • Increasing understanding of the long-term impact of pollution on species and ecosystems C1, C2 • Guidelines, standards and codes of conduct to prevent negative impacts to biodiversity such as incentive measures for remedial activities and the adoption of eco-friendly standards by tourism operations • Biodiversity risk assessments and determining carrying capacity for protected and sensitive areas • Improving disposal and management of sewage and solid wastes in watersheds, coastal and marine areas C1 • Wastewater solutions not adequate with water pollution hotspots C1	• Increasing technical and scientific capacity within the agricultural sector C2 • Increasing research to ascertain the nature and extent of freshwater resources, as well as the threats to these resources C2 • Gaps in data, information and knowledge required to manage coastal and marine resources • Gaps in knowledge to determine sustainable harvest rates C2 • Gaps in knowledge of the ecology, taxonomy and systematics, and status of species C2 • Mechanisms to ensure awareness by the judiciary of the status of biodiversity, especially threatened species C4

Country	Policy gaps	Legislative and regulatory gaps	Institutional and capacity gaps	Technical gaps	Information gaps
	• Continuing to establish protected areas to conserve species and their habitats C3	and accidental entanglement in gill nets; • Completing amendments to the Wild Life Protection Act to protect plants, invertebrates and micro-organisms C3			
St Kitts & Nevis	• No formally ratified water resources policy • need to mainstream natural resource management in all sectors C3 • weak linkages between land degradation, environmental quality to human health C2	• Statutory authority for WRM assigned to the water utility; • Absence of legislation to give specific institutional powers to manage natural resource use C3 • No Statutory Rules and Orders necessary to effect legislation enacted C3 • Backlog of draft legislation remain in the drafting or enacting stage • Limited exposure and understanding of the legal personnel to environmental issues and impacts. C3 • Outdated penalties – fees and fines too low especially for penalties related to agriculture • Lack of environmental standards C2,C3	• Challenges in the flow of information among agencies and unclear lines of authority • Capacity limitations among agencies; lack the necessary tools and budgets to effectively and efficiently execute their duties C3 • Weak enforcement of existing legislation relevant to the environment in all sectors • Relatively low engagement of community groups and CSOs in active natural resources management C3 • National inter-sectoral coordinating mechanism needs strengthening and not mainstreamed in national-level planning; existence of multiple such	• Challenges in tackling solid waste issue at the point of the consumer and importer • Inadequate systems to manage liquid waste C1 • landslide areas and eroded/denuded areas; disruptive localized and seasonal flooding especially along the lower sections of the watershed C1 • Heavy erosion headland and shoreline; beach denuded; regular sand mining activities C1	• sparse data availability/data capture mechanisms – limits connections; are not appropriately linked and need strengthening C2 • Indicators are not applied in decision making C2 • Inadequate consistent efforts for awareness building and education on environment matters particularly on land degradation C4 • Information overload and insufficient interest among the media managers to be actively involved in the dissemination process for environmental information were identified as critical concerns C2,C4

Country	Policy gaps	Legislative and regulatory gaps	Institutional and capacity gaps	Technical gaps	Information gaps
			committees typically 'project-driven **C3**		• Lack of long-termed sustained monitoring of productivity of the natural resource base and the ecosystem services provided **C2** • Inadequate infrastructure for the provision of information to support decision making **C2**,**C4** • Shortage of accurate and generally inaccessible scientific data for decision making **C2** • limited understanding of resource use/extraction rates/ use characterization - by community, government, private sector **C4** • no manual available to quarry operators on Nevis **C1**,**C4** • Low awareness of alternative building materials **C4**
Saint Lucia	• Lack of an overall framework policy to pursue sustainable use and development of the resources • Land management interventions seldom	• Weak and or inadequate existing laws **C3** • Weak and slow legislative ratification and adoption process • Lack of accompanying regulations to adequately	• Limited implementation of policies and plans • Poor Coordination and enforcement of laws and regulations • Weak watershed management efforts	• Alternative solutions needed to deal with high turbidity loading in potable surface (water supply) sources • Appropriate wastewater solutions needed for	• Inadequate scientific data to support policy and programme response **C2**,**C3** • Limited long term monitoring of critical environmental

Country	Policy gaps	Legislative and regulatory gaps	Institutional and capacity gaps	Technical gaps	Information gaps
	placed in context of watershed management framework; general lack of mainstreamed watershed management planning C3 • Limited mainstreaming sustainable land management in national policy C3 • Poor translation of International Obligations from MEAs to local level • poor understanding of the watershed and socio/economic development relationships C2,C3	effect legislative instruments • Lack of legislation to deal primarily with Climate change •	• Weak enforcement of current environment legislation • Weak civil society partnership and participation C3 • Capacities of relevant state agencies are challenged by of high turnover of staff resulting in lost knowledge	coastal communities and livestock facilities (pig farms) • Inadequate Solid waste management • landslide areas and eroded/denuded areas rendered unstable since Hurricane Tomas; large expanses of hillslopes are under dasheen cultivation; C1 • soil agronomic practices having impacts (not measured) on surface water intake located downslope. C1 • Removal of riparian vegetation; acute riverbank erosion; negative impacts on terrestrial and aquatic biodiversity - loss of species, change in species composition; C1 • aggravated erosion and sedimentation leading to heightened flood risk C1	parameters in both the marine and terrestrial • limited appreciation and understanding of stream hydrology and dynamic processes C2,C4 • public apathy/limited awareness C4 • Linkages between water, land and ecosystem degradation and socio-economic impacts to tourism sector not well documented and reported; C2, C3 • lack of mainstreamed assessment protocols C2, C3 • environmental assessments tend to be very sporadic and limited time series C2 • data tends not to be analysed - reports generated often not shared C2, C4
St Vincent & the Grenadines	• Integrated Forest Policy is lacking C3 • Lack of land use policy/plan	• Weak and or inadequate environmental related laws C3	• Severe shortfall in capacity to pursue needed programmes and plans and enforcement	• Major erosion caused by major floods of 2011; obstructions causing accelerated erosion on riverbanks of farm	• Inadequate scientific data C2 • apathetic view and lack of awareness C4

Country	Policy gaps	Legislative and regulatory gaps	Institutional and capacity gaps	Technical gaps	Information gaps
	• Absence of an integrated management of the fresh water resources • Absence of holistic Sustainable Land Management **C3**	• Weak legislation in a number of areas –forestry, coastal zone among others • Land use planning guidelines are weak **C3** • Lack of pollution prevention regulations especially in the coastal and maritime zones • Civil society partnership and participation are severely weak and absent in certain areas **C3** •	• Poor enforcement of environmental laws • Non-clarity over institutional mandates among the various agencies which have jurisdiction on aspects environmental management **C3** • Poor land use enforcement • Capacities in relevant state and non-state agencies are not as string; challenge of high turnover of staff and knowledge is lost	holdings causing loss of land area **C1** • encroachment by farmers - destruction of riparian zones **C1** • impacts to livelihoods from excessive sedimentation – loss of important fishing potential **C1** • threat to road access to farms and CWSA intake • threats to downstream communities due to heighten flood risk **C1** • River banks devoid of buffer/supporting vegetation **C1** • Absence of river course maintenance programme **C1** • pig effluent not treated to acceptable quality - no evidence of good practices/investment in effluent standards before discharge onto rivers - high risk of exposure of contaminants to humans contributing to negative human health **C1,C2,C3**	

Country	Policy gaps	Legislative and regulatory gaps	Institutional and capacity gaps	Technical gaps	Information gaps
Trinidad & Tobago	• Overarching National Environmental Policy needs to be revisited **C3** • Biodiversity not included as cross cutting element on older policies **C3** • Implementation of policy into programmes and legislation slow **C3**	• Slow levels of translation of National Action Plans for international agreements into policies, laws, programmes and financial arrangements **C3** • Reactive legislative arrangements as opposed to strategic and inclusive **C3** • Lack of harmonization of environmental legislation **C3** • Environmental laws, especially with respect to penalties have to be revisited to be used as deterrents **C3**	• Lack of political priority in light of other national priorities **C3** • Lack of coordination and communication between relevant stakeholders C3 • Low levels of integration of Civil Society **C3**	• Fairly low importance of research on the national agenda, hence funding opportunities are few **C2** • Inability to develop education and awareness campaigns to gain local ownership of programmes and policies or to effectively change attitudes of citizenry **C4** • Better infusion of Environmental Education into national schools' curriculum necessary **C4**	• Lack of usage of strategic environmental assessments **C2**
Regional level	• Lack of overarching regional policies on land and water resources management • High-level policy-governance across region is relatively weak	• Common legislative frameworks and regulatory mechanisms for environmental resource management are not well developed (noting however advancements at the OECS sub-region)	• Regional agencies constrained in scope and reach as a function of resource constraints • Poor level of programmatic coordination among regional agency partners	• Limited transfer of technical competencies from regional agencies to the national level; due mainly to resource constraints	• Harmonized information management and information sharing systems at the regional level are weak

Sources: National IWEco sub-project proposals, augmented by the following:

National Environmental Summary Antigua and Barbuda 2010 http://www.pnuma.org/publicaciones/FINAL%20NES%20Antigua%20Barbuda%20Nov%202010-%20edited.pdf
National Environmental Summary Barbados 2010 http://www.pnuma.org/publicaciones/FINAL%20Barbados%20NES%20Nov%202010-%20edited.pdf
National Environmental Summary Grenada 2010 http://www.pnuma.org/publicaciones/Final%20NES%20Grenada%20Nov-%202010-%20edited.pdf
National Environmental Summary Federation of St. Kitts & Nevis 2010 http://www.pnuma.org/publicaciones/Final%20NES%20St%20Kitts%20Nevis%20Nov%202010-%20edited.pdf
National Environmental Summary Saint Lucia 2010 http://www.pnuma.org/publicaciones/Final%20NES%20-%20St%20Lucia-2010-%20edited.pdf

National Environmental Summary Saint Vincent and the Grenadines 2010
http://www.pnuma.org/publicaciones/FINAL%20NES%20St%20Vincent%20and%20Grenadines%20Nov%202010-%20edited.pdf

1.7 Barrier Analysis

117. The **root causes** for natural resource degradation are generally interrelated but with varying degrees of impact across the specific ecosystem services. A short account of the root causes of the threats outlined above is presented.

118. **Poor agricultural practices:** As noted previously, in most countries intensive agriculture (traditional cash crops of sugarcane and bananas) has had a strong influence on land resources degradation over many decades, with the mountainous islands with limited flat arable lands being most significantly affected. Land degradation has significantly impacted land productivity for future agriculture as the cycle of erosion leads to soil fatigue. To compensate, nutrient replacement through fertilization must be done, but when applied indiscriminately, contributes to nutrient loading in watercourses and the marine environment. Chronic land degradation on small holdings (which account for the majority of agricultural output in most countries) remains embedded since the average small farmer is often unable to secure the necessary resources required to implement soil and water conservation measures which usually require heavy capital investments. In addition, the education level and awareness of farmers are also limiting factors that inhibit uptake of appropriate technologies aimed at mitigating land degradation.

119. **Poor management of forest lands:** The primary threat to forest (including wetland forests) lands is the increasing pressure from competition for land for urban expansion and to a lesser extent, agriculture. Historically, forests were cleared primarily for agriculture with the disastrous effects from slash and burn agriculture. This has changed in recent years as the economies of the Caribbean countries have become diversified away from agriculture. This has meant that forests in inaccessible interior areas remain relatively untouched, as they often fall within protected areas, however, forestscapes over lowland and coastal zones, that in many cases harbour unique and sensitive wildlife, are being subject to rapid clearing for development. In most countries, these lands tend to be privately-owned where there are generally no regulatory frameworks that provide for sustainable development of forest resources outside of protected areas or government forest reserves. As these lands are cleared and developed and/or transitioned out of agricultural use, their market value escalates dramatically making it more challenging to institute management controls for biodiversity and soil and water conservation given that they are regarded as commercial tradable assets.

120. **Poorly managed aggregate mining:** Quarrying and aggregate (including sand) extraction is considered a problem in many Caribbean countries given the extent and intensity of land degradation over the landscape and along coastal zones. Mining and quarrying activities in upland areas and along the coast are a cause for concern, particularly where overburden and spoil material are not contained and

immobilized and cause siltation of waterways and sedimentation of marine ecosystems. The demand for aggregate in many islands has been steadily increasing with the expansion of settlements, commercial and industrial development. The small size of many of the islands mean that there are limited options in confining the environmental outcomes based on proximity of the operation to sensitive ecosystems and there are also limited options for alternative extractions. Further, the majority of quarry or mining operations take place on private lands over which regulations are not sufficiently strong or adequate to safeguard the environment. While many countries are attempting to stamp out illegal mining and quarry operations along beaches, the problem remains widespread as the markets for these products are not informed or sensitized of the negative environmental outcomes of poor quarry management.

121. **Unplanned and/or poorly planned infrastructural development:** With the expansion of settlement and other commercial development, road access is continually expanding to serve needs. However, challenges are evident in most of the Caribbean countries in terms of operation and maintenance of roadways, in particularly runoff and drainage control. Roadways particularly in steep environments that are not drained properly typically act as channels for erosive runoff/stormflow that degrade and destabilize adjacent lands making them more prone to slope failures and mass wasting. Although there are codes of practices for road construction, poor construction, lack of environmental assessments and general lack of maintenance and upkeep as a result of limited resources especially in the case of private access roadways, exacerbates the situation.

122. The issues with adverse environmental outcomes associated with road construction also extend to other forms of infrastructural development. In the main, larger-scale development projects with bigger environmental footprints are usually subject by government regulation to environmental impact assessments and developers are expected to submit mitigation plans to ward off adverse environmental outcomes. The challenge however is that the vast majority of property developments are not subjected to the same level of environmental impact scrutiny yet their cumulative effect on the landscape as a whole is great. The impacts of land degradation are apparent in settlement areas that are located in fragile landscapes underlain by erodible soils or where excessive polluted runoff is generated. Such issues are more prevalent and acute in high-density, low-income housing development areas. Addressing these concerns invariably is linked to (i) the weak policy an regulatory environment and (ii) the general lack of capacity mainly in smaller-scale investors and operators to install the needed measures to safeguard the environment.

123. **Uncontrolled expansion of exotic species:** This is a significant issue that affects both land and biodiversity assets. Among the better known includes the proliferation of the exotic lemon grass (*Cymobopogon nardus*) in drier areas that in turn present an extreme fire-risk during the dry months. With habitat modification by human

influences, the possibilities for invasion of opportunistic alien species is heightened, compromising the indigenous biodiversity. As with the other issues related to land management on private lands, the key constraint is the lack of clear policy and regulatory mechanisms. In the marine environment the recent invasion of the IndoPacific Lionfish (*Pterois volitans*) is a major concern across the Caribbean particularly where weakened coral reef ecosystems are not as productive due to anthropocentric stresses, and predation by the lionfish is further compromising survivorship of several ecologically and economically important fish, lobster and shrimp species. Further the resources required for addressing expansion of alien invasive species at the national level in most cases simply does not exist as the priority ascribed is usually relatively low.

124. There are a few **key barriers** that are common across all the Caribbean countries that present impediments and need to be addressed. Among the main ones are **institutional and governance weaknesses**. At the state planning level environmental management issues are generally handled in a rather fragmented approach between agencies. There tends to be no central coordinating entities that have technical and policy oversight for land development across all sectors. Planning processes tend to be sectorally-driven and do not take into consideration principles of maintenance of ecosystem services (water, soil productivity, biodiversity, buffer to natural hazards, etc.) that are of benefit to the widest range of stakeholders and the natural environment.; in short absence of a mainstreamed approach. There are very often overlapping institutional functions which create challenges in the implementation of policy at the national level and national and even regional entities often found developing and implementing policies and programmes in isolation from one another. There are gaps in institutional mandates as well as in support legislative and regulatory instruments that do not adequately address coordinated planning for IWRM, SLM and biodiversity management

125. Pursuant to the UNCCD and CBD conventions, most Caribbean countries have developed National Action Plans (NAPs) and National Biodiversity Strategy and Action Plans (NBSAPs) that lay out strategic actions in the management of land (in the context of land degradation) and biodiversity resources respectively. Strategic plans for water resources remain poorly defined however, although under the GEF-IWCAM Project, governments were assisted in undertaking the initial steps in formulation of Integrated Water Resources Management policies and plans. Jamaica is the only country that has a national overarching plan for management of its water resources.

126. Integrated water resources management, sustainable land management, biodiversity management and sustainable forests management (IWRM, SLM, BD, SFM) strategies should all be incorporated within the watershed-based management. However these considerations are poorly understood by planning and development and socio-economic specialists and as such are not featured in

planning guidelines. The ecological dynamic associated with water in the environment is lost and is a hindrance for mainstreaming a joint approach to planning and development and ecosystems management. The root cause is lack of continuous education amongst mainstream planners; many studies have been conducted and there has been some awareness but the agenda for mainstreaming these sustainable management strategies has not progressed in most countries.

127. Related to institutional and governance barriers is the relatively weak human resource capacity within agencies with the appropriate mandates. Capacities within State and non-state agencies and other stakeholder organizations are often not maintained at a level to facilitate long-term sustainability of interventions. In many instances training and capacity building tend to be project-driven with lack in effort to institutionalize these initiatives into the business plans of agencies and organizations from a human resource development perspective. Personnel who may have benefited from capacity-building themselves are often not sufficiently empowered to become resource providers, and there is generally little attempt at creating the environment that warrants active demand of skills attained in real-world application. This issue is often compounded by high turnover rates of skilled technical personnel as they tend to seek alternative, more lucrative employment outside the government service, in many cases the knowledge leaving with them. The private sector is often overlooked as a potential ally in building overall national human resource capacities for natural resources management and there are generally only weak attempts to solicit active engagement of private sector partners in HR development.

128. The low level of enforcement of laws and regulations is very often a challenge especially since this responsibility falls on state agencies with their limited capacity. The low level of awareness by major stakeholders and the general public also contributes to poor enforcement. Enactment of new legislation is also a challenge given the very lengthy processes in drafting the necessary legislation and getting the bills through parliament. In some instances, though an existing law may provide a broad range of control over most areas; the main weakness is that the regulations with that piece of legislation do not exist or may not be well developed. In some cases laws overlap and the instructional responses are not clearly defined. In most if not all of the Caribbean territories, there is a multiplicity of laws, each dealing separately (and through different sectoral responsibilities) with various aspects of resource management, thus encouraging a compartmentalised and isolated approach to environmental management.

129. Financial constraints remain an overarching challenge in terms of sustaining investments in natural resources management in many Caribbean countries. In the face of competing needs, core state resources tend to remain directed at poverty alleviation, health care and education, with comparatively little invested in natural resources management. In most countries the bulk of resources in NRM are secured

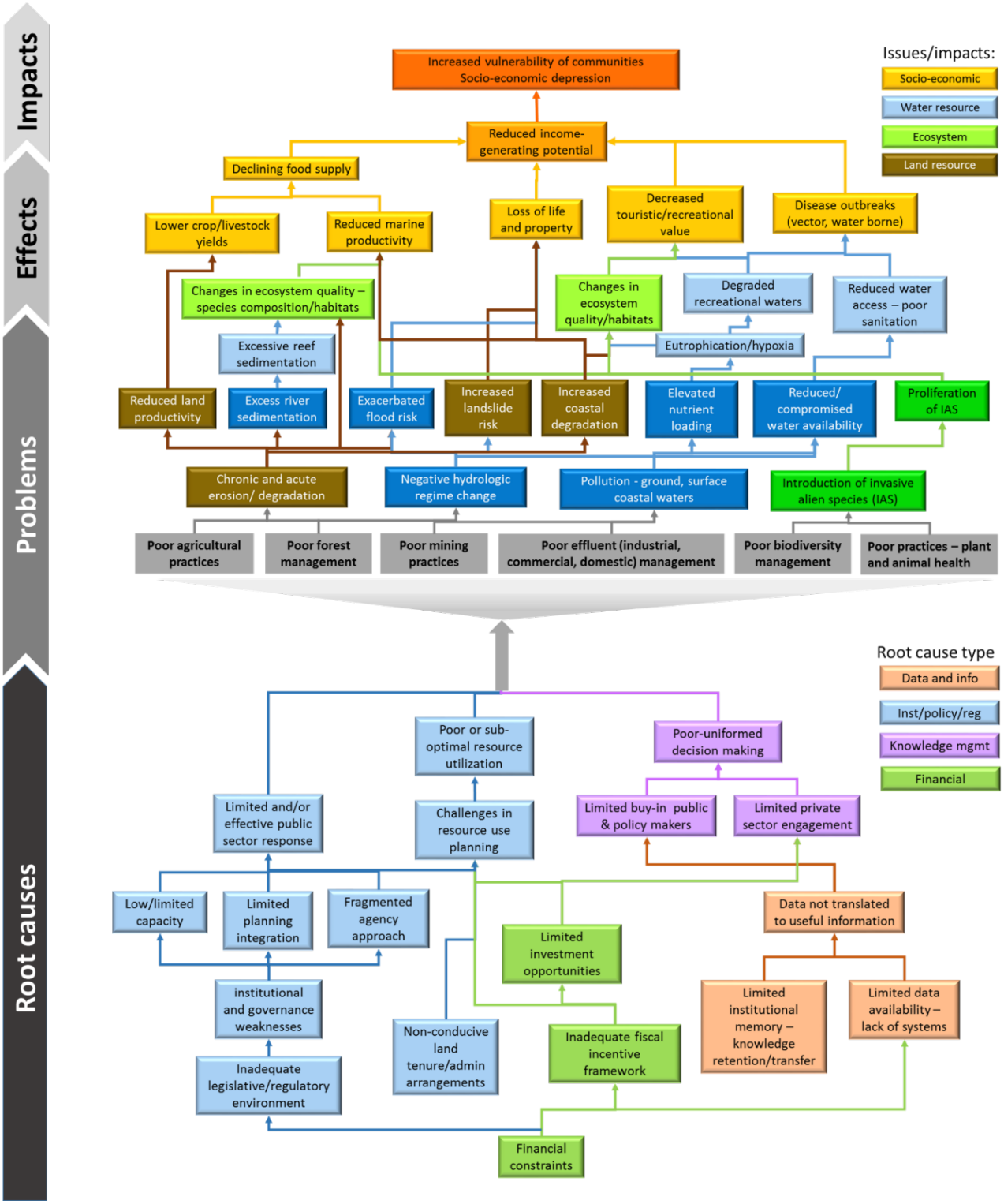
through external donor funding. Given the small scale of economies that dominate the productive sectors, stakeholders themselves (farmers, and other investors) are often not able to independently make the investments in sustainable resources management. An increasing trend in many countries is the transition of lands out of agricultural production given the downturn in markets for traditional agricultural export commodities. Consequently agricultural lands are facing increasing abandonment and where in proximity to roads and other service amenities, are sold for urban development or commercial purpose with short-term economic gain for the land owner. However in most cases this signals irreversible loss of future indigenous economic productivity from agricultural output, often accompanied by loss of potential ecosystem services that these lands could provide as they are sub-divided, fragmented and converted to urban landscapes.

130. Insufficient investment in public education and awareness results in challenges in the adoption of behavioural changes needed for enhanced environmental stewardship. While gains have been made through various projects and programmes both at the national and regional level over the years which has to some degree has translated to more favourable policy environments in the context of sustainable resource development, it has not been fully translated into actions at the institutional and individual levels. Public education and awareness raising on matters of the environment still tend to be driven along the rise and wane cycles of availability of project resources, the outputs of which are in many cases, not further supported by longer term national programmes to build in sustainability. The private sector also tends not to be sufficiently engaged in uptake of such PA/PE outputs so as to trigger organizational behavioural changes in a proactive manner.

131. Closely related to education and awareness is the issue of lack of sustainability of investments in data collection and knowledge management. Over the years there have been investments (mainly project-driven) in all the Caribbean countries in strengthening data capture for improved decision-making, however the integration of science and knowledge from data monitoring systems into mainstream decision-making is still not meeting the desired effect. This has been largely due to challenges with follow-up resource commitment by governments post-project to maintain and operate these data capture systems. Investment in data capture systems is also fundamentally informed by whether there are national processes that specifically mandate the use of data for decision making. In many instances data provision is not tied to regulatory or statutory requirements thereby limiting the perception of utility of data captured. Considering the influences of climate change in terms of changing temperature and moisture regimes on the ecosystems and communities it is recognized that the impacts need to be monitored and reported on so as to trigger urgent appropriate policy and action at the national level.

132. Figure 2 presents the Problem Tree analysis that diagrammatically summarizes the root causes through to the problems to effects and impacts.

Figure 2. Problem Tree Analysis



2.8 Stakeholder Analysis

133. The implementation of this project will be coordinated by UNEP Car/RCU and the Environmental Health and Sustainable Development Department of the CARPHA and will involve many regional and international partners given their core institutional mandate and interventions and programmes that they are already engaged in within the Caribbean region. In the design of this project, bi-lateral discussions were held with all the various core stakeholders that are engaged in work within the Caribbean region at the regional level. This includes governmental and non-governmental agencies and inter-governmental agencies and academia. An analysis was carried out of their technical strengths and competitive advantage in delivering contributions to the project through associated projects and programmes that they will be engaged with over the span of the IWEco Project. Contributions through partnership arrangements have been identified and quantified in terms of co-financing.

134. Besides the lead project implementing and executing agencies, several partners have been identified within an **IWEco Project Partnership** during the course of project development; a greatly expanded grouping from the PIF submission. Given the areas of engagement of the various agencies, the project partnership is divided into three main technical groupings based on their contributions to the project; (1) Research, (2) Governance and (3) Public awareness and public education. Two support partnership groupings around resource mobilization and private sector participation takes into account of the contributions and advisory support of financial sector agencies and the private sector. Community beneficiaries are considered partners at the local project levels.

1. Research Partnership

135. The Research Partnership will support the project by assisting the national projects in the establishment and implementation of the monitoring protocols based on the indicators derived from the GEF Tracking Tools. The Partnership will provide technical contributions to the project Regional Technical advisory Group (RTAG). The contributions from the partnership will not be confined to pure research but in large measure will contribute to application. The following are the agencies that constitute the Partnership (additional partnerships will likely be formed during implementation).

136. The **Caribbean Public Health Agency (CARPHA)** through its Environmental Health and Sustainable Development (EHSD) Department (formerly CEHI) will play a significant role in continuing to support contributions to improved natural resources management mainly in the areas of water (and wastewater) and land resources management building on the inputs of CEHI within the GEF-IWCAM Project in association with other partners in IWRM planning and policy development. The

inclusion of the (German government-financed) Caribbean Aqua-Terrestrial Solutions CATS Programme within the EHSD Department's project portfolio on behalf of CARIOCOM brings significant elements of policy strengthening and capacity building within marine protected areas and marine biodiversity management and building sustainable livelihoods in through sustainable land resources management. CARPHA's Surveillance, Disease Prevention and Control Division (SDPC) and the Research, Training and Policy Development Unit (REPDU) will bring significant capacity in contributing to the human health evidence base related to environmental contributors in crafting national and regional level policy and assisting with capacity to monitor and assess the state of the environment.

137. The **University of the West Indies (UWI):** UWI's Centre for Resource Management and Environmental Studies (CERMES, Barbados) will support research and policy guidance on areas related to water use efficiency, watershed management and IWRM in collaboration with regional partners such as CEHI (CARPHA) and GWP-C. The Department of Geomatics Engineering & Land Management and the Faculty of Food and Agriculture at UWI, St. Augustine Campus (Trinidad) will provide support to research and applications in a range of land management studies from flood and hydrologic modelling to GIS applications for land use planning. The Department of Geomatics Engineering & Land Management also is host to Caribbean WaterNet, a Caribbean network for action research and capacity building in Integrated Water Resources Management. UWI's Mona Campus in Jamaica will also be engaged through its research work with the Climate Studies Group.

138. The **National Oceanic & Atmospheric Administration – National Ocean Service, International Program Office (NOAA-NOS)** will provide regional guidance as well country-specific assistance to implement effective watershed management practices and support policy reforms to reduce pollutant loadings to critical coastal areas and balance the competing needs of ecosystem sustainability and economic development. NOAA-NOS will also provide direct assistance to select project countries to help build capacity for water quality monitoring to establish baseline conditions and efficacy of said implemented practices as well as contributing to regional standards for measuring the health of the marine environment. NOAA-NOS will also conduct training for coastal resource managers of IWEco partner countries that will improve regional management and technical capacity to address polluted runoff, especially for those watersheds adjacent to coral reef resources.

139. The **United Nations University Institute for Water, Environment & Health (UNU-INWEH)** will contribute technical expertise to strengthen capacities at both the country project implementation level and the regional level. Areas of focus will include watershed management, small-system wastewater treatment, integrated coastal marine management, including coral reef and mangrove ecosystems, coastal development, Marine Protected Areas, coastal pollution and the effects on human health, IWRM, sustainable land management and climate change adaptation.

140. The **International Atomic Energy Agency - Environmental Laboratories (IAEA-EL)** operates a Marine Environmental Studies Laboratory (MESL) which implements marine monitoring programmes in collaboration with regional laboratories, and provides training in analytical techniques. The lab is the pillar of the Quality Assurance programme for determination of non-nuclear contaminants in the marine environment. The IAEA also operates a Terrestrial Environment Laboratory and supports Member State laboratories in enhancing the quality of analytical measurement data both in trace element and radionuclide determination. It also assists in strengthening capabilities for evaluating radionuclide migration, geochemical and biochemical enrichment and radiation effects on humans and ecosystems. The IAEA-EL has been supporting the Cienfuegos Environmental Studies Centre (CEAC), a marine environmental research centre in Cuba, to build capacity in application of nuclear and isotopic technologies in environmental quality assessment. Under the GEF-IWCAM Project CEAC served as one of the key nodes for knowledge transfer between countries. Under the project the IAEA-EL will provide advisory support and training to diagnostic laboratories in the Caribbean to introduce new techniques and methods for tracking pollutant loading into the receiving marine environment and support inter-laboratory quality assurance and quality control.

141. The **Caribbean Institute for Meteorology and Hydrology (CIMH)** is a training and research organization with a mandate to improve the meteorological and hydrological services and to assist in promoting the awareness of the benefits of these services for the economic well-being of the CMO countries. The agency will support the project through provision of technical and advisory services associated with the establishment of hydro-meteorology field monitoring protocols, equipment installations and training in use and management of monitoring equipment.

142. **UNESCO International Hydrology Programme – (IHP)** will introduce to the project, initiatives under development at the LAC regional level through the capacities existing in the following programmes: Flow Regimes from International Experimental and Network Data (FRIEND); Groundwater Resources Assessment under the Pressures of Humanity and Climate Change (GRAPHIC); Groundwater Science and Management; International Flood Initiative (IFI); International Sediment Initiative (ISI); Ecohydrology; Urban Water Management; Water and Education; Water and Gender; Water and Culture and the PCCP (Potential Conflict to Cooperation Potential). UNESCO-IHP will facilitate access, at both the national and regional project levels, to the regional network of IHP National Committees, as well as to UNESCO water-related Centers and Chairs in relevant subject areas.

143. The **Food and Agriculture Organization (FAO)** brings to the project expertise in soil and water resources and forest resources management. Currently the FAO leads the land and water resources management thematic area within the CARICOM Jagdeo

Initiative for agricultural development. This work has been to focus on policy and strategies for maximizing food production through the efficient use of land and water resources. The FAO is also assisting Caribbean countries to access TCP grants and in one case a GEF project grant in support of sustainable forest and protected areas management in some of the countries. FAO is expected to assist by drawing on its network of specialists to build technical capacity within local resource agencies for sustainable forest management.

144. The **Water Center for the Humid Tropics of Latin America and The Caribbean (CATHALAC)** will assist with development of human and institutional capacities at both the local and regional project levels in applied technical areas such as integrated watershed management, climate change impact assessment, environmental modelling and analysis, and risk management. Of particular interest are the capabilities that CATHALAC brings in terms of remote sensing applications for environmental assessments and GIS-based applications for spatial land and water resources planning. Since 2005, and in conjunction with NASA, USAID, and other partners, the Centre has been implementing the Regional Visualization & Monitoring System (SERVIR, in Spanish), a regional platform for environmental monitoring. In that context, CATHALAC will be able to leverage and acquire satellite imagery of the project's participating countries, for specific applications. In addition, CATHALAC will be involved in modelling to assess watershed degradation (soil loss and nutrient loading), using tools such as the Non-point Source Pollution & Erosion Comparison Tool (N-SPECT), and the Soil & Water Assessment Tool (SWAT). In the context of this project, CATHALAC will also leverage its experience in its current (2012-2015) IDRC-funded "Water Security & Climate Change in Central America and the Caribbean" project.

145. The **Center of Engineering and Environmental Management of Bays and Coasts (CIMAB)** based in Cuba is a one of the two Regional Activity Centres (RACs) for the LBS Protocol and participated as a core partner in the implementation of the GEF-IWCAM Project. CIMAB will bring to the project (as in the case of the IWCAM Project) expertise in integrated coastal zone management and modelling of land-oceans impacts in terms of the physical and biological dimension from human influences. CIMAB was a lead partner in the update of Technical Report TR33 (first published 1994) that assessed pollution of the Caribbean Sea Basin from LBS of marine pollution. CIMAB collaborated with other IWCAM participating countries in sharing technical expertise and in the conduct of assessments as part of the national Cuba demonstration project but also in Antigua and Barbuda. This relationship will be continued in this project. CIMAB has also provided technical assistance to Dominican Republic and Jamaica particularly in development and implementation of monitoring and assessment programmes.

146. The **Institute of Marine Affairs (IMA)** is a multi-disciplinary marine and environmental research organisation based in Trinidad and Tobago and has the

mandate to collect, analyse and disseminate information relating to the economic, technological, environmental, social and legal developments in marine affairs and to formulate and implement specific programmes/projects. The Institute has contributed to the sustainable development of the coastal and marine areas of the insular Caribbean through initiatives under CARICOM or UNEP's Caribbean Environment Programme. The IMA collaborates under the CARICOM Fisheries Resource Assessment and Management Program (CFRAMP) and is one of the two Regional Activity Centres (RAC) for the Protocol Concerning Pollution from Land-based Sources and Activities in the Wider Caribbean Region (LBS Protocol). As a Regional Activity Centre, the IMA assists UNEP in the implementation of the LBS Protocol. The IMA will continue in its role under the GEF-IWCAM as a core collaborator for capacity development in environmental quality assessment of marine ecosystems.

147. The **Pan-American Health Organization (PAHO)** is the Regional Office for the Americas of the World Health Organization which provides technical cooperation and mobilizes partnerships to improve health and quality of life in its 35 Member States of the Americas. The organization is concerned with the entire range of health issues that face countries of the hemisphere which span from emergent and re-emergent communicable and non-communicable diseases, to HIV/AIDS to infant mortality to general health promotion. The Organization also provides technical collaboration with respect to emergency preparedness and disaster relief coordination. In connection to environmental quality and environmental health the organization assists with the improvement of drinking water supplies, enhancement of adequate sanitation and reduction of disease risk associated with poor environmental practices and pollution particularly related to poor sanitation. Under the project PAHO is expected to partner closely with CARPHA in strengthening disease surveillance and prevention as linked to environmental quality.

2. Governance Partnership

148. The following partners will contribute to the strengthening of policy and advocacy across the various project components and the major thematic areas in water, land and biodiversity resources management.

149. The **Organisation of Eastern Caribbean States (OECS)** supports its Member States in realizing policy objectives and strategic targets articulated within the **St. George's Declaration of Principles for Environmental Sustainability** and has collaborative partnerships with regional and international partners and donors in meeting this development agenda. The Secretariat is collaborating with the United States Agency for International Development (USAID) on the OECS - ***USAID Climate Variability, Change and Mitigation (RRACC) Project:*** Reducing the risks to human and natural assets resulting from CC (RRACC) for the 6 independent states of the OECS which includes a component on water resources and sustainable land management and

coastal area management. The project seeks to build resilience, as well as institutional capacity in government and related sectors affected by climate change. The Secretariat is also implementing the sub-regional project ***Supporting the Eastern Caribbean States to Improve Land Policies and Management*** financed by the Australian Government through UN-Habitat which seeks to develop OECS land policy guidelines and national land policies and will include capacity enhancement and the use of relevant SLM tools. The Secretariat is also implementing an EU-funded intervention within the Global Climate Change Alliance (GCCA) framework on ***Climate Change Adaptation and Sustainable Land Management in the Eastern Caribbean*** that also aims to build institutional capacities and provide suitable technical tools and training to support SLM. These projects will contribute significantly to the outputs of the IWEco Project and close joint collaboration in the implementation process is envisaged.

150. The **Caribbean Community Climate Change Centre (CCCCC)** is the lead CARICOM agency with responsibility for advancement of the **CARICOM Regional Framework for Achieving Development Resilient to Climate Change and its Implementation Plan** for the Caribbean. The Centre is the lead implementation agency for a number of initiatives that fall within this programme supported by several CARICOM agencies, other regional bodies, international technical and donor partners. The following are those initiatives that are of direct relevance to the IWEco Project. The EU-financed ***Global Climate Change Alliance (GCCA)*** will enhance capacities within the Caribbean in addressing vulnerabilities associated with climate change through policy change, and to support the mainstreaming of sustainable development goals. The UK Government, through the Centre, is supporting the implementation of priority actions within the Climate Change Implementation Plan under the ***Caribbean Regional Resilience Development Implementation Plan*** that will entail the strengthening of state institutions and policy development. Under the ***Pilot Programme for Climate Resilience*** investments are being made in enhancing climate-related data capture, down-scaled modelling, storage and analysis for dissemination and decision making. Under an implementation agreement with the Inter-American Development Bank a ***Regional Integrated Observing Network for Environmental Change in the wider Caribbean*** will be developed with supportive education and outreach components. Additional support to observation and data management is being provided through the Global Climate Change Alliance under the 10th EDF Intra-ACP financial framework. The ***Caribbean Weather Impacts Group (CARIWIG) Project*** being implemented through the Centre and supported with technical inputs from UWI, the Institute of Meteorology of Cuba (INSMET) and other UK-based research institutes are contributing to climate change scenario analysis by providing locally relevant weather projections and impacts through inputs from leading weather generator models. Given the extent of overlap of these initiatives with components of the IWEco Project, joint implementation is envisaged.

151. The **Caribbean Community Secretariat (CARICOM)** as the political organ of the Caribbean Community, has a role in bringing regional policy positions to the attention of Heads of Government and other Ministerial bodies. It has also been mandated to advance the establishment of a CARICOM Consortium on Water and the formulation of a Common Water Resources Management Framework for CARICOM States based on IWRM principles. The project will support the Consortium in development of the Common Water Framework within the umbrella of CARICOM in collaboration with the Secretariat and other partners in the water sector across the region. The CARICOM Secretariat has been implementing an MEAs strengthening initiative that includes common elements in respect of policy and mainstreaming that are consistent with the IWEco Project.

152. The **Caribbean Tourism Organization (CTO)** is expected to provide policy-level guidance on joint collaboration and provide assistance in promoting awareness of the initiative amongst constituents and ministers with responsibility for tourism in the Caribbean region. The CTO places emphasis on the promotion of sustainably responsible tourism investment in terms of supporting livelihoods within communities and good environmental practices. The Caribbean Alliance for Sustainable Tourism (CAST) a not-for-profit entity of the Caribbean Hotel Association (CHA) that promotes responsible environmental and social management of the Caribbean's natural and heritage resources within the hotel and tourism sector. CAST provides guidance and expertise in awareness raising programs, environmental management systems (EMS) and best practices. Useful vehicles to raise awareness and build partnerships will be through the annual Conference on Sustainable Tourism Development (STC) hosted by the CTO, and through voluntary eco-labels such as Blue Flag for beaches and marinas and other programmes that are supported by CAST. The project will seek partnerships with associated support organizations such as the UK travel Foundation and IICA's Agro-Tourism Linkages Centre (Barbados).

153. The **Global Water Partnership – Caribbean (GWP-C)** will support capacity development in the project countries at both national and regional levels with focus on the area of integrated water resources management. GWP will bring the wealth of global experiences to the project through tools designed for application by decision makers in the water resources sector. Engagement of the GWP-C will be through the conduct of national and regional training events, publication of best practices and the hosting of regional fora and dialogues in IWRM. Support to the project will be provided through the Water, Climate and Development Programme (WACDEP).

154. The **Caribbean Water & Wastewater Association (CWWA),** an association of water and waste sector professionals, seeks to advance the science, practice and management of water supply and wastewater disposal for the benefit of Caribbean people. The CWWA hosts annual conferences with the primary purpose of

showcasing the work of resource management and industry professionals in the water and wastewater sector, and collaborates with the national chapters to advance policy advocacy, technical backstopping and facilitate capacity-building.

155. The **Caribbean Water & Sewerage Association (CAWASA)** is a regional umbrella organization of water utilities dedicated to serving the growth and development of its members. CAWASA maintains an active programme of capacity building for its utility members in various technical areas related to operation and maintenance of water utilities and sustainable management of water and wastewater resources. CAWASA will promote these areas of mutual interest to the project and will contribute to the strengthening of policy, legislative and institutional reforms and capacity building, and enhancing knowledge exchange, best-practices, replication and promoting stakeholder involvement within the project framework.

156. The **Organization of American States (OAS)'s Department of Sustainable Development** will provide policy level support to the project through direct technical advice from experts under the relevant portfolios of the Department which include Water Resources Management, Energy and Climate Change Mitigation, Biodiversity and Sustainable Land Management and Environmental Law and Governance. The contributions will be particularly linked to Component 3 of the project. There will be opportunities to transmit the outputs of the project through the OAS governance mechanisms via the DSD.

157. **The Nature Conservancy (TNC)**'s programmes in the Bahamas, Jamaica, the Dominican Republic and the Eastern Caribbean with a focus primarily on land-based activities that impact coastal natural resources and on conservation of marine resources will be complementary to the IWEco Project and actions will be coordinated to ensure synergies in implementation. The **Caribbean Challenge (CCI)** initiative that has been committed to by nine countries in the Caribbean, seeks to facilitate the conservation of at least 20% of their nearshore marine and coastal environments in national marine protected areas systems by 2020 and trigger the creation of National Conservation Trust Funds. These national funds are to be also supported by a proposed Caribbean Biodiversity Fund (CBF). The models for sustainable financing of land and marine biodiversity conservation advanced under the CCI will be of significant interest in terms of replication and/or strengthening at the national and regional levels under the IWEco Project.

158. The **International Union for Conservation of Nature (IUCN) - Regional Office for Mesoamerica and Caribbean** will partner with the IWEco Project in strengthening capacity building amongst state agencies and local stakeholders in the integration of ecosystem services principles in watershed management at the national level with development of best practice guidelines at the regional level of the project. IUCN will also collaborate in demonstration of best practices for watershed management through sub-basin governance arrangements and contribute to expanded learning

and knowledge sharing, and results on the ground that can be upscaled and replicated.

159. The **Caribbean Network for Integrated Rural Development (CNIRD)** is regional non-governmental organization, whose focus is on networking with national and sub-regional intermediaries based in the Caribbean region, with the objective of achieving integrated rural development. The CNIRD was designated responsibility by the national foal points for the UNCCD Convention in the Caribbean the Support Office for the Partnership Initiative on Sustainable Land Management (PISLM). The PISLM serves as a mechanism to facilitate exchange of experiences and good land management practices between participating countries, and as a mechanism for stimulating the replication of various approaches, tools and methodologies on SLM throughout the region. Through the PISLM mechanism support will be provided for replication and translation to mainstreamed policy for best practices in SLM.

3. Public Awareness / Public Education (PA/PE) Partnership

160. The Public Awareness / Public Education (PA/PE) Partnership will support the awareness and education strategy development and implementation of the project. The project will employ social marketing methods and popular media to give maximum visibility through 'blitz campaigns' to generate buy-in across all segments of society, inclusive of policy makers, the private sector and community. The extensive range of knowledge products generated by the GEF-IWCAM Project, combined with lessons learnt from project implementation by other partners will be utilized from the onset of the project to 'popularize' approaches and actions proposed by the project.

161. **PCI Media Impact** empowers communities worldwide to inspire positive social and environmental change through Entertainment-Education and creative communications. PCI Media Impact is implementing ***My Island - My Community*** a strategic communications for behaviour change program that builds knowledge, shifts attitudes and changes behaviours to help create resilient island communities. This programme is being implemented in collaboration with a range of local and regional NGO and government partners and draws on entertainment icons from the region to help mainstream messages about the environment through popular media. Media Impact will use the lessons and experiences gained from the current My Island - My Community programme to apply within the IWEco Project framework at both national and regional levels.

162. **Panos Caribbean** reaches out to marginalized people through capacity building, information production, information dissemination and networking on communicating Caribbean development issues. Within the IWEco Project, Panos Caribbean proposes to incorporate communications elements in technical training and develop sectoral communication strategies to create an enabling environment

for water, biodiversity and sustainable land management. Panos will share lessons learnt from its premier environmental project, ***Voices for Climate Change Education*** in the design and implementation of activities.

163. The **Caribbean Natural Resources Institute (CANARI)** will assist with empowerment for action and equitable participation associated with the project interventions at the communal level. The approaches to be employed will foster effective collaboration in the management of natural resources between state agencies and beneficiary communities to enhance quality of life while conserving these resources. CANARI's tried and tested **'action learning'** model will build structure into the participatory approach in decision making amongst local project implementers augmented by requisite research, capacity building, communication and fostering partnerships.

164. The **Caribbean Student Environmental Alliance (Caribbean SEA)** seeks to empower Caribbean youth to lead their communities toward better stewardship of their natural resources through collaborative watershed initiatives. The **'citizen science'** approach to engagement of students and the community in observing the state of the environment around them greatly enhances awareness and social responsibility on matters of environmental management. Caribbean SEA has also been involved in replicating pollution control measures that were tried and tested under the IWCAM Project along with other environmental conservation and restoration work such as mangrove replanting, reforestation of landslide areas as well as biogas digesters and other constructed wetlands. Under the project the organization proposes to broaden citizen science in learning and action in promoting environmental awareness and assist with further implementation of community based water restoration options.

165. The **Caribbean Examinations Council (CXC)** will partner through local ministries of education and secondary schools where students in Forms 4 and 5 (in all countries except Cuba and The Dominican Republic) write school-based assessments (SBAs)[24] as part of the fulfilments for graduation from secondary school level. The SBA is structured as a research compilation in a given subject area. Students who choose to do SBAs that are aligned to environmental themes will use the outputs of the project as resource material in a structured support mechanism whereby the national project stakeholders will be the primary points of contact for knowledge. Subject areas including biology, geography, integrated science and social studies have potential alignments to learning areas under the project.

4. Partners for resource mobilization

[24] Manual for CXC School Based Assessments (SBA)
http://www.cxc.org/SiteAssets/MANUALS/SBA_Manual_2012.pdf

166. Resource mobilization partners will bring expertise to the IWEco project planning and implementation process particularly at the national level to facilitate the replication of solutions that are the focus of the national sub-projects.

167. The **Caribbean Development Bank (CDB)** will participate as a project partner to bring technical and policy perspectives to resource mobilization how to build financial sustainability of investments in environmental resource management. The Bank has various investment and funding grant windows that could be accessed through joint project development triggered by the IWEco Project for the benefit of priority needs at both country level and at the wider regional level. Where opportunity presents itself collaborative linkages will be made with the **Inter-American Development Bank (IDB)** and the World Bank in partnership to strengthen and build on contributions of the IWEco Project in the countries but to seek out new opportunities for investment around other financing mechanisms.

168. The **GEF Small Grants Programme** will contribute knowledge through the global experience of the programme in building economic livelihoods through community-based initiatives. The Programme will foster replication of best practices in project development, capacity-building for enterprise development and implementation through the execution of the national sub-projects. GEF-SGP will be a source of ready finance for small communal business enterprise development that will contribute to socio-economic development at the national level.

5. Private sector support

169. Partnering with the Private Sector will expand visibility and help build relevance of project interventions at both regional and national levels in mainstreaming environmental management into business investments. These private sector interests will include stakeholders in the hospitality and beverage and other manufacturing sectors (heavy water users). Investments in sustainable production and consumption and 'greening' industry within the scope of IWEco thematic areas of pollution control, land and water resources management and biodiversity conservation presents an opportunity to exchange ideas and replicate good practices. The use of innovative technologies provided under this project also presents opportunities for returns on investment for businesses through reduction in expenses related to environmental management, promotion of green growth revenue generating initiatives, building awareness and publicity for the private sector entity especially in the target community and increased contribution to development planning in the country / region.

170. Private sector partners will also assist the project through sponsorship, with roll-out of public awareness 'blitz' programmes, drawing on conventional and innovative social marketing concepts and approaches, using the outputs generated by the project. Some partnerships have been explored with a few regional and

international companies during project design (included in narrative below), but these are to be formalized during project inception and project roll-out.

- **Travel and tourism: Sandals Resorts** is a premier hotel chain that operates properties in Jamaica, the Bahamas the Turks and Caicos Islands and in the Eastern Caribbean (Saint Lucia, Antigua and Barbuda and Grenada). Sandals Resorts plays a major role in the Caribbean hospitality sector through its various corporate and social responsibility programmes including environmental stewardship including programmes such as the Sandals Foundation and Earth Check. It is anticipated that **local hotel resorts** will support the project based on needs at the national level in roll-out of the projects and how interactions are forged. It is also anticipated that **airline companies** operating within the Caribbean will support the project particularly in sponsoring travel costs associated with collaborative exchanges for community stakeholders and schools.

- **Manufacturing: Coca-Cola** is a global private sector leader in beverage manufacture and operates through licence numerous production facilities across the Caribbean. The company, through its local affiliates has embarked on making investments in cleaner production, pollution control/improved effluent management, reforestation of lands that serve as water catchments for manufacturing processes, water use efficiency and waste recycling. **Local breweries and rum distillers** will partner with the project at the local level through the national projects. These private sector interests are linked to environmental management through the large quantities of water that are used in the manufacture of these products. There are also environmental linkages through the disposal of effluent and the impacts on the receiving fresh and coastal waters. Given the widespread local and international appeal of these branded and highly unique products that are often regarded as synonymous with national identity and pride, these commodities can be the medium through which partnerships for the environment can be built.

- **Telecommunications: Digicel,** one of the major telecommunications companies that provides service in the Caribbean countries has been championing internal initiatives for fostering environmental conservation in its operations through its Go-Green Programme. The company supports local community-based initiatives, and through its communications technology base can provide support to public outreach efforts.

- **Petrochemicals: SOL Caribbean** has major investments in the petro-chemical supply and distribution sector across most of the Caribbean and has environmental safeguard programmes regarding safe handling of oil products. There are also a few local **waste oil recycling companies** in the countries that are engaged with recycling waste oil, thereby removing from the waste stream, minimizing the potential for land and water degradation. Strategic cooperation will be established to assist with capacity building and awareness raising on reducing risks of waste oil contamination.

- There is a wide range of local-level private sector interests in areas such as small-scale manufacture, mining, solid waste recycling, retail and entertainment to name a few that will be encouraged to partner with the project at the local level as collaborative relationships are forged particularly where there are areas of mutual socio-economic benefit.

6. Local communities

171. The local communities are the front-line beneficiaries of the interventions that are to be implemented under the project. These communities will include fisherfolk having economic ties to exploitation of near-shore coastal biodiversity resources, farmers with interests in maintaining viable livelihoods associated with land and water resource conservation, stakeholders in the tourism sector that have strong interests in maintenance of the quality of coastal and terrestrial environments for the sale of recreation packages, and rural and peri-urban communities having dependence on access to water and sanitation services. The community stakeholders groups will therefore include *inter-alia* farmer and fisher cooperatives, small business associations, tourism associations, chambers of commerce and industries, water use groups and advocates, environmental NGOs, sports and social clubs, school clubs, religious and faith-based clubs, engineering and other professional associations. The IWEco project will help foster economic opportunities for beneficiary communities at the local project level. Engagement of the mainstream commercial private sector interests in a supportive role to small-scale community based co-management arrangements will be supported.

SECTION II INTERVENTION STRATEGY (ALTERNATIVE)

2.1 Project Rationale, policy conformity and expected global environmental benefits

172. The concept of “Ridge to Reef” management or the integrating watershed and coastal areas management (IWCAM) approach for natural resources in small islands provides an underpinning for addressing the multiple challenges of sustainable water, land (including forests) and biodiversity management and conservation within the spatial framework of the watershed unit. By extension the project will demonstrate the integration of the strategic objectives of the GEF International Waters, Land Degradation, Biodiversity and Sustainable Forest Management focal areas within a natural resources management framework. The country interventions, the innovative solutions for addressing degradation of natural resources are designed and will be implemented so that they realise interlinked benefits ultimately with the goal of enhanced ecosystem flows and benefits at the communal level that will be impactful through replication of practice at the national level, the Caribbean region and across SIDS globally.

173. The project is necessary as it will contribute further support to addressing the threats to ecosystems functioning and socio-economic resilience through degradation of the natural resource assets of the Caribbean. While the GEF-IWCAM Project and other interventions have contributed to improvements in natural resources management governance in the region, there remain significant needs particularly in identifying and broadening investments in sustainable technologies and approaches. Barriers still remain that hinder the uptake of appropriate technologies and mainstreaming of policies into national development frameworks that can be translated to incentives to facilitate uptake.

174. The project will contribute significantly toward:

175. **Expanding and replication of sustainable solutions:** There is continued need to explore appropriate solutions for wastewater and effluent control given the chronic impacts that discharge of untreated effluent and greywater is having on the nearshore coastal environment. In the Caribbean there are not many examples of working tailor-made solutions that adequately address issues particularly in coastal communities that are not connected to municipal wastewater plants where conventional on-site treatment systems do not work effectively on account of the high water-tables. In many cases where these communities are lower income low-costs solutions must be found and the project will draw on best practices form the worldwide pool of knowledge and build on these and contribute to learning and replication. Biodiversity resources are threatened, particularly those ecosystems that harbour resources of significant global conservation value due to endemism and/or economic value through provisioning services. The threat in many parts of the Caribbean is driven by competition for land for human settlement expansion. The needs to be further contributions to integrating biodiversity resource conservation within mainstream land use planning and investment in research and solutions that will maintain or enhance the ecosystems functioning and deriving benefits. Building resilience to land degradation in the spectre of more intense cyclonic activity associated with climate change and destructive impacts particularly in steep mountainous areas that are degraded by human activity is of critical concern. Although agriculture, which was once singled out as a main contributor to land degradation, the cause for concern has transitioned also to urban settlement as communities have advanced to interior regions. Methods of armouring slopes, riparian and coastal zones through effective reforestation, natural system approaches and bioengineered solutions that reduces risk are of high interest.

176. **Strengthened monitoring and assessment:** The measurement of progress and benefits accrued will continue to be a major focus for the project in the context of enhancing local capacities to assess against indicators that are robust and easy to apply. The IWEco Project will continue to support this area that has been traditionally weak, particularly so in the smaller countries that have limited capacity

to monitor and contribute to evidence-based decision making. The GEF tracking tools provide not only the basis for assessment of progress from project implementation but will be contributory to the mainstreaming of assessments of environmental and socio-economic outcomes associated with investments in environmental management.

177. **Contributions from financing agencies in design of fiscal incentives:** The review of the IWCAM Project revealed that more work is needed to bring on board the financing institutions and financial policy agencies to support the search for financially sustainable solutions and viable livelihoods that will serve to enhance ecosystems functioning. The linkages between financial investments through financial institutions and environment must be strengthened through good proactive policy and articulation of workable fiscal incentives. The engagement of beneficiary communities through the GEF Small Grants Programme in partnership with local cooperatives and other credit organizations are avenues to build sustainability.

178. **Promoting high-level buy-in within governance frameworks:** Across the various political levels of governance from sub-regional to hemispheric and global; OECS, CARICOM, Association of Caribbean States, OAS through to AOSIS, the project will contribute strengthening of existing governance frameworks across the Caribbean, serving to raise the awareness of the outputs through the political process. Raising the profile of the project outputs and outcomes at the CARICOM level of ministers and heads of government for example was a weakness that was noted in the review of the IWCAM Project. There has already been significant momentum built around the need for enhancing climate change resilience at higher political levels and the project will seek to position the contributions in terms of water, land and ecosystems resilience building within the climate change adaptation frameworks.

2.2 Consistency with GEF focal area strategies

179. The project is consistent with the GEF Focal Area Strategies for International Waters (IW), Land Degradation (LD) and Biodiversity (BD) including Sustainable Forest Management (SFM) with each focal area actions complementing one another as to promote a truly integrated approach to the management of natural resources. The project seeks to focus on innovation, catalysing implementation of cutting-edge technologies and policy reforms with the objective of enabling replication and scaling-up, and enhancing engagement of beneficiary community stakeholders and the private sector. The project will contribute to the removal of barriers that hinder the implementation of sustainable solutions that intend to address the interrelated problems of land degradation and loss of biodiversity and ecosystem services in consideration of the urgent need to accelerate climate change resilience. This will be achieved within the SIDS approach for improved land and water (freshwater and coastal waters) resources management including ecosystems governance; that is,

the 'ridge to reef' or the integrating watershed and coastal areas management ("IWCAM") approach.

180. **GEF International Waters (IW) Strategy:** The project seeks to enhance the management of watershed areas, groundwater aquifers, and coastal and marine ecosystems within the Caribbean Sea basin and will address **Strategic Objective 1, *to catalyse multi-state cooperation to balance conflicting water uses in trans-boundary surface and groundwater basins while considering climatic variability and change*** and **Strategic Objective 2, *to catalyse multi-state cooperation to rebuild marine fisheries and reduce pollution of coasts and Large Marine Ecosystems (LMEs) while considering climatic variability and change***. At the strategic outcome level the project will contribute to regional advancements in management and protection of the Caribbean Sea terrestrial and marine resources consistent with the Cartagena Convention framework, and build on mainstreaming of IWRM and ecosystems management principles advanced under the GEF-IWCAM Project into national development frameworks. The project will implement innovative solutions for reduced pollution, improved fresh and coastal water resources management in consideration of the challenges imposed by climate change and climate variability (Components 1 to 4).

181. A critical element in the strategy that will be addressed is strengthening the capacity and effectiveness of state agencies, community and civil society stakeholders in management of national waters and executing harmonized actions as it pertains to transboundary waters, specifically the Caribbean Sea, which is regarded as a shared resource within the definition of trans-boundary waters.

182. **GEF Land Degradation (LD) Strategy:** The project seeks to contribute towards arresting and reversing current trends in land degradation which in the Caribbean, is aggravated by deforestation and unsustainable land management particularly in the more mountainous areas and other landscapes with fragile soils that are vulnerable to degradation. The project will address **Strategic Objective 3 *to reduce pressures on natural resources from competing land uses in the wider landscape***. At the strategic outcome level, the project will enhance the cross-sectoral enabling environment for integrated landscape management. This aspect continues to present a significant barrier in Caribbean SIDS where unsustainable land management and land use conflicts impact on ecosystem functioning, and the integrity of water resources in particular. The project will foster the promotion of integrated landscape management practices adopted by local communities within the framework of the Small Grants Programme and build on lessons learned from community-based interventions from the GEF-IWCAM Project demonstration initiatives in the Caribbean. The project will target investments in integrated watershed management through forest rehabilitation and conservation of degraded upland areas, riparian corridors and coastal/mangrove ecosystems (Component 1 predominantly but also components 2 to 4). It should be noted that the approaches

advanced under the project will be consistent with the **Sustainable Forest management/REDD-Plus Strategy** where management regimes that strengthen conservation, sustainable management of forests and enhancement of forest carbon stocks will be supported. The project has been designed to secure multiple environmental benefits and to strengthen the spatial planning framework, including the development of regulatory and institutional framework and the necessary tools to promote SFM and SLM in the Caribbean islands of Antigua & Barbuda, Cuba, the Dominican Republic, Jamaica, St Kitts and Nevis, St Lucia and St Vincent and the Grenadines (Components 1 & 3). The project will support the sustainable land management interventions articulated under the UNCCD National Plans of Action (NAPs) of the participating Caribbean SIDS.

183. **GEF Biodiversity (BD) Strategy:** The project will promote the conservation and sustainable use of biodiversity and the maintenance of ecosystem goods and services through the improved management of ecologically sensitive areas of interest (particularly those outside protected area systems) towards long-term positive impacts in representation of terrestrial and marine ecosystems, and threatened species consistent with the Aichi Biodiversity Targets**.** The project will address **Strategic Objective 2** ***to mainstream biodiversity conservation and sustainable use into production landscapes, seascapes and sectors***. At the strategic outcome level the project will seek to increase and expand sustainably managed landscapes and seascapes that integrate biodiversity conservation (Component 1 predominantly but also components 2 to 4). In the project a significant underpinning will be maintaining economic livelihoods that are closely tied to maintenance of healthy ecosystems through improved pollution control measures. In the Caribbean the fisheries and the tourism sectors are heavily reliant on the integrity of healthy terrestrial and marine ecosystems. Watershed protection and sustainable forest management for water-related ecosystem services will translate seamlessly to biodiversity conservation.

184. **GEF Sustainable Forest Management / REDD+ Strategy:** The project will address **Strategic Objective 1** ***to reduce pressures on forest resources and generate sustainable flows of forest ecosystem services***. At the strategic outcome level the project will enhance the enabling environment within the forest sector and across sectors, foster application of good management practices in existing forests with carbon sequestration benefits and promote the adoption of good management practices by relevant economic actors. Through forest restoration activities across all the countries there will be benefits accrued to local beneficiary communities through expanded revenue streams through direct benefits with products and services derived from improved forest and agro-forestry systems and indirect benefits in terms of enhanced security of communities through reduced risk of landslides and flooding occurrence, maintenance of viable ecosystems and populations, and enhanced carbon sequestration.

2.3 Policy conformity

185. Global environmental benefits would accrue through a regional approach to promote exchange of best practices in addressing priority concerns associated with water, land (forestry and coastal zone) and biodiversity within the trans-boundary system known as the Caribbean Sea. The global environmental benefits relate to preservation of the uniqueness of the resources of the Caribbean Sea basin, an area with relatively high biological diversity both in terms of terrestrial and marine ecosystems, contributions to global carbon sequestration and contribution to the well-being of populations in the region through economic development and social security. Specifically, through supporting implementation of the LBS Protocol, which also supports the GPA, the project will address a common threat of pollution of the regional sea, which is linked to the global oceans agenda. Through its support of Agenda 21 Chapters 17 and 18 as well as the MDGs and WSSD targets, the project contributes to human well-being and poverty eradication by sustaining water-related and dependent livelihoods, securing food sources, promoting equitable access to water, and reducing water-related health risks in addition to resolving and preventing water-related use conflicts in water bodies. Further, the project will contribute to knowledge-sharing on mainstreaming SLM in SIDS and contribute to the global pool of knowledge on ecosystem function. Conservation of forest lands will contribute to global efforts aimed at conservation of biodiversity and enhancement of carbon sequestration in mitigation of the impacts of global warming on climate change.

186. Global benefits would be generated indirectly as the enabling environment leads to projects with on-the-ground investments in improved practices, and directly as sustainable land and ecosystems management is taken into consideration at the policy and institutional levels through better policies and incorporation of those concepts into the national development framework. The integrated and multi-faceted approach to natural resources management within a ridge to reef (or IWCAM) framework in the small island context serves to demonstrate how resources can be effectively utilised to realize added benefits across several thematic areas (water, LD and BD) as opposed to discrete sectoral interventions. This is also particularly useful given the resource poor circumstances that exist in many SIDS regions.

187. Specific Global Environmental Benefits under the GEF International Waters, Land Degradation (including SFM) and Biodiversity focal areas can be summarized as follows:

188. **Water resources:** enhancement of resilience of fragile coastal and marine ecosystems of the Caribbean Sea and contribution to maintenance of reliant

livelihoods dependant on freshwater and coastal resources through reduced nutrient loading and other harmful pollutant discharges;

189. **Land degradation (and SFM):** Improved provision of agro-ecosystem and forest ecosystem goods and services with contributions to carbon sequestration through sustainable forest management, reduced upland erosion rates and reduced rates of sedimentation from watersheds into receiving environments. In terms of carbon benefits the following is estimated based on project interventions around sustainable forest/watershed management:

190. **Carbon sequestration:** through restoration and reforestation over an estimated 2,700 hectares of forests within the countries within upper watersheds, riparian zones and coastal ecotypes including mangroves over the project duration: Total of 180,327 tCO_2 eq (based on the FAO estimate of biomass of 280 tonnes/ha applying a conversion factor of 3.76 with variable growth rates estimated between 17 and 20 tonnes/ha)

191. **Avoided carbon emissions:** Through in-situ conservation and sustainable forest management over approximately 46,000 hectares in upland watersheds areas and riparian zones that are typically dominated by broad-leaved wet forests, secondary woodlands, dry forest types and mangroves: Total of 408,103 tCO_2 eq (based on the FAO estimate of biomass of 280 tonnes/ha applying a conversion factor of 3.76 with estimates of annual deforestation rates from available sources)

192. **Biodiversity:** protection, maintenance and enhancement of terrestrial and aquatic ecosystems and associated species abundance and diversity. The Caribbean has been noted as being a biodiversity hotpot given the high level of endemism that occurs due to genetic isolation and evolution. Of the plant species, more than 70% are endemic and with respect to reptiles and amphibians, over 95% are endemic. Between 8 and 35% of species within the major marine taxa found globally are endemic to the Caribbean hotspot.

193. The project seeks to place under protected management regimes at least 2,700 hectares of ecologically important biological corridors (comprising of riparian zones, dry coastal forest ecotypes and upland forest ecosystems) and contribute to reduced pollutant loadings, particularly of sediments and nutrients (phosphates and nitrates to within LBS Protocols limits) in avoidance of excessive eutrophication of nearshore waters and smothering of coral reef systems. Of highest conservation interest in the countries are the rare and/or endemic wildlife species (such as the Amazona parrots, manatees) and economically importantly species, particularly sedentary species such as conch and sea urchins that are particularly impacted by heavy sediment and nutrient loads.

2.4 Project Objective, Outcomes and Outputs/Activities

Project goal and objective

194. The long-term goal of the project is to enhance the sustainable flow of ecosystem services and their contribution to sustainable socio-economic development in the Caribbean.

195. **Global environment objective:** to promote innovative systemic methodologies and approaches for the integrated sustainable management of water, land and globally threatened biodiversity resources that are relevant, replicable and up-scalable for small island developing states (SIDS). These efforts will mitigate further environmental degradation and create enabling conditions for environmentally sustainable development of the Caribbean region.

196. **Project Objective:** The Project Objective is to contribute to the preservation of Caribbean ecosystems that are of global significance and the sustainability of livelihoods through the application of existing proven technologies and approaches that are appropriate for small island developing states.

197. The successful achievement of this objective will deliver four substantive outcomes associated with the four project components. UNEP will be in charge of implementing Components 1, 2, 3, 4 and 5, while UNDP will be involved in the implementation of part of Component 4, specifically Sub-components 4.1.5 and 4.1.7. The outcomes are as follows:

- **Component 1 Outcomes:** Verifiable evidence-based stress reduction project sites through appropriate sustainable water, land and ecosystems management interventions that account for climate change *and* Enhanced livelihood opportunities and socio-economic co-benefits for targeted communities from improved ecosystem services functioning;
- **Component 2 Outcome:** Improved decision making based on strengthened national and regional information systems for monitoring of environmental status with respect to key international agreements;
- **Component 3 Outcome:** Improved and effective management of water, land and ecosystems resources that account for climate change through strengthened policy and legislation *and* Strengthened capacity of national and regional institutions and other stakeholders for improved water, land, and ecosystems management that take climate change into account;

- **Component 4 Outcome:** Enhanced engagement of practitioners and other stakeholders through effective and targeted knowledge management and knowledge sharing networks.

198. Project management, monitoring and evaluation are treated as separate components. **Component 5** will contribute overall project management through a regional Project Co-ordination Unit (PCU) and supports the oversight of the activities through Steering Committee supervision, reports, etc. Further, the PCU will oversee development of an 'exit strategy,' with the support of the National Project Implementation Units (NPIUs), to further improve the sustainability of the actions implemented and principles agreed through the Project. **Component 6** is the implementation of the Project Mid-term and Terminal Evaluation for the project. The UNDP guidelines for M&E will be followed involving independent mid-term and terminal evaluation.

199. The detailed Sub-Projects are presented in Appendices 31-38 (refer to the UNEP ProDoc). The proposed workplan and timetable of the IWEco Project is given in UNEP ProDoc Appendix 5. Figure 3 illustrates the project component relationships.

200. UNEP through the Caribbean Regional Coordinating Unit (Car/RCU) will have responsibility for execution of the national sub-projects. The Caribbean Public Health Agency (under its Environmental Health and Sustainable Development Department) will have responsibility for execution of the Regional Sub-projects (Components) 2, 3 and 4 and in the case of Regional Sub-project (Component) 4 will have joint responsibility with UNDP mainly through the knowledge management mechanisms established through IW-LEARN. UNDP will also have responsibility for the implementation of the community-based initiatives under the GEF Small Grants Programme under the National Sub-projects (Component 1).

2.5 Project components and expected results

201. The IWEco Project was designed based on the situational analyses (and problem tree analysis at Figure 2) at both the national and regional levels, following the Theory of Change logic in accordance with guidance from the GEF[25] and further elaborated in UNEP's Programme Manual[26], that translated the situational/problem tree analysis to an objective tree analysis with formulation of appropriate activities and contributory outputs. Execution of these activities and successful delivery of outputs will drive the desired change processes in realization of the outcomes toward attaining the project goal.

[25] FIFTH OVERALL PERFORMANCE STUDY OF THE GEF: FINAL REPORT: At the Crossroads for Higher Impact at http://www.thegef.org/gef/sites/thegef.org/files/documents/OPS5-Final-Report-EN.pdf
[26] UNEP Programme Manual at http://www.unep.org/QAS/Documents/UNEP_Programme_Manual_May_2013.pdf

202. In this regard, the IWEco Project will be implemented through four (4) Overall 'technical' Project Components:

- **Component 1:** contributes to the development and implementation of **integrated targeted innovative, climate-change resilient solutions** appropriate for Caribbean and global SIDS for further replication in integrated water resources management (including water use efficiency), sustainable land management (with relevant elements of integrated coastal zone management), and maintenance and/or enhancement of biodiversity resources and ecosystem services.
- **Component 2:** contributes to the strengthening of the integrated water resources management (including water use efficiency), sustainable land management (and ICZM) and ecosystems **monitoring, and indicators framework** that already exist at the national and regional levels and enhance mainstreaming for evidence-based decision making.
- **Component 3:** contributes to strengthening of **policy, legislative and institutional reforms and capacity building** for integrated water resources management (including water use efficiency), sustainable land management (and ICZM) and ecosystem services management taking into consideration climate change resilience building.
- **Component 4:** contributes to enhancing **knowledge exchange**, best-practices, replication and stakeholder involvement within and amongst beneficiary communities, professionals, and the private sector at the national, regional and global levels.

203. Under Component 1 there are eight (8) National Sub-Projects that focus on country project interventions. Components 2, 3 and 4 are each supported by three (3) Regional Sub-projects that are designed to support the national interventions, where harmonized regional-level approaches are more effective in addressing common multi-country issues in gaining economies of scale and consistency in implementation of across the participating countries.

204. It should be noted that the structure of the national sub-projects emulate the configuration of the overall project in design, where national component 1 include the range of on-site interventions, while sub-components 2, 3 and 4 support strengthening the monitoring and assessment frameworks, enhancement of national policy and institutional frameworks and enhancement of knowledge sharing and dissemination respectively.

205. The project component relationships are mapped in Figure 3.

Figure 3. Project component relationships

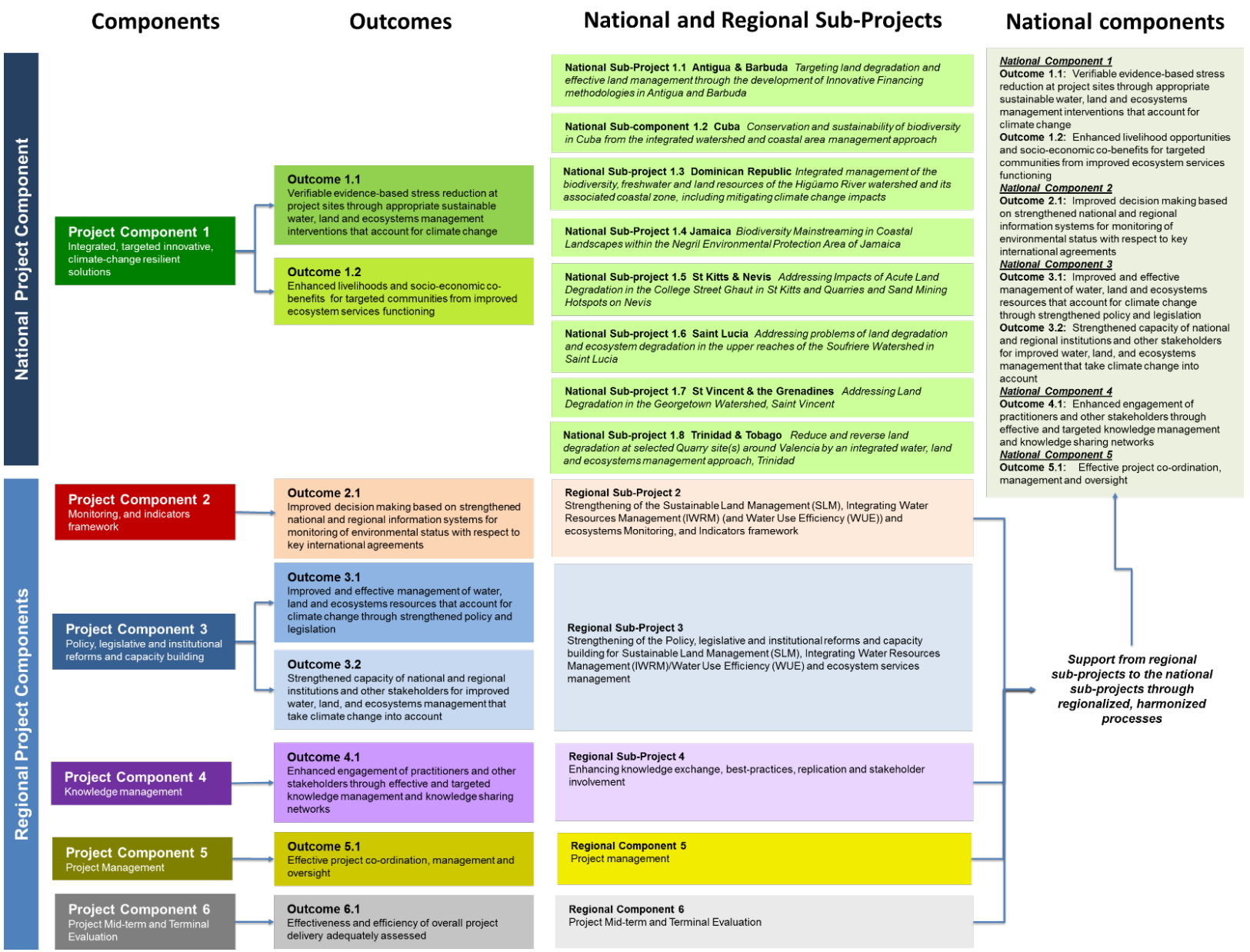
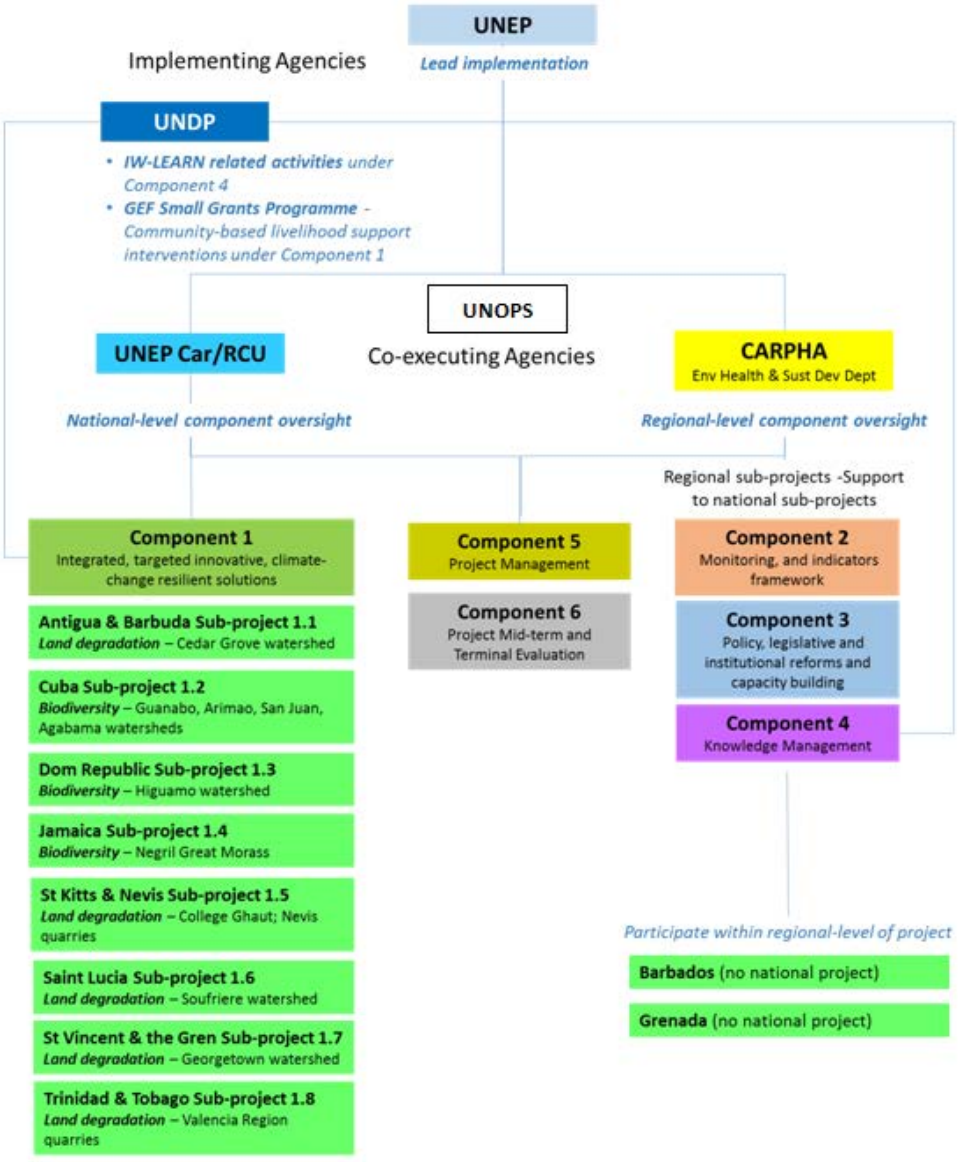


Figure 4. Agency executing relationships



206. Summaries of the main activities and outputs for each sub-project are presented below:

Component 1: Implementation of Integrated Targeted Innovative, climate-change resilient approaches in Sustainable Land Management (SLM), Integrating Water Resources Management (IWRM) (including Water Use Efficiency (WUE)), Integrated Coastal Zone management (ICZM) and maintenance of ecosystem services:

207. This component comprises of eight (8) national sub-projects that replicate and upscale innovative solutions for water, land and biodiversity/ecosystems management (including sustainable forest management). The national sub-projects are:

- **Antigua and Barbuda:** *Targeting land degradation and effective land management through the development of Innovative Financing methodologies in Antigua and Barbuda*
- **Cuba:** *Conservation and sustainability of biodiversity in Cuba from the integrated watershed and coastal area management approach*
- **Dominican Republic:** *Integrated management of the biodiversity, freshwater and land resources of the Higüamo River watershed and its associated coastal zone, including mitigating climate change impacts*
- **Jamaica:** *Biodiversity Mainstreaming in Coastal Landscapes within the Negril Environmental Protection Area of Jamaica*
- **St. Kitts & Nevis:** *Addressing Impacts of Acute Land Degradation in the College Street Ghaut in St Kitts and Quarries and Sand Mining Hotspots on Nevis*
- **Saint Lucia:** *Addressing problems of land degradation and ecosystem degradation in the upper reaches of the Soufriere Watershed in Saint Lucia*
- **St. Vincent & the Grenadines:** *Addressing Land Degradation in the Georgetown Watershed, Saint Vincent*
- **Trinidad & Tobago:** *Reduce and reverse land degradation at selected quarry site(s) around Valencia by an integrated water, land and ecosystems management approach, Trinidad*

208. The **GEF Small Grants Programme (GEF-SGP)** will contribute to the development of community-based livelihood initiatives around the main national interventions of the IWEco Project. GEF Small Grants Programme (SGP), launched in 1992, has supported more than 18,000 grant projects with an investment of over US$478 million grants around the world, which has in turn leveraged US$622 million in co-financing. It has accumulated considerable community-based environmental management experiences, and promoted sustainable environmental management

at community level. In the context of regional management of the shared water body of the Caribbean, SGP's special niche lies in its community-based approach to piloting and demonstration -experiences which can contribute inputs from the ground level to the regional governance framework and process. The partnership between IWEco and SGP can optimize the complementary roles these programmes can play, and contribute to achieving greater impacts for the management of the Caribbean.

209. While US$1 million in funding will be allocated by the IWEco project for a community based component to be delivered through SGP, the global SGP will match this investment with an additional $1 million in resources to support activities on the ground. This matching support from SGP will further enhance the community component of the IWEco intervention, while project level co-financing to be generated at the community level will leverage additional support. The community component in the IWEco project will undertake the following activities: (1) support the demonstration and piloting of sustainable local solutions to environmental problems in the areas of wastewater and effluent management, coastal habitat management, fisheries, chemicals and hazardous substances and other priority issues in the region; (2) develop local stakeholders' capacities to implement regional and national policies at the community level; (3) incorporate community-based experiences and approaches into the management of widespread and biologically significant coastal ecosystems through upscaling by national governments and regional entities; and (4) facilitate vertical exchanges of information between local, national and regional levels, and horizontal exchanges between communities beyond national boundaries. Table 4 outlines the proposed budgets for activities under the IWEco project.

Table 4. Proposed GEF SGP Budget breakdown

Activities	**Budgets (US$)**
1. Grants to Communities	700,000
2. National Technical and Operational Support	
2.1. National capacity development and training workshops	36,396
2.2. Technical advice and support to local communities (cons. plus misc.)	86,604
2.3. Field monitoring visits (travel)	39,000
2.4. Outreach and communications	
2.5. Reporting, review and consolidation (1 consultant)	15,000
3. Knowledge Sharing and Evaluation	
3.1. Regional review and knowledge consolidation (plus visual prod)	33,000
3.1. Regional launching workshop	21,500
3.2. Workshop for lessons learnt and experience sharing	21,500
3.3. Evaluation (1 consultant)	20,000

PM	27,000
Total	**1,000,000**

Sub-Project 1.1: Targeting land degradation and effective land management through the development of Innovative Financing methodologies in Antigua and Barbuda

210. The project will build from the investments made under the GEF-IWCAM Project that will champion an innovative approach to sustainable financing to address and mitigate further land degradation on mainland Antigua that is caused by the disposal of sewage and sewage sludge and other contaminants and waste oil into the environment. The project geographic focus will be on the Cedar Grove Watershed which extends over approximately 1,419 hectares, with forest coverage over 424 hectares. Addressing the issues of disposal of sewage under the GEF-IWCAM Project led to the upgrading of the McKinnon's wastewater treatment plant to a Membrane Bioreactor (MBR) process with the capacity to process 76 m^3 (20,000 gallons) of sewage daily to minimize contamination of the McKinnon's Salt Pond, an important wetland ecosystem in the country. However, given the continued relatively rapid urban expansion within the Cedar Grove area around Friar's Hill, additional capacity for sewage treatment is required. This is particularly needed given the relatively impervious nature of the underlying soil strata across many parts of Antigua which renders the effective use of on-site waste soakaway systems challenging. As a result, the pump-out of septic systems from residential and commercial properties is required on a regular basis. The bulk of this sewage is disposed of at the Cook's Landfill and in the adjacent wetland. In addition to the challenge of sewage disposal, waste oil is typically disposed of in adjacent lands around the Cooks Landfill. The indiscriminate disposal of sewage and waste oil and oily waste is rampant across the island as haulage and disposal of these substances is not regulated. The result has been acute degradation at these locations and compromised ecosystem quality and heightened risk of exposure to human health.

211. This project will contribute to a further expansion of the McKinnons wastewater treatment plant up to 379 m^3 per day to increase the service catchment to service an area that extends up to Friars Hill over some 1,419 hectares within the watershed. Additionally, the project will effectively assist in removing the burden of an estimated 13 tonnes of sewage and sewage sludge (with other contaminated waste) from entering the environment at the Cooks Landfill annually. At present there is one waste oil recycler in the country, however, the estimated volume of oil and oily waste generated by commercial and industry is beyond the processing capacity of the single plant. The IWEco Project investment will include the installation of a small-capacity 57m^3/day (15,000 gallon/day) processing plant that will handle the processing of this excess waste oil mainly within Public Sector entities as well from the food service sector. The project will demonstrate the ability to self-finance the

investments through the Sustainable Island Resource Fund (SIRF). The upgraded WWTP and oil processing plant will be powered by solar arrays, thereby reducing conventional power requirements. Revenue generated from the WWTP through service connection and sale of outputs such as treated water for irrigation (and other non-potable purposes) and processed sludge (as soil ameliorants) along with useful oil by-products such as bio-diesel will feed into the SRIF and build the capital base for further investment. To support sustainability, the project will strengthen the policy and regulatory environment along with appropriate fiscal incentives. The project will also seek to update the UNCCD National Action Plan.

212. **Total Costs for Sub-Project US$3,775,563: GEF Grant US$1,215,685, Co-financing – US$ 2,559,878**

213. **Component 1.1: Installation of wastewater and oily residue treatment solutions to minimize pollution and land degradation in the Cedar Grove watershed in Antigua**.

- **Sub-component 1.1.1: Conduct a socio-economic and technical viability study** for wastewater plan expansion. This will include necessary baseline data collection (through soil and water quality sampling to determine levels of nitrates / oil polluting soil and waterways). Findings will be presented to stakeholders through a series of consultations.
- **Sub-component 1.1.2: Installation of an appropriate pre-treatment facility** to absorb additional sewage diverted from the National Landfill. This will include the procurement of materials and equipment, the construction and installation of facility and the development of operations & training procedures for operations of pre-treatment/ sorting facility.
- **Sub-component 1.1.3: Expansion of the McKinnon's Sewage Treatment plant** to treat additional sewage diverted from the Cooks Sanitary Landfill and from the McKinnon's commercial entities. The expansion will include incorporation of renewable energy to facilitate self sufficiency. Pipeworks will be installed to service surrounding commercial entities and homes with sale of sewage treatment services.
- **Sub-component 1.1.4: Installation of a waste oil/oily water separator and recycling facility** for Government-owned enterprises and other business engaged in bulk oil consumption. This will entail establishment of a public-private partnership with Local Oils Ltd (a private recycler), the training of APUA personnel in operations of waste oil separator system, the development and implementation of procedures for used oil collection

214. **Component 1.2: Enhanced livelihood opportunities and socio-economic co-benefits for targeted communities from improved ecosystem services functioning**. This will include the assessment of co-benefits of IWEco Interventions within project site and nationally in consideration of the livelihoods impact on sewage handlers/

liquid waste handlers and farmers. A findings report on impact on livelihoods and Government expenditure on fuel/ oil recycling and management will be produced.

215. **Component 2: Strengthening Monitoring and Indicators frameworks for sustainable land management in Antigua and Barbuda.**

- **Sub-component 2.1: Installation of appropriate data collection and monitoring systems** to assess change in environmental status. The focus on systems to assess the reduction of oils and nitrates within the soil at the project impact areas.

216. **Component 3.1: Enhancing stakeholder coordination and capacity building for sustainable land management and natural resources management in Antigua and Barbuda**.

- **Sub-component 3.1.1: Development of policy guidelines and support legislation for the sustainable financing and management of liquid waste.** This will entail the establishment of a pilot mechanism for the sustainable financing and management of liquid waste in Antigua and Barbuda. This will be further supported by the development and implementation of a financial business plan to further support the implementation of the recommendations from the IWCAM demonstration project.

- **Sub-component 3.1.2: Develop a management mechanism through partnership with the SIRF Fund, National Solid Waste Management Authority (NSMA) and the Central Board of Health**. This is the establishment of SIRF Board for wastewater management services and facilitation of recycling waste oil services with approved by-laws and ordinances.

217. **Component 3.2: Strengthened capacity of national and regional institutions and other stakeholders for water, land, and ecosystems management that accounts for climate change.**

- **Sub-component 3.2.1 Development of a compliance framework for sewage handlers**: Draft standards for liquid waste collection, policy and or regulations will be developed in consultation and sensitization of sewage handlers. A certification scheme and registration for liquid waste collectors will be implemented.
- **Sub-component 3.2.2. Institutionalize a certified training workshop on the management and operation of sewage treatment facilities:** This will include an assessment of training needs by service providers, the development and implementation of training programme aligned with a tertiary academic institutions. Training workshop (in operations and maintenance of the sewage treatment plant & waste oil separation) with field visits will be conducted for service providers.

218. **Component 4: Enhance knowledge exchange, promotion of best-practices, replication and expanding stakeholder involvement for SLM and natural resources management.** There are 2 sub-components:

- **Sub-component 4.1.1: Community and stakeholder consultations.** This will include the design of the national awareness strategy that is harmonized with the regional programme. Knowledge, Attitude and Practice (KAP) surveys will be conducted to inform the design and implementation of the public awareness efforts under the project. Stakeholder/beneficiary consultations will be held to provide continual guidance to the process and gain buy-in. Special attention will be paid to commemorative days and special events connected with the environment. A web platform for the project will be established to facilitate information access.
- **Sub-component 4.1.2: Development and publication of sewage management systems (as part of the SIRF fund activities).** This will include the development of appropriate Public Service Announcements, and a documentary on addressing liquid waste in the country.

219. **Component 5: Installation of the project management arrangements.** The IWEco national component will be absorbed into this existing management structure with the Environment Division that will serve as the National Executing Agency. The reporting and management of accounts will be spearheaded by the Environment Division based on inputs of the National Project Coordinator and decisions made by the PMU.

220. The main outputs of **Sub-Project 1.1** are as follows:

- Upgraded capacity for handling of 455m^3/day (100,000 GPD) of sewage waste (avoided disposal contributing to land degradation)
- Trained water plant operators
- Installed capacity for processing waste oil into oil products (avoided disposal contributing to land degradation)
- Trained oil recycling plant operators (via certified training program)
- Trained professionals in monitoring and assessment protocols
- Strengthened capacities among stakeholders in relevant areas
- Policy guidelines, legislation to support sustainable financing and management of liquid waste and waste oil recycling
- National PA/PE programme and associated media products
- At least one community-based enterprise developed under the GEF-SGP
- Scientific publications, books, other awareness resources

Sub-Project 1.2: Conservation and sustainability of biodiversity in Cuba from the integrated watershed and coastal area management approach

221. The loss of biological diversity particularly within the more populated areas where almost half of Cuba's population reside is considered among Cuba's principal environmental problems. This is due to alteration and fragmentation of landscapes and ecosystems with the consequent decline in threatened populations of flora and fauna. This sub-project will implement improved environmental management approaches, including more integrated land-use planning and foster good agricultural practices through strengthened management capabilities of agencies and relevant stakeholders in Cuba. Special emphasis will being placed on threatened and endangered species, targeting four nationally important biologically important areas. The project will also seek to identify and build the capabilities to monitor appropriate environmental indicators, utilize mechanisms for strengthening cross-sectoral and inter-institutional coordination, and provide capacity-building in sub-project intervention areas. This initiative will contribute to the development of innovative approaches, tools and technologies for effectively addressing stresses that pose risk to terrestrial and marine biodiversity resources in the target areas, with a view to replication across the country.

222. The four intervention areas to be targeted within the project are situated within the western, central and eastern regions of the country and cover a combined area of 2,952 km^2, or 2.69% of Cuba's landmass. Within For three of the four selected watersheds, the Guanabo, Arimao and San Juan some 13,670 hectares of existing forest cover will be protected and sustainably managed (specifics on the Agabama watershed will be defined at inception phase). Within these selected watersheds, the project will support the reforestation of 1,690 hectares. Through a combination of direct on-ground interventions that include reforestation, control of land-based sources of pollution and sustainable agriculture the stresses sensitive ecosystems will be reduced. The project will make contributions to the strengthening the National System of Protected Areas (SNAP) (which covers 22% of the national territory in all its categories) which will not only assist conserve biodiversity but will of itself generate employment for local populations as rangers and other park employees.

223. **Total Costs for Sub-Project US$5,300,7825: GEF Grant US$2,169,685, Co-financing – US$3,131,140**

224. **Component 1: Development and implementation of environmental management tools for biodiversity conservation, including addressing climate change impacts**.

- **Sub-component 1.1: Land use planning for biodiversity conservation:** The principal activity will be the development and implementation of innovative approaches for integrated land use planning in the following biodiversity-important watersheds within four (4) areas across Cuba, (1) the Rio Guanabo watershed (Habana del Este), (2) The Rio Agabama watershed (Santi Spíritus), (3) the Rio Arimao watershed (Cienfuegos) and (4) The Rio San Juan watershed (Santiago de Cuba).

- **Sub-component 1.2: Application of management measures for addressing specific environmental problems threatening biodiversity conservation in the target areas.** The key activities will include the identification of innovative and effective and solutions to address contaminants from household and industrial wastewater, identify measures to control soil contamination due to unsustainable industrial and agricultural practices in sub-project demonstration areas, conduct restorative actions within the effected ecosystems in each of the target areas while contributing to the reduction of CO_2 emissions through intensive cultivation of algae as a biomass source, and by means of reforestation in selected areas within the sub-project intervention areas.

- **Sub-component 1.3: Promotion of conservation and sustainable use of biodiversity through good agricultural practices:** This will include the promotion of Forest Farms with programs of sustainable management of biodiversity within the target areas, provision of support to the implementation of sustainable biodiversity resource management by farmers and farmers' cooperatives and develop guidelines for good agricultural practices (GAP) based on lessons learned from interventions in each demonstration area of the sub-project.

225. **Component 2: Assessment and monitoring of the problems which need to be addressed through integrated watershed and coastal area management (IWCAM) in the western, central and eastern regions of Cuba.**

- **Sub-component 2.1: Completion of baseline data in the four sub-project demonstration areas and selection of indicators.** This will include completion of assessment of the baseline data needed for informing the effective monitoring of the project impacts at the local level. This will also include analysis and selection of appropriate indicators for measuring progress on biodiversity conservation within an integrated watershed and coastal area management framework. In consultation with stakeholders, a monitoring protocol for the utilization of existing and the designing of new indicators for assessing sub-project implementation will be developed.

- **Sub-component 2.2: Establishment of a systematic biodiversity monitoring program for the four sub-project demonstration areas, taking into account climatic variability and relevant environmental and socio-economic factors**. Biodiversity

inventories of the targeted ecosystems in each of the sub-project demonstration areas will be updated with the identification of 'indicator species' to be monitored to assess the state of health within the selected ecosystems. This will also include the monitoring and assessment of water quality in fluvial systems and coastal areas using select biological, physical and chemical indicators. The functional ecosystem response to natural and anthropogenic disturbances will be evaluated, and models developed for assessment of risk/threat to biodiversity and ecosystems within the four target areas.

226. **Component 3: Improvement of the political, legislative and institutional framework and capacity building for implementing integrated watershed and coastal area management in support of biodiversity conservation in Cuba**.

- **Sub-component 3.1.1: Legal and regulatory frameworks for integrated watershed and coastal zone management.** The coherence, efficiency, efficacy and legal of the existing legal and regulatory frameworks to support strengthened biodiversity resource management will be evaluated, and the necessary revisions for enhanced legal and regulatory frameworks will be identified.

- **Sub-component 3.1.2: Institutional framework for integrated watershed and coastal area management:** This will include the analysis of the existing institutional frameworks governing biodiversity resource management in the country, with a focus on the deficiencies. Recommendations will be developed to improve the functionality and coordination of response by the institutional mechanisms, including strengthening public participation in improved biodiversity management.

- **Sub-component 3.1.3: Procedures for the resolution of inter-institutional and inter-jurisdictional conflicts:** Procedures for resolving inter-agency conflicts will be evaluated, along with an assessment of effectiveness of current procedures for resolution of inter-institutional and inter-jurisdictional conflicts. Out of this assessment, new procedures and/or the improvement of existing procedures will be proposed along with a more effective framework for inter-institutional coordination and cooperation.

- **Sub-component 3.1.4: Coordination and information sharing on sub-project status and developments among sub-project partners and stakeholders**. This sub-component will include the design and implementation of the project's National Network (RIWEco for the Spanish acronym), which will include a Central Node connecting the Secondary Nodes. An Information Management System (SGI for the Spanish acronym) will be installed for knowledge transfer from the specialists at the Central Node to all Secondary Nodes and trained users. Desktop and web services and applications for the management of spatial information with trained specialists and users will be designed and implemented. Long-distance training courses using web-based platforms will be developed.

- **Sub-component 3.2.1: Capacity building through training and education programmes for sub-project implementation, sustainability and replication:** The sub-component will contribute to inputs to the Masters Degree Programmes on Integrated Coastal Area Management (ICAM), provide support the teaching of the 5th edition of the Masters Programme in ICZM at a national level, and support the teaching the Distance online Diploma course on "Management of Biodiversity from an IWCAM Approach", at a national level. In addition the sub-component will assist with the delivery of short term courses and workshops, as well as lectures specific to the integrated management of resources in each sub-project demonstration area. A Community Environmental Education programme in the sub-project's intervention areas will be supported.

227. **Component 4: Information management and dissemination and sub-project replication.**

- **Sub-component 4.1: National and international dissemination of sub-project information and replication.** This will entail the design and roll-out of IWEco Cuba's website. It will also include the establishment of the project's Network of Knowledge (RIWEco for the Spanish acronym) with the aim of creating synergies among national and international networks and other projects dedicated to related topics. The results of the sub-project will be published for decision-makers and the wider public audience. Under this sub-component the outputs of the project will be promoted and systematically presented at national and international events. A biannual national event will be supported to present, debate and interchange experiences related to the results of the sub-project in each of the four target areas.

228. **Component 5: Installation of the project management arrangements.** This will include the mechanism of stakeholder participation in the project through the establishment of a Project Steering Committee Chaired by CEAC and include CITMA, MINCEX, MINAG, MININT and MES as core members. The PSC will be supported by a **National Coordination Group** directed by CEAC and comprising of CITMA (IGT, CNAP, AMA, IES, ANC, IDO, INSMET), MINAG (SEF, CNSV, IMV), MININT (CGB, CGF), MES (UH, UCF, UO) and NGOs (Pro-Naturaleza, Fundación Antonio Núñez Jiménez, ACTAF, ANAP). A **Project Management Unit** will comprise of an Executive Project Director, Technical Coordinator, Financial and Operational Administrator, 4 S-P Component Coordinators and supported by 5 technical specialists. Four **Provincial Coordinators** (one per province) will assist with feedback between the 4 regions.

229. The main outputs of **Sub-Project 1.2** are as follows:

- Innovative solutions and investments addressing wastewater and soil contamination impacting critical ecosystems and habitats within the four project target areas (Rio Guanabo watershed, Habana del Este; Rio Agabama watershed, Santi Spíritus; Rio Arimao watershed, Cienfuegos and Rio San Juan watershed, Santiago de Cuba).
- At least 1,690 hectares of reforested in targeted investments and 13,670 hectares of forest cover preserved to maintain critical ecosystems in target areas
- Forest farms operational based on sustainable management of biodiversity
- Farmers' cooperatives practicing biodiversity-sensitive sustainable resource management
- Guidelines on good agricultural practices that are sensitive to protection and conservation of biological resources.
- Four detailed updated biodiversity inventories for the target areas,
- Annual assessments on water quality and fluvial systems in the sub-project's demonstration areas
- Assessments of ecosystem responses to natural and anthropogenic disturbances in the target areas and potential threats from climatic change
- Recommendations for strengthening the institutional framework for management of biodiversity resources within an IWCAM framework
- An electronic national knowledge network ('RIWEco' Spanish acronym) for dissemination of project achievements and lessons learned amongst partners (inclusive of generated spatial information)
- Strengthened university programmes on biodiversity and Integrated Management of Coastal Areas at the Universities of Havana, Oriente and Cienfuegos,
- Trained professionals, project partners and stakeholders in biodiversity resource management and ICZM/IWCAM approaches
- IWEco Cuba project website
- Publications, including books, booklets, guidelines of good practices, bulletins, posters and calendar diaries (agendas)
- Two biannual national consultations to showcase project achievements
- At least one community-based enterprise developed under the GEF-SGP

Sub-Project 1.3: Integrated management of the biodiversity, freshwater and land resources of the Higüamo River watershed and its associated coastal zone, including mitigating climate change impacts – Dominican Republic

230. The sub-project seeks to address the significant concerns associated with acute environmental resource degradation and the impacts on the state of the biodiversity resources within the Higüamo River basin. The watershed is the largest in the eastern region of the country and ranks as the sixth largest in the country with an area of 1,182 km^2, equivalent to 2.4% of the country's total area. The watershed's

estuarine zone contains two important protected areas; (i) the 141-hectare Laguna Mallen Wildlife Refuge for the protection of numerous species of egrets, migratory ducks and native and endemic species, and (ii) the 1,848-hectare Higüamo River Wildlife Reserve located in the upper part of the estuary which is dominated by mangroves and habitats for a large number of native, endemic and migratory species of birds, as well as other estuarine, coastal and marine species. Within the Higüamo River Wildlife Refuge numerous native plant species are classified as threatened, of which many are endemic. This includes critically endangered plants such as *Diospyros domingensis,* along with other vulnerable/endangered endemic species such as *Mammea Americana, Acrocomia quisqueyana* and *Mimosa domingensis*. The area harbours 3 and 10 endemic species of amphibians and reptiles respectively, including the Hispaniola Boa (*Epicrates striatus*). Seven endemic bird species have been recorded from the area.

231. The Higüamo River is one of the most polluted rivers in the country, particularly within the lower one-fourth of the river running through San Pedro de Macoris where industry is concentrated and the province's urban centre is located. Despite the river's estuary containing mangroves that are an important natural nurseries for a wide variety of fish, crustaceans and other fauna, biodiversity degradation on account of the pollutant influx into the environment is having detrimental impacts on sustainable livelihoods of communities that are reliant on the natural resource.

232. The objective of the sub-project is the conservation and sustainable use of biodiversity through the strengthening of national capacities of stakeholders for the integrated management of the resources of the Higüamo River watershed for the maintenance, restoration and sustainability of ecosystem services, supported by appropriate policies, institutional reforms and legislation. Creation of an enabling environment will facilitate the implementation of sustainable innovate solutions and effective technologies for mitigating environmental degradation. Some 27,574 hectares of existing forest cover in the Higüamo River watershed will be protected and sustainably managed through the project for the conservation of terrestrial biodiversity resources. The project will support the reforestation of 500 hectares, primarily mangroves within the estuarine zone that represent important habitat for rare flora and fauna.

233. **Total Costs for Sub-Project US$4,273,460: GEF Grant US$999,685, Co-financing – US$3,273,775**

234. **Component 1: Developing and implementing approaches for the integrated management and maintenance of ecosystem services of the Higüamo River watershed**.

- **Sub-component 1.1: Developing an integrated management plan for the Higüamo River watershed and estuarine zone.** This includes the preparation of a master plan

for the integrated management Higüamo River watershed and estuarine zone, taking into account innovative adaptations to climate change and sensitive ecosystems. The necessary professional skills at the national and/or local levels to support project implementation will be developed.

- **Sub-component 1.2: Develop supportive plans and guidelines.** The following guidelines for pollutant contamination mitigation will be developed for application by land resource manager, commercial/industrial and water and sanitation operators for reducing threats to ecosystem degradation: (i) coastal bioengineering and reforestation, watershed reforestation and cooperation of small wastewater treatment systems; (ii) water safety plans for small public water supply systems; (iii) plan for reducing water pollution from land-based activities in the watershed; (iv) protocol for the management and control of organic waste; (iv) guidelines for bioengineering for slope stabilization, runoff control and aquifer replenishment

- **Sub-component 1.3: Environmental restoration and sustainable use measures for improved wastewater management, increased access to safe water and enhanced ecosystem services.** The following are the key actions to be undertaken that will draw on the best practice guidelines to be developed under sub-component 1.2. Develop a habitat conservation program for ecosystems and threatened species in the watershed (and its estuarine zone) to include deforestation of critical areas within the watershed, with particular attention on wetland ecosystems and mangroves. Pilot projects employing innovative pollution mitigation methods will target wastewater treatment and solid waste management within selected communities. Water security investments (around rainwater harvesting) for select targeted communities will be made. The project will promoting improved fishing practices in the watershed and estuarine zone and will seek to generate ecotourism opportunities within the watershed and its estuarine zone. The project will contribute directly to the strengthening of implementation of the National Emergency Plan (taking into account climate change related disasters, including hurricanes, floods and landslides, as well as land degradation).

235. **Component 2: Assessing problems and identifying priorities for improving the management of the land, water and biodiversity resources of the Higüamo River watershed and its associated coastal zone, taking into account climate change, sensitive ecosystems and ecosystem services.**

- **Sub-component 2.1: Identifying priority problems and sources of pollution**. This sub-component provides the knowledge support for guiding interventions under Component 1 and will include (i) the identification and assessment of the problems and sources of pollution impacting the Higüamo River, (ii) the identification and assessment of ecosystem and human health risks resulting from exposure to polluted freshwater and coastal waters, and (iii) identification of priorities to

manage and guide investments in efficient natural resource and ecosystem management.

- **Sub-component 2.2: Monitoring and assessment of project interventions and capacity building to support project implementation.** This will entail the selection of environmental and socioeconomic indicators to be used for monitoring and assessing ecosystem (including water quality) in terms of gauging the effectiveness of project interventions, and the establishment of a robust monitoring program based on the selected indicators for periodically assessing the quality of ecosystems, freshwater and coastal seawater resources.

236. **Component 3: Strengthening of policies and legal and institutional frameworks and capacity building for sustainable land management, integrated management of water resources and the management of ecosystem services, taking into account climate change**.

- **Sub-component 3.1: Strengthening of policies and legal and institutional frameworks.** This sub-component seeks to strengthen the mechanisms to improve the coordination between sectors involved in the management of biodiversity and water resources (including coastal zone waters). It will involve assessment of existing policies, legislation and institutional arrangements relevant to the integrated management of the Higüamo River watershed (and its estuarine zone) and associated critical ecosystems along with the development of appropriate recommendations for enhancement.

- **Sub-component 3.2: Expanding capacity building.** This sub-component will raise awareness among public officials and stakeholders in municipal governments, local government agencies and organizations of the elements and actions required for enhanced biodiversity management based on the IWCAM approach. A comprehensive training programme will be developed along with the execution of the requisite training to target stakeholders (public officials and stakeholders, including private industry) to support implementation of the project. This will include the development and dissemination of associated resource material.

237. **Component 4: Sharing of project information, lessons learned and good practices, and promoting project replication.**

- **Sub-component 4.1: Dissemination of information and lessons learned and project replication.** This will include the production and dissemination of project publications for disseminating scientific and technical information, results of assessments and analyses, lessons learned and best practices, and the development and maintenance of the project website for providing up-to-date information on progress in project implementation, including achievements and lessons learned, and replication. Professionals and stakeholders will be facilitated to exchange

knowledge and experiences with other SIDS regions through various meeting and exchange programmes. Two major technical conferences to demonstrate innovative solutions implemented by the project will be convened.

238. **Component 5: Installation of the project management arrangements.** A **Project Steering Committee** (PSC) will be established consisting of the Ministry of Environment (MIMARENA), INDRHI, INAP, the Ministry of Health, the Ministry of Agriculture and the Ministry of Public Works and Communication. The PSC may also include other major co-financing and implementing partners. The PSC, presided by MIMARENA will be responsible for managing the execution of project activities, including reviewing and advising on the main outputs of the sub-project, ensuring that the Government's environmental policy is fully reflected, ensuring effective communication and decision-making, and assisting with mobilization of expertise as needed for proper execution of the project outputs. The MIMARENA and the PSC will be advised by an **Advisory Stakeholder Committee** with representatives of local authorities, communities and organizations in the project's intervention areas.

239. The main outputs of **Sub-Project 1.3** are as follows:

- Master plan and integrated conservation program for integrated biodiversity management within the Higüamo River watershed (and its estuarine zone) including proposals for establishment of new protected areas (protection of threatened species and ecosystems)
- Reforestation of critical degraded watershed areas/habitats
- Communal wastewater treatment investment
- Communal solid waste management investment
- Rainwater harvesting systems for water stressed communities
- Ecotourism attraction/route in the Higüamo River watershed and its estuarine zone making use of existing Wildlife Refuges.
- Technical guidelines for *inter-alia*, coastal bioengineering and reforestation, watershed restoration, small wastewater treatment systems, water safety plans, good agricultural practices, bioengineering for slope stabilization, runoff control and aquifer replenishment
- Updated baseline (ecosystems and human health status) and project monitoring programme based on environmental and socioeconomic indicators suite
- Strengthened National Intersectoral Committee
- Updated policy, legal/regulatory and institutional frameworks for water quality, industrial discharge regulation, land use and ecosystems management.
- Built capacity building for professionals and other stakeholders
- Identification of gaps and opportunities to update the policy framework on water quality, industrial discharge, land use and ecosystem management.

- Website (linked to IW Learn), Publications and other media products
- A program for dissemination of project information, experiences and lessons learned.
- At least one community-based enterprise developed under the GEF-SGP

Sub-Project 1.4: Biodiversity Mainstreaming in Coastal Landscapes within the Negril Environmental Protection Area of Jamaica

240. The Negril Great Morass (Negril Environmental Protection Area) encompassing some 40,670 hectares of coastal and marine ecosystems, is the island's second largest coastal wetland and one of the largest natural coastal ecosystems in the Caribbean region, supporting internationally significant species and high species endemism. Its biodiversity is threatened by human-induced drainage of its wetlands, coastal development and unsustainable agricultural practices. Dropping water levels and depletion of its flora and fauna are further exacerbated by frequent brush fires, peat subsidence, sedimentation, aquatic nutrient enrichment and invasive species. More recently, increasing brush fires are threatening the tourism industry and human health in nearby adjacent areas.

241. This national sub-component project aims to promote conservation of internationally significant wetland biodiversity through the restoration of wetland ecosystem services and sustainable use of wetland biological resources. To this end, actions will be undertaken to (1) restore historical hydrological and other physical processes, (2) enhance and re-establish native vegetation communities to provide habitat to wetland fauna, (3) eliminate conflicts that degrade ecosystem functions and (4) implement institutional arrangements to ensure the long-term sustainability of wetland biological resources. The project will also seek the declaration of the wetland as a Ramsar site of international importance, along with the creation of the Negril Royal Palm Reserve as a national park to expand representation of inland water ecosystems in the PA system. Furthermore, it targets extending protective coverage to threatened species such as Royal Palm (*Roystonea princeps*) and West Indian Whistling Duck (*Dendrocygna arborea*).The project will contribute to the GEF focal area of biodiversity, including the GEF operational programmes on mainstreaming biodiversity conservation and sustainable use and improving the sustainability of protected area systems. It will also further enable the Government of Jamaica to meet its obligations under the Convention on Biological Diversity (CBD) and to achieve national goals in Vision 2030 on the sustainable management and utilization of natural resources

242. **Total Costs for Sub-Project US$13,359,257: GEF Grant US$3,114,685, Co-financing – US$10,244,572**

243. **Component 1: Developing and implementing approaches for the integrated management and maintenance of ecosystem services of the Negril Environmental Protection Area (EPA).**

- **Sub-component 1.1: Planning Hydrological Restoration of the Negril Environmental Protection Area.** This will involve the development of a water level management plan based on specific habitat requirements that is informed by hydrologic modelling to determine specific restoration needs. Hydrological zoning plans and their priority uses based on habitat and water requirements will be developed.

- **Sub-component 1.2: Land use and management planning for the Negril Environmental Protection Area.** This will entail the development of a wetland land use management plan and strategy to enhance functions/services based on desired habitat requirements for increasing associated species and improving water quality. Priority areas according to restorative needs will be identified. These inputs will inform the development of a revised and updated Negril EPA management plan with sustainable goals and strategies. Selected sites will be identified for designation as national parks (including Ramsar Convention sites of international importance) as appropriate.

- **Sub-component 1.3: Rehabilitation of Hydrological Zones through innovative approaches: Restoring Habitat Conditions for internationally significant, endemic and migratory species and ecosystems.** Under this sub-component innovative hydrologic solutions will be implemented to restore natural water inflow and outflows towards balancing of the hydrological regime in the morass for improved ecosystem functioning. This will be augmented by active restoration of the habitats through re-vegetation using native species and re-establishment of vegetative corridors between targeted sites to provide habitat and allow for migration of flora and fauna across wetland zones. There will be active enhancement of the soil substrate to stimulate seasonal wetland hydrology, encourage seed production and increase habitat viability particularly within RPR (the Royal Palm Reserve swamp forest) and palm islands. There will be active management interventions to minimize further proliferation of alien invasive species across targeted sites to reduce impacts of native populations.

- **Sub-component 1.4: Addressing Unsustainable Use of Wetland Ecosystems and Biodiversity.** This will include the conduct of a knowledge, attitudes and practices (KAP) assessment and based on the findings, train and educate farmers on sustainable farming practices and alternative livelihood options, using best environmental practices to realize improved water quality, reduced occurrence of brush fires and improved condition of peat reserves. Employing best environmental practices through targeted interventions with private land owners will serve to enhance wetland conservation and protection.

244. **Component 2: Assessing problems and identifying priorities for improving the management of the land, water and biodiversity resources of the Negril EPA, taking into account climate change, sensitive ecosystems and ecosystem services.**

- **Sub-component 2.1: Completion of Baseline data, identification of priority problems and selection of indicators**. This sub-component will contribute baseline data to guide the interventions under sub-component 1. This will include the delineation of the historical wetland boundaries and land uses within each area, determination of the water mass balance and management needs for each zone, determination of existing soil conditions, hydrological conductivity and vegetation characteristics in each zone. A searchable database delineating historical and current biophysical features of the wetland will be developed.

- **Sub-component 2.2: Monitoring and assessment of project interventions and capacity building to support project implementation.** This will entail the development of accessible spatial data to guide wetland conservation and monitoring, the establishment of a monitoring network for measuring hydrological fluctuations for ground and surface water flows, the development of a long-term land use monitoring plan for the Negril EPA with an appropriate monitoring regime and applicable remedial measures for enhancing water quality and biodiversity. Monitoring devices will be installed and maintained to generate needed data.

245. **Component 3: Strengthening of policies and legal and institutional frameworks and capacity building for sustainable land management, integrated management of water resources and the management of ecosystem services, taking into account climate change**.

- **Sub-component 3.1: Strengthen policies and legal frameworks.** The project will support the institution of long- term wetland land tenure arrangements for resolving land tenure issues in the Negril EPA. The illegal use of lands within the EPA have been closely associated with negative impacts such as habitat destruction and the resultant decline in biodiversity, as well as the unsustainable use of the Negril's land and hydrologic resources.

- **Sub-component 3.2: Building Capacity for Managing Wetland Protected Areas.** Under this sub-component local institutional capacity to implement long-term biodiversity conservation and ecosystem management will be developed. Through this activity, effective local capacity will be built for participation in long-term wetland protected area management.

246. **Component 4: Sharing of project information, lessons learned and good practices, and promoting project replication.**

- **Sub-component 4.1: Dissemination of information, good practices and lessons learned and project replication.** A comprehensive public awareness programme on the conservation of wetland biodiversity will be developed. This sub-component will seek to strengthen/build capacity within a local ecological centre for gathering information and data relevant to the management of the Negril EPA and promoting the research and study of native flora and fauna, ecosystem services and management options for enhancing ecosystem resources by national institutions, universities and research institutes. The focus of this sub-component will be on the dissemination of the sub-project's achievements and lessons learned with a view to promoting replication within and outside Jamaica and promoting its sustainability far beyond sub-project completion.

247. **Component 5: Installation of the project management arrangements.** The project will establish a National **Project Steering Committee** (PSC) consisting of NEPA, the Jamaica Hotel and Tourist Association (JHTA), the Negril Chamber of Commerce, the Negril Environment Protection Trust Fund (NEPT), the Negril Coral Reef Preservation Society (NCRPS) and UNEP/CAR-RCU, with UNEP as the GEF implementing agency. The PSC will also include other major co-financing and implementing partners. The PSC, presided by NEPA, will be responsible for managing the execution of project activities, including reviewing and advising on the main outputs of the sub-project, ensuring that the Government's environmental policy is fully reflected, ensuring effective communication and decision-making, and assisting with mobilization of expertise as needed for proper execution of project outputs. NEPA as the project **National Executing Agency** (NEA) will be responsible for implementing the project. A **National Project Manager** (NPM) will be appointed to assist the government-appointed National Coordinator from NEPA. The NPM will be responsible for coordinating, managing and monitoring the implementation of the project. The NPM will also coordinate and oversee the preparation of the project outputs, manage project finances, oversee overall resource allocation, and, where relevant, submit proposals for budget revisions to the NPSC and UNEP.

248. The main outputs of **Sub-Project 1.4** are as follows:

- Revised Negril EPA management plan and strategy including priority zoning of areas based on restorative need
- Ramsar site designation of the Negril EPA
- Innovative solutions for wetland restoration across 230 hectares including the installation of shallow lagoons for re-establishing habitat corridors, establishment of vegetation buffer zones, construction of moist soil habitat within RPR and palm islands and eradication and control of alien invasive species
- Seed bank and seedling stock for the restoration of ecosystems, including the documentation of best practices for seed collection, establishment and acclimation of nursery grown species

- Trained farmers and other land owners practicing sustainable practices that enhance ecosystem productivity
- Spatial databases containing biophysical features, wetland boundaries and existing land uses and diagnostic characterization within each zone
- Long-term wetland land use monitoring plan
- Monitoring network measuring hydrological and ecosystem parameters
- Analysis of land tenure issues, including prescriptive rights and recommendations for action
- Capacity-building training courses to support long-term biodiversity conservation and ecosystem management, and cadre of trained public officials and stakeholders
- Educational and public awareness programme and associated resource materials
- Research and information centre for the Negril EPA
- At least one community-based enterprise developed under the GEF-SGP

Sub-Project 1.5: Addressing Impacts of Acute Land Degradation in the College Street Ghaut in St Kitts and Quarry and Sand Mining Hotspots on Nevis

249. On St. Kitts, the College Ghaut and associated watershed area covering approximately 662 hectares has been subjected to acute land degradation on account of significant encroachment associated with agriculture and settlements, along with the indiscriminate disposal of solid and liquid (grey waters) waste. Removal of protective vegetation has resulted in increased erosion rates from the river banks and across the upper reaches of the watershed. This has resulted in sedimentation of the river channel with heightened risk of flooding and loss to life and property particularly within the lower watershed reaches. The main watercourse of the College Street Ghaut watershed originates north of the Olivees Mountain and runs past the west of the airport runway, through to the capital city of Basseterre, discharging to the sea. There is evidence of increasing sedimentation of the marine environment in the Basseterre Bay and some impacts to the coral reefs, which are prime recreational dive sites and thus foreign revenue earners.

250. On the sister island of Nevis, land degradation is associated with poor quarry management practices that results in excessive sediment discharge into the streams and the marine environment. There are seven seasonally active, privately operated quarries on the island, of which five are on lands leased from the Government, while two are on private land. These quarry sites cover a combined 27 hectares and are located in the area of Hicks Estate, Butlers Mountain, Indian Castle and Dogwood Estate along the eastern and southern sides of Nevis. In addition to excessive sedimentation from quarry operations, numerous beaches are exploited for sand with similar impacts in terms of acute erosion particularly around Indian Castle.

251. On St. Kitts the project interventions will focus on the installation of soil conservation measures within the College Ghaut. These measures will include establishment of vegetative contour rows, protection of existing forests, installation of new gabions and maintenance of existing ones along the main watercourse, stabilization of

existing retaining walls and bridges and clearing of culverts, drains, outfalls and roads of debris and sediment. On Nevis on-site investments will include stabilization of ghauts and water harvesting systems to reduce quarry run-off into the ocean; replanting of mangroves and other coastal plant species towards restoration of coastal wetlands, deployment of artificial reefs at New River, Indian Castle, Dogwood and Long Haul, beach restoration at Indian Castle and restoration and reforestation of non-productive quarry areas. For both islands the project will provide support for long-term sustainability and replication through policy, regulatory support, exchange of best practices. The project will support selected final steps in the legislative drafting of the National Conservation and Environmental Management Act (NCEMA), a federal law, to ensure quarrying and sand mining are adequately covered, as well as development of a Sand Mining and Quarrying Ordinance for Nevis and will introduce sector standards together with a licensing system for quarry operators that is conditional on training and compliance.

252. **Total Costs for Sub-Project US$4,273,460: GEF Grant US$999,685, Co-financing – US$3,273,775**

253. **Component 1. To develop and foster the implementation of targeted innovative, climate-change resilient approaches to integrated sustainable land and water resources management and enhanced management and maintenance of ecosystem services within the College Street Ghaut watershed and quarry sites on Nevis**.

- **Sub-component 1.1. Achieve measurable stress reduction in the College Street Ghaut watershed and downstream of quarry sites in Nevis through appropriate sustainable water, land and ecosystems management interventions that account for climate change.** On **St Kitts**, this will achieved through stabilization of the banks of College Street Ghaut by reinforcing and maintaining existing construction, such as retaining walls, bridges, culverts, and drains, by installing gabion baskets and by planting vetiver hedgerows in the College Street Ghaut. On-site treatment of grey water will be installed on private and commercial properties in greater Basseterre area and a retention pond constructed at Shadwell Estate. On **Nevis**, ghauts and water harvesting systems will be stabilized to reduce quarry run-off into ocean. Restoration and reforestation plans with guiding criteria for abandoned quarry areas will be developed. These criteria will be used to identify non-productive quarry areas for restoration and reforestation under the project. Artificial reefs will be deployed at New River, Indian Castle, Dogwood and Long Haul. At Indian Castle, the beach will also be restored. In addition to the local physical interventions, an initial rapid assessment and continuous monitoring during the project will inform a national watershed management plan.

- **Sub-component 1.2: Enhance livelihood opportunities and socio-economic co-benefits for targeted communities in the College Street Ghaut watershed and downstream of quarry sites in Nevis from improved ecosystem services functioning:** A Cost-benefit and feasibility study for sustainable sand extraction will be conducted for St Kitts and Nevis. A public awareness campaign will focus on alternative construction materials and the effect on sand mining on beaches of St Kitts and Nevis. A community needs assessment with gender audits in Saint Kitts and Nevis will focus on economic livelihoods and environmental services in College Street Ghaut watershed and quarry sites on Nevis. This will be complimented by a geotechnical survey to determine stability and sustainability/thresholds of operations. Both will feed into the design and implementation of small-scale interventions (i.e. SGP) to provide access to safe drinking and ambient water for women and men as well as disadvantaged groups.

254. **Component 2: Strengthening of the Sustainable Land Management (SLM), Integrating Water Resources Management (IWRM) and ecosystems Monitoring and Indicators frameworks in Saint Kitts and Nevis.**

- **Sub-component 2.1: Strengthening national and regional systems for monitoring of environmental status with respect to key international agreements.** This will entail the review of current status with respect to incorporation of indicators into national reporting accounts and address gaps through contribution to the formal adoption of indicators. Consultative discussions will be held with the publication of relevant guidance documents and tools. This sub-component will also entail capacity building for the assessment and application of indicators in reporting.

255. **Component 3: Strengthening of policy, legislative and institutional reforms and building capacity to support Sustainable Land Management (SLM), Integrating Water Resources Management (IWRM) and ecosystem services management taking into consideration climate change resilience building in Saint Kitts and Nevis.**

- **Sub-component 3.1: Strengthening policy and legislation for the effective management of water, land and ecosystems resources that account for climate change.** This will include the review national land and water resources management legislation and institutional arrangements to identify gaps and weaknesses, formulate recommendations and development appropriate instruments for ratification. Targeted educational and sensitization efforts will support the activities under this sub-component.

- **Sub-component 3.2: Strengthening capacity of national and regional institutions and other stakeholders for water, land, and ecosystems management that take climate change into account.** This will involve support to cross-sectoral committees with government, NGOs, civil society and private sector participation through the provision of resources to host meetings, consultation and other dialogues to educate stakeholders on the project, identify synergies between other initiatives and

avenues for mainstreaming and gain high-level policy and decision-maker buy-in. The private sector will be encouraged to actively participate. Training and capacity building will be carried out at the national level for improved management practices. Community participatory media/outreach tools will be developed and applied as part of the capacity building efforts. This effort will also be based on knowledge generated from the national project.

256. **Component 4: Enhance knowledge exchange, promotion of best-practices, replication and expanding stakeholder involvement in Saint Kitts and Nevis.**

- **Sub-component 4.1: Improve information access and enhanced engagement of practitioners and other stakeholders via targeted knowledge sharing networks:** This will include the design of the national awareness strategy that is harmonized with the regional programme. The programme will be designed so that it strengthens existing programmes and builds collaborative linkages with other complementary project/programme initiatives and stakeholders. Special attention will be paid to commemorative days and special events connected with the environment. Innovative media support products, citizen science promotion and social marketing will be designed based on the harmonized regional programme to be supported by the regional Public awareness and public education Partnership. A special PA/PE campaign to target high-level decision makers will be implemented. Pre and post project Knowledge Aptitude and Perception (KAP) surveys to assess the effectiveness of the awareness programme will be conducted. Regional and global networking and outreach will entail support to learning exchanges and internships amongst professionals and other stakeholders to other participating countries and other SIDS regions (linked to Component 1, within the global scope). The local project approaches, lessons learned will be loaded to relevant local and international web platforms. Project team members, beneficiary stakeholders, state representatives and other stakeholders will be supported to travel to regional and international fora to present the experiences and exchange lessons expand networking opportunities and contributions to project implementation).

257. **Component 5: Installation of the project management arrangements.** This will include the mechanism for stakeholder participation in the project through the establishment of a **Project Steering Committee** which will be chaired by the Senior Environmental Officer in the Physical Planning and Environment (DPPE). For the day-to-day management of the project, the National **Project Management Unit** (PMU) will be established within the DPPE Department, with a small support staff. The project will foster the establishment of the **National Environmental Committee/Commission** which will provide policy-level feedback to the National Intersectoral Committee (NIC).

258. The main outputs of **Sub-Project 1.5** are as follows:

- Banks of College Street Ghaut stabilized (St. Kitts)
- On-site treatment of grey water on private and commercial properties in greater Basseterre area (St. Kitts)
- Retention pond constructed at Shadwell Estate (St. Kitts)
- Restoration and reforestation plan for abandoned areas within operational quarries (Nevis)
- Deployment of artificial reefs at New River, Indian Castle, Dogwood and Long Haul (Nevis)
- Beach restoration at Indian Castle (Nevis)
- Watershed Management Plan for College Street Ghaut as a sub-component of overall National Water Resources Management Plan.
- Cost-benefit and feasibility study for sustainable sand extraction for St Kitts and Nevis
- A monitoring protocol for periodic assessment of identified environmental indicators (ground and surface water quality in particular) at intervention sites with participatory engagement of stakeholders
- National reviews of water and wastewater legislation and institutional arrangements followed by recommendations of necessary reforms and support with drafting legislation
- Support to legislative drafting of NCEMA (federal legislation) to ensure quarrying and sand mining are adequately covered
- Programmes for cross-sectoral sensitization and awareness-raising for all relevant stakeholders; emphasis on alternative construction materials and the effect on sand mining on beaches
- Programmes for training and capacity building to support SLM and watershed management across relevant government, private sector agencies and civil society stakeholders; includes Training of quarry operators on site layout and best practices
- Technical exchange visits between professionals, civil society organizations to share knowledge directly over the duration of the project
- Research articles, books, other awareness materials through various media
- At least one community-based enterprise developed under the GEF-SGP

Sub-Project 1.6: Addressing problems of land degradation and ecosystem degradation in the upper reaches of the Soufriere Watershed in Saint Lucia

259. The project seeks to address land degradation within the Fond St. Jacques / Migny area in the upper reaches of the Soufriere watershed due to unsustainable land management practices which has and continues to impact negatively on the livelihoods of the population that depends on the land and adjacent coastal

resources. The project will introduce innovative solutions for erosion control, agricultural non-point source mitigation, land stabilization and runoff/flood control to degraded sites located over 84 hectares. The intervention approach adopted will be highly participatory, involving at least 30 farmers, agricultural and forestry extension officers and community representatives. The project will seek to introduce livelihood alternatives to include cut flower and ornamental production and agouti rearing amongst others. The intervention will also support the development of a protocol for science-based monitoring with respect to LD, IW and socioeconomic indicators in assessment of achievement of the project objectives. The project will provide the necessary training to targeted stakeholders in SLM techniques as well as appropriate business models required for sustainable livelihoods. The GEF Small Grants Programme will provide support in building capacity of stakeholders and other community members toward the development of livelihood initiatives associated with the project.

260. **Total Costs for Sub-Project 1.6: US$3,841,321 GEF Grant US$729,685, Co-financing – US$3,084,636**

261. **Component 1.1 Measurable stress reduction achieved in the Soufriere watershed through appropriate sustainable water, land and ecosystems management interventions that account for climate change**.

- **Sub-component 1.1.1: A rapid SLM and SFM-related diagnostic analysis for the Soufriere watershed and environs** to update the baseline and ensure the monitoring framework for relevant biophysical and socioeconomic indicators is well defined and aligned with local capacities.
- **Sub-component 1.1.2: Reforested and rehabilitated lands and riverbank protected and restored along critical reaches in the upper Fond St. Jacques/Migny area.** Some 80 hectares have been targeted for reforestation, rehabilitation (incorporating the use of structural land stabilization techniques, agroforestry, and soil amelioration), and riverbank stabilization. The precise interventions will be selected with the involvement of farmers and technician based on technical feasibility and taking cognizance of the need to safeguard and enhance the livelihood needs of participation farmers.

262. **Component 1.2: Enhanced livelihood opportunities and socio-economic co-benefits for targeted communities from improved ecosystem services functioning**.

- **Sub-component 1.2.1: Increase in revenue generation within target communities** for selected stakeholder groups through integration within the value chain for agricultural products. This will entail the development of alternative livelihoods for targeted farmers and provision of assistance in the development of an appropriate business model. It is intended that beneficiary farmers be organized into clusters and ultimately into a Fond St. Jacques Farmers network. The intention is to establish

a unique product brand as a means of ensuring sustainability of the business ventures beyond the life of the project. The GEF Small Grants Programme will support the development of livelihood opportunities.

263. **Component 2: Strengthened national and regional systems for monitoring of environmental status with respect to key international agreements.**

- **Sub-component 2.1.1:** Identification of a **Suite of project-specific IW and LD-related indicators** to assist objective assessment and monitoring of impacts of the project. The project from its inception phase will through the regional component, establish partnerships with regional institutions such as the UWI, IICA and others to establish a monitoring framework for SLM and ecosystems management. This data collection regime will be subsequently fed into the Forestry Management Information System (FMIS) in use by the Department since 2009.
- **Sub-component 2.1.2: Installation of monitoring capacity and generation of project-specific data sets** by relevant agencies and community groups that are presented in interim and final reports and other information products as part of the project monitoring programme.

264. **Component 3.2: Strengthened capacity of national and regional institutions and other stakeholders for water, land, and ecosystems management that accounts for climate change**.

- **Sub-component 3.2.1: Technical personnel and farmers trained in SLM practices** for more effective implementation of interventions toward future replication and mainstreaming within national frameworks. This will include on-site training in tools and techniques, field exchange visits with extension officers and farmers along with support to students who wish to undertake school-based assessments in related topics.

265. **Component 4: Improved engagement and information access for practitioners and other stakeholders through targeted knowledge sharing networks.**

- **Sub-component 4.1.1:** Produce a **Suite of best practices for effective SLM** based on project interventions and lessons learnt documented. The project will collaborate with the Environmental Education Officer of the Ministry during the inception phase in the development of a common framework for knowledge capture and dissemination. This will consider existing frameworks and lessons learnt from previous initiatives. This will subsequently inform the procurement of tools/equipment required to ensure that project activities are accurately and effectively documented.
- **Sub-component 4.1.2:** Conduct **Sensitization and awareness raising programs** incorporating local/regional lessons learnt and relevant media products on water, land and ecosystems management. This will be led by public education personnel

within the Forestry Department and the Ministry in a collaborative effort with institutions such as the SWMA, the SLHTA, the Ministry of Education, Sandals Resorts and other private sector interests involved in good environmental practices. These activities will utilize media products developed at the regional level.

266. **Component 5: Installation of the project management arrangements.** The project will be implemented by the Department of Forestry within the Ministry of sustainable Development, Energy, Science and Technology. The Department of Forestry has recently established a Planning, Monitoring and Evaluation (PME) team headed by one of two Assistant Chief Forest Officers (ACFO). The ACFO will have overall oversight and management of the project and a Forestry Officer (FO) will be appointed as Project Coordinator (PC). The PC will be responsible for the day-to-day on-the-ground implementation of the project and will be supported by other officers of the PME, one other FO who is currently based in Soufriere Range, and a Project Secretary who will be hired by the project.

267. The main outputs of **Sub-Project 1.6** are as follows:

- Rehabilitated and reforested lands and critical riverbanks protected through targeted interventions over 50 hectares in the Fond St. Jacques, Soufriere area
- Increased revenue generated in target communities through project interventions.
- Trained professionals and farmers in appropriate and innovative SLM techniques.
- Trained professionals in monitoring and assessment protocols and environmental quality status assessment
- Strengthened national intersectoral committee
- Strengthened capacities among stakeholders in relevant areas
- National PA/PE programme and associated media products
- At least one community-based enterprise
- Scientific publications, books, other publications
- Participation at conferences
- Country partnership technical exchanges
- At least one community-based enterprise developed under the GEF-SGP

Sub-Project 1.7: Addressing Land Degradation in the Georgetown Watershed, Saint Vincent in St. Vincent & the Grenadines

268. The Georgetown Watershed management area on Saint Vincent encompasses some 5,750 hectares, including the drainage basins for the (a) Byera River, (b) Congo Valley River and Jennings River, which merge midway to form Grand Sable River, which

flows to the coast, (c) Caratal River and Perseverance River and (d) the Langley Park River. The Georgetown community was severely impacted by Hurricane Tomas in October 2010 and destructive floods associated with an extreme rain event in April 2011. The watershed has also been undergoing gradual degradation, mainly associated with agricultural development. In the upper-most reaches of the watershed the illicit cultivation of marijuana is contributing to the problem. Pig rearing with consequent pollution hazard has been increasing particularly in the Jennings/Congo valley. Effluent from manufacturing is discharged into the mouth of the Perseverance River, creating a nuisance to the community and impacting the aquatic biodiversity downstream. The watershed area falls within a national biodiversity hotspot, which, among other rare and threatened species, is home to the endemic St Vincent Parrot (*Amazona guildingii*), a national flagship for conservation in the country, and five endemic reptiles.

269. The project will target reforestation and conservation forestry interventions over at least 7.5 hectares within upland areas where landslides have occurred and along some 1.8 km of riverbank that continue to actively erode. Approximately 10 hectares of farmland was impacted by the severe flooding. At least 2 hectares of the most severely degraded areas will be reclaimed using a range of soil stabilization and forest management techniques which will serve to demonstrate innovative approaches as a learning centre for sustainable land management practices. It is expected that some 15 to 20 farm holdings will be positively impacted, bringing lands back into productive potential in the medium to long-term. The project will include commercial thinning over approximately 5 hectares within mahogany and blue mahoe forest plantations located at Perseverance. The project will also target the reduction of harmful discharges of pig effluent into the environment through the employment of dry manure techniques. The project will also contribute to the development of the Jennings Bird watching Trail; an upgrade to an existing forest patrol trail which will result in spin-off economic benefits to the community.

270. **Total Costs for Sub-Project US$2,608,560: GEF Grant US$999,685, Co-financing – US$1,606,875**

Component 1:To develop and foster the implementation of targeted Innovative, climate-change resilient approaches to integrated sustainable land and water resources management and enhanced management and maintenance of ecosystem services within the Georgetown Watershed.

- **Sub-component 1.1: Measurable stress reduction at project sites through appropriate sustainable water, land and ecosystems management interventions that account for climate change:** Interventions will include riverbank rehabilitation/restoration along Perseverance River, Jennings and Congo Valley and Langley Park Rivers; restoration of original watercourse (1) above Scabby Dam at Perseverance and (2) just below Scabby Dam (course changed by April 2011 rains)

through removal of obstructions (triggered by April 2011 rains). Furthermore, lands in Perseverance that were affected by Hurricane Tomas and April 2011 and December 2013 floods will be reforested/rehabilitated; Perseverance mahogany and blue mahoe plantations will be enhanced and used as field demonstration sites. The targeted interventions will encompass a total of 15 hectares with wider landscape conservation over an estimated 100 hectares.

- **Sub-component 1.2: Enhanced livelihood opportunities and socio-economic co-benefits for targeted communities from improved ecosystem services functioning:** Using the results from exercises conducted under Sub-component 1.1 precise income generating opportunities will be determined and the required skills engaged. Foreseen revenue generating ventures within target communities include (i) investment in the Jennings Bird watching Forest Trail to upgrade facilities; (ii) investment in integrated/sustainable waste management for pig production and organic agriculture, and (iii) consumptive use of riverine and near-shore marine fisheries (subsistence fishing); specifically tri-tri, crayfish, mullets, macawk fish. The GEF Small Grants Programme will provide support.

271. **Component 2: To strengthen Sustainable Land Management (SLM), Integrating Water Resources Management (IWRM) and ecosystems Monitoring and Indicators frameworks in Saint Vincent and the Grenadines.**

- **Sub-component 2.1: Strengthened national and regional systems for monitoring of environmental status with respect to key international agreements:** This will entail the review of current status with respect to incorporation of indicators into national reporting accounts and address gaps through contribution to the formal adoption of indicators. Consultative discussions will be held simultaneously with the publication of relevant guidance documents and tools in order to facilitate adoption into national accounts of IW and LD, and BD-related indicators of process, stress reduction, and environmental and socioeconomic status to monitor improvements in the management of land and water resources and wastewater. This sub-components will also invest in capacity building for the assessment and application of indicators in reporting.

272. **Component 3. Enhancing stakeholder coordination and capacity building for biodiversity resources management and natural resources management in St. Vincent and the Grenadines**.

- **Sub-component 3.1: Strengthened policy and legislation for the effective management of water, land and ecosystems resources that account for climate change:** New and/or revised policies and regulations on water supply and sanitation will be developed, based on the IWRM Roadmaps (and IWRM/WUE strategies where they may exist), National Plans of Action for SLM and ecosystem conservation. This will include the review national land and water resources management legislation

and institutional arrangements to identify gaps and weaknesses, formulate recommendations and development appropriate instruments for ratification. Targeted educational and sensitization efforts will support the activities under this sub-component.

- **Sub-component 3.2: Strengthened capacity of national and regional institutions and other stakeholders for water, land, and ecosystems management that take climate change into account:** The inter-sectoral National Environmental Advisory Board (NEAB) will be strengthened through the provision of resources to host meetings, consultation and other dialogues to educate stakeholders on the project, identify synergies between other initiatives and avenues for mainstreaming and gain high-level policy and decision-maker buy-in. The private sector will be encouraged to actively participate. This will also include programmes for of cross-sectoral sensitization and awareness-raising for all relevant stakeholders on LD and watershed management, integrating SLM & ecosystem management, IWRM/WUE and ICZM management issues to support mainstreaming and implementation. Training and capacity building will be carried out at the national level for improved management practices. Community participatory media/outreach tools will be developed and applied as part of the capacity building efforts. This effort will also be based on knowledge generated from the national project).

273. **Component 4: To enhance knowledge exchange, promotion of best-practices, replication and expanding stakeholder involvement in Saint Vincent and the Grenadines.**

- **Sub-component 4.1: Improved information access and enhanced engagement of practitioners and other stakeholders via targeted knowledge sharing networks:** The design and implement a national public awareness campaign will include the design of the national awareness strategy that is harmonized with the regional programme. The programme will be designed so that it strengthens existing programmes and builds collaborative linkages with other complementary project/programme initiatives and stakeholders. Special attention will be paid to commemorative days and special events connected with the environment. Innovative media support products, citizen science promotion and social marketing will be designed based on the harmonized regional programme to be supported by the regional Public awareness and public education Partnership. A special PA/PE campaign to target high-level decision makers will be implemented. Pre and post project Knowledge Aptitude and Perception (KAP) surveys to assess the effectiveness of the awareness programme will be conducted. Regional and global networking and outreach will entail support to learning exchanges and internships amongst professionals and other stakeholders to other participating countries and other SIDS regions (linked to Component 1, within the global scope). The local project approaches, lessons learned will be loaded to relevant local and

international web platforms. Project team members, beneficiary stakeholders, state representatives and other stakeholders will be supported to travel to regional and international fora to present the experiences and exchange lessons expand networking opportunities and contributions to project implementation. Saint Vincent and the Grenadines will contribute to a suite of best practices and lessons that are exchanged with other SIDS. Saint Vincent and the Grenadines contributed to a Community of Practice (COP) for the Caribbean region for vertical as well as horizontal (multi-sectoral) information exchanges with local stakeholders, as well as debates on the needs and aspirations of people, project deliverables and environmental realities.

274. **Component 5: Installation of the project management arrangements.** This will include the mechanism for stakeholder participation in the project through the establishment of a **Project Steering Committee** (PSC). The PSC will be the reconstituted National Environmental Advisory Board (NEAB). For the day-to-day management of the project, the National **Project Management Unit** (PMU), with a small support staff will be established within in the Ministry of Health Wellness and the Environment, the project National Execution Agency.

275. The main outputs of **Sub-Project 1.7** are as follows:

- Riverbank rehabilitation/restoration along Perseverance River, Jennings and Congo Valley and Langley Park Rivers. Restoration of original watercourse (1) above Scabby Dam at Perseverance and (2) just below Scabby Dam through removal of obstructions
- Reforested/rehabilitated lands at Perseverance most severely affected by Hurricane Tomas and April 2011 floods – to be used as training site on SLM tools and techniques, best practices
- Upgraded Jennings Bird watching Forest Trail
- Investments in integrated/sustainable waste management for pig production (by-products directed organic agriculture
- Strengthened inter-sectoral National Environmental Advisory Board (NEAB)
- Programmes for training and capacity building to support the implementation SLM and watershed management for relevant government, private sector agencies and civil society stakeholders
- Programmes for of cross-sectoral sensitization and awareness-raising for all relevant stakeholders
- At least one community-based enterprise developed under the GEF-SGP

Sub-Project 1.8: Reduce and reverse land degradation at selected Quarry site(s) around Valencia by an integrated water, land and ecosystems management approach, Trinidad

276. The project seeks to reduce the acute degradation that is occurring over some 100 hectares of abandoned degraded quarry areas within the Valencia area through the implementation of innovative land rehabilitation methods and reduce the impact on communities through the application and adherence to international best practice for quarry operators, and improved adherence to local legal parameters. The major activities proposed to achieve these outcomes include (i) the establishment and implementation of an effective public awareness campaign to increase voluntary compliance and monitoring of quarries by legislative agencies, (ii) the maintenance and enhancement of the natural ecosystems for the benefit of biodiversity health and eco-tourism operators through the establishment of an effective and operational stakeholder management committee and (iii) the revision and operationalization of existing relevant policies and/or development and operationalization of new policies along with relevant legislative requirements. Ultimately, the project will lead to increased land cover and carbon sequestration, protection of surface and groundwater resources, conservation of biodiversity of global significance and create an enhanced enabling environment including the institutional capacity for good forest management practices.

277. Total Costs for Sub-Project **US$1,412,533:** GEF Grant **US$643,658,** Co-financing – **US$798,875**

278. **Component 1.1: develop and foster the implementation of targeted Innovative, climate-change resilient approaches to integrated sustainable land and water resources management and enhanced management and maintenance of ecosystem services at selected quarry site(s) around Valencia**.

- **Sub-component 1.1.1: Conduct of a rapid water and land-related diagnostic analysis** to inform identification of the innovative interventions.

- **Sub-component 1.1.2: Restoration and reforestation plan and investment in restorative measures** for abandoned quarry areas within operating quarries around Valencia. The project will seek the development of a restoration and reforestation plan for abandoned areas within operational quarries around Valencia. Based on the recommendations from the plan, investments toward the restoration and reforestation of non-productive quarry areas will be made. Bioengineering stabilization techniques will be employed, along with the replanting of denuded scar-faces at quarries. Alley-planting of trees and hedges in open and unsightly stretches along the Valencia road will be undertaken. Runoff control measures in select areas will also be installed to reduce the accelerated erosion and land degradation

279. **Component 1.2: Enhanced livelihood opportunities and socio-economic co-benefits for targeted communities from improved ecosystem services functioning for climate change.** This will entail the assessment of the potential socio-economic benefits for communities within the target area in terms of enhanced livelihood opportunities. The assessment will contribute input toward the implementation of at least one small-scale community-based initiative associated with the project intervention with the support of the GEF Small Grants Programme.

280. **Component 2: Strengthened national and regional systems for monitoring of environmental status with respect to key international agreements.**

- **Sub-component 2.1.1: Installation of a monitoring protocol for assessment of identified environmental indicators** (air quality, surface water quality, vegetation recovery, in particular) at intervention sites with participatory engagement of stakeholders. This will be informed by a gap analysis based on a compilation of all existing data and information pertaining to the environmental quality at Valencia quarries and their environs.

281. **Component 3.1: Strengthened policy and legislation for the effective management of water, land and ecosystems resources that account for climate change**.

- **Sub-component 3.1.1: Develop/contribute recommendations for compliance and enforcement capacity and capability to facilitate enforcement of relevant existing legislation within Valencia quarries.** This will build on ongoing work pertaining to meeting requirements by operators of the Environmental Management Act Chapter 35:05 including the Certificate of Environmental Clearance (CEC) Rules, and the Water Pollution Rules.

282. **Component 3.2: Strengthened capacity of national and regional institutions and other stakeholders for water, land, and ecosystems management, taking climate change into account**.

- **Sub-component 3.2.1: Train professionals and technical staff in relevant lead agencies, primary CSO and individual stakeholders** in core technical areas (e.g. bio-engineering, erosion control, storm water and wastewater management, rehabilitation) based on lessons from the project.
- **Sub-component 3.2.2: Develop a Training manual and conduct training of operators** on best quarry layout and extraction practices to facilitate subsequent restoration/reforestation.

283. **Component 4: Improved information access and enhanced engagement of practitioners and other stakeholders via targeted knowledge sharing networks.**

- **Sub-component 4.1.1:** Compile **Best practice guidelines / code of practices for adoption in national regulations**. This will strengthen a Community of Practice (COP) for quarry management land degradation control in the Caribbean and across SIDS at the global level. The knowledge will be disseminated through relevant national websites, the project website and other clearinghouse mechanisms, including a Regional Best-Practice Compendium. Community participatory media/outreach tools will be applied to share knowledge in capacity building exercises.
- **Sub-component 4.1.2: Technical exchange visits between professionals, civil society organizations to share knowledge directly over the duration of the project**. This will entail support to learning exchanges and internships amongst professionals and other stakeholders to other participating countries and other SIDS regions (linked to Component 1, within the global scope). The local project approaches, lessons learned will be loaded to relevant local and international web platforms.
- **Sub-component 4.1.3: Participation in major technical conferences and symposia convened to showcase the innovative solutions.** Project team members, beneficiary stakeholders, state representatives and other stakeholders will be supported to travel to regional and international fora to present the experiences and exchange lessons expand networking opportunities and contributions to project implementation
- **Sub-component 4.1.4:** Produce and disseminate **Research articles, books, other awareness materials through various media and national campaigns** on all relevant areas as generated by the project based on interest/needs of stakeholders (e.g. use of alternative construction materials, methods for land/soil conservation, flood mitigation, landscape restoration).

284. **Component 5: Installation of the project management arrangements.** This will include the mechanism for stakeholder participation in the project through the establishment of a **Project Steering Committee** (PSC). For the day-to-day management of the project, the National **Project Management Unit** (PMU), with a small support staff will be established within the Environmental Management Authority, the project National Execution Agency.

285. The main outputs of **Sub-Project 1.8** are as follows:

- Quarry restoration plan through participatory process with stakeholders
- At least 100 hectares of lands restored/rehabilitated and land degradation control measures installed
- At least 1 community –based livelihood opportunity created
- Installed technical capacity to assess change in environmental quality status associated with project investment

- Recommendations of enhanced compliance to legal requirements to build on ongoing efforts
- Best practice guidelines / code of practices for adoption in national regulations
- Trained professionals, operators and other CSO stakeholders
- Technical exchange visits between professionals, civil society organizations to share knowledge directly over the duration of the project
- At least 2 major technical conferences and symposia convened to showcase the innovative solutions
- Research articles, books, other awareness materials through various media

286. **Gender mainstreaming:** For all interventions, the participation of stakeholders whether at the level of the agency implementers or at the community level the dimensions of gender engagement will be assessed. Analysis of participation and benefits across the traditional male versus female dimension will be augmented by analyses in respect of special needs/interest groups and other societal segments such as vulnerable 'at-risk' groups. These analyses will be carried out in parallel with project implementation and as such, will not represent stand-alone assessments. These analyses to be done over the course of project implementation, will be nested mainly within national and region Component 3 that is concerned with policy and strengthening of the enabling frameworks. Based on the principle of adaptive learning the project interventions will be modified to appropriately within acceptable limits of change to realize gender mainstreaming within implementation.

Regional Sub-project 2: Strengthening of the Sustainable Land Management, Integrating Water Resources Management and ecosystems Monitoring, and Indicators framework.

287. This component within Sub-project 2 will support country-level efforts under Component 1 to develop and apply national and regional water, land and biodiversity (including sustainable forest management) indicators to assess the effectiveness of water, land (including ICZM) and ecosystems management in the participating SIDS. These will be developed in close cooperation with the other partner SIDS projects (Pacific and African), will be in line with internationally recommended indicators and related initiatives (e.g. GWP, GIWA, UN-Water, TWAP, UNEP GPA, LADA), and will provide the mechanism to track project impact on the implementation of the LBS Protocol (to the Cartagena Convention), UNFCCC, UNCCD, CBD and WSSD targets. The Research Partnership (details under Section 2.5) will provide significant technical support and guidance to this component. The indicators framework developed under the GEF-IWCAM Project will form a major part of the basis for this sub-project.

288. The project will strengthen the scientific basis for effective monitoring and assessment to include tools and indicators for multi-scale application, by developing

improved methods for multi-scale assessment and monitoring of land degradation trends, and for impact monitoring of GEF investment in water, land and ecosystem services maintenance. This will build on existing GEF-financed initiatives to fully integrate methods for establishment of project baselines, identifying measureable indicators, and subsequent monitoring.

289. The monitoring mechanism developed to track national and regional-level implementation will include climate considerations and gender mainstreaming in participating SIDS. Feedback will be incorporated from other regional and nationally related projects developing indicators and monitoring and evaluation plans and regional agreements and will work closely with all national stakeholders to ensure that the monitoring and data analysis approach developed feeds in from existing research and databases, to support national priorities, plans and strategies, and where capacity gaps are identified, that appropriate capacity is built upon for the long term monitoring of IWRM/WUE, ICZM and SLM and ecosystem services provision. As such this component also works closely with the on-the ground interventions and innovative solutions developed and implemented under Component 1, the policy, legislation and institutional reforms and capacity building activities under Component 3, and the knowledge, exchange, best practices and stakeholder involvement of Component 4.

290. A **Research Partnership** will provide technical advice and scientific research contributions under this project component linked to national project development and implementation, particularly in establishment of monitoring and assessment protocols to track implementation progress based on relevant indicators associated with the GEF tracking tools. The engagement of the research partners and contributions to robust scientific observations will serve to strengthen overall project reporting and assist the national focal point agencies in assessment of progress. The partnership will also facilitate policy development and capacity building for science-based monitoring and assessment within the regional-level components of the project. Where identified partnership agreements with some of these partners as they are tasked with implementation of elements of the project. Figure 5 illustrates the partner agency relationships and roles, and the information flow process across the national and regional levels, and between project components.

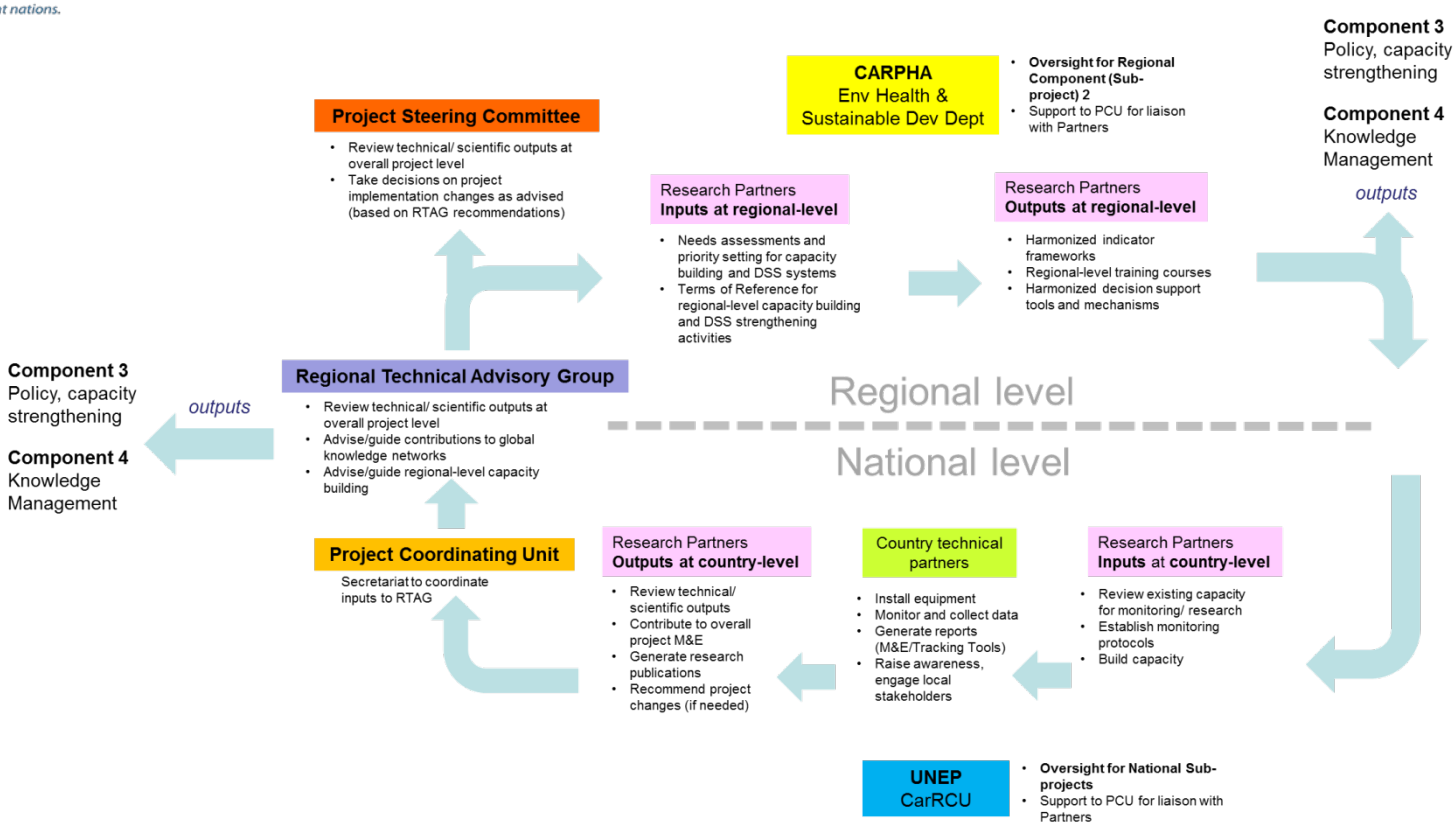


Figure 5. Component 2 agency relationships, roles and knowledge flow across the national and regional levels, and between project components.

291. Total Costs for Sub-Project 2: **US$13,574,282**: GEF Grant **US$1,303,782**, Co-financing – **US$12,270,500**

292. **Regional Component 2.1: Strengthened national and regional systems for monitoring of environmental status with respect to key international agreements.** The following are the 4 sub-components:

- **Sub-component 2.1.1 Development of a regional environmental indicators compendium.** The countries will be supported in strengthening the adoption of critical environmental indicators into national accounts which will build on the foundational work of the GEF-IWCAM project indicators work. An assessment will be undertaken to determine the status of application of environmental indicators in national accounts and regulatory instruments including convention obligations. Gaps will be determined and recommendations developed to assist mainstreaming into national accounts. This activity will be undertaken at national levels where findings will be fed to the regional level through consultative meetings and workshops. These contributions will feed into the development of an environmental indicators compendium for Caribbean SIDS.

- **Sub-component 2.1.2 Support to scientific research for monitoring at national projects.** Under the technical guide of the Research Partnership the range of national sub-project research needs will be reviewed and analysed so as to harmonize the approaches to the conduct of the monitoring. The approach will result in direct contributions by the research partners in assisting with monitoring and assessments through deployment of professionals, students and research fellows to assist the countries. The emphasis on the research programme will be on ensuring the robust capture of the change in status brought on by the project investment through monitoring the indicators. Through this exchange, technical capacities will be built within the local stakeholder agencies. The research will result not only in technical content that will support the project reporting mechanisms, but also feed into the various regional and global knowledge networks.

- **Sub-component 2.1.3. Strengthening of the field monitoring and assessment capabilities.** The countries will make provisions for the installation of necessary tools, equipment and systems to monitor the impacts of the interventions on environmental parameters. The establishment of these systems will be guided by technical support from the research partnership. Where necessary, further support to data capture systems may be provided through the regional sub-project through procurements of laboratory diagnostic tools, equipment and supplies as informed by in-country assessments. The regional sub-project may augment the expansion of the monitoring and assessment capabilities at the national level through support to school and community programmes with the provision of field test kits and other resources. Beneficiaries of these resources will be trained in effective use (linked to Sub-project 3 on capacity building)

- **Sub-component 2.1.4 Development of decision support tools and systems.** Under this sub-component capacity will be strengthened to apply decision support systems (DSS) to support the policy development and legislative reform processes. This will be on a demand basis from the countries depending on existing capabilities. Technical guidance and assistance from the Research Partnership will be provided to establish national and where applicable, regional information systems for environmental monitoring. The efforts will build on existing decision support systems as far as practical so as to avoid duplication and unnecessary escalation of effort to operate decision support systems as related to capacity limitations. The outputs from the DSS will feed into Sub-project 4 in terms of uptake by the various regional and global knowledge networks.

293. The main outputs of **Sub-Project 2** are as follows:

- Regional Indicators Assessment
- National and Regional Workshops to discuss the findings from the needs assessment and accompanying Recommendations Paper
- Regional Indicators Compendium

- Research Protocol that details the scope of monitoring and assessment work required by in each country
- Data and Information that will be used for project reporting against the GEF Tracking Tools and other indicators
- Technical and scientific publications
- Report on diagnostic needs assessments
- Laboratory equipment and supplies for select labs and research agencies
- Sampling tools and equipment for schools and community groups
- Training modules and training for stakeholders in the use of the tools
- Country Needs Assessment on strengthening decision support systems at the regional level
- Hardware and software and other decision support tools
- Training Modules
- Trained professionals and other stakeholders

Regional Sub-project 3: Strengthening of the Policy, legislative and institutional reforms and capacity building for Sustainable Land Management, Integrating Water Resources Management and ecosystem services management

294. This component to be implemented within Sub-project 3 addresses the policy, legislation, institutions and capacity needs to enable Caribbean SIDS to develop and implement water, land (including ICZM) and ecosystems management plans and enhance the enabling environment for meeting national, regional and international obligations of environmental resource management frameworks including the SIDS sustainable development frameworks, the BPOA, WSSD targets and the Millennium Development Goals. To augment national efforts under Component 1, policy, legislation and institutional reforms will be supported through harmonized regional approaches that address the lack of financing and policy and the lack of coordination among sectors identified in many of the participating countries. Particular focus will be (in parallel with the innovative project interventions under Component 1) on policy tools and guidelines for the protection of surface and ground-waters (also from extreme events, drought and projected climate change), for sustainable sanitation, and for sustainable land management by exploring best practices and lessons learned generated under Component 4. Emphasis will be placed on advancing gender mainstreaming within policy and capacity building in support of all the components. Gender audits and targeted analyses to ascertain derived benefits by stakeholders will be conducted, along with training that will strengthen gender-equitable access to ecosystem services, safe and adequate water, sanitation, food security and other benefits derived from project implementation. Importantly, support in this area will assist in positioning the countries in alignment of the enabling frameworks that respond to the policy directions of the GEF6 replenishment around the theme of the Food, Water, Energy and Ecosystems nexus.

295. Through a regional approach (particularly where there are common needs), this component will support national efforts under component 1, the development of tools and guidelines along with required capacity building, that provide options for incentivising sustainable use of water, land and biodiversity resources, with focus on key priority themes *inter-alia* water use efficiency, wastewater recycling, enhancing drought resilience, reducing risk from acute land degradation and flooding, and enterprise development using biodiversity resources in meeting sustainable development goals and reducing poverty. This will require coordination amongst the relevant national sectors and the strengthening and expansion of National Inter-sectoral Committees (NICs) in the countries, the harmonization with national plans, and the implementation of programmes of cross-sectoral sensitization and awareness raising, along with training and capacity building in the identified national institutions and private sector (closely linked to the Stakeholder Involvement Plan under Component 4).

296. A **Governance Partnership** group that comprises key regional and international governmental and non-governmental agencies will provide technical back-stopping to assist countries strengthen and mainstream policies and strategies drawing on the knowledge-base of these agencies through collective experience in work in the region. The contributions will be rolled out at both the regional component "umbrella" and under the national sub-projects in respect to interventions at the country-level related to enhancing existing mechanisms and where practical to new ones. Based on common themes that emerge from the national sub-projects, investment in policy and capacity building support will be harmonized at the regional level to gain efficiency and synergies in implementation. Figure 6 illustrates the partner agency relationships and roles, and the information flow process across the national and regional levels, and between project components.

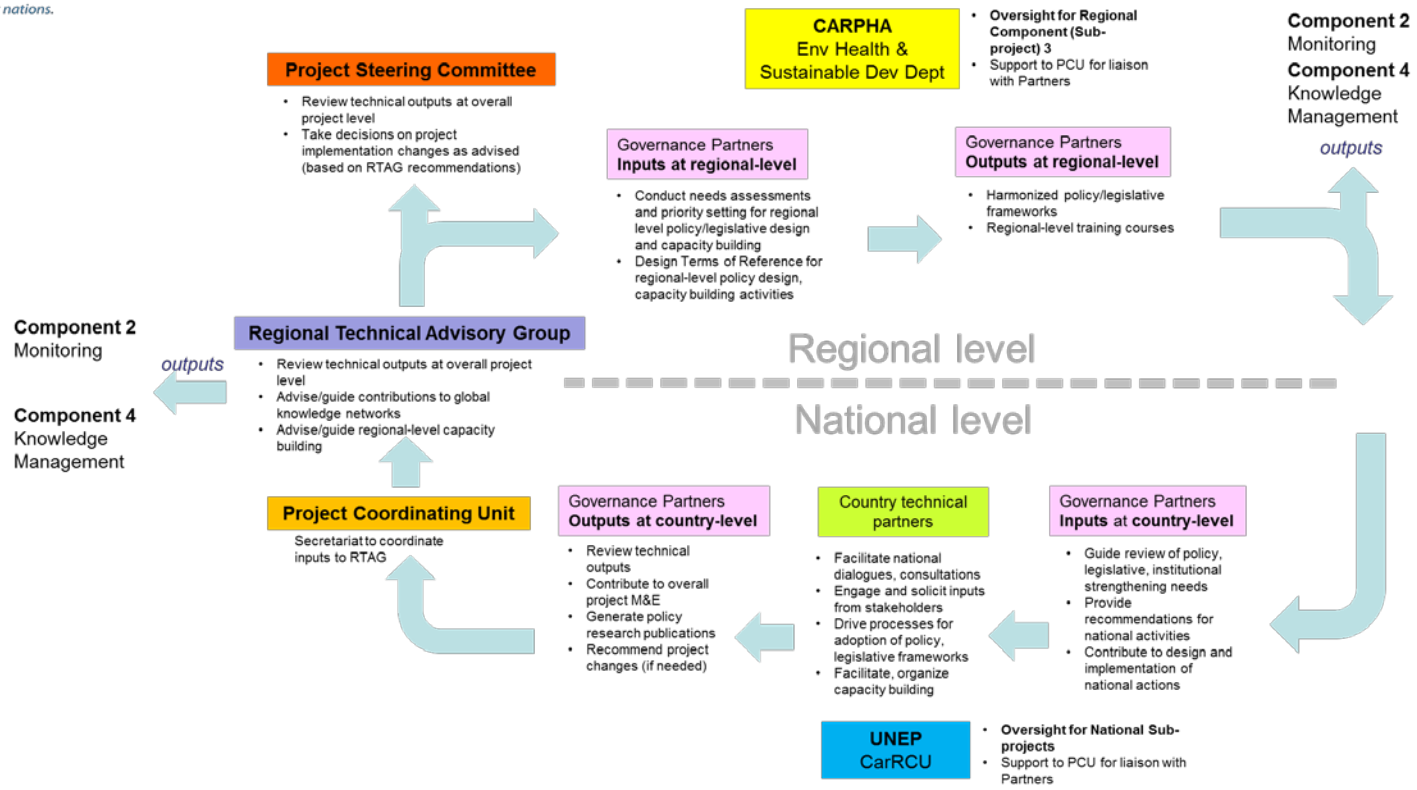


Figure 6. Component 3 agency relationships, roles and knowledge flow across the national and regional levels, and between project components.

297. Total Costs for Sub-Project 3: **US$16,653,008**: GEF Grant **US$5,042,008**, Co-financing – **US$11,611,000**

298. **Regional Component 3.1: Policy, legislative and regulatory strengthening.** The following are the 2 sub-components.

- **Sub-component 3.1.1: Upgrade national-level policies and regulations including incentive measures, for water, land and ecosystems management.** Under this sub-component support will be given to the countries to improve the enabling environment so as to facilitate the implementation of policy and the legislative provisions that are not only responsive to the needs of private sector and natural resource user groups, but are gender-sensitive and maximize opportunity for positive socio-economic growth and development amongst special interest groups at risk. The approach is to build on on-going efforts and where gaps exist, seek out new and innovative avenues to build sustainability of interventions. This sub-component is intended to support the innovative solutions/approaches that will be implemented under the national sub-projects in the terms of building sustainability and opportunity for replication and up-scaling within a conducive enabling environment.

- **Sub-component 3.1.2: Upgrade national and regional-level plans and strategies for improved water, land and ecosystems management.** Under this regional sub-component the efforts of the countries at strengthening and mainstreaming national action plans and strategies will be supported within the resource capacity of the umbrella project and prioritized demand from the countries for additional assistance. The project will contribute to strengthening regional frameworks for environmental management, notably the proposed CARICOM regional framework for integrated water resources management.

299. **Regional Component 3.2: Strengthen capacity for implementation of policy and regulatory requirements at national and regional and individual and institutional levels.** The following are the 2 sub-components:

- **Sub-component 3.2.1: Strengthen national participatory consultative and coordination mechanisms.** The National Intersectoral Committees are anticipated to serve as the primary mechanism for engagement of wider stakeholder groups with the national project interventions, solicit buy-in and contribute to the process of mainstreaming the outputs from the project into relevant national frameworks to facilitate replication and upscaling. The project will also foster civil society engagement through conventional and non-conventional methods depending on the target audiences.
- **Sub-component 3.2.2 Training and capacity building programmes to support implementation of policy and management interventions. The capacity** development programme for the project will be executed at both national and regional levels. Under the national sub-projects, provisions will be made for capacity building associated with the specific national project interventions, however this may be augmented by the regional umbrella sub-project depending on the potential for up-scaling and the possibilities for gaining synergies across common capacity development needs across several countries. This sub-component serves to backstop all the sub-projects of IWEco. The project will seek avenues for co-execution of capacity building with the project partners where it is expected that the partners will play leadership roles depending on competitive advantage.

300. The main outputs of **Sub-Project 3** are as follows:

- Regional policy and legislative (including fiscal enabling environment) assessment and recommendations Report
- Revised and upgraded policy, legislative and fiscal regime instruments for select countries
- Case-studies on best practices for policy and legislative reform processes for environmental management and sustainable development from Caribbean and global SIDS

- Revised/strengthened national strategies and action plans for environmental management
- CARICOM Integrated Water Resources Management (IWRM) Framework
- Proceedings and recommendations from NIC meetings
- Reports from special consultative events
- Regional-level capacity building needs assessment
- Regional capacity building programme
- Training Modules and technical support resources
- Trained professionals and other stakeholders

Regional Sub-project 4: Enhancing knowledge exchange, best-practices, replication and stakeholder involvement

301. The component aims to provide support, from a global to a local level for countries to have the capacity, tools and knowledge to meet WSSD and MDG targets on IWRM, water supply and sanitation, sustainable land management (including ICZM) and biodiversity conservation frameworks. The project will utilize existing networks for natural resources management under these thematic areas within SIDS and other regions, to identify and share best practices and lessons particularly in relation to the selection of more suitable and applicable technologies and practices and water resource management/use methodologies. Inter-regional dialogue will be established with other global initiatives (e.g. in partnership with AOSIS), and learning exchange study visits and/or twinning activities between SIDS or groups of participating SIDS and other regions will be established (in particular the African and Pacific SIDS projects).

302. At the national level, consultative dialogue as the mechanism for engaging, integrating and empowering National Inter-sectoral Committee (NICs) will be established. A stakeholder identification and analysis process will be utilized in planning and preparation for consultative dialogues to ensure that engagement of relevant policy, sectoral, local community and expertise (scientific, technical, etc.) is representative and inclusive. This may include the implementation of innovative approaches to increase stakeholder involvement with an emphasis on the community level, which will ensure input from local communities and associated structures (for instance fishers associations, farmers associations, NGOs, CBOs and local government), provide an information sharing platform where such input can be augmented, discussed and debated, and 'top-down, bottom-up' information sharing can be promoted and developed.

303. The project will facilitate knowledge exchanges via Communities of Practice (CoP) that includes beneficiary and target stakeholders, including technical specialists, in discussing issues, solutions and generally sharing information and insight, through dialogue between civil society and government. The project will participate and

contribute to global knowledge sharing platforms such as GEF IW:LEARN and will contribute to regional and global meetings such as the Global Oceans Forum, GPA, CWWA, CEF and the World Water Forum, amongst others. The project will be responsible for the hosting of GEF's 7th International Waters Conference.

304. A **Public Awareness / Public Education Partnership** will provide close support under the regional component and at the national levels through application of innovative tools and methods for expanding buy-in and driving behavioural change around the implementation of the national sub-projects. This will be translated to regional-level support in terms of harmonization of media and outreach products. Figure 7 illustrates the partner agency relationships and roles, and the information flow process across the national and regional levels, and between project components.

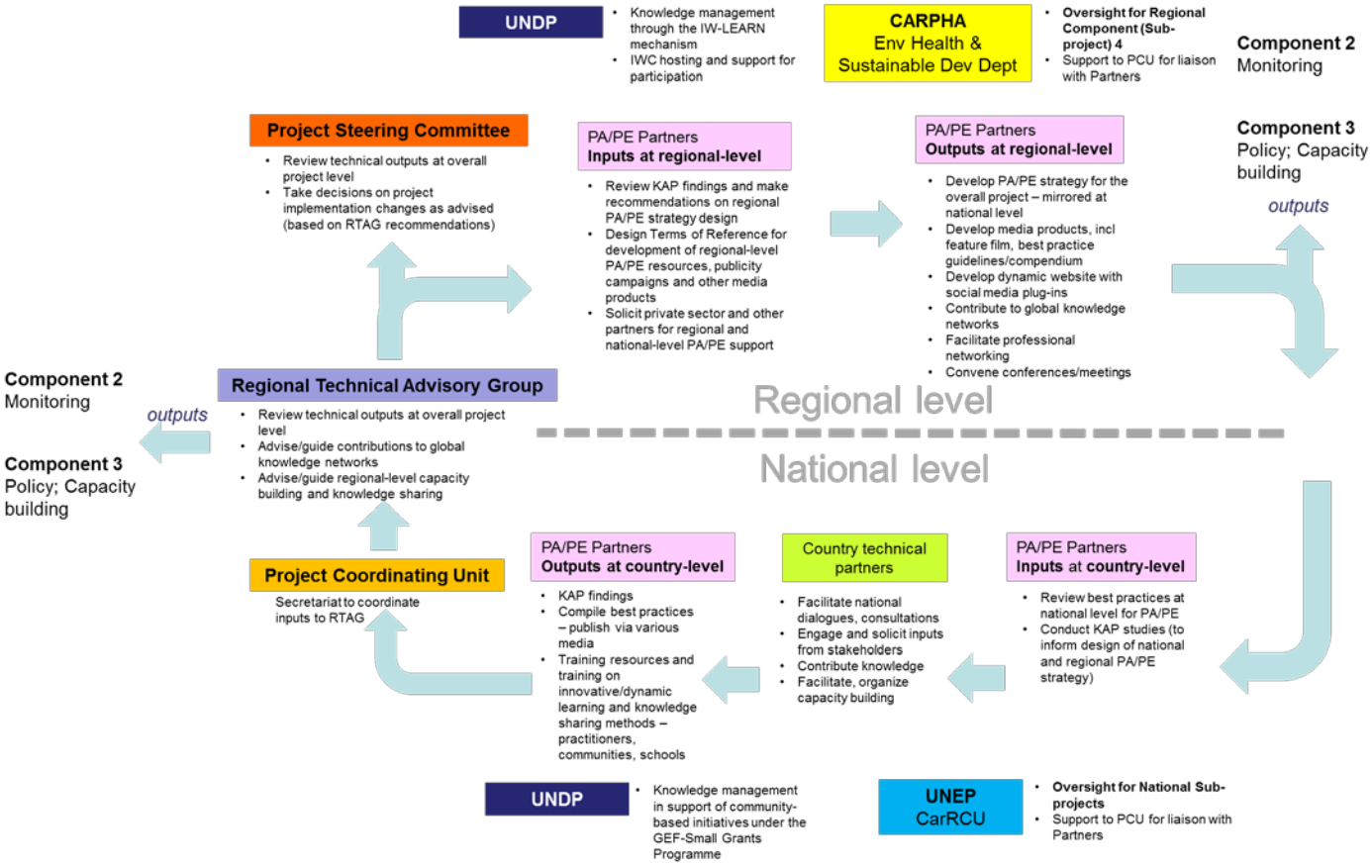


Figure 7. Component 4 agency relationships, roles and knowledge flow across the national and regional levels, and between project components.

305. Total Costs for Sub-Project 4: **US$12,989,435**: GEF Grant **US$1,387,895**, Co-financing – **US$11,601,540**

306. **Regional Component 4.1: Improved engagement and information access for practitioners and other stakeholders through targeted knowledge sharing networks.** (Sub-components 4.1.5 and 4.1.7 will be executed by UNDP in joint collaboration with CARPHA, supported by UNEP Car/RCU):

- **Sub-component 4.1.1: Public awareness / Public education (PA/PE) Strategy development for the regional and national project components.** The PA/PE Partnership will provide technical support and guidance to the development of the strategy that will guide and harmonize the country and regional level interventions. The strategy will need to be formulated at project inception, based on a needs assessment from the countries and amongst regional partners. Avenues for private sector engagement will be explored and partnerships solicited.
- **Sub-component 4.1.2: Execution of Knowledge, Attitude and Practice (KAP) assessments during the project.** Knowledge, Attitude and Practice (KAP) surveys will be devised for administration at project inception, at mid-term and at project closure.
- **Sub-component 4.1.3: Best practice guidelines, Lessons learnt outputs and Communities of Practice.** Throughout the life of the project implementation of the national interventions with focus on the best practices and lessons learnt will be documented that will be used as inputs for the project documentary that will be produced near the close of the project. Technical briefs (also in YouTube video format), best practice guidelines, experience notes and other publications will be generated during the life of the project. The project will support contributions to dedicated platforms (web-based and other fora) for practitioners and foster the strengthening of Communities of Practice (CoP). Under this sub-component project newsletters will be issued quarterly by the PCU.
- **Sub-component 4.1.4: Application of innovative communications and learning tools.** Workshops will be hosted to strengthen communications and marketing skills for technical personnel with focus on effective design and delivery of messages, drawing on commercial marketing tools and methods. The project will collaborate with partners to explore the application of innovative and emerging communications platforms to engage target audiences. Community participatory techniques to engage stakeholders within the national projects will be employed drawing on tools such as 3-D participatory GIS applications and community-based resources assessments and integration of citizen science approaches to understanding issues and finding solutions. Learning modules for schools will be developed and/or strengthened at both national level and harmonized at the regional level through collaborations with the Caribbean Examinations Council (CXC) through school-based resource assessment. This sub-component is linked to Sub-project (Component 3) which has significant capacity development elements.
- **Sub-component 4.1.5: Development and management of the project website, production and dissemination of publications and media products.** The IWEco

Project website will serve as the primary portal/clearinghouse for archiving and dissemination of knowledge products generated. Content from the IWCAM website and other relevant web-based resources such as IW-LEARN will be linked in this website. Under this sub-component technical, scientific and other miscellaneous publications will be issued. Radio, film and other media products will be generated based on emergent themes and will draw on contributions from well-known personalities in the creative arts and sporting fields. Regional-level literary and visual arts competitions for schools will be hosted with support from the private sector; this will augment national programmes. Mobile exhibit displays for the project will be procured along with project promotional paraphernalia. The PA/PE Partnership will play significant advisory and implementation roles in execution of this sub-component. This sub-component will be executed by UNDP.

- **Sub-component 4.1.6: Support professional (policy and technical) and stakeholder exchanges.** This sub-component will augment country exchange programmes on a demand basis to support learning opportunities during implementation of the national sub-projects. These exchanges will be between participating countries and other SIDS regions. Stakeholders will be supported to attend relevant meetings and conferences to share project experiences.
- **Sub-component 4.1.7: Hosting of the 7th GEF International Waters Conference (IWC7):** The IWC is a biennial dynamic learning event to share practical experience, apply evolving policies and procedures, address emerging priorities and improve overall project performance within the GEF International Waters portfolio. IWCs convene on average 300 participants from about 70 projects and at least 80 countries. The IWC7 theme is "Economic Valuation as a Tool to Bridge the Science-Policy Gap". This sub-component will be executed by UNDP.
- **Sub-component 4.1.8: Hosting two GEF-IWECO Project Partnership Conferences.** The project will support the convening of major conferences to coincide with Earth Day celebrations in June 2015 and 2017. This will represent an opportunity to bring in all the project partners and other stakeholders to learn of the project progress, contribute to future actions and build partnership networks. The year 2015 will mark the end of the UN International Decade for Action 'Water for Life' and the first of these events will be themed around a review of progress in water resources and related natural resources management in the Caribbean region over the decade.

307. The main outputs of **Sub-Project 4** are as follows:

- Regional Needs Assessment and Comprehensive PA/PE Programme for regional and national implementation
- Findings from the KAP surveys for start, mid-term and end of project periods
- Best Practice Guidelines in all output formats

- Caribbean Compendium of Best Environmental Resources Management Practices in all appropriate formats
- Review and needs assessment for application of knowledge tools
- Toolkit suite of practitioner training modules including manuals and associated resource material; how-to and best-practice technical factsheets, brochures, leaflets, booklets, manuals
- Training-of-trainer events and workshop evaluations
- School resource toolkits, School field activities and documented outputs, SBAs, including science fair submissions, Submissions from school competitive events including *inter-alia* essays, poems, art pieces, song, film and other interpretive art pieces, children's resources including booklets, cartoon strips, board games, colouring books, puzzles
- IWEco Project website; project quarterly newsletters
- Musical, drama/theatre productions; radio and television jingles
- Calendars, posters, art products; billboards, bumpers stickers
- Feature-length film; YouTube videos (hosted on project website and other portals)
- Documented proceedings from local seminars and lectures
- Technical papers and presentations;
- Reports from professional exchange assignments and resource materials acquired from exchange assignments; conference proceedings, conference articles, digital video cast coverage, mainstream media coverage and associated articles

Regional Component 5: Project Management

308. This Component will comprise of two main activities

- Day-to-day Project Management through the PCU
- Co-ordination by the EA

309. **Activity 5.1: Day-to-day Project Management through the PCU**

310. A Project Co-ordinating Unit (PCU) will be based in the Environmental Health and Sustainable Development Department, of the Caribbean Public Health Agency in Saint Lucia and will serve as the IWEco Project Secretariat. Additional technical coordination, oversight, monitoring and administrative support will be provided by a dedicated Programme Officer and Administrative Assistant based at the offices of UNEP's Caribbean Regional Coordinating Unit in Jamaica. The Unit will be headed by a Regional Project Coordinator and the team shall consist of technical advisors from CARPHA, administrative support staff and consultants as required. The staffing of the PCU and terms of reference for individual members are contained in Appendix 11 of this project document. The PCU will be responsible for project management, organizing meetings of the PSC and RTAG, liaison with the component coordinating units, and liaison with UNEP/GEF, UNDP/GEF and GEF.

311. The IWEco Project PCU will have overall responsibility for the management of the project including the convening of RTAG and PSC meetings, networking and communication with close technical co-execution, oversight and support from UNEP Car/RCU. The PCU will report to UNEP and UNDP as the Implementing Agencies for onward reporting to the GEF

312. The PCU will also be responsible for co-ordinating the project oversight activities and for ensuring that all M&E requirements are implemented according to best practice (Component 6; Appendix 7). The PCU will be supported on a technical level by the RTAG constituents, the Research Partnership, Governance Partnership and the PA/PE Partnership as described in Section 4 (Institutional Framework and Implementation Arrangements). The project administrative implementation will be under the oversight of a **Project Steering Committee** (Section 4). The project executing arrangements (and organogram) are shown in Figure 8.

313. **Activity 5.2: Co-ordination by the EAs**

314. The Caribbean Public Health Agency (CARPHA) through its Environmental Health and Sustainable Development (EHSD) Department and UNEP's Caribbean regional Coordinating Unit will be act as **Co-Executing Agencies** for this project.

315. Although in general terms, UNEP/UNDP will provide overall supervision to project implementation and manage the funds provided to the project by UNEP/UNDP on behalf of GEF, in a manner consistent with UNEP/UNDP financial reporting requirements, UNEP CAR/RCU and CARPHA will provide a range of services throughout the project execution cycle (i.e. (1) project execution coordination and technical backstopping, (2) project monitoring and progress review and (3) project closure. UNEP Car/RCU will have lead responsibility for execution of the national sub-projects. CARPHA through its EHSD Department will have lead responsibility for execution of the regional 'umbrella' sub-projects.

316. In consultation with the PCU, the countries and UNEP as the lead IA and UNDP as the co-implementing agency, and as laid down in Appendix 11 (refer to the UNEP ProDoc) in accordance with the Project Coordination Agreement, it will subsequently sign with UNEP, it will coordinate project execution in accordance with the project execution plan laid out in the project document. Specifically it will (1) ensure quality of products, outputs and deliverables, (2) compile and submit progress, financial and audit reports to the IAs, (3) submit budget revisions to IAs for approval, (4) address and rectify any issues or inconsistencies raised by the IAs and/or the Steering Committee and (5) bring issues raised by or associated with countries to the IAs and/or the Steering Committee for resolution.

317. With respect to Project Monitoring and progress review , CARPHA-EHSD Department and UNEP Car/RCU will (1) ensure day-to-day coordination of project execution, (2) develop yearly project implementation reports (PIR), (3) support the organization of the mid-term evaluation (MTE) as a management tool, (4) support the development of a management response to MTE, (5) participate in and provide all information requested by independent TE, and (6) support the development of the management response to evaluation reports and Steering Committee recommendations.

318. At the time of project closure, CARPHA-EHSD Department and UNEP Car/RCU will (1) provide to the IAs information on realized outputs, inventories, submitted reports, verification of co-finance, terminal reporting, audit and financial closure and (2) it will contribute to knowledge management exercises in relation to project.

319. Total Cost Component (Sub-project) 5: **US$2,463,176**: GEF Grant: **US$535,473**; Co-financing: **US$1,927,703**

320. The **overall output** will be the completion of a well-managed program of activities.

Regional Component 6: Mid-term and Terminal Evaluation

321. The project will meet the standard monitoring and evaluation (M&E) requirements and procedures of UNEP and UNDP. All reports (technical, administrative and financial) will be the responsibility of the PCU. In addition the PCU will co-ordinate the independent mid-term and terminal evaluations. These actions, in combination with regular meetings of the project Steering Committee, will comprise continuous monitoring and evaluation of the project and enable adaptive management changes to be recommended. Terms of Reference for this evaluation are contained in Appendix 9 of the UNEP ProDoc.

322. The PCU will oversee the M&E activities of the whole project and ensure that Sub-Projects conduct M&E consistent with the agreed overall plan.

323. **Total Cost Component 6: US$306,297: GEF Grant: US$150,000; Co-financing: US$156,297**

324. Full details of the M&E Plan are presented in Appendix 7 and summarised in Section 6.

2.6 Project Indicators and Impact Monitoring

325. The proposed project builds on lessons learnt from the predecessor project the GEF-IWCAM Project that piloted innovate solutions aimed at addressing challenges associated with poor watershed and coastal areas management and governance for integrated water resources management. This project, being a multi-focal area project will seek to adopt an integrated resource management approach - beyond water resources management, that sharpens the focus on sustainable land management, biodiversity and sustainable forestry management within the watershed management spatial construct as successfully demonstrated by the IWCAM Project.

326. The potential risks to the project implementation are described in section 3.5 below; the key assumptions for this intervention are:

- There is cohesion amongst the regional and national stakeholders in the approach for project implementation;
- The regional and international partners are engaged in project design and perceive mutual benefits;
- The GEF and project partners remain committed to project implementation and demonstrate flexibility and adaptive management given the possibility of changes on the project implementation landscape over the course of project implementation;
- Governments integrate environmental considerations within mainstream planning in respect to contributions to improved health and livelihood attainment and that the benefits of investments in environment is adequately reflected in national accounts and standard development indices;
- Development partners continue to support investments in improved environmental management towards improved community welfare and economic livelihoods;
- Governments will continue to demonstrate commitment toward investment in human resource and institutional capacity strengthening within both state and non-state agencies and that they are able to find alternative avenues to address issues through re-tooling and redeployment of human resources in consideration of economic challenges faced by governments;
- The international donor community and other partners will continue to support national and regional stakeholder groups in capacity building and empowerment efforts;
- The private sector will be engaged in project implementation and perceive mutual benefits in the context of economic gains from environmental stewardship and will contribute resources and share responsibilities in project execution;

- Governments and partners will continue commitment and investments in monitoring systems established by the project and that stakeholders recognize and value the benefits of monitoring systems and will contribute towards maintenance of such systems. It is assumed that the results and information from monitoring systems will be effectively communicated toward effecting meaningful change in practice and that the design of systems will be sensitive to capacities of stakeholder agencies to maintain these systems.
- Information captured from the project is achieved in a manner that lends to easy translation to many audiences and that countries actively use and promote best practices through regulatory avenues and practice codes at the national level. The beneficiaries and other stakeholders are assumed to become involved in sharing and advancing improved practices;
- There will be technical and administrative oversight, commitment and resource allocation by the co-executing agencies to facilitate successful project implementation.

2.7 Risk analysis and risk management measures

327. The primary risk that the project may face is low level of buy-in or uptake of the investments that are delivered under the project. The key factor in this case has mainly to do with the state of the economies in many of the Caribbean countries in relation to the degree to which state governments can commit core resources, both in terms of human and financial resources to continue making further investments or strengthening the enabling environments to make the interventions truly sustainable. High-level political or policy-level buy-in to foster strategy implementation is rather driven by the ability of government to realistically commit to these investments and if there are viable alternative options to contribute to sustainability that reside outside the public sector through private sector partnerships, this will be favoured.

328. The approach to be adopted by the IWEco Project will seek to address the sustainability issue that was highlighted in review of the IWCAM Project which noted that the private sector needed to be more prominent partners in the project interventions. Efforts at building public-private- partnerships (PPP) with the project were advanced in some countries notably the Dominican Republic and Jamaica and this approach will be expanded on in IWEco. The underlying assumption that underpins the risk management strategy is that the sustainable solutions proposed will be driven to the extent practical by business models and generation of revenue to beneficiaries. The IWEco Project must be cast as one that is not solely about environmental protection but rather building financial, economic and social security through good environmental practice through responsible actions that are seen to include stakeholders beyond the just the traditional state actors. The risks ratings and mitigation strategy is presented in Table 5 below.

Table 5. Risks and Risk Management Strategy

Risk Statement	Risk Level	Risk Mitigation Strategy
National water, land and ecosystems management policies and plans are not accepted by the governments and/or are poorly executed	Medium-high	• Project supports a transparent and all-inclusive consultation process. Strong leadership by national agencies and support by high-level "champion" policy makers. • Seek to empower civil society organizations and the private sector by their demonstrating and endorsing benefits of investment in integrated and sustainable water, land and biodiversity resources management.
Change in political administration that result in reversal or change of agreed plans and policies by previous administration	Low-Medium	• Involve multiple agencies and sectors in the formulation of the plans and policies, so that they are non-partisan and widely accepted. Engage opposition parliamentary representatives in the dialogue, planning and implementation processes
Occurrence of extreme events such as floods and hurricanes and other major natural disasters such as earthquakes	Medium-high	• Project activities implemented over a wide geographical area so as not to concentrate all impacts in one territory or portion of the region. • Project will also highlight ways to promote adaptation to climate change and lessen the impact of natural disasters.
Occurrence of adverse economic conditions and associated social destabilization	Medium	• Investment in appropriate and financially sustainable solutions that are effective with low level capital investment. • Build stakeholder buy-in and investment toward uplift of livelihoods at the local community level by provision of investment incentives under the project
Existence of governmental fiscal challenges that result in changing priorities diversion of human resource deployment to alternative areas	Medium- high	• Target increased engagement of the private sector so as to broaden buy-in beyond government. • The project to facilitate investment by the private sector and implement mechanisms to enhance long-term sustainability
Private sector do not perceive gains from the project and adopt a business as usual approach with negative impacts on the environment	Medium	• Project promotes best management practices to move toward adoption of voluntary schemes. Educate the private sector on national obligations to various regional and international environmental treaties

Risk Statement	Risk Level	Risk Mitigation Strategy
Innovative solutions are not technically and/or economically viable	Medium	• All national projects will be subject to a screening for technical and economic viability that will be part of the development of the detailed project workplan at project inception. This will be done in a participatory manner with stakeholders that include business interests and ministries with responsibility for fiscal investments • The project will solicit the active engagement of financing institutions in planning and implementation • Targeted research through the Research Partnership will inform the effectiveness of the project and allow for adaptive management
Low level of buy-in amongst senior policy stakeholders	Low-medium	• Implement innovative public awareness campaigns that feature special seminars around finance themes at both local and regional levels, as well as facilitated field excursions structured as part of the national and regional PA/PE strategy
Insufficient buy-in amongst the general community with limited awareness of the project and its outputs	Low- medium	• The project elevates the PA/PE campaigns to that of national 'blitz' campaigns through application of social marketing tools and methods.
Information outputs generated by the project do not become widely known	Low	• Investment in deliberate strategies for enhancement of communication by project proponents. • Active engagement of the national inter-sectoral committees for promotion to the wider community
Lessons and knowledge from the project are not effectively replicated across other Caribbean countries and other SIDS regions	Low	• Project proponents and stakeholders are empowered to share the knowledge and lessons through participation at regional and international fora. The project supports technical exchanges between countries • There is adequate documentation and widespread dissemination of these outputs
Capacity of community beneficiary groups are not at level to sustain the project outputs	Medium	• Project invests in community capacity building with particular focus on entrepreneurship and fostering of micro enterprises associated with the project
Low capacity to sustain monitoring and assessment of environmental benefits	Medium	• Project builds requisite capacity but also considers easily implemented tools and methods particularly relying on 'citizen

Risk Statement	Risk Level	Risk Mitigation Strategy
associated with the project implementation		science' approaches to augment the data capture capabilities of responsible state agencies
Insufficient sources of long-term finance to continue activities toward impacts after project closing	High	• The project focuses heavily on strong, self-reinforcing partnerships that are integrated into existing relationships and drivers for cooperation across a variety of specific actors. • Businesses, NGOs, communities and research partners' interest is spurned with the investments made in the form of in cash and in kind co-financing
Multiplicity of actors and complex management and coordination arrangements at regional and country levels could affect project implementation	Medium	• The responsibilities of the Executing Agencies (UNOPS, the Secretariat of the Cartagena Convention and EHSD Department) shall include coordinating the execution of their activities and components. • The executing agencies will closely liaise with the Regional Project Coordinator and will actively participate in the project steering committee and the project technical group, where both implementing agencies (UNEP and UNDP) will also participate (see below). • For the approval of the annual operational plan by the project steering committee close attention will be paid to ensure that the proposed activities by each co-executing agency are fully coordinated.

2.8 Expected Global, National and Local Benefits

329. Global environmental benefits would accrue through a regional approach to promote exchange of best practices in addressing priority concerns associated with water, land (forestry and coastal zone) and biodiversity within the trans-boundary system known as the Caribbean Sea. The global environmental benefits relate to preservation of the uniqueness of the resources of the Caribbean Sea basin, an area with relatively high biological diversity both in terms of terrestrial and marine ecosystems, contributions to global carbon sequestration and contribution to the well-being of populations in the region through economic development and social security. Specifically, through supporting implementation of the LBS Protocol, which also supports the GPA, the project will address a common threat of pollution of the regional sea, which is linked to the global oceans agenda. Through its support of Agenda 21 Chapters 17 and 18 as well as the MDGs and WSSD targets, the project contributes to human well-being and poverty eradication by sustaining water-

related and dependent livelihoods, securing food sources, promoting equitable access to water, and reducing water-related health risks in addition to resolving and preventing water-related use conflicts in water bodies. Further, the project will contribute to knowledge-sharing on mainstreaming SLM in SIDS and contribute to the global pool of knowledge on ecosystem function. Conservation of forest lands will contribute to global efforts aimed at conservation of biodiversity and enhancement of carbon sequestration in mitigation of the impacts of global warming on climate change.

330. Global benefits would be generated indirectly as the enabling environment leads to projects with on-the-ground investments in improved practices, and directly as sustainable land and ecosystems management is taken into consideration at the policy and institutional levels through better policies and incorporation of those concepts into the national development framework. The integrated and multi-faceted approach to natural resources management within a ridge to reef (or IWCAM) framework in the small island context serves to demonstrate how resources can be effectively utilised to realize added benefits across several thematic areas (water, LD and BD) as opposed to discrete sectoral interventions. This is also particularly useful given the resource poor circumstances that exist in many SIDS regions.

331. Specific Global Environmental Benefits under the GEF International Waters, Land Degradation (including SFM) and Biodiversity Focal Areas can be summarized as follows:

332. **Water resources (fresh and coastal):** enhancement of resilience of fragile coastal and marine ecosystems of the Caribbean Sea and contribution to maintenance of reliant livelihoods dependant on freshwater and coastal resources through reduced nutrient loading and other harmful pollutant discharges. IWEco builds on the multi-country cooperation approach reduce threats to the Caribbean Sea basin.

333. **Land degradation (and SFM):** Improved provision of agro-ecosystem and forest ecosystem goods and services with contributions to carbon sequestration through sustainable forest management, reduced upland erosion rates and reduced rates of sedimentation from watersheds into receiving environments. In terms of carbon benefits the following is estimated based on project interventions around sustainable forest/watershed management:

334. **Carbon sequestration:** through restoration and reforestation over an estimated 2,700 hectares of forests within the countries within upper watersheds, riparian zones and coastal ecotypes including mangroves over the project duration: Total of 180,327 tCO2 eq (based on the FAO estimate of biomass of 280 tonnes/ha applying a conversion factor of 3.76 with variable growth rates estimated between 17 and 20 tonnes/ha).

335. **Avoided carbon emissions:** Through in-situ conservation and sustainable forest management over approximately 46,000 hectares in upland watersheds areas and riparian zones that are typically dominated by broad-leaved wet forests, secondary woodlands, dry forest types and mangroves: Total of 408,103 tCO_2 eq (based on the FAO estimate of biomass of 280 tonnes/ha applying a conversion factor of 3.76 with estimates of annual deforestation rates from available sources).

336. **Biodiversity:** protection, maintenance and enhancement of terrestrial and aquatic ecosystems and associated species abundance and diversity. The Caribbean has been noted as being a biodiversity hotpot given the high level of endemism that occurs due to genetic isolation and evolution. Of the plant species, more than 70% are endemic and with respect to reptiles and amphibians, over 95% are endemic. Between 8 and 35% of species within the major marine taxa found globally are endemic to the Caribbean hotspot.

337. Through national actions the project seeks to place under protected management regimes at least 2,700 hectares of ecologically important biological corridors (comprising of riparian zones, dry coastal forest ecotypes and upland forest ecosystems) and contribute to reduced pollutant loadings, particularly of sediments and nutrients (phosphates and nitrates to within LBS Protocols limits) in avoidance of excessive eutrophication of nearshore waters and smothering of coral reef systems. Of highest conservation interest in the countries are the rare and/or endemic wildlife species (such as the Amazona parrots, manatees) and economically importantly species, particularly sedentary species such as conch and sea urchins that are particularly impacted by heavy sediment and nutrient loads.

338. **Up-scaling and replication from the GEF-IWCAM Project:** It should be noted that the GEF-IWCAM Project, not only initiated a process of reforms to implement an integrated approach to the management of watersheds and coastal areas (IWCAM) through activities to plan and manage aquatic resources and ecosystems on a sustainable basis, developing toolkits to support IWCAM reforms in policy, legislation and institutional arrangements, but also implemented pilot demonstration interventions aimed at improving the quality of fresh and coastal water resource for up-scaling and replication. In spite of these recent useful contributions, enabling environments in participating countries to foster replication and sustainability remain sub-optimal hence additional support is needed to drive toward reforms and wider implementation/replication of these solutions through joint programming with the GEF International Waters, Land Degradation and Biodiversity Focal Areas, within the integrated watershed and coastal area management (IWCAM), or “ridge to reef” framework. IWEco will therefore pay particular attention to the successes of the IWCAM Project in application of approaches, methods and technologies, and draw on approaches from other

national and regional interventions within the Caribbean and other SIDS regions in implementation across the national and regional components.

2.9 Country Ownership: Eligibility and Drivenness

Coordination with other GEF related initiatives

339. The proposed project will have linkages to several key GEF-financed initiatives that are currently being implanted across the Caribbean and other SIDS regions.

340. The **GEF-Caribbean Regional Fund for Wastewater Management (CReW)** established in 2011, seeks to provide sustainable financing for the wastewater sector, support policy and legislative reform, and foster regional dialogue and knowledge exchange among key stakeholders in the Wider Caribbean Region. The four year project, is being funded by the Global Environment Facility (GEF). The Inter-American Development Bank (IDB) and United Nations Environment Programme (UNEP) will be the co-implementing agencies for the project. The CReW aims at testing four individual Pilot Financing Mechanisms (PFMs) that will provide innovative financing modalities for wastewater management projects. CReW resources will be used for the capitalization of these four PFMs, and for providing technical assistance, such as design services, to ensure that the projects to be financed under the PFMs satisfy the technical, financial, socio-economic and environmental requirements of the CReW and local governments. The participating countries of the Wider Caribbean Areas include Antigua and Barbuda, Barbados, Belize, Costa Rica, Jamaica, Guatemala, Guyana, Honduras, Panama, Saint Lucia, Saint Vincent and the Grenadines, Suriname, Trinidad and Tobago.

341. The **GEF-Caribbean Large Marine Ecosystems (CLME)** - ***Sustainable Management of the Shared Living Marine Resources of the Caribbean Large Marine Ecosystem and Adjacent Regions*** covers Caribbean Large Marine Ecosystem (CLME) and the North Brazil Shelf Large Marine Ecosystem (NBSLME). Jointly referred to as the CLME+, this vast marine environment is characterized by globally significant levels of biodiversity, and provides critical goods and services that support enhanced livelihoods, human well-being and sustained socio-economic development in this region and well beyond. Under the five year (2009-2013) CLME Project a number of achievements were accomplished including the development of Transboundary Diagnostic Analyses (TDAs) and a Strategic Action Programme (SAP). The TDAs along with pilot projects and case studies implemented under the project served to inform the development of an agreed 10-year strategic programme of priority actions for improved policy, legal and institutional reforms, conservation measures, sustainable management actions and pollution control. A total of twenty-one countries (30 ministers) within the CLME+ Region have endorsed the CLME+ SAP. This is the first time under the GEF-International Waters Focal Area that such a large quorum of countries have agreed on an approach towards the governance and management of

the shared living marine resources. The CLME+ SAP has been developed as an "umbrella" Programme, meant to enhance cooperation among the region's many stakeholders, and to establish enabling conditions for creating synergies between the many different ongoing and planned projects and initiatives. The GEF Secretariat has agreed to support the region in its implementation of the CLME+ SAP: Catalysing Implementation of the Strategic Action Programme for the Sustainable Management of shared Living Marine Resources in the Caribbean and North Brazil Shelf Large Marine Ecosystems by providing funds in the amount of US$12.5 million to catalyse the implementation of the programme between 2014 – 2019. CLME+ countries will be supported in the execution of the actions of the SAP by the relevant regional and sub-regional organizations already active in the region (e.g. UNEP CEP, FAO-WECAFC, CRFM, OSPESCA and OECS, among others). Within this context, the IWEco Project and CLME+ Project will complement each other, as IWEco will continue to strengthen policies and capacities of individuals and organizations, and capabilities in respect of implementation of appropriate solutions to address land-based pollution and degradation as they impact the marine environment and its biodiversity. It is anticipated that the SAP will draw on these interventions and lessons to promote further upscaling and replication across the countries that fall beyond the remit of the IWEco Project. The close coordinated implementation between the CLME SAP and the IWEco Project will allow for joint learning and exchanging of best practices.

342. The **GEF Transboundary Waters Assessment Programme (TWAP)** will develop ecosystem-based assessment methodologies for five transboundary water systems (rivers, lakes, groundwater basins, Large Marine Ecosystems and open ocean) for the GEF in setting priorities and catalyse a partnership for conducting such a global assessment. The methodology will cover also inter-linkages among five water systems and will be used for assessing the changing conditions resulting from human and natural causes. The development of methodologies will be based on indicators and existing data and information sources. In the Caribbean the Caribbean Large Marine Ecosystem will likely be the principle waterbody under consideration, however it is anticipated that the knowledge products generated by the project will be of high relevance to IWEco.

343. The following are the GEF-funded national projects of relevance to the IWEco Project.

Table 6. Relevant national GEF initiatives to the IWEco Project by country within core focal area of the national project initiative.
Source: GEF Projects Database, accessed January 2014 (http://www.thegef.org/gef/project_list)

Country and IWEco national project focal area	GEF Project, status and implementing agency	Project objective/description
Antigua And Barbuda Land Degradation	Developing a Strategic Approach to Sustainable Land Management (CEO Approved)	Development of a strategic approach to Sustainable Land Management. This will be accomplished through the revision of the National Action Plan (NAP) for the UNCCD, aligning the NAP with the UNCCD 10-Year Strategy and creating provisions to facilitate the reporting and monitoring processes required by the Convention
Bahamas Multi-focal	Implementing Land, Water and Ecosystem Management	To develop a model of integrated land, water and ecosystem management for The Bahamas and other Small Island Developing States. *This project will be implemented in parallel with the full-sized GEF-IWEco Project.*
Barbados (participating at regional project level; no IWEco national project)	Assessment of Capacity Building Needs and Country Specific Priorities in the Conservation of Biodiversity and Participation in the National Clearing House Mechanism (under implementation; UNEP)	The overall goal and objectives of the Strategy and Action Plan attempt to address the range of issues relevant to the management of biodiversity in Barbados.
Cuba Biodiversity	Protecting Biodiversity and Establishing Sustainable Development of the in Sabana-Camaguey Region (Approved; UNDP)	Enhances current surveys of biodiversity by providing equipment and resources and assisting with rapid ecological inventories. Includes facilitating creation of geographic information systems, ongoing monitoring and analysis, and translation of data into procedures and guidelines for eco-tourism development
	Strengthening the National System of Protected Areas (under implementation; UNDP)	Conserve highly representative assemblages of four of Cuba's terrestrial ecoregions of global importance and classified as highest priority for conservation nationally and regionally
	Mainstreaming and Sustaining Biodiversity Conservation in Three Productive Sectors of the Sabana Camaguey Ecosystem (under implementation; UNDP)	Proposed FSP would promote operational changes within the tourism, fisheries and agriculture sectors to ensure biodiversity conservation across the sea and landscape that make up 80% of the archipelago.
	Application of a Regional Approach to the Management of Marine and Coastal Protected Areas in Cuba's Southern Archipelagos (under implementation; UNDP)	Globally significant marine biodiversity conserved and sustainably used through an extended, strengthened and integrated network of coastal and marine protected areas in the Southern Archipelagos region.
	BS Completion and Strengthening of the Cuban National Biosafety Framework for the Effective Implementation of the Cartagena Protocol (under implementation; UNDP)	To deal with the technical, legal, infrastructural and biosafety management gaps faced by Cuba's National Competent Authorities to ensure the successful and sustainable implementation of the Cartagena Protocol
	Agricultural Biodiversity Conservation and Man and Biosphere Reserves in Cuba:	To mainstream agricultural biodiversity into the management of the Cuban MaB Reserve System.

Country and IWEco national project focal area	GEF Project, status and implementing agency	Project objective/description
	Bridging Managed and Natural Landscapes (CEO endorsed; UNEP)	
	Enhancing the Prevention, Control and Management of Invasive Alien Species in Vulnerable Ecosystems (under implementation; UNDP)	To safeguard globally-significant biodiversity in vulnerable ecosystems, by building capacity at the systemic level to prevent, detect, control, and manage the spread of Invasive Alien Species (IAS) in Cuba.
	National Biodiversity Planning for Support in Implementing the CBD Strategic Plan 2011-2020 (CEO approved; UNDP)	To integrate the obligations of the Republic of Cuba under the Convention on Biological Diversity (CBD) into its national development and sectoral planning frameworks, through a renewed and participatory 'biodiversity planning' and strategizing process, in a manner that is in line with the global guideline contained in the CBD Strategic Plan for 2011-2020.
	A Landscape Approach to the Conservation of Threatened Mountain Ecosystems (Council approved; UNDP)	The Cuban Protected Areas System incorporates a landscape approach to management, strengthening the effectiveness of PAs as nuclei for the conservation of globally important species and ecosystems.
Dominican Republic Biodiversity	Re-engineering the National Protected Area System in Order to Achieve Financial Sustainability (under implementation; UNDP)	Project seeks to enhance the sustainability and conservation effectiveness of the national protected area system of Dominican Republic and its contribution to national sustainable development.
	Conserving Biodiversity in Coastal Areas Threatened by Rapid Tourism and Physical Infrastructure Development (Council approved; UNDP)	To ensure the conservation of biodiversity in ecologically important coastal areas threatened by the burgeoning tourism industry and associated physical development.
Grenada (participating at regional project level; no IWEco national project)	Development of a National Biodiversity Conservation Strategy, and Action Plan and Country Report to the CBD (under implementation; UNDP)	This project will assist the national Government to meet its obligations under the Convention on Biological Diversity.
	Assessment of Capacity Building Needs and Country Specific Priorities (CEO approved; UNDP)	The project proposal is to address in-situ and ex-situ conservation, incentive measures, specific threats to biodiversity, traditional practice, second report consultation and CHM.
	Implementing a Ridge to Reef Approach to Protecting Biodiversity and Ecosystem Functions within and Around Protected Areas (Council approved; UNDP)	To ensure that biodiversity and ecosystem functions within and around marine and terrestrial PAs in Grenada are better protected from threats through the adoption of an integrated "ridge to reef" approach that increases PA management effectiveness and applies targeted sustainable land management practices
Jamaica Biodiversity	Development of a National Biodiversity Conservation	This project will assist the national Government to meet its obligations under the Convention on Biological Diversity.

Country and IWEco national project focal area	GEF Project, status and implementing agency	Project objective/description
	Strategy & Action Plan and Report to the CBD (under implementation; UNDP)	
	Strengthening the Operational and Financial Sustainability of the National Protected Area System (under implementation; UNDP)	To consolidate the operational and financial sustainability of Jamaica's National System of Protected Areas.
	National Biodiversity Planning to Support the Implementation of the CBD 2011-2020 Strategic Plan (CEO approved; UNDP)	To integrate Jamaica's obligations under the Convention on Biological Diversity (CBD) into its national development and sectoral planning frameworks through a renewed and participative 'biodiversity planning' and strategizing process, in a manner that is in line with the global guidance contained in the CBD's Strategic Plan for 2011-2020.
	Assessment of Capacity Building Needs, Preparation of the Third National Report (CBD) and the Clearing House Mechanism (CEO approved; UNDP)	To evaluate existing needs and to propose a programme to build institutional and human resources capacity for conservation and sustainable use of Jamaica's biodiversity.
	Integrated Management of the Yallahs River and Hope River Watersheds (multi-focal area; CEO Endorsed; IADB)	Improve the conservation and management of biodiversity and the provision of ecosystem services in the Yallahs River and Hope River watersheds.
St Kitts & Nevis Land Degradation	Conserving Biodiversity and Reducing Habitat Degradation in Protected Areas and their Buffer Zones (Council approved; UNDP)	Conserving Biodiversity and Reducing habitat degradation in Protected Areas and their Buffer Zones
Saint Lucia Land Degradation	Iyanola - Natural Resource Management of the NE Coast (PPG Approved; UNEP)	Increased management effectiveness and sustainable use of the North East Coast's natural resource base to generate multiple global environmental benefits.
St Vincent & the Grenadines Land Degradation	National Biodiversity Strategies, Action Plan, and the Report to the Convention on Biological Diversity (under implementation; UNDP)	The main objective of this project is the formulation of a National Biodiversity Strategy and Action Plan through a fully participatory process that will include government, private sector, and NGOs.
Trinidad & Tobago Land Degradation	Improving Forest and Protected Area Management (PPG Approved; FAO)	To conserve biodiversity in Trinidad and Tobago by consolidating the protected area system, building capacity for conservation management and reducing forest degradation.

Other relevant non-GEF interventions in the Caribbean

344. **Caribbean Pilot Program for Climate Resilience (PPCR), Regional Strategic Program for Climate Resilience (SPCR)** is financed by the Climate Investment Funds (CIF), which are a pair of funds to help developing countries in piloting transformations in

clean technology, sustainable management of forests, increased energy access through renewable energy, and climate-resilient development. The program is designed to the Caribbean region to build on the adaptation efforts, as well as complement other climate related activities within the region. The PPCR objectives are (i) to pilot and demonstrate approaches for integration of climate risk and resilience into development policies and planning, (ii) to strengthen capacities at the national levels to integrates climate resilience into development planning, (iii) to scale up and leverage climate resilient investment, building upon other ongoing initiatives; and (iv) to enable learning-by-doing and sharing lessons at the country, regional and global levels. The objectives of the Caribbean PPCR will be pursued through separate multi-year Strategic Programs for Climate Resilience (SPCRs) for the six national tracks and single regional track of PPCR pilots. The following are the priority areas at the **national level** for the common IWEco participating countries (note Dominica and Haiti are included under the PPCR):

- **Grenada:** Integrated water resource management, capacity building at the sector level, and data management;
- **Jamaica:** Agriculture, land-use planning, health, water resources, integrated coastal zone management, climate proofing of national and sectoral plans, tourism, and data management;
- **Saint Lucia:** Agriculture, coastal and marine resources, financial sector, forestry, biodiversity, health, human settlement, critical infrastructure, tourism, and water resource management. Data needs include bathymetric and hydrometric data;
- **Saint Vincent and Grenadines**: Monitoring and evaluation of environmental hazards, watershed management, public sensitization and awareness, integrated planning, and data management.

345. The **regional strategic program** for climate resilience comprises of four main components, each focused on a clearly identifiable stage of climate adaptation. These stages are mainly (1) collection of climate relevant data, (2) data analysis, (3) impact modelling and (4) applied adaptation.

346. **Capacity Building Related to Multilateral Environmental Agreements (MEAs) In African, Caribbean and Pacific (ACP) Countries Phase 2** – ***The Caribbean Hub Sub-Component*** is part of the overall European Commission Programme for Capacity Building related to the implementation of MEAs in the African, Caribbean and Pacific (ACP) countries. Under the EUR 1,000,000 (US$1,352,500) project that runs to 2018 the CARICOM Secretariat, as the regional hub, will continue to deliver quality capacity-building services to Caribbean countries, such as negotiations skills development, resource mobilization support, environmental mainstreaming, guidance on MEAs enforcement and coordination, strategic planning, and support for the synergistic implementation of MEAs in an integrated manner. The project will entail the provision of services to assist Member States in strengthening their

technical and institutional capacity to address environmental management problems by strengthening intersectoral linkages and employing appropriate tools, strategies and instruments relating to the biodiversity and chemicals and waste clusters of MEAs. This will enable Caribbean countries to better address development challenges related to biodiversity loss, sustainable use of biodiversity resources, waste management, and the management of chemicals and hazardous substances.

2.10 Cost Effectiveness

347. The project will adopt a cost-effectiveness approach where it seeks to contribute to and strengthen existing processes at both the national and regional levels building on the lesson learnt from the GEF-IWCAM project and other relevant initiatives. The analysis of the baseline has demonstrated that significant work is being undertaken across the region and there are many opportunities for synergistic collaboration and cooperation. The formation of an expanded partnership with agencies that are already doing significant research, policy and awareness-raising work in the region will benefit project execution in that it will bring the collective knowledge and experiences of these agencies to bear without having to 're-create' the approaches and solutions from scratch.

348. The implementation of the suite of 'innovative solutions' that form the core of the national sub-projects will rely on successful achievements in application of these solutions in other parts of the globe and in particular within other SIDS regions. The project will foster joint learning opportunities across the participant countries where technical elements associated with the national projects will be 'regionalized' in that common themes will be highlighted for development of tools and methods that will be of benefit to a multi-country implementation approach. To illustrate, the OECS sub-regional countries are all investing in sustainable land management interventions, creating an opportunity for joint cooperation through the OECS Secretariat in implementation of the EU-financed SLM project.

349. Cost-effectiveness will be realized within the design of the national sub-projects at project inception through detailed economic and technical feasibility assessments that will result in the fine-tuning of the project implementation modalities, adjustments in the technical application of the innovative solutions envisaged at the FSP planning stage and in identification of sustainable livelihood opportunities. The assessments will ensure that the GEF investments will be technically feasible and importantly, sustainable post-project. Particular attention will be paid to the local enabling environment (policy and fiscal incentive frameworks), the capacity of the beneficiary stakeholders with state and non-state agencies, communities and relevant private sector partners. The assessment will substantially inform the detailed national project work plan components.

2.11 Sustainability

350. The IWEco Project draws on the experiences from the GEF-IWCAM Project in the implementation of innovative solutions aimed at addressing pollution and environmental degradation within watersheds and receiving coastal waters. The lessons learnt in terms of sustainability factors that need to be considered were documented during project implementation and highlighted during the project mid-term and terminal reviews.

351. In terms of institutional arrangements at the national level, the national intersectoral committees must play a major advisory role so as to facilitate the mainstreaming of project outputs within the national policy, legislative and regulatory frameworks. These NICs must have multi-sectoral representation so that participation is drawn across all primary interest groups so that buy-in is generated not only within the responsible state agencies but amongst communities and the private sector. These groups must see the relevance of the project intervention and how they stand to benefit. Where multi-sector committees already exist and are functional, these mechanisms should be utilized and/or strengthened.

352. The project will place significant emphasis on building capacity at the individual and institutional levels within both state and non-state organizations. Capacity building will be channelled through the national projects via on-site learning where the tools and techniques associated with implementing will be captured in the form of best practice guidelines and experience notes. These will be transferred to other national stakeholders' in-country and in other participating countries (and SIDS in other regions of the globe) through replication of training activities. Technical exchanges between country resource persons will assist in contributing to sustainability of technical inputs and long-term application. Broadening capacity building beyond the formal state agencies through use of citizen science approaches to assist with relatively simple data capture methods for learning and awareness raising that target schools and communities will contribute to sustainability at the 'grass-roots' level.

353. In terms of sustainability through the continued operation and replication of the on-ground project interventions, generation of economic benefits is necessary. While the benefits of some of the interventions will be long-range in financial returns and distributed over the community and the country as a whole, some aspects of the project should demonstrate shorter-term financial gains to targeted stakeholders who are among the most direct beneficiaries. At national project inception all the national sub-projects will be subjected to a further socio-economic screening not only to assess the risks but to evaluate the revenue generation potential and social impacts so that the initiatives can be fine-tuned to expand the financial flows to the community and private sector. The GEF-SGP will be instrumental in supporting this effort to generate sustainable financial benefits to the community and augmented

by technical support from the partnership agencies with capacities in community empowerment with assistance from social development ministries and local micro-credit finance institutions.

354. It is widely accepted that given the fragile state of Caribbean economies and their vulnerabilities, financial resources from the state level will continue to remain concentrated within the main social support programmes; education, health care and infrastructure, with relatively little earmarked for dedicated environmental initiatives. It is therefore expected that the donor community including the GEF mechanism will be solicited in supporting the countries to continue to build on the initiatives in environmental management particularly where benefits are to be accrued through enhancement of climate resilience. The IWEco Project will be contributory to the increment that demonstrates tangible benefits and will provide a platform for continued resource commitments from the donor community. The private sector will be engaged from the perspective of the direct and indirect benefits in the context of sustainability of business operation and the need to make investments perhaps beyond the tax regimes and other financial compensation frameworks they are subject to. The project expects to contribute to forging corporate environmental stewardship through financing or supporting efforts derived from the project.

355. A key pillar in securing sustainability is through education and awareness raising. At the local kevel the project will partner with relevant local stakeholders inclusive of the public and private sector, along with communities to launch the PA/PE programme to achieve maximum exposure to the project and what it intends to deliver. This will be championed by the National Intersectoral Committee. (NIC) Linkages will be sought through existing public awareness initiatives on the environment and strategic marketing alliances will be forged with private sector firms having mutual interests on environmental protection that have a high visibility in the community. Avenues for broadening public awareness will be sought through school and youth programmes, particular these aimed at getting people out in the field to observe and measure the state of the environment thorough programmes or these similar to Sandwatch using the tools like the Community-based Assessment Resource Toolkit developed under the IWCAM project. Partners such as Caribbean SEA, PCI Media Impact, CANARI and Panos Caribbean will assist with taking messages from the community intro mainstream media and new web-based applications. For high-level decision makers special fora will be organized to translate messages in the appropriate language; these will include ‘structured’ on-site retreats to not only heighten awareness amongst this audience but also to help blend government and fiscal policy to the project objectives with a view to identify pathways to sustainability.

2.12 Replicability

356. The project is designed with the purpose of up-scaling and replication of best technologies and practices, particularly those that were generated under the GEF-IWCAM Project. Given that the IWEco Project is a multi-focal area where countries have committed national STAR allocations from respective focal areas and have consequently designed on-ground interventions accordingly, it is anticipated that replication will be broadened for application and tracking of benefits across not only impacts to water resources, but also land and biodiversity resources with the added consideration of carbon benefits.

357. The country interventions with high potential for replication under the land degradation component include upland reforestation and riverbank stabilization through planting programmes that will utilize indigenous and exotic species with low mortality rates and high ability to adapt to the environment. Incorporation of low-cost bioengineering soil/slope stabilization and drainage control measures will be encouraged particularly in stabilization of unconsolidated soils within active and abandoned mining areas. In the case of Antigua and Barbuda, Saint Lucia and Jamaica issues of overland pollution and land degradation due to septage and oily waste discharge will be addressed with replicable innovations in terms of appropriate technologies to reduce discharges to the environment. Biodiversity interventions will overlap with land degradation remedial measures particularly those relating to restoration and amelioration of vegetative cover that will also benefit soil conservation and water balances. Innovative measures for replication will include development or revision of management plans and strengthening of improved land management practices that will positively impact bot terrestrial and marine protected areas and other biodiversity hotspot areas. Measures to be supported under the sustainable forestry management focal area will be aligned with both land degradation and biodiversity investments. Innovative methods for facilitating enhanced biomass accumulation in terms of commercial forest utilization and conservation for biodiversity and ecosystems management will be harnessed for up-scaling and replication. Actions at the country level will be also supported under the International Waters focal area replicating the IWCAM or ridge-to-reef framework. These interventions will be cross-cutting and will incorporate pollution control that impacts land and biodiversity resources. Innovative approaches will include low-water use livestock effluent management techniques, wastewater recycling and removing pollutants from commercial waste streams. The lessons learned from these interventions will continue, as with the GEF-IWCAM, to contribute to the regional and global SIDS exchange of best practices. State-of-the-art water resource monitoring and assessment approaches at both the 'informal' and community levels, and at the formal level through instrumented systems, will have high potential of up-scaling and replication

358. At the initial stages of in country project implementation, local technical personnel from counterpart participating countries that have shared interests along thematic lines, will be brought together to learn and share experiences for replication in their own countries. This technical and professional exchange programme will continue throughout the duration of the project, supported in a demand basis as need arises. One support to the replication process will be the targeted research programme associated with monitoring of the project indicators specific to the various GEF focal areas and cross-cutting with other focal areas. Evidence based and targeted research led by the Research Partnership and fed through to the RTAG will be used to determine the most appropriate options for replication. These options will be well-documented and promoted through scientific publication and presentations at appropriate fora.

359. The project will support a structured process for replication of best practices through the production and dissemination of knowledge products utilizing conventional means such as brochures, tech-packs and other printed resources. The project will promote the use of web-based platforms such as YouTube and Facebook within the Community of Practice portals to share information. The GEF IWLEARN Eforum will be a particularly useful platform, in addition to others such as the Caribbean Environment Programme (CEP) CHM, UNCCLearn, the United Nations Platform for Training Services on Climate Change, World Overview of Conservation Approaches and Technologies (WOCAT) and the Small Island Developing States Network (SIDSnet). The project will pay particular emphasis on results reporting by communicating its achievements in terms of progress towards the development objective through telling the story of the project. The series of "IW: Delivering Results" will be filled with stories from the project where the development impacts and lessons learnt will be documented in an reader friendly format.

SECTION III: MANAGEMENT ARRANGEMENTS

3.1 Implementing Agencies

360. The Project will be part of a joint initiative with UNEP. UNEP will act as the lead agency and will be in charge of implementing Components 1, 2, 3, 4 and 5.

361. UNDP will be responsible for the implementation of part of Components 1 and 4, specifically Outcomes C1.5.d (SGP subcomponent), C4.1.5 and C4.1.7. The resultant financial allocation for each agency is shown in Table 7. This project document will document the components that UNDP is accountable for.

Table 7. GEF funding per implementation agency

COMPONENTS/Outcomes	UNDP	UNEP

Component C1 - Development and Implementation of Integrated Targeted Innovative, climate-change resilient approaches in SLM, IWRM (including WUE), ICZM and maintenance of ecosystem services	**973,000**	**11,303,414**
Output C1.5.d. Employment and revenue generation opportunities by communities and private sector associated with project activities (SGP)	973,000	245,000
Component C2 - Strengthening of the Sustainable Land Management (SLM), Integrating Water Resources Management (IWRM) (and Water Use Efficiency (WUE)) and ecosystems Monitoring, and Indicators framework	**-**	**1,303,782**
Component C3 - Strengthening of the Policy, legislative and institutional reforms and capacity building for Sustainable Land Management (SLM), Integrating Water Resources Management (IWRM)/Water Use Efficiency (WUE) and ecosystem services management	**-**	**5,042,008**
Component C4 - Enhancing knowledge exchange, best-practices, replication and stakeholder involvement	**487,721**	**887,895**
Output 4.1.5. Project website (according to IW:LEARN guidelines) and media products	146,791	-
Output 4.1.7 7th GEF-International Waters Conference (US$ 295,000) and support participation of project personnel and stakeholders to 2 IWC conferences 2015 and 2017 (US$ 45930)	340,930	-
Project Management Cost (PMC)	**39,279**	**496,194**
Monitoring & Evaluation	**-**	**150,000**
TOTALS	**1,500,000**	**19,183,293**

362. UNDP will have a shared role with UNEP in the Knowledge Management component, to enhance knowledge exchange, best-practices, replication and stakeholder involvement within and amongst beneficiary communities, professionals, and the private sector at the national, regional and global levels.

363. UNDP will be particularly in charge of hosting of the GEF International Waters Conference IWC7 and supporting the establishment of an innovative ICT application and web portal to provide access to training and to increase the flow of information between experts, institutions and networks.

364. Also, resources from the IW Focal Area will be executed through utilization of the GEF Small Grants Programme model, in a community based component that will enhance local communities' capacity in environmental management and sustainable development. More specifically, the executing agency for the UNDP project will be UNOPS. UNOPS will engage the SGP project staff to provide services to the project for support in strengthening of livelihood opportunities in the development and execution of small-scale community investments associated with the national sub-projects in the eight countries. As the SGP is managed under a separate project implemented by UNOPS, the time and costs of UNOPS personnel utilized under that project for this initiative will be fully accounted for and funded by this project to ensure there is no cross-subsidization by the SGP project to this project.

3.2 Executing Agencies

365. For the funds to be implemented by UNDP the project will be executed by UNOPS. To this end a detailed project management plan will be prepared in collaboration with the UNDP Project Manager(s) in order to support a timely implementation of the activities. This management plan will specify the actions, timelines and responsibilities for review at the inception workshop. It will be completed and updated throughout the life of the project as relevant in accordance with the various annual reviews such as steering committees. The proposed execution arrangements take advantage of the recognised expertise of UNOPS in project execution and management in multi-country projects. The responsibility of this executing agency for the UNDP´s funds is to provide support to the project management and to assist the project staff in implementing the project's objectives.

366. In the case of funds to be implemented by UNEP, the project will be co-executed by the Secretariat to the Cartagena Convention, UNEP Caribbean Regional Coordinating Unit (Car/RCU) and the Environmental Health and Sustainable Development (EHSD) Department of CARPHA, with the Secretariat assuming the role of lead Executing Agency in case of UNEP funds. The proposed execution arrangements take advantage of the recognised expertise of CARPHA's EHSD Department (with the scope of responsibility from CEHI) in the field of freshwater resource management, land degradation assessments and pollution control and ecosystems quality/functioning assessment; and the Secretariat to the Cartagena Convention in matters related to the marine and coastal environment and in working in a multi-lingual environment. Both agencies have long established relationships with the countries of the region and importantly have the depth of experience garnered from the co-executing arrangements from the GEF-IWCAM Project. Sustainability of project benefits at the regional level will continue to be enhanced through these arrangements.

367. The responsibilities of the Executing Agencies (UNOPS, the Secretariat of the Cartagena Convention and EHSD Department) include coordinating the execution of their activities and components. To this end they will closely liaise with the Regional Project Coordinator and will actively participate in the project steering committee and the project technical group, where both implementing agencies (UNEP and UNDP) will also participate (see below). For the approval of the annual operational plan by the project steering committee close attention will be paid to ensure that the proposed activities by each co-executing agency are fully coordinated.

368. While at the national level, project implementation arrangements may vary but the general structure applies as follows (refer to the national sub-project documentation). Each participating country will designate a National Project Focal Point (NPFP) for the project and will further foster the establishment as relevant a National Intersectoral Committee (NIC). This NPFP should not be taken to be the

GEF National Focal Point (or the GEF Operational Focal Point), but rather the technical focal point within the line agency that has been designated with responsibility for the execution of the project. Regarding the NIC, where similar national intersectoral bodies are functional (with remits for environmental management and perhaps climate change) these mechanisms should be used rather than establishing a new entity. As with the GEF-IWCAM project the function of the NIC will be to ensure complementarity in implementation of activities associated with the project with other national initiatives and attempt to maximize synergistic relationships. The NIC also serve to guide the mainstreaming of outputs from the project within national strategies and polices. The National Project Focal Point will sit on this NIC, and will act as the country's representative to the Regional Project Steering Committee (RPSC).

369. For each project country a National Project Steering Committee (NPSC) will be formed. This committee will comprise of the direct technical contributors and project beneficiaries, representing both state and non-state organizations. The NPFP will act as the Chair of the national Project Steering Committee (NPSC) thereby establishing the NPFP as the key focal point for interactions with the Project Co-ordination Unit. For the day-to-day administration of the national project a National Project Manager (NPM) will be recruited, along with at least a technical officer and an administrative officer. An outreach and communications officer may be considered but this will depend on the complexity of the national project and national budgetary provisions made available; further, the role of the outreach/ communications officer may be combined within the terms of reference of the project manager or the technical officer. This information is elaborated in the National Sub-project Documents. The NPM will report to the NPSC on progress of implementation on a quarterly basis.

370. Regional co-ordination and collaboration will be facilitated through a Regional Project Co-ordination Unit (PCU), consisting of appropriate professional and support staff that will also provide technical assistance and advice to the participating countries. The staff of this team may be augmented through secondment of national staff to the project. The IWEco Project Coordination Unit will be established and operated out of EHSD Department of CARPHA (based in Saint Lucia). The staffing of the PCU and terms of reference for individual members are contained in Appendix 11 of this project document.

371. The Regional Project Steering Committee (PSC) will meet annually to monitor progress in project execution, to provide strategic and policy guidance, and to review and approve annual work plans and budgets. The Committee will be chaired by a national representative (on a rotational basis) and will consist of the national project focal points (NPFPs) from all participating countries, representatives of the two GEF Implementing Agencies, the three co-Executing Agencies comprising the core group, along with the CARICOM Secretariat and the OECS Secretariat. The Project

Coordination Unit will provide the Secretariat to the RPSC. The Steering Committee may decide, in its absolute discretion, to vary this membership through the addition of representatives from other IGOs, NGOs, and the private sector, particularly significant co-financiers.

372. The project, through the PCU and through the approval of the Regional Project Steering Committee, will adopt a Regional Technical Advisory Group (RTAG). The RTAG will advise the Steering Committee and the PCU on project technical issues at the local project level and at the regional level. Each country will nominate a suitable technical representative to the RTAG (could be the National Project Manager or the National Project Focal Point or another designate, on condition that the technical acumen of the nominee meets requirements). These representatives, including designates from the IAs and EAs will from the 'core group'. The RTAG will include agency designates from three partnership groupings that have been established to support the project; the Research Partnership, the Governance Partnership and the PA/PE Partnership. The host of agencies that are partnering with the IWEco Project are clustered within these three groupings (though not excluded from participating in others) based on core technical competencies delivered to the project. These partnership clusters will include agencies that are actively implementing components of the project either at the national and/or regional levels via resourced partnership Implementation Agreements. Meetings of the RTAG will take place annually immediately following the RPSC meeting. Participation of the agency partners will depend on the RTAG agenda, also with due consideration to avoid unwieldiness and costs associated with bringing all the partners to meetings annually. A mechanism will need to be devised to have collective representation from the partnership clusters. The PCU will serve as the secretariat for the RTAG. Figure 8 illustrates the project organizational arrangements.

373. A biennial IWEco Partnership Forum will be convened after the first two years of project implementation followed by another towards the final year of the project. The Partnership Forum will be formulated like a conference to be attended by both representatives of the PSC and the full RTAG, along with donors, private sector collaborators and other regional and international governmental and non-governmental agencies. The main objective will be to review the contributions of the project, uptake the lessons learned, knowledge gained and seek out opportunities for replication, forge new collaborations and initiatives and consider policy and implementation mainstreaming at the SIDS regional and global levels.

UNDP/GEF Implementing Arrangements diagram:

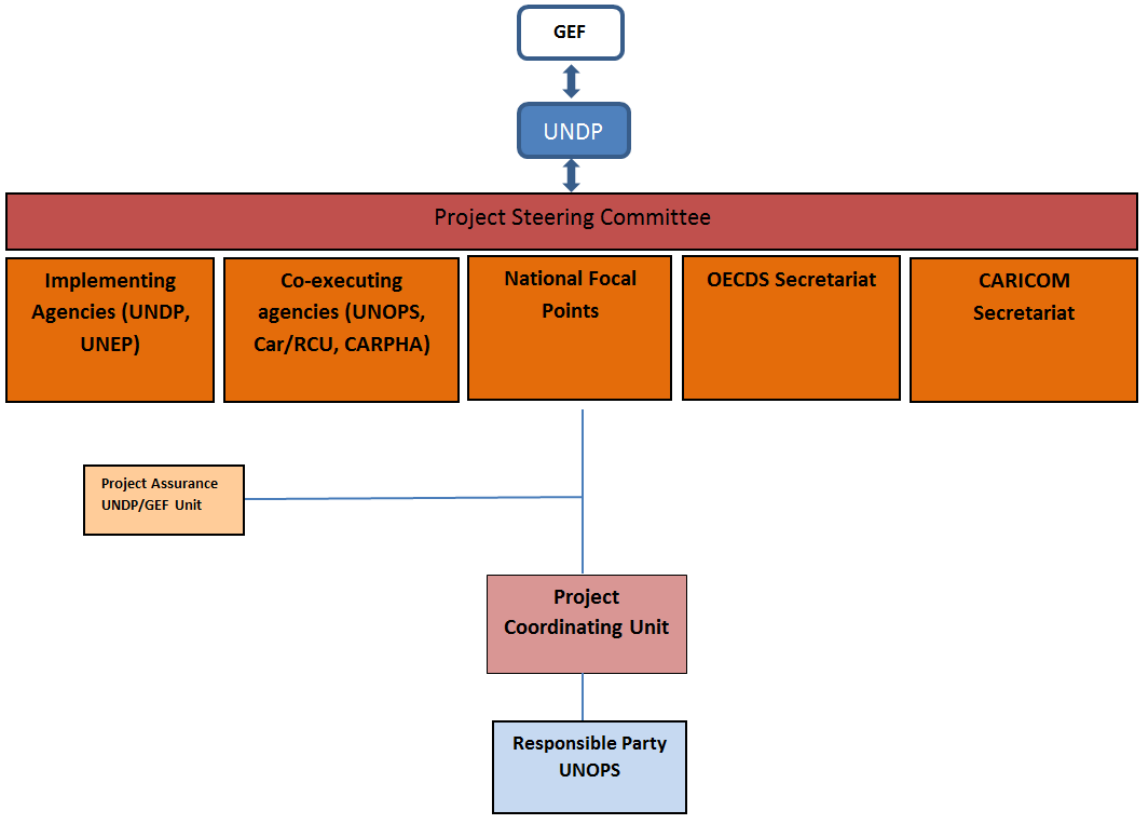
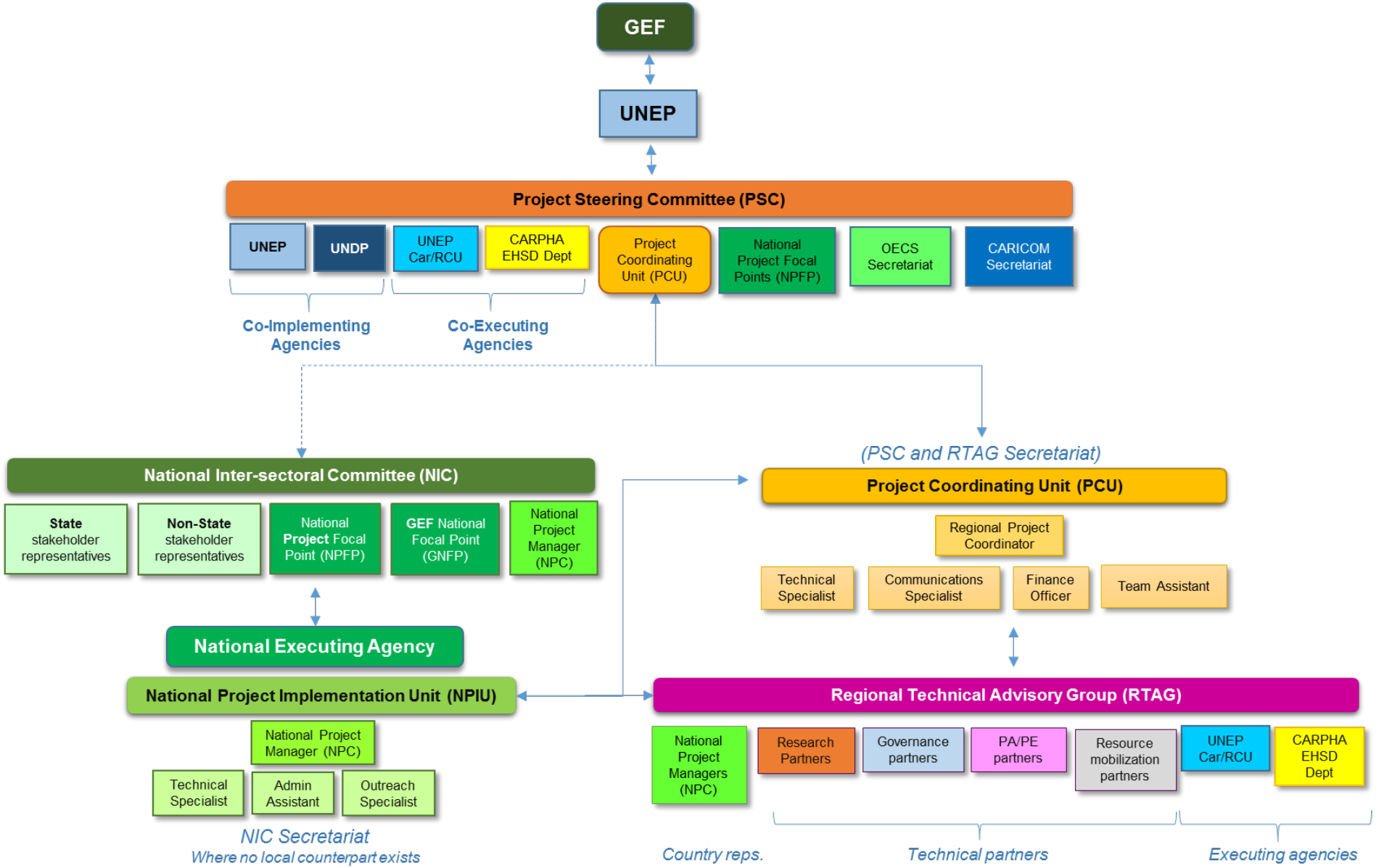


Figure 8. IWEco Project Organogram – governance mechanisms and relationships



PART IV: MONITORING AND EVALUATION PLAN

4.1 Reporting of monitoring process

374. Monitoring and Evaluation include a series of linked activities, including a complete Project Document, Project Implementation Review (PIR), Tripartite Reviews, Annual and Quarterly Project Reports (and thence to the GEF Project Implementation Review Process), Work Plan, and independent mid-term and final project Evaluations (see Table 7). Monitoring and evaluation begins with preparation of the Project Document, complete with logical framework matrix (LogFrame) developed according to standard M&E procedures, including clear indicators of implementation progress and means of verification.

375. The project M&E plan is consistent with the GEF Monitoring and Evaluation policy. The Project Results Framework presented in Appendix 4 includes Self-Monitoring, Analysis and Reporting Technology (SMART) indicators for each expected outcome as well as mid-term and end-of-project targets. These indicators along with the key deliverables and benchmarks included in Appendix 6 will be the main tools for assessing project implementation progress and whether project results are being achieved. The means of verification and the costs associated with obtaining the information to track the indicators are summarized in Appendix 2. Other M&E related costs are also presented in the Costed M&E Plan and are fully integrated in the overall project budget.

376. The M&E plan will be presented to the first meeting of the PSC to ensure project stakeholders understand their roles and responsibilities vis-à-vis project monitoring and evaluation. The PSC will be responsible for proposing to UNEP management any necessary amendments to the M&E plan during project implementation. Indicators and their means of verification may also be fine-tuned by the PSC. Day-to-day project monitoring is the responsibility of the PCU but other project partners will have responsibilities to collect specific information to track the indicators. It is the responsibility of the Project Manager to inform UNEP of any delays or difficulties faced during implementation so that the appropriate support or corrective measures can be adopted in a timely fashion.

377. The Project Steering Committee will receive periodic reports on progress and will make recommendations to UNEP/UNDP concerning the need to revise any aspects of the Results Framework or the M&E plan. Project oversight to ensure that the project meets UNEP, UNDP and GEF policies and procedures is the responsibility to

the Task Manager in UNEP-GEF. The Task Manager will also review the quality of draft project outputs, provide feedback to the project partners, and establish peer review procedures to ensure adequate quality of scientific and technical outputs and publications.

378. Project supervision will take an adaptive management approach. The Project Manager will develop a project supervision plan at the inception of the project which will be communicated to the project partners during the first meeting of the PSC. The Project Manager will also be responsible for initial screening of the financial and administrative reports from the core partners prior to their submission to the Finance and Management Divisions of the United Nations Office at Nairobi. Progress vis-à-vis the delivery of agreed project outputs will be assessed by the PSC at least annually. Project risks and assumptions will be regularly reviewed both by project partners and the PCU on behalf of UNEP/UNDP. Risk assessment and rating is an integral part of the annual Project Implementation Review (PIR), preparation of which will be the responsibility of the Project Manager. The quality of project monitoring and evaluation will also be reviewed and rated as part of the PIR and the PSC shall clear the PIR prior to its final submission. Key financial parameters will be monitored quarterly to ensure cost-effective use of financial resources.

379. A mid-term management review will be conducted by the Task Manager in consultation with the Project Manager and the outcomes reported to the Project Steering Committee. An independent terminal evaluation will take place at the end of project implementation. The Evaluation and Oversight Unit of UNEP will manage both the mid-term and terminal evaluation processes.

4.2 Independent Evaluation

380. An independent terminal evaluation will take place at the end of project implementation. The Evaluation and Oversight Unit of UNEP will manage the terminal evaluation process. A review of the quality of the evaluation report will be done by the Evaluation and Oversight Unit and submitted along with the report to the GEF Evaluation Office not later than 6 months after the completion of the evaluation. The standard terms of reference for the terminal evaluation are included in Appendix 9. These will be adjusted to the special needs of the project.

381. The GEF tracking tools are attached as Appendix 15. These will be updated at mid-term and at the end of the project and will be made available to the GEF Secretariat along with the project PIR report. As mentioned above the mid-term review and terminal evaluation will verify the information of the tracking tool.

SECTION V: LEGAL CONTEXT

382. This Project Document shall be the instrument referred to as such in Article 1 of the Basic Assistance Agreement between the United Nations Development Program and those participating institutions which signed such agreement".

383. This project will be implemented by UNOPS in accordance with its financial regulations, rules, practices and procedures only to the extent that they do not contravene the principles of the Financial Regulations and Rules of UNDP. Where the financial governance of an Implementing Partner does not provide the required guidance to ensure best value for money, fairness, integrity, transparency, and effective international competition, the financial governance of UNDP shall apply. The Implementing Partner will request from UNDP financial funds in accordance with UNDP procedures.

384. The implementing partner shall:

a) put in place an appropriate security plan and maintain the security plan, taking into account the security situation in the country where the project is being carried;
b) assume all risks and liabilities related to the implementing partner's security, and the full implementation of the security plan

385. UNDP reserves the right to verify whether such a plan is in place, and to suggest modifications to the plan when necessary. Failure to maintain and implement an appropriate security plan as required hereunder shall be deemed a breach of this agreement.

386. The implementing partner agrees to undertake all reasonable efforts to ensure that none of the UNDP funds received pursuant to the Project Document are used to provide support to individuals or entities associated with terrorism and that the recipients of any amounts provided by UNDP hereunder do not appear on the list maintained by the Security Council Committee established pursuant to resolution 1267 (1999). The list can be accessed via http://www.un.org/Docs/sc/committees/1267/1267ListEng.htm

387. This provision must be included in all sub-contracts or sub-agreements entered into under this Project Document.

Auditing arrangements

388. Audit on project will follow UNDP Financial Regulations and Rules and applicable Audit policies.

Strategic Results Framework with GEF Increment

This project will contribute to achieving the following Country Programme Outcome as defined in CPAP or CPD: Improved quality of the water, land and biological resources in the Caribbean through application of appropriate solutions that maintains the flow of ecosystem benefits and their contribution to long-term socio-economic development in the Caribbean
Country Programme Outcome Indicators: Percentage of total national territory included in the National System of Protected Areas
Primary applicable Key Environment and Sustainable Development Key Result Area (same as that on the cover page, circle one): 2. Move towards the implementation of sustainable development models that will foster conservation of natural resources and ecosystem, climate change mitigation and adaptation, and use of renewable sources of energy, with the aim of reducing social and environmental vulnerabilities and thus achieving greater social equity and environmental justice.
Applicable GEF Strategic Objective and Program: Objective 1: : Implementation of an integrated approach to water, land and ecosystems services management, supported by policy, institutional and legislative reforms, and implementation of effective appropriate technologies to accelerate contribution to global targets on access to safe and reliable water supplies and improved sanitation, and contributing to improved ecosystem functioning in the Caribbean
Applicable GEF Expected Outcomes: ▪ Outcome C1.1: Measurable stress reduction at project sites through appropriate sustainable water, land and ecosystems management interventions that account for climate change. ▪ Outcome C1.2: Enhanced livelihood opportunities and socio-economic co-benefits for targeted communities from improved ecosystem services functioning. ▪ Outcome C 2.1: Strengthened national and regional systems for monitoring of environmental status with respect to key international agreements. ▪ Outcome C 3.1. Strengthened policy and legislation for the effective management of water, land and ecosystems resources that account for climate change Outcome C 3.2. Strengthened capacity of national and regional institutions and other stakeholders for water, land, and ecosystems management that accounts for climate change ▪ Outcome C 4.1. Improved engagement and information access for practitioners and other stakeholders through targeted knowledge sharing networks.
Applicable GEF Outcome Indicators: **International Waters – Focal Area Objective 1:** ▪ Outcome 1.1: Implementation of agreed Strategic Action Programmes (SAPs) incorporates transboundary IWRM principles (including environment and groundwater) and policy/ legal/institutional reforms into national/local plans. ▪ Outcome 1.3: Innovative solutions implemented for reduced pollution, improved water use efficiency, sustainable fisheries with rights-based management, IWRM, water supply protection in SIDS, and aquifer and catchment protection. ▪ Outcome 1.4: Climatic variability and change as well as groundwater capacity incorporated into updated SAP to reflect adaptive management. **International Waters - Focal Area Objective 2:** ▪ Outcome 2.1: Implementation of agreed Strategic Action Programmes (SAPs) incorporates ecosystem-based approaches to management of LMEs, ICM principles, and policy/legal/ institutional reforms into national/local plans. ▪ Outcome 2.3: Innovative solutions implemented for reduced pollution, rebuilding or protecting fish stocks with rights-based management, ICM, habitat (blue forest) restoration/conservation, and port management and produce measureable results. **Land Degradation - Focal Area Objective 3:** ▪ Outcome 3.1: Enhanced cross-sector enabling environment for integrated landscape management. ▪ Outcome 3.2: Integrated landscape management practices adopted by local communities. ▪ Outcome 3.3: Increased investments in integrated landscape management.

Biodiversity - Focal Area Objective 2:

- Outcome 2.1: Increase in sustainably managed landscapes and seascapes that integrate biodiversity
- conservation.

Sustainable Forest Management - Focal Area Objective 1:

- Outcome 1.1: Enhanced enabling environment within the forest sector and across sectors.
- Outcome 1.2: Good management practices applied in existing forests
- Outcome 1.3: Good management practices adopted by relevant economic actors.

Project Results Framework

(**Note**: For Component 1, which refers to the national sub-projects, only the primary key indicators, mid-term and end of project targets are listed in this 'amalgamated' logframe that collectively represents the 8 national sub-projects and the 3 regional-level sub-projects. Refer to the national sub-projects for further detail)

Project Goal: to enhance the sustainable flow of ecosystem services and their contribution to sustainable socio-economic development in the Caribbean through the application of appropriate solutions for the improved integrated management of water, land and biological resources					
	Key Indicators	**Baseline**	**Key Mid-term & project end targets**	**Sources of verification**	**Risks and Assumptions**
Objective: to contribute to the preservation of Caribbean ecosystems that are of global significance and the sustainability of livelihoods through the application of existing proven technologies and approaches that are appropriate for small island developing states through improved fresh and coastal water resources management, sustainable land management and sustainable forest management that also seek to enhance resilience of socio-ecological systems to the impacts of climate change.	• Suite of installed innovative solutions for improved water, land and biodiversity resources management • Installed capacity to measure change in environmental and related socio-economic status indicators • Mainstreamed policies and upgraded regulatory and fiscal incentive instruments for sustainable resources management • Trained stakeholders with built capacity	Fragmented and marginally effective interventions in addressing negative socio-economic and ecosystem impacts associated with water, land and biodiversity degradation due to relatively weak institutional and regulatory environments.	Effective, cost-effective on-ground technical and policy solutions that are widely disseminated through knowledge networks and replicated on-ground in Caribbean SIDS and global SIDS by end of project	Project reports; websites and public awareness resources; scientific publications; country state of environment reports; convention/treaty/MEA agreements	**Risks:** Occurrence of catastrophic natural events that impact country implementation; changes in socio-economic stability at the country or regional level that results in policy shifts and commitments **Assumptions:** Broad-based stakeholder buy-in and willingness of public and private sector to participate in building success in replication of solutions.
Component 1 Objective: To develop and foster the implementation of targeted Innovative, climate-change resilient approaches to Sustainable Land Management (SLM), Integrated Water Resources Management (IWRM) (including Water Use Efficiency (WUE)), Integrated Coastal Zone management (ICZM) and enhanced management and maintenance of ecosystem services *(refer to country project documents in Appendices 32 to 39 of the UNEP Project document for further detail)*					
Component 1 Outcomes	**Indicators**	**Baseline**	**Mid-term & project end targets**	**Sources of verification**	**Risks and Assumptions**
Outcome C1.1. Verifiable, evidence-based stress reduction at	• Number on investments in improved water, wastewater land and	• Methods and techniques available from experiences of the GEF-IWCAM Project	• Total of at least 12 'primary' innovative investments in improved water, wastewater land	• Project reports • Scientific and technical reports	**Risks:** **(i)** systems and frameworks for

Project Goal: to enhance the sustainable flow of ecosystem services and their contribution to sustainable socio-economic development in the Caribbean through the application of appropriate solutions for the improved integrated management of water, land and biological resources					
	Key Indicators	**Baseline**	**Key Mid-term & project end targets**	**Sources of verification**	**Risks and Assumptions**
project sites through appropriate sustainable water, land and ecosystems management interventions that account for climate change.	ecosystems management in 8 countries • Area of landscape under active improved management (hectares) • Improved species richness and diversity (species counts; biodiversity intactness index) • Improved fresh and coastal water quality (pollution loads) • Reduced risk to human health through improved access to water (number and type of disease reports) • Expansion in the number of methods and approaches replicated at national, regional level and among SIDS globally	• Need for continued up-scaling and replication • Deficiencies in adapting approaches and methods from the global level to Caribbean SIDS • Degradation of water, land and ecosystems resources continue with significant adverse socio-economic consequences • Loss of species richness and diversity • Human health and security at risk from poor environmental quality	and ecosystems management in 8 countries • At least 2,730 hectares of forest area including riparian zones, wetlands, habitats, under improved management practices through stress-reduction on-ground investments; • At least 46,000 hectares of forested landscapes within wider areas under in-situ conservation management regimes supported by project interventions by project end; • At least 10% improvement in selected indicator specie(s) abundance over the baseline by end of project; • At least 20% improvement in overall water quality (key parameters of the LBS Protocol) over the baseline from targeted areas by project end; • Best practices generated and used as basis for learning and replication.	• Internal agency reports such as from respective country management unit(s) • National reporting to conventions and other international and regional frameworks • Media reports • Stakeholder feedback	execution of activities are established by the project are not commensurate with national level capabilities needed (project may potentially burdened agencies at national level where multiple reporting frameworks are required from various projects); **(ii)** monitoring and other systems set up by the project are not maintained as a result of low resource commitment, diminished investment; **(iii)** policy stance/decisions that will not allow for necessary exchange of information between agencies, sectors etc. **(iv)** changes in implementation arrangements or priorities at national level undermine gains made by the project; **(v)** stakeholders not directly engaged or benefitting from the project may perceive
OUTPUT 1.1.a. Installed watershed protection and restoration measures **Applicable to:** St Kitts & Nevis Saint Lucia St Vincent & the Grenadines	• Number investments in upper watershed protection and restoration, including slope stabilization • Land /vegetative cover in upper watershed (hectares) LD5a IW4 SFM 1.2	• National sub-projects have been designed based on expert knowledge and in some cases baseline information to match technology options may not be available. • Acute land degradation in terms of direct pollution, soil loss associated with improper land	**Mid-term targets** • Commencement of 4 investments in watershed protection in 4 countries o *Degraded quarry sites in Nevis* o *Upper Soufriere watershed – St. Lucia* o *Georgetown watershed, St Vincent*	• Reports of national sub-projects; • Land degradation assessment reports; • water quality test reports; • media releases; • scientific reports/publications	

Project Goal: to enhance the sustainable flow of ecosystem services and their contribution to sustainable socio-economic development in the Caribbean through the application of appropriate solutions for the improved integrated management of water, land and biological resources					
	Key Indicators	**Baseline**	**Key Mid-term & project end targets**	**Sources of verification**	**Risks and Assumptions**
Trinidad & Tobago	• Estimated soil loss/sediment load (t/ha/yr) • Biomass accumulation (Kg C/ha/year)	management leads to impairment of sensitive ecosystem functioning, loss of agricultural productivity; • Decrease in revenue earnings from crops as a result of declining soil productivities; • Exacerbated flood risk in lower watershed reaches and increase in flood risk reduction measures (de-silting); • low knowledge transfer of alternative solutions for slope stabilization • lack of engagement and indifference of practitioners	o *Valencia area, Trinidad* • At least 50 ha total area of restored habitat and/or degraded lands over all sites • At least an average of 10% increase in the accumulated biomass (Kg C/ha/year) across all sites • Reduction in sediment loading across all sites by at approximately 10% over baseline (t/ha/yr.) **End of project targets** • At least 240 ha of restored habitat and/or degraded lands over all sites • Reduction in sediment loading across all sites by approximately 30% over baseline (t/ha/yr.) • At least and average of 30% increase in the accumulated biomass (Kg C/ha/year)		inadequacies in project activities and reduce likelihood of sustaining them **(vi)** occurrence of major socio-economic or environmental challenges as a result of natural or other events in one or more beneficiary countries that may compromise overall implementation **(vii)** partners and donors fail to actively promote replication through other project and program avenues **Assumptions**: **(i)** governments and partners provide commitment and investment needed to execute project activities; **(ii)** stakeholders recognize and value benefits of monitoring systems and contribute towards maintenance of such systems; **(iii)** effective communication of results/information
OUTPUT 1.1.b. Installed riparian restoration solutions, particularly upstream of surface water sources and recharge zone **Applicable to:** Dominican Republic St Kitts & Nevis St Vincent & the Grenadines	• Number investments in riparian restoration • Length of riparian zone rehabilitated (km) LD5a IW4 SFM 1.2 • Areal extent of degraded area rehabilitated (hectares) LD5a IW4 SFM 1.2 • Estimated soil loss/sediment load (t/ha/yr.) • Biomass accumulation (Kg C/ha/year)	• National sub-projects have been designed based on expert knowledge and in some cases baseline information to match technology options may not be available. • Removal of riparian vegetation; • acute riverbank erosion; • negative impacts on terrestrial and aquatic biodiversity - loss of species, change in species composition; • aggravated erosion and sedimentation leading to heightened flood risk;	**Mid-term targets** • At least 3 investments in riverbank soil/ slope stabilization initiated in 3 countries o *Higuamo watershed, Dom. Rep.* o *College Ghaut watershed, St Kitts* o *Georgetown watershed, St Vincent* • At least 2 km of riparian zone restored area over all sites • Reduction in sediment loading across all sites by approximately 10% over baseline (t/ha/yr.) **End of project targets**	• Feasibility Analysis Reports of national sub-projects; • Land degradation assessment reports; • water quality test reports; • riparian species richness and diversity assessments • media releases; • scientific reports/publications	

Project Goal: to enhance the sustainable flow of ecosystem services and their contribution to sustainable socio-economic development in the Caribbean through the application of appropriate solutions for the improved integrated management of water, land and biological resources					
	Key Indicators	**Baseline**	**Key Mid-term & project end targets**	**Sources of verification**	**Risks and Assumptions**
		• degradation of ambient water quality; • limited appreciation and understanding of stream hydrology and dynamic processes; • public apathy/limited awareness; • sedimentation of near shore marine ecosystems	• Total of at least 5 km of degraded riparian lands rehabilitated over all sites • Reduction in sediment loading across all sites by approximately 15% over baseline (t/ha/yr.) • Average increase in biomass accumulation by at least 20% over baseline		from monitoring systems leads to meaningful change in practice; **(iv)** Sufficient buy-in from agencies/practitioners facilitates collection of relevant data **(v)** sufficient baseline information exists to allow for determination of change of status on key parameters (human health, biodiversity) **(vi)** regional and international partners are engaged in project design and perceive mutual benefits **(vii)** cohesion amongst stakeholders in approach for project implementation **(viii)** countries actively use and promote best practices through regulatory avenues and practice codes at the national level; **(ix)** stakeholders are involved in sharing and advancing improved practices **(x)** Local project management team will
OUTPUT 1.1.c. Installed restoration measures within forest/mangrove estuarine and coastal areas, especially in high risk areas for storm inundation **Applicable to:** Dominican Republic Jamaica St Kitts & Nevis	• Number investments in coastal area ecosystem restoration • Area of mangrove/wetlands restored/rehabilitated IW4 o Protected area in project area BDII2 • Change in biomass accumulation (Kg C/ha/year) LD5a	• national sub-projects have been designed based on expert knowledge and in some cases baseline information to match technology options may not be available • Loss/degradation of mangrove and littoral forests; • increased coastal vulnerability to storm inundation and damaging storm surge; • loss/impaired ecosystems; • competing land use pressure; • wetlands used for illegal dumping of solid and liquid waste	**Mid-term targets** • 3 investments initiated in target wetland/coastal areas o *Higuamo watershed estuarine zone, Dom. Rep.* o *Negril Environmental Protected Area, Jamaica* o *Beach and coastal areas, Nevis* • At least 200 ha area of planting and bioengineering measures to stabilize and armour coastal environments **End of project targets** • Total of 3 investments in target wetland / coastal areas • Total of at least 500 ha restored • Average increase in biomass accumulation by at least 15% over baseline • Increase in select indicator specie(s) abundance by at least 10% in ecologically sensitive areas	• Feasibility Analysis Reports of national sub-projects; • Criteria and selection process for identification of target areas; • Shoreline profile assessments; • Water quality test results; • Species richness and diversity assessments; • Scientific reports/publications • Media releases	
Output C1.1.d. Installed effluent management (water reuse, recycling) and pollution reduction	• Number of wastewater installations • Number of oily waste recycling facilities	• Negative public perceptions over used of recycled water; • Limited knowledge on the subject;	**Mid-term targets** • At least 2 investments in wastewater management initiated in 2 countries	• Certificates of completion; • water quality test results; • assessments/interviews;	

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	Key Indicators	**Baseline**	**Key Mid-term & project end targets**	**Sources of verification**	**Risks and Assumptions**
measures for commercial/industrial entities, agricultural and settlement areas **Applicable to:** Antigua & Barbuda St Kitts & Nevis	• Volume of wastewater and oily wastes diverted (m3/yr.) IW14 • Water quality pollution concentrations (N, P & BOD (kg/yr) IW1	• Use of high-value potable water for non-potable uses that adds costs to operations; • Limited policy emphasis to encourage investment • Industrial/commercial draw-downs in potable supply during dry months creates overall supply challenges, results in business closures or reduced production outputs • limited up scaling of technologies in the region; • lack of resources to invest in municipal centralize systems, and lack of demonstrable, cost-effective technologies • significant land-based pollution from clustered communities with ineffective or non-existent waste water control systems contributing to negative human and ecosystems health outcomes	o *McKinnons Wastewater treatment, Antigua* o *College Ghaut/upper Basseterre* • At least 80 new connections to McKinnons WWTP in Cedar Grove • At least 70,000 m^3/yr wastewater diverted • At least 1 investment initiated in waste oil recycling; Crabbs, Antigua • At least 7 m^3/yr. oily wastes diverted from stockpiling or disposal **End of project targets** • Average of 20% reduction in critical pollution load parameters over baseline • At least 250 new connections to McKinnons WWTP in Cedar Grove • At least 160,000 m^3/yr. wastewater diverted • At least 15 m^3/yr. oily wastes diverted from stockpiling or disposal	• ambient water quality test results; • beneficiary assessments/interviews; • scientific reports/publications • hand-over agreements; • press releases	assist in advancing the use of the indicators framework through validation via project implementation **(xi)** accurate assessment possible for the extent of landscapes under treatment within project; **(xii)** ability to validate data (such as estimated volumes of runoff) through scientific research

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	Key Indicators	**Baseline**	**Key Mid-term & project end targets**	**Sources of verification**	**Risks and Assumptions**
OUTPUT 1.1.e. Conservation and restoration measures for increasing native and endemic population species abundance and diversity **Applicable to:** Cuba Dominican Republic Jamaica	• Biodiversity intactness index • Species richness and diversity studies – species count • Area planted /restored (hectares) • Invasive species reduction (ha, #s of targeted area) IW15, BDVI	• Species under threat from declining habitat quality and • ecosystem degradation; • Some level of baseline activity to address threats to biodiversity however is being done in an institutionally fragmented manner, leaving many critical habitats at high risk of further degradation • Critical habitats inadequate for the conservation of targeted species; • Fragmentation of habitats continue to threaten the viability and sustainability of targeted species	**Mid-term targets** • At least 3 investments in ecosystem restoration measures initiated • At least 580 hectares restored o *Rio Guanabo watershed; Rio Agabama watershed; Rio Arimao watershed; Rio San Juan watershed, Cuba* o *Higuamo watershed estuarine zone, Dom. Rep.* o *Negril Environmental Protected Area, Jamaica* • Select indicator specie(s) abundance within rehabilitated areas improve by 5% over baseline • Decrease by 10% the number of AIS across targeted sites to enhance native species population **End of project targets** • At least a total of 1,940 hectares restored • 5 investments in restoration measures completed • Decrease by 30% the number of AIS across targeted sites to enhance native species population • Select indicator specie(s) abundance within rehabilitated areas improve by 15% over baseline	• Biodiversity studies, analyses reports • Population census track/transect data • Species richness and diversity assessments; • Scientific studies/reports	
Outcome C1.2. **Enhanced livelihood opportunities and socio-economic co-benefits for**	• Expanded number of small-scale community-based initiatives that bring socio-economic and livelihoods benefits from land, water	• Community-based investments in natural resources management remains relatively low -keyed and few in number in	• Small-scale investments associated with the national projects supported by the GEF-SGP over project duration (to be defined at	• Agency-community MOUs and/or co-management arrangements; • project documentation;	**Risks:** **(i)** senior policy makers and other stakeholders do not regard

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	Key Indicators	**Baseline**	**Key Mid-term & project end targets**	**Sources of verification**	**Risks and Assumptions**
targeted communities from improved ecosystem services functioning.	and ecosystems management • Increased participation of community beneficiaries gaining economic benefits from integrated natural resource management disaggregated by gender and socio-economic status (clear evidence of gender-equity in access to benefits) • Increased average annual income to community beneficiaries • Improved water and sanitation security at local community level	consideration of the potential that exists; • limited capacity within community groups to tap into resources • Limited understanding of how investments in land, water and ecosystems resources management contributes to improved economies and sustainable livelihoods • Relatively low engagement of community groups and CSOs in active natural resources management	inception and during implementation) • At least 20 % increase in annual income per capita from community-based initiatives in crop and livestock production, and from forest and tree products over the project duration • At least 20% fewer reports of water-related illnesses Health indices of target communities • At least 10 investments in small-scale water and sanitation (effluent control) across at least 3 countries	• community surveys (including beneficiary economic analysis) • SGP implementation reviews; • National grantee reporting; • National planning and development reporting; •	investment in improved environmental management within national development priorities; **(ii)** private sector are not sufficiently integrated, perceive limited gains and adopt a 'business-as-usual' approach; **(iii)** challenges related to capacity limitations within targeted communities; **(iv)** low level of buy-in amongst targeted interest groups within communities; (v) lack of support by local counterpart state agencies (vi) insufficient buy-in at the national level may cause delays in start-up **(vii)** Major changes in project start-up conditions from project conceptualization period (viii) insufficient support by local agencies post-project; (ix) Unwillingness of community
Output C1.2.a. Augmented water supply systems employing rainwater harvesting within critically water-stressed communities **Applicable to:** Dominican Republic	• Number rainwater harvesting systems installed • Water supply reliability (number of incidences of insufficient water availability, by community, year) •	• Communities, particularly (lower-income) faced with erratic water supply in dry months with heightened risk of compromised health and sanitation; • Climate changed-induced impacts on water resource availability will lever more stress on disadvantaged communities; • Coping strategies to deal with water insecurity associated with drought and storm/flood events is weak in such communities; • Limited knowledge on safe applications of RWH	**Mid-term targets** • At least 10 rainwater harvesting (RWH) installations at communal level that serve multiple beneficiaries and are actively supplying water • Water supply reliability in target communities increased over baseline levels by at least 50% **End of project targets** • At least 40 rainwater harvesting (RWH) installations at communal level • Water supply reliability in target communities increased over baseline levels by at least 50% • Qualitative evidence on use of harvested rainwater (number of	• Certificates of completion; • Hand-over agreements; • Press/media releases; • Water availability and water quality test results (stored water); • Health clinic/district reports; • Beneficiary assessments/interviews; • Scientific reports/publications	

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	Key Indicators	**Baseline**	**Key Mid-term & project end targets**	**Sources of verification**	**Risks and Assumptions**
			uses and types, perception/quality of uses		stakeholders to provide financial information; **(x)** occurrence of natural disasters that may cause significant disruption to businesses and/or implementation progress; **(xi)** unavailability of a financial specialist to undertake required evaluation **(xii)** sub-project actions may result in unintended adverse consequences within and outside the target area; **(xiii)** project in eventual implementation demonstrates non-
Output C1.2.b. Upgraded water supply systems for delivery and greater access to safe water supply within critically water-stressed **communities** **Applicable to:** St Kitts & Nevis	• Number of water borne illness reports within target community • Number of households in target community with improved water and sanitation access	• Communities serviced by poor water supply systems face erratic water supply in dry months with heightened risk of compromised health and sanitation; • climate changed-induced impacts on water resource availability will lever more stress on disadvantaged communities; • coping strategies to deal with water insecurity associated with drought and storm/flood events is weak in such communities	**Mid-term targets** • Initiation of at least 1 small-scale communal intervention under GEF-SGP on enhancing water security and sanitation **End of project targets** • Small-scale water and sanitation intervention completed • 60% improvement of water quality samples meeting accepted quality standards • Increase by at least 40% in number of households with improved access to water and sanitation in target community • Reduction by at least 30% in reports in water-borne illness within target community	• certificates of completion; • hand-over agreements; • press releases; • water quality test results (stored water); • health clinic/district reports; • beneficiary assessments/interviews; • scientific reports/publications	

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	Key Indicators	**Baseline**	**Key Mid-term & project end targets**	**Sources of verification**	**Risks and Assumptions**
Output C1.2.c. Installed solutions/technologies within targeted communities for improved sanitation and solid waste management **Applicable to:** Dominican Republic	• Number of persons, communities with access to improved sanitation; • Incidence of community water-borne disease and other skin, ear, nose and throat infections (# persons/# times, by community, year)	• Lower income communities typically challenged by low quality sanitation solutions given physical/spatial and economic constraints • risk from exposure to untreated waste is high - higher during flood conditions due to direct contact and water supply contamination; • low capacity for investment in conventional systems including municipal wastewater treatment plants; • low level of technology transfer from other regions where successfully applied; • adverse public perceptions to such solutions	**Mid-term targets** • Adopted plan for improved solid waste management in target community • At least 1 investment in solid waste management within 1 target community • Finalized plan for implementation of pilot on improved **End of project targets** • Reduction in volume of solid waste to ambient environment by at least 50%	• Certificates of completion; • Hand-over agreements; • Press releases; • Water quality test results in ambient receiving environments • Health clinic/district reports; • beneficiary assessments/interviews • scientific reports/publications	viability for expansion or replication; **(xiv)** major change in socio-economic circumstance and/or political shift with changed priorities **Assumptions:** (i) governments integrate environmental considerations within mainstream planning in respect to contributions to improved health and livelihood attainment; (ii) the benefits of investments in environment is adequately reflected in national accounts and standard development indices; (iii) development partners continue to support investments in improved environmental management towards improved community welfare and economic livelihoods (iv) communities are motivated and perceive livelihood and other benefits;
Output C1.5.d. Employment and revenue generation opportunities by communities and private sector associated with project activities (SGP) **Applicable to:** All countries	• Number of new communal enterprises • Estimated revenue from recycling, small scale farming enterprises, fishing (US$/yr.) (disaggregated by gender and socio-economic status) • Estimated annual revenues from eco-touristic activity (US$/yr.)	• Declining ecosystem productivity in near-shore fishing areas as a result of land-based degradation land and water with resultant declines in economic benefits to dependent communities • poorly documented impacts; • absence of data that makes linkages; • methodologies not mainstreamed at national reporting level • Threats to viability of tourism-based natural attractions on account of land and ecosystems degradation;	**Mid-term targets** • At least 8 small-scale community-based investments supported by the GEF SGP in all countries • On average at least 20% change in revenue generation for most directly engaged stakeholders in agriculture, forestry, near-shore fisheries and other livelihoods • On average at least 40% change in revenue for most directly engaged stakeholders in eco-tourism o *Dominican Republic* o *Jamaica* o *St Vincent & the Grenadines* **End of project targets**	• Records/financial statements from cooperatives; • tailored financial data capture tool	

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	Key Indicators	**Baseline**	**Key Mid-term & project end targets**	**Sources of verification**	**Risks and Assumptions**
		• Linkages between water, land and ecosystem degradation and socio-economic impacts to tourism sector not well documented and reported; • absence of data to make linkages; • lack of mainstreamed assessment protocols •	• 75% change on revenue generation for most directly engaged stakeholders in agriculture, forestry, near-shore fisheries and other livelihoods • 80% change in revenue for most directly engaged stakeholders in eco-tourism		(v) lessons learnt and positive experiences are built on for replication (vi) Sufficient baseline data that allows ability to assess risk level to target communities in context of contributions from the project (vii) the country focal point agencies are adequately mobilized to engage in the assessment process; (viii) data to augment project design is relatively easily available (ix) availability of support/advisory services from local business support agencies that focus on micro and small and medium enterprises (SMEs) (x) the project oversight technical committee (national inter-sectoral committee) functions to provide adequate guidance and foster national buy-in
Outcome 2.1. Strengthened national systems for monitoring of environmental status with respect to key international agreements.	• Strengthened indicators framework adopted and mainstreamed into socio-economic, planning and development and environmental status assessments; • State and non-state stakeholders demonstrate competency in application of indicators and data capture systems to enhance decision making	• Indicators are not applied in mainstream decision making • low level of awareness amongst decision-makers of utility of environmental indicators • observation platforms and decision support systems (DSS) for monitoring are generally weak • Weak capacities in relevant state and non-state agencies for monitoring indicators	• technical personnel applying accepted methods and techniques in making resource assessments that support decision-making • Accurate, verified suite of data from project sites that support decision making for replication and up-scaling in all 8 countries	• Scientific reports • state of environment reports at national and regional levels • UN convention and other international and regional reporting outputs • Data observation platforms • training/capacity building programmes • project reports	
Output C2 Strengthened national monitoring systems	• Monitoring protocol & instrumentation installed at target intervention sites • Accurate datasets (support project reporting)	• Structured baseline information generally unavailable and inadequate for assessing progress • Tracking of appropriate indicators is poor to non-existent; • assessments are very sporadic and limited time series • data and information tends not to be analyzed • limited capacity to utilize information	**Mid-term targets** • Monitoring protocols and instrumented systems installed at all 8 project sites • All relevant project personnel trained in operation and maintenance of the systems • Accurate datasets being generated **End of project targets** • Accurate datasets being generated	• Scientific reports • Project reports • Equipment maintenance and operation logs • Training resources	

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	Key Indicators	**Baseline**	**Key Mid-term & project end targets**	**Sources of verification**	**Risks and Assumptions**
		• decision making is very often not based on scientific information			
Outcome 3.1. Strengthened national policy and legislation for the effective management of water, land and ecosystems resources that account for climate change and enhanced capacity	• Improved compliance based on strong and effective policy and legislative instruments • Demonstrated integration of water, land and ecosystems management in mainstream socio-economic development • Enhanced capacity amongst support organization and beneficiaries to build sustainability	• National socio-economic development do not adequately factor in environmental management policy • environmental policy is weakly articulated at both national and regional levels • out-of-date legislation and regulations • international and regional treaties not integrated into national law • incentive measures to accompany legislative provisions weak • agency and beneficiary capacities for implementation are relatively weak	• Policy and legislative reforms advanced and adopted • national development planning strategies and decision making frameworks broadening incorporation of elements of water, land and ecosystems resources management • cooperation amongst regional support agencies strengthened through establishment of joint cooperation agreements by end of the project.	• gazetted legislative amendments • new policy statements • reporting to UN conventions and other regional and international frameworks • published policy statements • publication and dissemination and access to information • regional cooperation frameworks in effect;	
Output C3: Strengthened national policy, legislation and enhanced capacity	• Ratified policies • bills passed into law • new regulations • Adopted Inter-agency agreements • Number of meetings of the national inter-sectoral committees • Number of training workshops • Number stakeholders trained	• Current policy and regulatory environment inadequate for implementation of integrated natural resource management • Institutional collaborative arrangements are weak • Challenges in information flow, inter-agency coordination and effective delegation of responsibilities amongst agencies	**Mid-term targets** • Policy and regulatory reviews initiated in all 8 countries • Draft instruments generated • Stakeholder consultations held; inter-sectoral committee meetings held at least once every 6 months • Capacity-building programme designed and training initiated **End of project targets** • Draft policy and regulatory instruments adopted	• Gazetted notices on adopted regulations • Project reports • Stakeholder consultation proceedings • Training resources • Training workshop reports • Media releases	

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	Key Indicators	**Baseline**	**Key Mid-term & project end targets**	**Sources of verification**	**Risks and Assumptions**
		• Limited capacity amongst stakeholders in required areas of technical competence • High turnover in professionals require continual training	• Inter-agency agreements formalized • Stakeholder consultations held; inter-sectoral committee meetings held at least once every 6 months		
Outcome 4.1. Improved engagement and information access for practitioners and other stakeholders through targeted knowledge sharing networks	• Enhanced stakeholder networking and knowledge sharing towards implementation of solutions across the Caribbean and other SIDS regions • Expanded, strengthened community of practices with shared experiences in successfully implementing solutions	• relative isolation of practitioners with limited opportunities for interactive experience-based learning • limited dissemination and access to resources to practitioners in appropriate formats • translation of expert and traditional knowledge to application at community level is limited	• Evidence of stakeholders applying knowledge, tools and methods generated by project • Technical support agencies providing enhanced support in sharing information to improve design making; • Strengthened linkages amongst practitioners in various fields "community of practices" across SIDS regions • Dissemination of information and lessons learned to a wider audience of stakeholders from both the public and private sectors.	• Project reports • Uptake of the range of publications and evidence of use by stakeholders • Media reports and articles • Evidence of replication of tools and methods in other parts of the country, within the Caribbean and at the global level	
Output C4: Knowledge products, tools and methods	• number of consultations with stakeholders • Number and types of public awareness products made available • Web-based information exchange platform installed • Number of project stakeholders participating at conferences	• Local communities and stakeholders require continual engagement to support improved natural resource management • High-level policy makers may not be as sensitized as needed to drive and effect change • Knowledge sharing platforms are typically weak • Documentation of best practices toward replication and up-scaling remains weak	**Mid-term targets** • Suite of awareness-raising resources deigned and production initiated in all 8 countries • National web-based platforms for at least 2 countries • Technical exchanges initiated between each of the countries and other SIDS regions • Project lessons are transmitted to global knowledge networks **End of project targets**	• Project reports • Suite of awareness-raising material and knowledge products • Stakeholder consultation proceedings • Media releases	

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	Key Indicators	**Baseline**	**Key Mid-term & project end targets**	**Sources of verification**	**Risks and Assumptions**
		• Technical exchanges amongst practitioners tends to be limited due to financing constraints	• Countries are represented by project personnel and associated stakeholders in at least 2 conferences • At least 1 successful technical exchange between each of the countries and other SIDS regions • Project lessons are transmitted to global knowledge networks		
Component 2 Objective: To strengthen the water, land and ecosystems resources Monitoring, and Indicators frameworks					
Component 2 Outcomes	**Indicator**	**Baseline**	**Target**	**Sources of verification**	**Risks and Assumptions**
Outcome 2.1. Strengthened national and regional systems for monitoring of environmental status with respect to key international agreements.	• Strengthened indicators framework adopted at regional level becoming mainstreamed and utilized in national socio-economic, planning and development and environmental status assessments; • State and non-state stakeholders demonstrate competency in application of indicators to enhance decision making	• GEF-IWCAM commenced process of strengthening and harmonizing an environmental indicators framework in the region; requires continued support and strengthening • Indicators are not applied in mainstream decision making • low level of awareness amongst decision-makers of utility of environmental indicators • observation platforms and decision support systems (DSS) for monitoring are generally weak • Weak capacities in relevant state and non-state agencies for monitoring indicators	• Caribbean countries endorsed suite of indicators by end project • technical personnel applying accepted methods and techniques in making IWRM, SLM, BD and SFM assessments that support decision-making by end of project • community-based organizations, schools and other NGO groups are engaged in supportive natural resource assessments at the local community level by end of project	• state of environment reports at national and regional levels • UN convention and other international and regional reporting outputs • strengthened observation platforms • strengthened training/capacity building programmes • project reports	**Risks:** • indicators frameworks promoted by the GEF and donor community are difficult to integrate within national accounts due to capacity human resource and financial limitations • continued challenges in regional and international support agency coordination in harmonizing indicator reporting frameworks • capacity constraints in maintaining observation platforms
Output 2.1.1 Regional environmental indicators compendium	• National register/compendium of agreed indicators at national level IW13; IW16; SFM2.1	• GEF-IWCAM Project initiated a regional-level indicators framework but has not realized regional-level endorsement; further elaboration of this framework to include biodiversity,	**Mid-term targets** • Progress assessment (and recommendations) across region on mainstreaming indicators **End of project targets**	• Status/assessment reports by country • published register/compendium of compendium of indicators in national accounts	

Project Goal: to enhance the sustainable flow of ecosystem services and their contribution to sustainable socio-economic development in the Caribbean through the application of appropriate solutions for the improved integrated management of water, land and biological resources					
	Key Indicators	**Baseline**	**Key Mid-term & project end targets**	**Sources of verification**	**Risks and Assumptions**
	• suite of regionally accepted indicators IW13; IW16; SFM2.1 • complement of trained professionals LD3ii; SFM2.1	sustainable forest management needed • regional-level indicators framework does not exist • limited use of environmental indicators for national regulatory requirements • limited use of indicators in assessment of impacts of environmental degradation on productive sector outputs • limited integration of environmental indicators into national accounts • regional agencies advancing M&E based on indicators with relatively little attempts at harmonization within a regional framework.	• National reporting frameworks aligned to include environmental indicators in at least 4 countries • Harmonized ratified regional compendium of indicators	• convention reporting instruments • project progress reports • training reports;	and decision support platforms • ability to sustain capacity building efforts post-project **Assumptions:** • strong state support for establishing and mainstreaming monitoring and reporting frameworks on the basis of recognized benefits • continued support by regional and international support partners • governments, non-state organizations, private sector and community beneficiaries will remain committed to investment in capacity development
Output 2.1.2 Scientific research to support monitoring at national projects	• Research protocol for the national projects • Research partnership agreements signed between partners and UNEP	• research procedure not defined for national sub-projects • modalities for engagement of the project research partners not determined	**Mid-term targets** • 8 research protocols for national sub-projects • Partnership agreements developed and effected for all collaborating agency partners • 8 country research protocols under implementation • At least 8 scientific publications prepared **End of project targets** • country project research protocols implemented • Total of at least 20 scientific publications prepared	• Research protocol for each national project • Signed partnership agreements • research publications • Project reports	
Output 2.1.3. Strengthened field	• Installed monitoring systems IW13; IW16 SFM2.1; BD02-IAS-5	• monitoring systems for country projects not determined	**Mid-term targets**	• Scientific research reports Project reports	

Project Goal: to enhance the sustainable flow of ecosystem services and their contribution to sustainable socio-economic development in the Caribbean through the application of appropriate solutions for the improved integrated management of water, land and biological resources					
	Key Indicators	**Baseline**	**Key Mid-term & project end targets**	**Sources of verification**	**Risks and Assumptions**
monitoring and assessment capabilities	• Trained operators (professionals and communities) for systems LD3ii; SFM2.1	• capacity requirements to operate and maintain systems not known	• Monitoring systems installed and functional providing data in all 8 countries • 8 training modules/packages prepared based on national needs • Training delivered to system operators within local collaborating agencies **End of project targets** • Data monitoring (sustainability) protocols post-project developed for 8 countries • Data outputs from monitoring systems met project reporting requirements		
Output 2.1.4 Decision support system (DSS) tools	• Decision support systems/ tools IW13; IW16; SFM2.1; • trained professionals in use of systems LD3ii	• Limited capacities to assess environmental parameters • input data for DSS inadequate • application of DSS tools to support planning remains poorly developed • limited financial resource capacity to maintain DSS;	**Mid-term targets** • 8 needs assessments for each country • Training modules (regional level) developed • contribution to installation and operation of national information systems in at least 4 countries • DSS operational and project data integrated for at least 4 countries • training programmes for operators implemented in at least 4 countries **End of project targets** • DSS operational and project data integrated for all countries • training programmes for operators completed all countries • Continuity protocol for 8 countries for data integration into wider knowledge networks	• System assessment needs reports • system component procurement and installation • training modules and training reports	

Project Goal: to enhance the sustainable flow of ecosystem services and their contribution to sustainable socio-economic development in the Caribbean through the application of appropriate solutions for the improved integrated management of water, land and biological resources					
	Key Indicators	**Baseline**	**Key Mid-term & project end targets**	**Sources of verification**	**Risks and Assumptions**
Component 3 Objective: To strengthen policy, legislative and institutional reforms and capacity building to support Sustainable Land Management (SLM), Integrating Water Resources Management (IWRM)/Water Use Efficiency (WUE) and ecosystem services management taking into consideration climate change resilience building.					
Component 3 Outcomes	**Indicator**	**Baseline**	**Target**	**Sources of verification**	**Risks and Assumptions**
Outcome 3.1. Strengthened policy and legislation for the effective management of water, land and ecosystems resources that account for climate change	• Improved compliance based on strong and effective policy and legislative instruments • Demonstrated integration of water, land and ecosystems management in mainstream socio-economic development	• National socio-economic development do not adequately factor in environmental management policy • environmental policy is weakly articulated at both national and regional levels • absence of regional-level environmental policy framework • out-of-date legislation • regulations not sufficiently developed to make laws effective • international and regional treaties not integrated into national law • limited awareness and buy-in from stakeholders • incentive measures to accompany legislative provisions weak • approaches are more command-and-control rather than participatory	• countries commence process to policy and legislative reforms by mid-project • national development planning strategies and decision making frameworks broadening incorporation of elements of water, land and ecosystems resources management by end of project • cooperation amongst regional support agencies strengthened through establishment of joint cooperation agreements by end of project	• gazetted legislative amendments • new policy statements • reporting to UN conventions and other regional and international frameworks • published policy statements • publication and dissemination and access to information • regional cooperation frameworks in effect;	**Risks:** • Weak overarching strategic development framework means extent of mainstreaming of IWRM, BD and other frameworks within may be limited and have diminished value • Very lengthy Investments in legislative reform as a result of review processes take a long time to go through parliamentary processes • Potential lack of willingness at political level where proposals may be regarded as either controversial or costly to implement
Output 3.1.1 New and/or revised national-level policies and regulations for water, land and ecosystems management	• Ratified policies IW5 LD3i;ii;iii BD02-V-6 SFM1.1 • bills passed into law, and/or amendments passed IW5 LD3i;ii;iii BD02-V-6 SFM1.1 new and/or strengthened regulations IW5 LD3i;ii;iii BD02-V-6 SFM1.1	• low accorded priority assigned hampers progress in legislative reforms • national action plans and other frameworks under regional and international treaties obligations not mainstreamed in local laws and regulations	**Mid-term targets** • Regional review of status of policy, legislative implementation across 10 countries (update from existing sources as available) • At least 4 countries have initiated processes for review/strengthening of existing legislative instruments	• status review and recommendations report • new/upgraded legislative drafts and regulations • gazetted publications • media releases • project reports	

Project Goal: to enhance the sustainable flow of ecosystem services and their contribution to sustainable socio-economic development in the Caribbean through the application of appropriate solutions for the improved integrated management of water, land and biological resources					
	Key Indicators	**Baseline**	**Key Mid-term & project end targets**	**Sources of verification**	**Risks and Assumptions**
		• low level of buy-in at political, private sector and civil society levels • Some level of policy and legislative reforms but rate of adoption and implementation is hampered by agency capacity limitations to drive processes	and/or development of new legislative instruments • At least 2 policy/regulatory instruments ratified in respective countries **End of project targets** • total of at least 6 relevant national policy/regulatory instruments ratified in respective countries		• lack of broad-based stakeholder support • **Assumptions:** • There is recognition of the importance of such strategic frameworks and there a high-level support to the process; • The project public awareness programme should provide the needed information to increase buy-in to policy and legal reforms
Output 3.1.2 New and/or upgraded national and regional-level plans and strategies for improved water, land and ecosystems management	• New and/or upgraded national strategic/action plans IW1; IW5 LD3i;ii;iii BD02-V-6 SFM1.1	• national planning processes at national level initiated in many countries but pace is slow due to low priority • level of awareness amongst stakeholders is relatively low • some regional frameworks, regional action plans are in process of formulation but yet to be completed	**Mid-term targets** • at least 4 countries have commenced the review and upgrade of relevant national plans • At least 2 relevant strategic action plans ratified in respective countries • 1 regional policy consultation and draft regional IWRM framework/action plan **End of project targets** • Total of at least 4 countries have ratified at highest national level strategic/action plans • Regional action framework for IWRM endorsed by Caribbean Heads of Government	• Published plans/strategies • Regional Water Framework • media releases • project reports	
Outcome 3.2. Strengthened capacity of national and regional institutions and other stakeholders for water, land, and ecosystems management that accounts for climate change	• Decision making improved through enhanced coordination amongst relevant national stakeholders • institutional response from national state and non-state agencies and regional agencies effective in addressing implementation	• Poor decision outcomes from fragmented institutional responses • Limited engagement of stakeholders due to weakly constituted consultative processes on environmental management • agency effectiveness to implement water, land and ecosystems management	• decision making at policy level supported by improved stakeholder engagement • improved level of technical support from national agencies to stakeholder interests for environmental management • improved planning and coordination emerging between regional support organizations	• meeting records and inputs to policy processes from intersectional committee meetings • regional inter-agency cooperation frameworks in effect	**Risks:** • National inter-sectorial mechanisms may be overburdened with many other competing interests with resulting stakeholder fatigue

Project Goal: to enhance the sustainable flow of ecosystem services and their contribution to sustainable socio-economic development in the Caribbean through the application of appropriate solutions for the improved integrated management of water, land and biological resources					
	Key Indicators	**Baseline**	**Key Mid-term & project end targets**	**Sources of verification**	**Risks and Assumptions**
	of water, land and ecosystems management	compromised by limited human resource and financial capacity • low awareness at policy making level to gain support for investment in institutional strengthening • poor coordination amongst regional agencies in harmonizing approaches and advisory support to countries	• stakeholders demonstrating empowerment through enhanced capacity through provision of skills and information		• these mechanisms remain informal so inputs are not directed through to formal developmental policy • may be some level of stakeholder fatigue given other competing training programmes **Assumptions:** • There is willingness to build on either existing frameworks or develop new ones with due focus directed to facilitate integrated project implementation • there will be high-level support to the work of the NIC • there will be appropriate representation on the NIC that will be linked to the work of the national project so that there can be appropriate information exchange to all
Output 3.2.1 Strengthened national participatory consultative and coordination mechanisms	Functional NIC endorsed at senior policy level (could be existing mechanism) **IW4**	• National inter-sectorial coordinating mechanisms weak and not mainstreamed in national-level planning • stakeholder fatigue, lack of drivenness and capacity limitations in making meaningful contributions	**Mid-term targets** • Support to at least 1 NIC meetings per country with high-level policy makers **End of project targets** Support to total of at least 2 NIC meetings per country with high-level policy makers	• Proceedings of NIC meetings • media releases • project progress reports	
Output 3.2.2 Training and capacity building programmes to support implementation of water, land and ecosystems management across government, private sector agencies and civil society organizations	• Successfully implemented training activities at national and regional levels **IW17** • number and diversity of stakeholders that participated	• Countries have implemented capacity building programmes mainly associated with projects where resources are available • routine training and capacity building limited on account of resource constraints • high personnel turnover rate necessitates continual investment in capacity building	**Mid-term targets** • regional-level capacity needs assessment completed (based on existing knowledge) • Capacity building programme (harmonized) developed including resource material • Support to at least 10 national and regional training activities **End of project targets** • Support to total of at least 20 national and regional training activities • Compilation of resources materials into training toolkits	• Training needs assessment report • training modules and other technical resources • project reports	

Project Goal: to enhance the sustainable flow of ecosystem services and their contribution to sustainable socio-economic development in the Caribbean through the application of appropriate solutions for the improved integrated management of water, land and biological resources					
	Key Indicators	**Baseline**	**Key Mid-term & project end targets**	**Sources of verification**	**Risks and Assumptions**
					beneficiary stakeholders • Stakeholders are willing to participate and share knowledge post-training
Component 4 Objective: To enhance knowledge exchange amongst practitioners to improve integrated and effective water, land and ecosystems resource management through the promotion of best-practices, replication of lessons learnt and experiences gained					
Component 4 Outcomes	**Indicator**	**Baseline**	**Target**	**Sources of verification**	**Risks and Assumptions**
Outcome 4.1. Improved engagement and information access for practitioners and other stakeholders through targeted knowledge sharing networks	• Enhanced stakeholder networking and knowledge sharing towards implementation of solutions across the Caribbean and other SIDS regions • Expanded, strengthened community of practices with shared experiences in successfully implementing solutions	• relative isolation of practitioners with limited opportunities for interactive experience-based learning • limited dissemination and access to resources to practitioners in appropriate formats • many web-based platforms but translation of knowledge to implementation is not well understood; • translation of expert and traditional knowledge to application at community level is limited	• evidence of stakeholders applying knowledge, tools and methods generated by project • technical support agencies providing enhanced support in sharing information to improve design making; • strengthened linkages amongst practitioners in various fields "community of practices" across SIDS regions • project stakeholders and other resource users accessing project website • project contribute to other information clearinghouse mechanisms	• Formal and informal communities of practices and associated knowledge platforms functional; • reporting to UN conventions and other regional and international frameworks • project on-line resources frequented by user community evidenced by interface diagnostics	**Risks:** • Perception that there are too many such KM platforms that do not function to initial expectation • Maintenance of project website may be neglected post-project • Occurrence of disruptions to hosting of conference events or technical exchanges on account of adverse weather conditions at time of event • unforeseen prohibitive costs associated with hosting of
Output 4.1.1 Public awareness / Public education (PA/PE) Strategy for the regional and national project components	PA/PE Strategy for the overall project and 10 National PA/PE programmes for each country informed by a needs assessment	• No regional PA/PE Strategy exist to integrate and harmonize actions across the project • National PA/PE interventions occurring but isolated from each	**Mid-term targets** • Comprehensive regional and 10 national PA/PE programmes **End of project targets**	• Needs assessment report PA/PE Strategy for project featuring regional and national actions	

Project Goal: to enhance the sustainable flow of ecosystem services and their contribution to sustainable socio-economic development in the Caribbean through the application of appropriate solutions for the improved integrated management of water, land and biological resources					
	Key Indicators	**Baseline**	**Key Mid-term & project end targets**	**Sources of verification**	**Risks and Assumptions**
		other and lacking a unified approach			conference events related to fluctuating air travel costs, hotel and other venue costs •
Output 4.1.2 Knowledge, Attitude and Practice (KAP) assessments during the project	KAP survey in all countries at project start-up, at mid-term and near project closure	limited knowledge on perceptions of environmental issues and perceptions to effectively guide project interventions	**Mid-term targets** • First KAP survey and findings (within 2 months of project commencement) **End of project targets** • second KAP survey and findings at end of Year 3 • final KAP survey and findings at mid-year 5	Findings reports from the three surveys	**Assumptions:** • stakeholders consulted will be cooperative • strong buy-in by technical professionals and policy makers • buy-in and support from the private sector • willingness to make continued investment in knowledge sharing amongst stakeholders • stakeholders will recognize value of KM platforms • transition of project website to support agency post-project • costs for production of learning resources and media products will not be prohibitive • Willingness of countries to host
Output 4.1.3 Newsletters, Best practice guidelines, Lessons learnt outputs and Communities of Practice	• Content contributed to existing web-based platforms • documented best practices (as reference compendium) available • Project showcases at special events • Published experience notes	• documentation of best practices and application in the utilization of natural resources for commercial and industrial purposes remains weak • extent of information capture and dissemination is not sufficient to encourage uptake • capacity limitations in capturing and sharing knowledge • best practices harvested from projects do not receive sufficient visibility • communities of practices are not well defined and requires further support and development inputs	**Mid-term targets** • 10 quarterly IWECO Project newsletters published • at least 6 best practice guidelines • best-practice guidelines presented at least 3 regional and international events **End of project targets** • total of 20 quarterly IWECO Project newsletters published • at least 12 total best practice guidelines • Project experience notes • best-practice guidelines presented at least total of 6 regional and international events • Compendium of best practices in "Caribbean Environmental Outlook-type" documenting relevant topics	• Published compendium of best practices • MOUs/cooperation frameworks between cooperation agencies • user-website interface diagnostics • content updates	
Output 4.1.4 Innovative communications and learning tools	• Number and diversity of student educational resources available and in use	• limited application of innovative tools and approaches in natural resources management	**Mid-term targets** • At least 2 school educational resource toolkits (including games) developed and disseminated	• Reports from schools on use of tools • reports from field citizen science investigations	

Project Goal: to enhance the sustainable flow of ecosystem services and their contribution to sustainable socio-economic development in the Caribbean through the application of appropriate solutions for the improved integrated management of water, land and biological resources					
	Key Indicators	**Baseline**	**Key Mid-term & project end targets**	**Sources of verification**	**Risks and Assumptions**
	• number and diversity of technical seminars, lecture series, workshops hosted for various stakeholders	• lack of capacities to effectively deliver these innovative approaches	• at least 2 environment-themed songs (and videos) by popular music personalities (English and Spanish) targeting school audiences • Citizen science-based programmes (following the IWCAM CBRA toolkit; use of participatory 3-D GIS, and others) rolled out in at least 4 countries **End of project targets** • Citizen science-based programmes rolled out in remaining countries	• airplay of songs on broadcast media • Project reports • Community feedback	conference events and provide necessary support • Support from the various project partners and provision of technical contributions in conference hosting
Output 4.1.5. Project website (according to IW:LEARN guidelines) and media products	• **Project website (with social media plug-ins)** IW • number and diversity of media products (jingles, videos, film, digital, print media) developed and disseminated • number and diversity of stakeholders impacted • number of special promotional blitzes executed (in collaboration with private sector and other partners)	• UNEP CEP manages content from the GEF-IWCAM Project via the project website • level of access to and application of knowledge products on web portals not well understood • PA/PE programmes are on-going in all countries - tends to be ad-hoc and not sufficiently mainstreamed in agency programmes • Linkages between mainstream media to facilitate outreach are weak • private sector not targeted sufficiently to trigger their engagement	**Mid-term targets** • IWECO Project website operational • range of printed and electronic media products (including travelling exhibition display for project) • support to at least 1 special promotional blitz in each country (supported by the private sector in association with commemorative days) • support to in-country seminars, lecture series **End of project targets** • 1 feature-length film highlighting the project issues and solutions/achievements across all countries • range of printed and electronic media products • support to in-country seminars, lecture series	• User traffic on website • number of content downloads from website • Project newsletter • press releases (via various media) • private sector participatory/promotional agreements; (vi)	

Project Goal: to enhance the sustainable flow of ecosystem services and their contribution to sustainable socio-economic development in the Caribbean through the application of appropriate solutions for the improved integrated management of water, land and biological resources					
	Key Indicators	**Baseline**	**Key Mid-term & project end targets**	**Sources of verification**	**Risks and Assumptions**
Output 4.1.6 Professional exchanges; participation at regional and international fora	• **(i) Participation in IW events (GEF IWC, Community of Practice (COP), IW:LEARN)** IW • **number of published experience notes through IWLEARN** IW • Participation at major conferences and number of papers presented • Number of project showcases • number of professional and stakeholder exchanges between countries	• opportunities exist for participation at major conferences to showcase work and exchange ideas among SIDS regions • outputs from such exchanges result in new intellectual contributions to projects and programmes including new initiatives.	**Mid-term targets** • Participation of stakeholders in at least 5 major regional and global events/conferences (average 5 persons representing the project attending each event) • At least 3 technical exchanges between professionals across SIDS regions to share experiences and develop competencies **End of project targets** • Participation of stakeholders in total of at least 10 major regional and global events/conferences • at least 10 conference papers delivered • total of at least 8 technical exchanges between professionals across SIDS regions	• Papers delivered • Conference/meeting proceedings • country host agreements • country mission reports	
Output 4.1.7 Hosting of the GEF International Waters Conference and participation support to upcoming GEF-IWCs, and regional dialogues on environment and development	• Hosting of the IWC7 Conference • Number of participants at IWC8 and 9 events • Number of Caribbean regional dialogues/workshops • Number of participants at regional dialogues/workshops	Conference has been held biennially although has not been hosted in a SIDS region	**Mid-term targets** o IWC7 Conference successfully hosted o At least 5 professionals and targeted stakeholders participated at IWC8 **End of project targets** • At least 2 regional dialogues hosted • Total of at least 5 professionals and targeted stakeholders participated at IWC8 and IWC9 o Total of at least 4 regional dialogues hosted	• Papers delivered • Conference/meeting proceedings • country host agreement	
Output 4.1.8 Hosting two GEF-IWECO Project Partnership Conferences	• Hosting of the biennial GEF-IWECO Project Partnership	• The GEF-IWCAM Project supported the hosting of validate tools partnership events in	**Mid-term targets** 1st GEF-IWECO Partnership Conference hosted	• Hosting agreements signed with host countries	

Project Goal: to enhance the sustainable flow of ecosystem services and their contribution to sustainable socio-economic development in the Caribbean through the application of appropriate solutions for the improved integrated management of water, land and biological resources					
	Key Indicators	**Baseline**	**Key Mid-term & project end targets**	**Sources of verification**	**Risks and Assumptions**
	Conferences (2015 and 2017) • number and diversity of participation • **Number of publications** IW	association with the Caribbean Environmental Forum • there are no significant environmental fora/conferences hosted by other agencies in the Caribbean region	**End of project targets** 2nd GEF-IWECO Partnership Conference	• Conference successfully held and proceedings published and disseminated outputs from the conferences disseminated through the IWLEARN mechanism	

Total budget and workplan

Award ID:	**00082779**	**Project ID(s):**	**00091543**
Award Title:	**Integrating Water, Land and Ecosystems Management in Caribbean Small Island Developing States (IWECO)**		
Business Unit:	**UNDP1**		
Project Title:	**IWECO**		
PIMS no	**4873**		
Implementing Partner (Executing Agency)	**UNOPS**		

GEF Outcome/Atlas Activity	**Responsible Party/ Implementing Agent**	**Fund ID**	**Donor Name**	**Atlas Budgetary Account Code**	**ATLAS Budget Description**	**Amount Year 1 (USD)**	**Amount Year 2 (USD)**	**Amount Year 3 (USD)**	**Amount Year 4 (USD)**	**Amount Year 5 (USD)**	**Total (USD)**	**Budget Notes**
Outcome #2/C2 Development and Implementation of Integrated Targeted Innovative, climate-change resilient approaches in SLM, IWRM (including WUE), ICZM and	UNOPS	**62000**	**GEF**	71200	International Consultants	8,000	8,000	8,000	8,000	8,000	40,000	**1**
				71300	Local Consultants	3,000	3,000	3,000	3,000	3,000	15,000	**2**
				71600	Travel	7,800	7,800	7,800	7,800	7,800	39,000	**3**
				72600	Grants	-	250,000	250,000	200,000	-	700,000	**4**
				75700	Training (Workshops)	26,466	-	26,465	-	26,465	79,396	**5**
				74200	Audio Visual & Print Prod Cost	-	6,000	-	6,000	-	12,000	**6**

maintenance of ecosystem services. Ref. Output C1.5.d. Employment and revenue generation opportunities by communities and private sector associated with project activities (SGP)				74500	Miscellaneous	17,520	17,520	17,521	17,520	17,523	87,604	**7**
					sub-total GEF	**62,786**	**292,320**	**312,786**	**242,320**	**62,788**	**973,000**	
Outcome #4/C4 Enhancing Knowledge exchange, best-practices, replication and stakeholder involvement . Ref. Output 4.1.5. Project website (according to IW:LEARN guidelines) and media products Output 4.1.7 7th GEF-International Waters Conference (US$ 295,000) and support participation of project personnel and stakeholders to 2 IWC conferences 2015 and 2017	UNOPS	**62000**	**GEF**	72100	Contractual Services-Companies	25,360	27,710	39,560	36,311	17,850	146,791	**8**
				75700	Training (Workshops)	145,000	-	-	-	-	145,000	**9**
				71600	Travel	55,000	22,965	-	22,965	-	100,930	**10**
				74200	Audio Visual & Print Prod Cost	90,000	-	-	-	-	90,000	**11**
				74500	Miscellaneous	5,000					5,000	**12**
					sub-total GEF	**320,360**	**50,675**	**39,560**	**59,276**	**17,850**	**487,721**	
Project Management	UNDP	**62000**	**GEF**	71300	Local Consultants	2,000	3,000	6,000	3,000	3,000	17,000	**13**
				72100	Contractual Services Companies	2,279	5,000	3,000	7,000	5,000	22,279	**14**
					Total Management	**4,279**	**8,000**	**9,000**	**10,000**	**8,000**	**39,279**	
					PROJECT TOTAL	**387,425**	**350,995**	**361,346**	**311,596**	**88,638**	**1,500,000**	

Budget Notes

1	Staffing support for SGP staff in project implementation at the global level
2	Staffing support for SGP staff in project implementation at the local level
3	Travel needed for technical assistance or monitoring visits

4	Grants to Communities (managed by SGP)
5	**Training:** Including national seminars, lecture series etc., (4.1.5.4)
6	Products on knowledge exchange, best-practices, replication and stakeholder involvement
7	Miscellaneous expenses are related to reporting, review and consolidation across communities once the field visits are in full coordination. Due to the large number of countries involved in the project, securing funds for unexpected events or setbacks is safe.
8	Contractual services for specialists to delivering the following products: (i) Website design, operation and management (4.1.5.1); (ii) Development of outreach products (1.1.5.2); (iii) Documentary highlighting the project issues and solutions/achievements across all countries (4.1.5.3) Under this sub-component technical, scientific and other miscellaneous publications will be issued. Radio, film and other media products will be generated based on emergent themes and will draw on contributions from well-known personalities in the creative arts and sporting fields. Regional-level literary and visual arts competitions for schools will be hosted with support from the private sector; this will augment national programmes. Mobile exhibit displays for the project will be procured along with project promotional paraphernalia.
9	$145,000 for the 7th GEF-International Waters Conference
10	$55,000 for IW 7th GEF- International Waters Conference . $45,930 Travel costs related to host stakeholders participation in 2 IWC conferences 2015 and 2017
11	Costs related to audiovisual and other production for the 7th GEF- International Waters Conference
12	Miscellaneous costs for the 7th GEF- International Waters Conference.
13	Project management costs
14	Project management costs

Appendices

Appendix 1: UNDP Environmental and social safeguards
Appendix 2: UNDP Tracking Tools

Refer to the UNEP Project Document annexes for the following documents relevant to the UNDP Project Document:

Appendix 4: Results Framework
Appendix 5: Work plan and timetable
Appendix 10: Decision-making flowchart and organogram
Appendix 11: Agreements and TORs (including PCU TORs)
Appendix 12: Co-financing commitment letters from project partners

Tracking tools

Appendices 14-21: GEF Tracking Tools – Biodiversity and Land Degradation - national projects
Appendix 22: GEF International Waters Tracking Tool (regional level)
Appendices 23-30: GEF Tracking Tools – Sustainable Forest Management – national projects

National and regional project documents

Appendix 31: National Sub-project 1.1 Antigua and Barbuda
Appendix 32: National Sub-project 1.2 Cuba
Appendix 33: National Sub-project 1.3 Dominican Republic
Appendix 34: National Sub-project 1.4 Jamaica
Appendix 35: National Sub-project 1.5 St Kitts and Nevis
Appendix 36: National Sub-project 1.6 Saint Lucia
Appendix 37: National Sub-project 1.7 St Vincent and the Grenadines
Appendix 38: National Sub-project 1.8 Trinidad & Tobago
Appendix 39: Regional Sub-project 2 Monitoring and indicators
Appendix 40: Regional Sub-project 3 Policy, legislation, capacity building
Appendix 41: Regional Sub-project 4 Knowledge management