



EUROPEAN COMMISSION

**PROVISION OF SERVICES IN THE SECTOR OF
COOPERATION RELATED TO:**

Lot 6: Environment

Framework Contract N°IB/AMS/451

Beneficiary Country: Caribbean Region

Letter of Contract N° 2008/169324

“Region Environmental Profile, Caribbean”

Final Report, volume 1

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September 2009

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This report is financed by the European Commission and is presented by Agrifor Consult for the European Commission. It does not necessarily reflect the opinion of the European Commission.

Table of Contents

Acronyms and Abbreviations

| | | |
|-------|---|----|
| 0. | Introduction | |
| 1. | Summary | 1 |
| 2. | State of the Environment | 9 |
| 2.1 | Physical and biological environment | 9 |
| 2.1.1 | Climate and climate variability | 9 |
| 2.1.2 | Geology and mineral resources | 10 |
| 2.1.3 | Land and topography | 10 |
| 2.1.4 | Natural water systems (surface water, groundwater, marine) | 10 |
| 2.1.5 | Ecosystems and biodiversity | 11 |
| 2.1.6 | Climate change and risk of natural disasters | 12 |
| 2.2 | Socio-economic environment | 14 |
| 2.2.1 | Key pressures on the environment | 14 |
| 2.2.2 | Urban areas and industries | 19 |
| 2.2.3 | Poverty, health and living conditions | 23 |
| 2.3 | Environment situation and trends | 25 |
| 2.4 | Environmental Indicators | 25 |
| 3. | Environmental Policy, Legislative and Institutional Framework | 27 |
| 3.1 | Environmental policy and legislation | 27 |
| 3.2 | Environmental legislation and institutional framework | 29 |
| 3.3 | Integration of environmental concerns into the main sectors | 34 |
| 4. | EU and other Donor Co-Operation with the Region from an Environmental Perspective | 40 |
| 4.1 | EU Co-operation from an environmental perspective | 40 |
| 4.2 | Co-operation funded by other agencies from an environmental perspective | 45 |
| 5. | Conclusions and Recommendations | 52 |
| 5.1 | Conclusions | 52 |
| 5.2 | Recommendations | 53 |

Acronyms and Abbreviations

| | |
|-----------|--|
| ACS | Association of Caribbean States |
| ACP | African Caribbean and Pacific group of countries |
| AFD | Agence Française de Développement |
| AMEP | Assessment and Management of Environmental Pollution |
| BCPR | Bureau of Crisis Prevention and Recovery |
| BOD | Biochemical Oxygen Demand |
| BMZ | Bundesministerium für Zusammenarbeit |
| BPOA | Barbados Programme of Action |
| CAFT | CARIFORUM Agriculture and Fisheries Programme |
| CaMPAM | Caribbean Marine Protected Areas Network |
| CANARI | Caribbean Natural Resources Institute |
| CARICAT | Caribbean Centre for Development Administration |
| CARICOM | Caribbean Community |
| CARIFORUM | Caribbean Forum of ACP States |
| CARSEA | Caribbean Sea Ecological Assessment |
| CAST | Caribbean Alliance for Sustainable Tourism |
| CCA | Caribbean Conservation Association |
| CCDF | Canada-Cuba Community Development Fund |
| CCCCC | Caribbean Community Climate Change Centre |
| CDB | Caribbean Development Bank |
| CDM | Comprehensive Disaster Management |
| CDERA | Caribbean Disaster Emergency Response Agency |
| CEHI | Caribbean Environmental Health Institute |
| CEIS | Caribbean Energy Information System |
| CEP | Caribbean Environment Programme |
| CEPNET | Information Systems for the Management of Marine and Coastal Resources |
| CETA | Communication, Education, Training and Awareness |
| CFC | Caribbean Food Corporation |
| CFNI | Caribbean Food and Nutrition Institute |
| CFP | Common Fisheries Policy |
| CFRAMP | CARICOM Fisheries Resource Assessment and Management Programme |
| CHA | Caribbean Hotel Association |
| CIDA | Canadian International Development Agency |
| CLME | Caribbean Large Marine Ecosystem Project |
| CMI | Caribbean Meteorological Institute |
| CMO | Caribbean Meteorological Organization |
| COD | Chemical Oxygen Demand |
| CORAASAN | Santiago Corporation for Water Supply and Sewerage |
| CPACC | Caribbean Planning for Adaptation to Climate Change Project |
| CREDP | Caribbean Renewable Energy Development Project |
| CREP | Caribbean Regional Environment Program |
| CRI | Catastrophe Risk Insurance Project |
| CRFM | Caribbean Regional Fisheries Mechanism |
| CRNM | Caribbean Regional Negotiating Machinery |

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| CSME | Caribbean Single Market and Economy |
| CSO | Civil Society Organisation |
| CSP | Country Strategy Paper |
| CTO | Caribbean Tourism Organisation |
| CWP | Caribbean Water Partnership |
| DCI | Development Cooperation Instrument |
| DFID | Department for International Development |
| DIPECHO | Disaster Preparedness ECHO |
| DIREN | Direction Régionale de l'Environnement |
| DO | Dissolved Oxygen |
| DR-CAFTA | Dominican Republic-Central American Free Trade Agreement |
| DSS | Decision Support Systems |
| EC | European Community |
| ECHO | European Community Humanitarian Office |
| EDF | European Development Fund |
| EEZ | Exclusive Economic Zone |
| EIA | Environmental Impact Assessment |
| EIB | European Investment Bank |
| ENRTP | Environment and sustainable management of natural resources, incl. energy |
| ENSO | El Niño/Southern Oscillation |
| EPA | Economic Partnership Agreement |
| ESDU | Environment and Sustainable Development Unit |
| ETA | Education, Training and Awareness |
| ETDP | Eco Tourism Development Programme |
| EU | European Union |
| FAO | Food and Agriculture Organisation |
| GCCA | Global Climate Change Alliance |
| GCFI | Gulf and Caribbean Fisheries Institute |
| GDP | Gross domestic Product |
| GEF | Global Environment Fund |
| GSEII | Global Sustainable Energy Islands Initiative |
| GTZ | Gesellschaft fuer Technische Zusammenarbeit |
| ICRM | Integrated Coastal Resource Management |
| ICZM | Integrated Coastal Zone Management |
| IDB | Inter-American Development Bank |
| IITF | International Institute of Tropical Forestry |
| INAPA | National Institute for Drinking Water |
| INSTRAW | International Research and Training Institute for the Advancement of Women |
| IRF | Island Resources Foundation |
| IUCN | World Conservation Union |
| IWCAM | Integrating Watershed and Coastal Area Management in Small Island Developing States of the Caribbean |
| IWRM | Integrated Water Resources Management |
| JICA | Japanese International Cooperation Agency |
| JOPI | Johannesburg Plan of Implementation |
| LAC | Latin America & the Caribbean |

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| LLCS | Low-Lying Coastal States |
| MACC | Mainstreaming Adaptation to Climate Change |
| MARPOL | International Convention for the Prevention of Pollution from Ships |
| MEA | Multilateral Environmental Agreement |
| MTBE | Methyl Tertiary-Butyl Ether |
| NAP | National Action Plans |
| NC | Nature Conservancy |
| NEMS | National Environmental Management Strategies |
| NFP | National Forest Programme |
| NIP | National Indicative Programme |
| NGO | Non Governmental Organisation |
| NP | National Park |
| NRM | Natural Resources Management |
| NRMU | Natural Resources Monitoring Unit |
| OAS | Organisation of American States |
| OCT | Overseas Countries and Territories |
| OECS | Organisation of Eastern Caribbean States |
| OTEC | Ocean Thermal Energy Conversion |
| PASMP | Protected Area System Master Plan |
| POPs | Persistent Organic Pollutants |
| RBLAC | Regional Bureau for Latin America and the Caribbean |
| REI | Regional Energy Initiative |
| REPAHA | Caribbean Regional Centre for the Education and Training of Animal Health and Veterinary Public Health Assistants |
| RIP | Regional Indicative Programme |
| ROLAC | Regional Office for Latin America and the Caribbean |
| RSP | Regional Strategy Paper |
| SEA | Strategic Environmental Assessments |
| SEMARN | State Secretary for Environment and Natural Resources |
| SECCI | Sustainable Energy and Climate Change Initiative |
| SFA | Special Framework for Assistance |
| SGD | St. George's Declaration |
| SIA | Social Impact Assessment |
| SIDS | Small Island Developing States |
| SPAW | Specially Protected Areas and Wildlife |
| STABEX | Stabilisation of Export Earnings |
| SYSMIN | System for mineral product |
| TCD | Technical Cooperation Department |
| TDS | Total Dissolved Solids |
| TSS | Total Suspended Solids |
| UK | United Kingdom |
| UN | United Nations |
| UNCBD | UN Convention on Biological Diversity |
| UNCCD | UN Convention to Combat Desertification |
| UNCLOS | UN Convention on the Law of the Seas |
| UNECLAC | United Nations Economic Commission for Latin America and the Caribbean |

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| UNDP | United Nations Development Programme |
| UNEP | United Nations Environment Programme |
| UNESCO | United Nations Educational, Scientific and Cultural Organization |
| UNFCCC | United Nations Framework Convention on Climate Change |
| UNICA | Association of Caribbean Universities and Research Institutes |
| USA | United States of America |
| USAID | United States Agency for International Development |
| WB | World Bank |
| WIDECAST | Wider Caribbean Sea Turtle Conservation Network |
| WSI | Water and Sanitation Initiative |
| WTO | World Trade Organisation |
| WWF | World Wide Fund for Nature |

0. Introduction

The present report summarises the main findings of the mission team (three environmental experts) assigned to prepare the 'Region Environmental Profile of the Caribbean'. The region subject comprises *The Greater Antilles* (Cuba, Haiti, Jamaica and the Dominican Republic) *The Lesser Antilles* (Antigua and Barbuda, Barbados, Dominica, Grenada, Saint Kitts and Nevis, Saint Lucia, Saint Vincent & the Grenadines, Trinidad & Tobago), *The Guyanas* (Suriname and Guyana) and Central-American *Belize*. The findings are based on an extensive desk study of the major existing documents on the relevant topics, on personal consultation of resources persons in a selection of countries (Barbados, Guyana, Jamaica, Haiti, Dominican Republic and Cuba) during a first field mission between the 15th and 30th of March and the 10th and 16th of May (Cuba) 2009, and on the outcomes of the plenary discussions and group work carried out during a regional workshop on 26th and 27th May 2009 in Jamaica.

The study was commissioned by the EC in view of the 2010 mid-term review of the Caribbean Regional Strategy Paper and Regional Indicative Programme (2008-2013). The RSP/RIP was signed jointly by the CARIFORUM and the EU in November 2008. The agreed focal area is Regional Economic Integration/Cooperation and EPA implementation. The RSP/RIP under the 10th EDF does thus not directly address environmental issues, which was the case of the RSP/RIP under the 9th EDF. This was a joint agreement since numerous complementary programmes in favour of the environment and climate change are currently on-going or in the pipeline, including the Global Climate Change Alliance (under which the region stands to benefit from €8 million), intra-ACP programme on Disaster Risk Reduction for a total amount of €180 million, and the intra-ACP programme on renewable energies (under which the region stands to benefit from €1,5 million).

However, environmental concerns remain high on the agenda of the CARIFORUM, as shows the Joint Communiqué adopted during the CARIFORUM-EU Troika Summit (Peru, May 2008). Therefore, the upcoming mid-term review is a key occasion to assess the validity of the RSP/RIP and the complementary environmental programmes ongoing and planned taking a holistic view of overall EU development assistance at regional level.

The present document aims to contribute to this upcoming review process. To this end, the report includes an overview of the state of the environment in the region, a review of the environmental institutional and legal framework in the region, an overview of EU and other donor cooperation in environment-related sectors, and finally a number of recommendations for mainstreaming environmental concerns in priority development areas for the Caribbean Region and the EC – Caribbean cooperation in particular. These recommendations take into account the recommendations which have been jointly developed during the regional workshop. They include recommendations to be taken into account by the RSP/RIP review team to address the need and possible ways to integrate the environmental sector in the RSP/RIP. (see also the terms of reference in annex).

1. Summary

- **State of the environment**

The region has a tropical climate with a relatively dry season followed by a summer period which coincides with the hurricane season in the northern part of the region.

The Wider Caribbean has been identified as one of the world's biodiversity hot-spots. At the same time the region is considered one of the most natural disaster prone areas in the world.

From an environmental point of view the countries involved vary substantially. The region includes large, forest covered nations with low population densities on the South-American and Central-American mainland, as well as medium size island states with important cities, harbours and industrial activities and also very small pristine islands. The level of economy and development ranges from rather modern industrialised states such as Trinidad, to island states with luxury tourist infrastructure and poor agricultural based societies like Haiti.

The Caribbean states all depend heavily on their natural ecosystems, both for the extraction of mineral resources, fishery, agriculture and forestry but also for the importance that tourism comprises for their economies. For the islands states coastal and marine resources are vital. The protection of the different ecosystems is therefore of direct importance to all the countries.

The ecosystems in all states are under growing different human pressures and climate change is already having a serious impact on the Caribbean natural values and human societies. Hurricanes, earthquakes, volcanic activity and tidal waves make the Caribbean twelve times as exposed to disasters as the world average. Natural disasters have a far greater effect on people in the Caribbean SIDS and LLCs compared to most other areas in the world, measured in terms of proportion of population affected and GDP. Climate change trend is likely to increase over the decades to come and is projected to include sea level rise, increased extreme weather conditions such as hurricanes, droughts and floods that already seriously affect the region. The ability of the Caribbean to adapt to the destructive impacts of climate change and increasing environmental vulnerability are key factors that determine whether or not development in these countries will be sustainable.

Man made environmental pressures in the countries vary along with the economic level of the country and their natural situation. It can be stated that in the wealthier states the environmental problems are related to industrial production (mining industry, oil refinery, manufacturing), the high production of household and industrial waste, a high consumption of water and energy with associated high CO₂ emissions (in particular in T&T), urbanisation with limited use of spatial planning tools and large scale infrastructural projects. In the poorer states the pressure comes mainly from deforestation and lack of adequate technology in agriculture as well as insufficient waste and water management.

There are also many similarities with respect to pressure on the environment. On the one hand, there are external forces over which the states in the region itself have little or no control (such as natural disasters and climate change). On the other hand, socio-economic activities contribute to serious environmental degradation and depletion of natural resources: growing populations in combination with unsustainable natural resource exploitation, conversion of agricultural and natural land into built-on land (tourist resorts, infrastructure, industry, etc), poorly managed tourism, extraction of natural resources in vulnerable areas, deficient waste management, water pollution and the introduction of alien species. All are important factors that result to a different extent per country in an ongoing loss of forest cover, reduction of terrestrial and marine biodiversity, growing erosion, coral reef degradation and growing pollution of water, land and air. It is estimated that two-thirds of the Caribbean reefs are at risk now. A main factor is progressive acidification of the oceans deriving from increased CO₂ absorption.

In general infrastructure for waste disposal, waste treatment, waste water collection and treatment, and agricultural practices are not sufficiently developed to guarantee sustainability. Urbanisation leads to unhealthy living conditions for the poor, discharge of waste and waste water to the marine

environment occupancy of coastal areas by tourist resorts. This leads to environmental trends that indicate a rising pattern for watershed and coastal zone degradation, habitat conversion, overharvesting of fish grounds, contamination of aquatic ecosystems, salt intrusion, waste generation and disposal (including hazardous waste) and energy consumption.

Many countries in the region are working hard now on more sustainable development, including better legislation, extension of sewerage and water treatment systems, reduction of the use of persistent chemicals in the agriculture, the extension of protected areas and natural parks, forest preservation and certification systems, the introduction of renewable energy production, programmes for waste recycling prevention of waste production and import, better control on overfishing and introduction of cleaner production processes in industry, reduction of greenhouse gasses in cooperation with industrialised countries.

- **Environmental policy, legislative and institutional framework**

The Caribbean SIDS and LLCS have been moving from being reactive to proactive in dealing with environmental issues at the national, regional and international levels. Only a few countries have developed National Sustainable Development Strategies, but most have formulated a national environmental policy, a national environmental management strategy, or equivalent. A wide range of policies and plans has been included under the heading of national sustainable development activities and several countries have enacted or drafted comprehensive environmental legislation including EIA procedures for all large development projects (industries, mining, construction, transport), and adopted National Environmental Action Plans. Most governments place environmental considerations high on the national agenda and have instituted measures to ensure the incorporation of environmental concerns in national policy, including in National Strategic Plans, Economic Development Plans, and Poverty Reduction Strategies. Nationally-funded initiatives have been undertaken and public sector investments in environmental management have been significant in many countries. In addition, Governments have found creative ways of raising funds for local sustainable development initiatives. These include establishing environmental funds; debt-for-nature swaps; local application of the polluter-pays principle; imposition of "environmental levies" in the waste management sector; and the provision of incentives for the private sector to adopt environmentally responsible actions.

Despite these efforts of environment mainstreaming in the different economic sectors and policies, most of the governments continue to be faced with serious obstacles in the effective implementation of the existing policy instruments. Integration of environmental issues is still seen as a supplementary expense for development activities. Integration of environment aspects in trade agreements are still under – explored and up to now sea level rise and prevention of natural disasters are very seldom taken into account in physical planning. Strategic instruments, like Strategic Environmental Assessments (SEA), are rarely used to imbed infrastructure and transport development in sustainable integrated development planning. Linking environment to the economy (Environment/growth modelling) and mainstreaming Climate change in national development agenda remain poor. The public policy framework for environmental management is still largely oriented towards control, regulation and a reactive approach to environmental issues.

Some countries have established agencies to deal with specific aspects of environmental management and have clearly delineated agencies to initiate and/or coordinate national policies and programmes. But national coordination in most countries is still characterised by overlapping mandates and confusion among responsibilities of sector ministries and a huge number of specialised institutions for environment issues, leading to important inefficiencies in the implementation of national policies. The structures with the mandate for coordination - often the Ministry of Environment- are not strong enough in competition with other ministries to fulfil a leadership role. Environmental issues are not given priority in national decision making, even if they are mentioned in the national policy documents. Poor implementation of existing policies, strategies and regulations and lack of a holistic view are major challenges for environment management and sustainable development.

Caribbean countries are active participants in all the main international environmental treaties and conventions and they are the most important vehicle to address main environmental issues. But MEAs

place a substantial burden on small countries with limited staff and capacities. Reporting, particularly in the absence of adequate systems for monitoring and data management, is perceived by many as a costly exercise that yields few tangible benefits. International conventions require countries to prepare specific programmes and plans of actions which often duplicate each other, fail to build on earlier efforts, and cause a significant drain in the resources of the agencies that are expected to prepare them.

During the 1990s the Caribbean witnessed a surge of specialised institutions of relevance to environmental management and biodiversity conservation that were created by the regional organisations such as CARICOM and the OECS. Several regional strategies and action plans have been developed for sustainable development and to address major environment challenges. A wide variety of regional environmental mechanisms and institutions is in place, but the region's fragmentation, by language, politics and colonial history, means that only a few mechanisms serve the entire Wider Caribbean. Challenges in coordination/harmonisation, communication, duplication of efforts, overlapping mandates, limited practical outcomes from the regional institutions and dependency on donor funding for enforcement remain major problems of the actual regional institutional framework. A real 'Caribbean identity' is not yet existing and the functioning of CARICOM can be improved in terms of better integration of the interests of the non-Anglophone countries and increased transparency of decisions making procedures.

Most recent national and regional policies include provisions for stakeholder participation. Growing acceptance of participatory approaches has opened spaces for collaborative management arrangements and NGOs are included in policy development processes and consultations. Although these spaces for government-civil society engagement exist, participatory processes are not always adequately institutionalized. Civil society participation is very different depending on structures, sectors and countries. Beside active NGO and University participation, private sector participation is - except EIA requirements- mainly limited to smaller local businesses in the tourism sector.

Capacity challenges are a major problem for environment management and sustainable development at all levels. Regional bodies, especially CARICOM, have insufficient staff for sustainable development and capacities for regional coordination and cross sectoral thinking are missing. Regional specialised institutions (CDERA, CCCCC) are not given the necessary authority, power and mandate to act as a regional institute, coordination between them is still poor and impact and visibility especially of CCCCC are low outside the Anglophone CARICOM member states.

Most Caribbean countries have small populations and a lack of institutional and individual capacities exists in the region. The size of environmental departments, in terms of manpower and financial resources allocated to them, in competition with other ministries/departments, is low and insufficient to effectively manage environmental issues in the Caribbean; special technical equipment for control is often missing and the number of skilled individuals available to undertake roles in the fields of environmental management, conservation and policy development are constrained. The employment of existing skilled persons is often hampered by insufficient financial resources. Inadequate access to information on projects and studies undertaken in the region and lack of coordination/harmonisation at national level create duplication of efforts and contradictions. Limited employment opportunities in the region as well as the failure of environmental institutions to build on the capacity of skilled personnel has led, to a certain extent, to a loss of skilled individuals to metropolitan countries in the region and, even worse, outside the region.

- **EU and other donor co-operation with the Region from an environmental perspective.**

The current political framework for the EU-CARIFORUM relations is mainly provided by (1) the EU-Caribbean Partnership for Growth, Stability and Development (2006) and by (2) the outcomes of the 3rd CARIFORUM-EU Troika Summit (2008). Both policy documents reflect a general consensus and acknowledgement of the severity of the environmental challenges the region is facing, of the threat these challenges pose to current and future socio-economic development, and of the need to address these environmental issues in the frame of the CARIFORUM-EU cooperation programme. As possible modalities to support the region to start mitigating the environmental problems, the Joint Communiqué of the Troika Summit in 2008 mentions (1) the establishment of a regional Task Force dealing amongst others with climate change, energy and food security; (2) the existence of the newly started

Intra-ACP/EU Natural Disaster Facility (10th EDF); and (3) the EU Global Climate Change Alliance. Furthermore, a CARIFORUM-EU Declaration on Climate Change and Energy was signed at the Summit event.

In spite of the clearly environment-supportive EU-CARIFORUM policy framework and the significant financial support available to the Caribbean countries through the EDF, DCI, ECHO, SFA,... instruments, there is a clear general tendency in the EU-CARIFORUM cooperation towards less investment in the environmental sector. The current Regional Indicative Programmes (10th EDF) focus almost exclusively on regional integration and cooperation among CARIFORUM countries and on the needs related to the implementation of the Economic Partnership Agreement (EPA), which is considered to be a vehicle for regional integration. Moreover, environmental mainstreaming in the selected focal areas is weak. Most ongoing or recently finalised EC-funded interventions related to the environment are hence supported under the previous financing cycles (7th – 9th EDF).

EU Member States that provide substantial assistance to the environmental sector in the region are the UK (DFID), France, Germany, Spain and the Netherlands. Most current support is however going to bilateral interventions; only DFID has a genuine regional programme for the Caribbean and Germany supports some bi-national projects in Haiti and the Dominican Republic. Another trend among the EU MS consists in the allocation of larger budgets to multi-donor programmes and initiatives (including to the EC budgets).

Though the EU (EC + MS) can be considered as the main provider of development assistance (in grants) to the region, a large range of other donor agencies and funds supporting initiatives in the field of environment and/or natural disaster management do exist. They are: GEF, OAS, IDB, WB, JICA, CIDA, CDB, USAID, UNDP, UNEP, FAO, the WWF, IUCN, and finally the Nature Conservancy.

The region has attracted a vast range of donor agencies and the number of donor-supported environment-related initiatives is impressive. Unfortunately, proper coordination among donors and hence optimisation of the efficiency of all these donor investments and contributions in addressing environmental issues, remains a difficult point. The practical outcomes of these support initiatives are still limited due to concentration on policy development and capacity building, and few support for field implementation. Though donor coordination has improved over the past years, there is still room for further improvement and steps need to be taken to avoid overlapping funding.

• **Conclusions and recommendations**

Conclusion 1: Environmental degradation and the unsustainable use of natural resources have continued in the Caribbean SIDS and LLCS, with negative consequences for social and economic development. The key economic sectors such as tourism, agriculture, fisheries and forestry depend heavily on more and more stressed natural resources. The ability of the Caribbean to reverse the trends of increasing environmental vulnerability and degradation is one of the key factors that determine whether or not development in these countries will be sustainable.

Conclusion 2: The key environment concern of all countries in the region is adaptation and preparation for climate change and natural disasters. Although the contribution of the Caribbean countries to this global phenomenon is very low, the potential impact is enormous. Other high ranked concerns, which originate from the countries own activities and policies are: land use management in a holistic way (water, forest etc), especially for coastal areas and watersheds; marine environment, renewable energy/energy effectiveness and waste/waste water management. Depending on the sub-regional specific situations the ranking of environment problems after climate change and disasters varies as follows:

- Guyanas' sub - region: marine flooding, water drainage, avoid deforestation/protect standing forests, establishment of protected areas
- OECS region: waste from cruise ships (marine pollution), waste and waste water management, renewable energies
- Greater Antilles: water/watershed management, deforestation, soil management/erosion, renewable energies to reduce deforestation

Conclusion 3: The Caribbean SIDS and LLCS have begun to take action towards achieving sustainable development at national and regional level and the countries have made significant progress in establishing comprehensive policy, institutional and legal frameworks for environmental management. But limited capacities and coordination difficulties – at national and regional level - are still major challenges in implementation/enforcement of existing policies/regulations and effective sustainable environmental management.

Conclusion 4: Integration of environmental concerns into the main economic sectors is very varies between the countries and the sectors. Significant efforts have been made the last years in most sectors and countries, but up to now sea level rise and prevention of natural disasters are very rarely taken into account in urban development, infrastructure/transport and physical planning. The use of strategic instruments, like SEA, environment/economic growth modelling and mainstreaming of climate change in national development agenda remain poor due to low priority of environment issues in decision making on national development planning.

Conclusion 5: The importance given to the environment in the EU-CARIFORUM policy statements is not reflected in the current Regional Indicative Programme. Indeed, initially planned environment and disaster management components were left out of the 10th EDF RIP, since numerous complementary programmes in favour of the environment and climate change are currently on-going or in the pipeline, including the Global Climate Change Alliance (under which the region stands to benefit from €8 million), intra-ACP programme on Disaster Risk Reduction for a total amount of €180 million, and the intra-ACP programme on renewable energies (under which the region stands to benefit from €1,5 million). The same – though to a lesser extent – goes for the respective National Indicative Programmes (2008-2013). Only in a few cases is environment addressed as a focal sector and environmental mainstreaming in the selected focal areas is generally reported to be deficient. Further, the environmental initiatives (CARIFORUM Regional Task Force, GCCA, intra ACP-EU Natural Disaster Facility) referred to in the EU-CARIFORUM Troika Summit Agreement are not yet known by most of the EC Delegations and Ministries of Environment. Most are not put in place yet. The upcoming mid-term review is a key occasion to assess the validity of the RSP/NIP and the complementary environmental programmes ongoing and planned taking a holistic view of overall EU development assistance at regional level.

Conclusion 6: The region accommodates an important donor community active in the environmental sector supporting a multitude of recently concluded and ongoing programmes and interventions addressing environmental issues. Priorities for donor assistance are the natural disaster-related programmes, ranging from relief and rehabilitation to management and preparedness. Adaptation to climate change – which is a very broad subject – is rapidly gaining importance. Donor coordination has improved over the last decade but still remains a difficult point. In general, the donor community displays a certain tendency towards contributing to multi-lateral and multi-donor initiatives rather than investing in smaller bilateral programmes.

Conclusion 7: Authorities in the visited countries have a clear preference for national or sub-regional field projects and programmes. The benefits from regional initiatives are perceived to be significantly less than those that are generated through national or sub-regional projects.

Recommendations:

Following recommendations address all levels (National Governments, regional structures, donors) to different extent. Theses which concern especially the EC cooperation are indicated (*). The most important key environmental priorities for future EC-Caribbean cooperation are high-lighted (in bold) to facilitate future priority ranking and decision making concerning financial support of EC to environmental issues in the Caribbean.

Preliminary remark: Previous recommendations from UNEP Outlook 2004 and review of the Barbados Plan of Action 2005 are still considered valid.

GENERAL AND TRANSVERSAL RECOMMENDATIONS

- As a regional priority EC/donor support should go to the implementation of existing regional policies and strategies coordinated by regional institutions, to multi-donor programmes and to the implementation of MEA-related action plans. Within this priority framework for cooperation and based on the availability of significant budgets, the EC should put emphasis on the larger investment components such as infrastructure, construction, etc. Furthermore should a certain percentage of regional and national funding from EU be used for the implementation of measures proposed in chapter 4 of the CARIFORUM/EU EPA.
- The close inter-linkages between environment and development lead to the recommendation that environmental aspects should be part and parcel of all development programmes. Further, it should be taken into account that the implementation of predominantly socio-economic development programmes can be very effective in preventing further environmental degradation (e.g. programmes that focus on poverty reduction or employment creation and therefore reduce the pressure on natural resources).
- A focus on the opportunities that are provided by the assets of environment and natural resources rather than on environmental problems could lead to a more positive attitude towards environmental management and to an increased environmental awareness both at decision-making and general public level. This positive opportunity approach should also be reflected in the regional development programmes.
- Countries have to improve interdisciplinary coordination/harmonisation between technical ministries/institutions in order to increase effectiveness of the provided donor assistance. This includes simplification of the institutional framework for environmental management and clarification of the mandates.
- The role of civil society as well as private sector in development processes should be enhanced.

NATURAL DISASTER RISK REDUCTION AND PREPAREDNESS, CLIMATE CHANGE ADAPTATION

- **Support the implementation of regional strategies to prepare and respond to CC (Adaptation to Climate Change, Enhanced Comprehensive Disaster Management Strategy and Framework) as a central issue for development of the region incl. especially 'Support significant infrastructure investments for adaptation to the expected climate changes' (*)**
- Support countries in making use of funds available from the clean development mechanism (CDM), Adaptation Fund (UNFCCC) and GCCA (*)
- Support assessments of climate change/hurricane impact on the economies
- Include natural disaster/climate change risk assessment in procedures for funded projects (*)
- Support regional cooperation initiatives for preparation of human resources, update of technology and equipment, to improve early warning systems. (*)
- Strengthen the institutional capacity of existing monitoring and observation centers for early warning of natural disasters and support regional networking among these.

FOOD, WATER AND ENERGY SECURITY

- **Support energy efficiency and alternative sources of energy such as waste-to-energy initiatives, wind, solar, geothermal, (bio)fuels making use of existing alternative energy technologies in the region. (*)**
This should include:
* **Contribute to the Caribbean Renewable Energy Development Programme (*)**
- Support employment programmes in order to reduce poverty and reduce environmental stress incl. ecotourism, fishery programmes, sugar cane energy,
- Support the implementation of regional water management strategies, as currently under development by CARICOM, and the implementation of food security strategies (*)
- Support national programmes for improvement of water use, saving, drinking water supply (loss prevention through better maintenance, in particular of main water distribution systems) (*)

WASTE WATER AND WASTE MANAGEMENT

- Support significant investments in waste water treatment, sewerage systems and waste disposal/treatment (*)
- Support infrastructural and management support for reception and treatment of ship generated waste (*)
- Support institutional strengthening with respect to waste and waste water treatment (*)

INTEGRATED ECOSYSTEM MANAGEMENT

- Continue/increase support to sub - regional environment initiatives which address shared resources in similar eco-regions (Caribbean Biological Corridor Initiative, bi-national Haiti-Dominican Republic Programme (NRM, watershed management), transformation of Dominica into an "organic island" within the Caribbean SIDS programme) (*)
- Establish partnership with Caribbean Environment Programme (as part of the UNEP Sea Programme) with special focus on treatment and management of marine ecosystem via the Caribbean Sea Commission (*)
- Support the implementation of national Coastal Zone Management programmes (*)
- Design and support a regional programme on indigenous knowledge on biological resources, including protection of intellectual property rights and improvement of management, processing and commercialisation of these products. (3)

REGIONAL AND DONOR COORDINATION/ PROGRAMMES

- Develop a mechanism for better exchange of information between donors and regional agencies (including CSO) on current priorities, specific projects planned and under implementation, etc.
- Set up a Caribbean-owned fund or a facility allowing exchange of human and technical expertise among countries of the region (added value: develop South-South cooperation, strengthen regional expertise, establish a database of country thematic experts, country focal points and key institutions).(*)

GOVERNANCE AND DECISION MAKING

- Support the implementation and the enforcement of existing environmental regulations (*)
- Encourage SEA for the strategic economic sectors and make SEA a precondition for EC sector budget support to those sector with a high potential environmental impact (*)
- Develop environmental 'core' indicators for National/Regional Development Plans
- Support countries to develop a 'green economy', to show that environmental integration is not only a supplementary expense

INSTITUTIONAL STRENGTHENING/CAPACITY BUILDING

- Support capacity building on Environmental mainstreaming with emphasis on SEA, indicators, EIA, environment screening (*)
This has to include:
 - * Reinforce capacity within EC delegations to ensure proper environmental mainstreaming in the RIP/NIP implementation and inclusion of environmental indicators in the 'internal evaluation grid for regional/countries' programmes'. (*)
- Strengthen technical and methodological capacities of existing regional, national and local organisations and institutions involved in environmental management and control, varying strongly per institute and per country
- Support training/capacity building of the private sector in environmental management and cleaner production, technology and promote PPP and private sector international cooperation (*)
- Support regional cooperation initiatives that contribute to better preparation of human resources and update of technology and equipment with the view to improve the countries' early warning systems and make regional funding available for capacity building (*)
- Facilitate exchange and cooperation between the Caribbean Sea Commission (ACS) and other regional sea commissions (especially Baltic Sea Programme) (*)

INFORMATION/COMMUNICATION/SENSIBILISATION/MONITORING

- Increase public knowledge on environmental regulations
- Provide information to interested parties and facilitate their access to EC funding opportunities (*)
- Increase access to information technology and improve capacity to apply it
- Support programmes for the exchange and dissemination of existing knowledge and experience between countries
- Support the CNIGS in Haiti to develop regional services throughout the Caribbean in satellite data collection and interpretation (Environmental Observatory for the Caribbean)(*)

2. State of the Environment

2.1 Physical and biological environment

The region subject to this report comprises the eastern perimeter of the wider Caribbean region, and includes the islands of the Greater and Lesser Antilles, those of the Bahamian chain to the north, the low lying states of Guyana and Suriname, as part of the South American mainland, and the Gulf coast state of Belize as part of the Central American mainland (annex 6.1.1).

2.1.1 Climate and climate variability

The Caribbean climate is tropical, moderated to some extent by the prevailing northeast trade winds. Individual climatic conditions are strongly dependent on elevation. At sea level there is little variation in temperature, regardless of the time of the day or the season of the year. Temperatures range between 24 and 32 °C. Rainfall distribution is determined by the size, shape, topography, relief and geographic position with respect to the north wind. Flat islands tend to receive slightly less rainfall, but its pattern is more consistent. Most of the rainfall occurs during short heavy outbursts during daylight hours. The period of heaviest rainfall usually occurs after the sun has passed directly overhead, which in these islands would usually be in the middle of May and again in early August. The rainy season coincides with the summer hurricane season. Hurricanes develop over the ocean during the summer months (June to November) when the sea surface temperature is high (over 27 °C), and the air pressure falls below 950 millibars. These conditions create an "eye" about 20 km wide, around which a steep pressure gradient forms that generates wind speeds of 110 to 280 km/h. The diameter of hurricanes can extend up to 800 km and the combination of these strong storm winds with extremely heavy rainfall often result in considerable damage to human property and nature. The region can be divided in the following sub-regions:

The Greater Antilles (Cuba, Haiti, Jamaica and the Dominican Republic) with a total surface of 198.330 km² in the Intertropical Convergence Zone is influenced by northern winds. The climate is tropical marine, with a dry and a wet season and fairly constant temperatures throughout the year. Even in elevated areas, temperatures rarely drop below 13° C.

The Lesser Antilles (Antigua and Barbuda, Barbados, Dominica, Grenada, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines and Trinidad and Tobago), with a total surface of 8.430 km². Temperatures are similar to the Greater Antilles. The average rainfall is around 1100 mm. However, in the mountainous islands there is an important screen effect on the south coasts, characterised by an arid climate. The dry season is more significant towards the south. Tropical storms occasionally cause hurricanes.

The Guyanas (Suriname and Guyana), in the south limited by the Guyana belt, a mountain range forming the natural barrier separating the countries from the Brazilian Amazon River basin. These countries, with an area of 378.240 km² are dominated by mountainous tropical and savannah forests and have a tropical climate. The coastal area is characterized by two dry and two wet seasons, while one dry and one wet season characterize the rest of the territory. The coastal average annual temperature varies from 23 °C to 32 °C. In the interior, away from the moderating effect of the sea, temperature variation is higher, especially between day and night. Precipitation is higher in the south, 1 500 mm to 2 400 mm/year, mainly concentrated in the humid season.

Belize, located in *Northern Central America*, with a subtropical climate. Temperatures range from 21° C in the cooler months of October to February to 32.2° C in the warmer months of May to September. The annual mean relative humidity is 81.8%, while total rainfall varies from 1.588 mm to 4.290 mm, annually. The average annual rainfall over the past 15 years is reported at 2.006 mm. There are two distinct seasons: a rainy season, which normally commences in late May and lasts until November,

and a dry season, which stretches from December to early May. Topographic variations throughout the country are responsible for major fluctuations in air temperature, humidity and rainfall.

2.1.2 Geology and mineral resources

The Caribbean islands lay in a wide arc between Florida in the north and Venezuela in the south forming a barrier between the Caribbean Sea and the Atlantic Ocean. The islands, which are the isolated upper parts of a submerged chain of volcanic mountains, are scattered over thousands of square kilometres of sea. Apart from Guyana, Suriname, Cuba, Jamaica, Dominican Republic/Haiti and Belize the countries belong to the smallest in the world.

Three principal geological formations are found throughout the Caribbean. These are igneous and metamorphic rocks, limestone hills or karst, and coastal, sedimentary plains of varying depths. Active volcanoes exist in Dominica, St. Lucia, St. Vincent & the Grenadines, and off the coast of Grenada, which also has some older crater lakes. All the islands have rugged coastlines with numerous inlets with white or dark sandy beaches (depending on the rock substratum) with sand of varying texture.

The most important mineral resources in the region include gold, diamonds and bauxite. Suriname and Jamaica have extensive deposits of bauxite, some of which mined and processed locally into alumina. In addition, Jamaica has large quantities of gypsum. Trinidad and Tobago has petroleum (as well as, to a far lesser extent, Cuba), pitch, and natural gas. Small, non-commercially viable deposits of manganese, lead, copper, and zinc are found throughout most of the islands.

2.1.3 Land and topography

The geological formations in the region result in three prevailing types of topography: (i) high mountains (over 1,200 metres) covered with dense rainforests and numerous rivers; (ii) hilly countryside (seldom above 600 metres); (iii) coastal plains with their greatest extensions usually on the southern or western sides of the mountains.

There is a wide variation in the quality and availability of land resources in the Caribbean, relative to population densities and economic use. For example, Barbados is ranked as the sixteenth most densely populated country in the world. At the other extreme Guyana and Suriname are under-populated, extremely rich in flora, fauna and minerals, having approximately 80% of their territory as primary forest. Antigua & Barbuda and Haiti face a challenging food security situation because the poor quality of their soils permits very little farming activity.

Land use changes have major consequences for soil resources, groundwater, wildlife and biodiversity, landscapes and the quality of air and water. Land use changes are the effect of growing populations and changing economic activities. Forest land is cleared for agriculture, roads and other infrastructure or settlements, and fertile agricultural land may be converted irreversibly to built-up land. The small size of most Caribbean islands, coupled with their special land tenure systems, soil types, relief and climatic variation, limit the area available for urban settlement, agriculture, mining, commercial forestry, tourism and other infrastructure, and certainly make land one of the most limited resources in the region. It is therefore subject to intense pressures from human activities. Poor land use and land management as well as increasing conflicts for access to land (for agriculture, urbanisation or other activities) have led to the degradation of this resource. Erosion and land degradation are particularly severe in coastal areas and in areas formerly covered by forests.

2.1.4 Natural water systems (lakes, rivers, surface water, groundwater)

The elevation of the land determines the hydrology and terrestrial habitat diversity, with the variety of vegetative habitats increasing with elevation. Smaller, flatter islands and archipelagic systems such as

The Bahamas tend to be dry with little or no surface water. The more elevated and bigger islands are characterised by the presence of surface water and forested hills and/or mountains. Belize, Guyana and Suriname have extensive mountainous rainforest reserves.

Loss of forest cover, unsustainable agricultural practices, fires, mining activities, and other developments in the upper watersheds are contributing to watershed degradation that has significant implications for future development in the region. The most significant implications of watershed degradation in the region are the threat to drinking water supplies, groundwater and deterioration of surface waters - like lakes and rivers - and of coastal ecosystems. Salt intrusion in the lower areas, due to extensive use, lowering of the groundwater level and raising sea water level are serious problems in the SIDS.

Guyana, Suriname and Belize have torrent rivers and lakes in the forest areas. Cuba and the Dominican Republic have numerous rivers.

The UN Convention on the Law of the Seas (UNCLOS) with its provision for the 200 miles Exclusive Economic Zone (EEZ) has made the Caribbean Sea the most extensive and important resource for most Caribbean countries, in particular for the small island developing states (SIDS). The combined area of the Caribbean Sea and the Gulf of Mexico is approximately 5.326.000 km². The majority of the population lives and the bulk of economic and social activities take place in or within five miles of the sea. It is the main resource linking the region. Because of the geographic configuration of several of the states, the protection of the ocean is of considerable importance. For example, The Bahamas archipelago covers 124,000sq. miles, 90% of which is water. The Caribbean Sea is however a threatened and vulnerable asset. Its fragile ecosystem is exposed to heavy traffic of cargo vessels and cruise liners, various other sources of pollution, and the living resources are often over-harvested.

The economy of the Caribbean region depends very heavily on coastal and marine resources. Coastal areas in the Caribbean are coming under extreme pressure due to unmitigated development, pollution, over-exploitation of resources, and growing conflicts between competing resource uses. It is estimated that two-thirds of the Caribbean reefs are at risk.

2.1.5 Ecosystems and biodiversity

The Caribbean as a whole has a rich diversity of ecologically vital ecosystems (e.g. forests, coral reefs, mangroves, sea grass beds). The mainland countries (Belize, Guyana and Suriname) are especially rich in terrestrial biodiversity and have a high level of forest cover. The islands are rich in marine biodiversity and multi-island states like The Bahamas, have extensive marine resources. The Wider Caribbean has been identified as one of the world's biodiversity hot-spots, with very high biological diversity per unit of land and a very high level of endemism (due to the diversity of microclimates and ecosystems in tropical regions and to the insular/isolate conditions). The coral reef and forest ecosystems were identified as the source of the majority of SIDS' biodiversity. 54 per cent of vertebrates (excluding fishes) and 59 per cent of plants are thought to be endemic. In Jamaica, for example, there are 3.003 species of flowering plants, 28% of which are endemic, and more than two thirds of the 61 species of reptiles and amphibians found there are endemic.

Unfortunately the extinction rate is also high: the IUCN Red List evaluated 2.074 species in the Caribbean islands alone and found that 2,2% were extinct and 38% threatened (annex 6.2.3). Of the 1.920 terrestrial species, 206 marine species and 347 freshwater species evaluated, respectively 38%, 22% and 22% are threatened. Invasive alien species are also considered a significant threat to biodiversity in geographic and evolutionary isolated systems such as the insular Caribbean states.

The Caribbean SIDS and LLCS count with over 600 protected areas, covering around 19% per cent of the regions territory (and about 200 proposed protected areas). At least 300 of these protected areas are marine, meant to protect coastal biodiversity resources both locally and regionally. The Caribbean has

2,8 million hectares of terrestrial protected areas and 10,9 million hectares of marine protected areas; the number of areas and size by category are indicated in the annex 6.2.4.

Despite the progress made during the past decade, the current status of protected areas in the Caribbean is troubling. In many countries, protected areas are the last remaining areas that are not seriously degraded. Some sites recommended for World Heritage have been reduced or opened for major tourism developments.

Some important marine ecosystems are:

Coral reefs are among the most important coastal resources in the CARICOM region in terms of providing food, habitats and nursery areas for numerous fish species and other aquatic animals. Coral reefs protect coastal areas from erosion and storms by creating natural breakwaters. Over the past two decades anthropogenic and natural influences have caused a reduction in hard corals and an increase in macroalgae cover to the point where some corals are overgrown by algae. This has been observed on several reefs, including in The Bahamas, Belize, St Vincent, Cuba and the Virgin Islands. Some Caribbean countries, including Cuba, the Dominican Republic, Guyana, Haiti, Jamaica and Suriname, host a range of cold-water coral species. The degradation of coral reefs has been particularly acute on narrow, coastal shelves accessible to low income fishers, and on reefs that are relatively close to highly populated areas. The deterioration of coral reef ecosystems was more significant in countries where economic development is heavily dependent on the marine environment, such as the Dominican Republic, Haiti and Jamaica. Earlier assessments found that reef condition tended to be relatively good in small, low-lying islands (for example, The Bahamas) and poor in near-shore areas in the high islands. Destruction of coral reefs as a result of hurricanes is growing over the last years. Also the effect of coral bleaching is rising.

Mangroves and littoral forests are considered to be the most biologically diverse habitats after coral reefs. For example, in Belize over 590 genera and more than 1 040 species of living organisms are known to inhabit the mangrove, littoral forests, lagoons and watersheds of coastal areas. The major threats to mangroves include coastal development and charcoal production. FAO reports decreasing mangrove cover over the period 1990 to 2000, with annual rates of decline ranging from 0.3 per cent in The Bahamas to 3.8 per cent in Barbados. Only St Lucia and some OCT's showed no significant change in mangrove cover over this period.

Sea grass beds are of considerable importance as a basis for fishery production, as a food source for aquatic animals such as fishes, turtles and sea urchins, and for coastal stabilization. They also provide a habitat and shelter for the young of many commercially important species, such as lobsters, snappers and conches. Sea grass beds are also extremely important elements in coastal waters because of their ability to filter pollutants. Loss of sea grass habitats not only decreases biodiversity, but also the ability of a coastal system to absorb pollutants from human activities, such as farming, aquaculture, sewage effluent, urban runoff and oil spills.

Biodiversity as a whole in the Caribbean is under tremendous pressure due to habitat destruction, overexploitation and harvesting of species, and pollution. The implications of biodiversity loss to the Caribbean region include loss of existing tourism and exploitative activities, as well as the opportunity costs of foregoing potentially new exploitative and non-exploitative activities such as tourism and new biological and chemical discoveries.

2.1.6 Climate change and risk of natural disasters

Hurricanes, earthquakes, volcanic activity and tidal waves make the Caribbean twelve times as exposed to disasters as the world average. Natural disasters have a much larger effect on people in the Caribbean SIDS and LLCS compared to most other areas in the world, measured in terms of proportion of population affected and GDP (cumulative damages). For example, the impact of Hurricane Ivan on Grenada was estimated at 200% of the GDP as compared to the 2% average of

natural disasters elsewhere in the world.

Other natural disasters that have affected the Caribbean in the last four decades are the earthquakes in Antigua and Barbuda in 1975 and a volcanic eruption in Montserrat in 1995. Belize is situated in an earthquake-prone area. Suriname had to cope with serious flooding in the inland, two years ago.

From 1978 to 1988 the Caribbean Region was affected by three hurricanes of a category 4 or 5 on the Saffir-Simpson Scale; in the period 1989 - 2001, there were eleven of this strength and in recent years hurricanes of the highest category are ever more frequent. Warming in the NW Caribbean was higher than in the E Caribbean, with significant increase in minimum temperature (1.4 °C since 1960). Warming was also observed to be higher in summer months than in cooler - traditionally drier - earlier months. This trend, while no conclusive evidence exists, is commonly attributed to the effect of climate change.

Main impacts of climate change

Climate change is already having a significant and serious impact on the Caribbean. This trend is likely to increase over the years and decades to come and is projected to include sea level rise, an increase in extreme weather events such as hurricanes, droughts and floods that already affect the region. Climate change forms a threat to development and diminishes the chances of achieving the Millennium Development Goals. Climate change will manifest itself by the following phenomena:

Sea-level rise of 30-55 cm for the Caribbean over the next 50 years has been considered a reasonable projection. Low-lying island states are especially vulnerable to sea level rise because the land area that exceeds three to four meters the present sea level is very limited. In the Caribbean, the majority of the human settlements, tourist facilities, airports, roads and other vital utilities and economic activities are located in the risk area along the coast. It must be mentioned that these human activities themselves have often led to the removal of the natural protective function provided by coastal ecosystems. Its potential effects on these important sectors for the local economies may have a devastating impact on local fragile economies.

Frequency and intensity of hurricanes will increase and will cause damage to humans, human settlements, ecosystems and the overall economic situation of the countries and region.

Changes in annual precipitation: Predictions indicate an increase of 6 % in the Western Caribbean and a decrease of 4% in the Eastern Caribbean. Wetter wet seasons and more severe and longer droughts during the dry seasons are also predicted. Water scarcity is thereby expected to become an issue given the increase in freshwater demands due to population growth and the expansion of tourism. In several countries, the adverse implications of climate change on water resources will be compounded as growing populations move into marginal areas with very limited water supply. The lack of fresh water can lead to a variety of health and food security problems.

Altered ocean circulation, vertical mixing and wave climate are other effects on the marine ecosystem. As a result, nutrient availability, biological productivity, the structure and functions of marine ecosystems, and heat and carbon storage capacity may be affected, with important feedbacks to the climate system.

Deterioration of coastal ecosystems, including mangroves, coastal wetlands, sandy beaches and coral reefs: Coral reefs will be damaged by tidal waves and hurricanes as well as by temperature effects. Coral bleaching will increase as a result of increased sea water temperatures. The frequency and extent of bleaching incidents have increased since the 1970s and are considered to be associated with an El Niño/Southern Oscillation (ENSO) disturbance. Bleaching incidents may become much more frequent. Coral reefs have a narrow temperature tolerance and temperature projections suggest that the thermal tolerance of reef-building corals will be exceeded within the next few decades. Local fishery will be affected by changes in these ecosystems.

Diminishing agricultural production as a result of scarcity of freshwater resources and increasing crop diseases. It is likely that crop production will be affected by alterations in the patterns of events brought about by climate change. A reduction in coastal arable land is also anticipated as a result of the projected sea-level rise and consequent saltwater intrusion. By mid-century, climate change is expected to reduce water resources in many islands to the point where they become insufficient to meet the demand during low rainfall periods.

Effects on biodiversity: Climate change may have an effect on the vegetation cover, on the degradation of land, on coral reefs and on marine resources. With higher temperatures, increased invasion by non-native species is expected to occur, particularly on mid-and high-latitude islands.

2.2 Socio-economic environment

Although significant variation exists among the countries in the Caribbean region, there are also many similarities with respect to pressure on the environment. On the one hand, there are external forces over which the states in the region have little or no control (such as natural disasters and climate change which are described in paragraph 2.1.6). On the other hand, socio-economic activities contribute to serious environmental degradation and depletion of natural resources. Growing populations in combination with unsustainable natural resource exploitation, conversion of agricultural and natural land into built-on land (tourist resorts, infrastructure, industry, etc.), poorly managed tourism, extraction of natural resources in vulnerable areas, deficient waste management, water pollution and the introduction of alien species are important factors that result in ongoing loss of forest cover, reduction of biodiversity, growing erosion, coral reef degradation and growing pollution of water, land and air.

There is a close linkage between the state of the environment and development in the Caribbean SIDS and LLCS due to a set of unique conditions, including: a heavy dependence on their limited natural resources; susceptibility to international trade; high transportation and communication costs; vulnerability to natural disasters; small domestic markets; high import content and dependence on a narrow range of export products. Therefore, the natural environment defines to a large extent the prosperity. Negative consequences for sustainable social and economic growth in the Caribbean Small Island Developing States (SIDS) and Low-Lying Coastal States (LLCS) are already noticeable as a result of the ongoing degradation.

To reduce the pressure on the environment, the challenge for the region is to improve environmental policies and control mechanisms and to introduce sustainable and more efficient technologies in all economic sectors. This chapter describes the actual pressure of human activities on the environment in the region.

2.2.1 Key pressures on the environment

- Agriculture

In 2002, 32,5 % of the land in the Caribbean SIDS was classified as agricultural area, which is the sum of arable land and permanent crops, although the figures range widely at the national level among islands, from 76,4 % in the Dominican Republic to almost zero on some of the smaller islands. Among the Caribbean LLCS, Guyana has the highest proportion of agricultural land (8,8 %), followed by Belize (6,7%). In many of the countries, except Belize, Cuba, Dominica, the Dominican Republic, Guyana, St Vincent and the Grenadines, and Suriname, the percentage of agricultural land has decreased over the last three decades, in some countries more dramatically than in others. Also total and per capita agricultural production decreased in most of the Caribbean countries and territories, with some exceptions, such as Antigua and Barbuda, The Bahamas, Belize, Dominica, the Dominican Republic, Guyana and Jamaica.

Common agricultural products from the region are: bananas, sugar, coffee (Haiti, Dominican Republic), cotton (Antigua), cocoa (Grenada and Dominican Republic), and citrus (Belize).

In order to raise crop yields, nutrients are added to the soil in farming. The main sources of added soil nutrients are commercial fertilizers and animal manure. The major nutrients in these inputs are nitrogen, phosphorous and potassium. Since not all fertilizers are absorbed by the crops eutrophication of water bodies, soil acidification and contamination of water supply with nitrates are serious side-effects of agricultural production. The actual environmental impact depends on the amounts applied, on the soil and plant types and on meteorological conditions at the local level.

Pesticides are used to avoid harvest loss caused by fungi, plants or animals. The use of pesticides in agriculture adds chemicals to ecosystems that have different environmental impacts but are eco-toxic by definition. Some add persistent organic chemicals that can take decades or even centuries to break down naturally. They tend to accumulate in the soil and biota, and residues may reach surface and ground waters through run-off and leaching respectively. Humans are exposed to pesticides through the food chain. Pesticides are used routinely on large plantations, but not always on smaller farms. These chemicals are often overused (spraying from the air) and transported in waterways, leading to the contamination of aquifers, affecting the biology of sensitive riverine ecosystems for a long period, particularly in case of persistent organic chemicals.

In the end, agro-chemical pollution and eutrophication also reach the sea, producing harmful impacts on the coastal ecosystems of the Caribbean. For example, large 'fish kill' off the coast of Trinidad was linked to harmful algal blooms. Studies conducted in Jamaica's Kingston Harbour confirmed the presence of pesticide residues as a result of non-point agricultural run-off into the marine environment. Coral reefs are negatively affected by agrochemicals.

In the continent states, the production of bio-diesel is a new trend. In some countries, like Suriname, (foreign) investors buy natural forest in order to convert these in palm oil plantations which bring important revenues.

Cattle and agricultural activities also lead to clearance of natural forest, especially in the continent states, in order to claim new production areas. In Belize for example, the transformation of agriculture from subsistence cultivation to industrial-scale mono-crop cultivation of oranges and bananas, and the rearing of cattle, has had a significant impact on biodiversity. Fertile alluvial soils that supported species rich ecosystems were cleared for agro-industrial farming, destroying valuable biodiversity in the process. The effluents generated by the agro-industry, especially of sugar, citrus and banana, pose a significant threat to biodiversity.

Agriculture and Climate change

The effects of climate change on freshwater resources and on crop susceptibility to diseases has negative consequences for agriculture in the region. Drought for example will have an impact on the water intensive banana cultivation, which is important in the region. Lack of water is associated with the Black Sigatoka disease. Only a few deep-rooted and salt-tolerant species such as mango, coconut and acacias are unaffected by drought. Agriculture also suffers from hurricanes and floods. It is very likely that crop production in the Caribbean SIDS and LLCS will be affected by alterations in the patterns of these events brought about by climate change. A reduction in coastal arable land is also anticipated as a result of the projected sea-level rise and consequent saltwater intrusion. These impacts coupled with reduced rainfall and the anticipated reduction in yields of current crops will result in reduced food security in the region.

- **Forestry**

The forests in the Caribbean are primarily tropical rainforests, tropical moist forests, tropical dry forests and mangrove forests. The countries in the region only account for 1% of the world's forest area. The proportion of forested territory ranges from 3% in Haiti to around 60% in Belize, 85% in Guyana and over 90% in Suriname (mainly due to lower population densities and their policies for

natural resource protection and utilization).

The large number of endemic plants, the particular characteristics of Caribbean wetlands and the importance of forests in local economies (tourism), make forests important to this region. Further, forests are essential for watershed protection (the lack of vegetation cover to retain excess water has led, to a great extent, to an even increased severity of disasters, such as flooding in combination with hurricanes and heavy rainfall. The decline in forest cover has diminished the natural capacity of the environment to act as a buffer in case of extreme meteorological events, such as hurricanes. Forests also play an important role in the global carbon cycle by acting as a carbon sink. Besides, forests provide many significant resources for mankind.

The changes in land use witnessed in the region over centuries have had the most dramatic impact on forest ecosystems. As a result deforestation has been intense in the region. Fuelled by the need for wood for energy, timber for export, land for transportation infrastructure, agriculture, housing, industrial and tourist development, past and continuing deforestation has left the region with a forest cover of only 19% of the total land area.

Most severe deforestation in the Caribbean occurred when colonial settlers first arrived in the region. For instance, about 80% of St Lucia's forests were cleared for agriculture in the 17th century. Haiti lost 50% of its forests in the 19th century; wood and energy demand in the following century left only 3% forest cover in the country. Wood trading is another important cause of deforestation in Haiti.

The pressure on the remaining forests is high in some countries. Expansion and improvement of road networks have facilitated the access to more remote forest areas and timber resources, leading to further deforestation. Except for Cuba and Grenada, the percentage forest cover either remained unchanged or declined between 1990 and 2000, with St Lucia showing the largest reduction. The average annual rate of deforestation over the last five years has approached 2 percent. Guyana has a good monitoring and EIA system in place to prevent further uncontrolled deforestation.

The island states' share of world production and trade in forest products is minor, and most are heavily dependent on imports to meet their paper, sawn wood and wood-based panel requirements. The majority of the Caribbean SIDS are too small to be able to meet national needs for energy and wood products. Cuba produces the widest range of wood products. Firewood and charcoal production was the highest in Cuba, which has managed to increase forest cover at the same time. For Guyana, forests are the major source of income. Also Suriname has a significant timber export. Haiti, which had the highest deforestation rate among the Caribbean has a high charcoal and firewood production.

While the future of forests in the region is bleak as existing pressures on this resource are expected to increase, some encouraging results have emerged from localised forest conservation efforts. The continued deterioration of forests is mainly due to unsustainable patterns of consumption and production.

- Fisheries

In the Caribbean, fish is the most important source of protein after poultry, especially in rural areas where the incidence of poverty may be high. There is a growing demand for fish and fish products associated with rapid human population growth. Caribbean fisheries play an important social and economic role. They form an important source of food, employment and foreign exchange earnings. For instance, in Jamaica, approximately 130,000 persons are employed in the fisheries sector with estimated earnings of US\$150 million per year. Fisheries contribute up to 8% of GDP in some countries (for example, Guyana). The largest fish exporting countries are The Bahamas (primarily lobster), Belize (mainly lobster and shrimp) and Guyana (primarily shrimp). Besides small-scale fishing by local fishermen, the region also counts with industrial fleets that engage in large-scale commercial fishing activities.

There is a high level of uncertainty regarding the status of the fishery resources in the region, due to

high species diversity, complex overlapping stocks, limited scientific information and inadequate management capacity. The fisheries of The Bahamas and Guyana appear to be in good condition, with catches still increasing, but catches are declining elsewhere. Fishery resources are generally overexploited in the region. Changes in reef fish communities throughout the Caribbean have been reported. An example is the reduced abundance of large-sized carnivorous reef fish such as snappers and groupers. Overfishing of reef fish communities is one of the major causes of deterioration of reef condition in the Caribbean.

Marine ecosystems have been adversely affected by overfishing of local stocks. Illegal fishing by local fleets and reflagging of vessels are often reported as ways to escape from high sea fishing rights limitations. Often vessels from other regions than the Caribbean itself are overexploiting the local seas (specially central American states). The EEZ are large and efficient control therefore is scarce. Coral reefs are damaged by certain fishing methods.

Aquaculture on land is introduced for more efficient production of highly demanded products. It has the potential for alleviating pressure on wild stocks, but goes along with other serious environmental impacts, such as the clearance of mangroves and other coastal vegetation for ponds, declining water quality caused by nutrient enrichment and oxygen depletion of outflowing water.

The fishery sector itself is impacted by environmental degradation in the form of pollution (sewer water, chemical pollution, agrochemicals, waste and oil from vessels), degradation of coastal and marine habitats and effects of climate change (changing fish pollutants, damage to fleets, damage to ecosystems and effects of sea-level rise).

- Mining

Minerals are non-renewable resources. The most important ones in the region include gold, diamonds and bauxite. Unsustainable exploitation will cause depletion in the long term, which can ultimately have an important impact on the economy of a country. The activities associated with mineral production, such as explosions, drilling and smelting, are a major source of air, water and soil pollution among others by the discharges of mineral wastes or mine tailings. In addition, these activities can also cause loss of habitats of wildlife.

Fuel and mining are predominant export products for the economies of some countries in the region such as Suriname (bauxite and alumina, gold), Jamaica (bauxite and alumina, oil refining) Trinidad and Tobago (petroleum, natural gas, iron, limestone, cement), Dominican Republic (bauxite, cement, ferronickel, gypsum, limestone, marble, nickel, salt, sand and gravel). For Cuba (oil), the Bahamas (aragonite and salt), Guyana (gold), Barbados (natural gas, petroleum, clay, hydraulic cement, limestone, sand), Dominica and St. Lucia fuel and mining have a minor percentage in the export. The other countries are mainly agricultural producers and manufactures.

Fuel and mining are important sources of foreign exchange for some countries and both are expected to increase, also in countries where the activities have so far not been significant. New fuel and mining activities are to be found in Cuba that is increasing its exploitation of oil and nickel reserves and Jamaica where the bauxite mining is a growing sector. In Suriname, the negative impacts of open-pit bauxite mining on human health, communities and the environment is significant. The use of mercury in small scale gold production processes causes disperse but serious contamination to the waterways of the mostly unspoiled rainforest.

- Water availability, extraction and consumption

Many countries in the Caribbean face severe constraints in quality and quantity of freshwater resource, because of their small size and their particular geological, topographical and climatic conditions. This is particularly the case for the low-lying SIDS, where limited supplies of groundwater are available and which are covered only by a thin permeable soil. Rainfall can be heavy but during a limited period only. In islands such as Anguilla, Antigua and Barbuda, Grenada, and Barbados, more than 65% of total annual rainfall may be recorded in the wet season from June to December. In Barbados

groundwater recharge is restricted to the three wettest months of the year, with only 15-30% of annual rainfall reaching the aquifers. Some Caribbean States are far below the limit of 1,000 m³ of available water per capita per year, under which countries are considered as 'water scarce'. Freshwater resources in the Caribbean are 2.532 m³ per capita compared to 17.607 m³ in the Western Indian Ocean and 127.066 m³ in the South Pacific.

Growing populations, urbanisation, improved sanitation and drinking water supply in rural areas, overall increased economic activities and industrialisation have caused an increase in the demand for freshwater resources and caused overexploitation of existing sources. Water demand is exceeding the natural supply capacity. Agriculture is the largest consumer of water in the Caribbean, consuming over 90 per cent of the total water used in Guyana, Haiti and Suriname. Tourism is the highest consumer in the touristic island states. Industrial consumption of total renewable water resources exceeds other uses in Barbados, while domestic consumption is the primary use in others such as Trinidad and Tobago.

The diminishing of remaining fresh water resources is mainly due to: overexploitation; loss of fresh water by deterioration of water supply systems (sometimes up to 50% leakage); poor maintenance of irrigation distribution systems; salt intrusion in ground water reservoirs and pollution with agrochemicals and domestic and industrial waste water.

Deforestation and the encroachment on protected areas of watersheds have resulted in significant changes in the water-retention capacity of the soil.

Also climate is associated with serious droughts and water shortages. The probable effects of climate change are noticeable in several countries: excess of water in LLCs (flooding in Suriname) and scarcity on the SIDS. Sea level rise leads to growing salt intrusion in the low areas. Changes in the occurrence of tropical depressions and storms will have an impact on the water supply of many Caribbean SIDS. In Dominica, for instance, within the last few decades an apparent tendency towards more extended periods of drought is well correlated with reduced flows in its main rivers. Since rivers are the main source of potable and irrigation water on the island and are also harnessed for power generation, declining flows have become of serious national concern.

In Trinidad & Tobago, the Bahamas and Barbados saltwater intrusion is already problematic. The available per capita water supply in Antigua and Barbuda (800 m³), Barbados (301 m³), and St Kitts and Nevis (621 m³) is alarming. Faced with chronic water shortage and the decline of the remaining water sources due to pollution and saltwater intrusion, some countries, such as the Bahamas face direct problems. Extraction of freshwater here is very high as a result of the tourism industry. Andros Island is a main resource from where fresh water is imported to tourist areas. It is projected that on Andros Island, where the water table is only 30 cm below the surface, high evaporation and increasing brackishness will occur if sea-level rise continues. The Bahamas for these reasons already imports water and is installing desalination plants by reverse osmosis to produce drinking water from sea water.

Insufficient quantity and quality of potable water increases the occurrence of waterborne diseases, particularly when people seek alternative sources, which may be of poor quality.

- Energy

Ninety percent of all energy used in the region is derived from petroleum, for electricity and transport, most of which is imported at high cost to the countries. They are also dependent on indigenous biomass fuels for cooking and crop-drying. Per capita energy consumption is relatively high in the region, the highest in Trinidad and Tobago. The regional structure of national energy consumption shows 71% from charcoal, 20% from petroleum products, 4% from cane biogases and 5% from hydroelectricity.

There is a wide variation in the available sources of energy across the region. At one end of the spectrum are countries like the Bahamas, Jamaica, Saint Lucia and Grenada that are totally dependent

on imported fuel. At the other end of the spectrum are countries like Trinidad and Tobago which export energy. Hydropower is applied in Suriname and several Islands with high elevations apply hydroelectricity (Dominica and St Vincent). Large-scale hydroelectricity production for export is also being considered in Guyana (planned Amaila Falls hydro-power and Turtuba hydro-power projects), but energy will be exported to the Latin American mainland, not to the Caribbean.

The use of fossil fuels contributes directly to the degradation of the environment through pollution in the form of emissions to the atmosphere of SO₂, CO₂ and others combustion gasses. As the cost of energy is a major constraint to sustainable development and economic growth, energy efficiency and the further development of renewable energy is a major concern in the region. Growing energy costs also lead to a renewed growth in the use of charcoal and wood in poor areas (p.e. in Jamaica).

There is considerable potential in the region to develop vast renewable energy resources: wind farms, hydroelectric power generation plants, Ocean Thermal Energy Conversion (OTEC), wave power, solar power, bagasse burning turbines, biomass digestors and geothermal energy. The use of solar energy for domestic water heating, for hotels and for community based projects and also the use of wind and hydropower and biomass sources such as bagasse is already successful in some SIDS. Barbados is in the frontline when it comes to introduction of solar and wind energy (with fiscal incentives for promotion), serving as a demonstration projects for the rest of the region. A programme in Barbados has resulted in a very high proportion of houses, hotels and other buildings being equipped for solar water heating. Dominica and St Kitts & Nevis are successfully experimenting with geothermal energy production. Cuba is well advanced with fuel and energy saving programmes and cleaner technologies for electricity generation. St. Lucia has pursued a number of initiatives, including the removal of taxes and duties on renewable energy technologies and the development of a wind farm capable of adding 13.5 megawatts to the national electricity grid. Generating electricity from ethanol produced from biomass feedstock is being considered in sugar-producing countries such as Barbados, the Dominican Republic and Jamaica. Bagasse, a by-product of sugar cane, is already used to co-generate electricity in Cuba. Jamaica is working on the implementing of a bio-fuels programme to ban methyl tertiary-butyl ether (MTBE) and introduce ethanol as the replacement in gasoline.

2.2.2 Urban areas and industries

- Urbanisation and infrastructure

The conversion of natural lands for urbanisation, industrialisation or agricultural development is a major issue in the Caribbean.

The annual average population growth in the region in 2003 was 0,79 for SIDS and 0,99 for LLCS, showing great reductions from the growth rates recorded three decades ago. While national average population densities in the Caribbean LLCS and the archipelagic states such as The Bahamas, remain relatively low (2,4–17,0 per km² in 1970 and 2,8–31,0 per km² in 2002), population densities in other Caribbean SIDS continue to increase, with a few exceptions such as Grenada, Montserrat, and St Kitts and Nevis, which are more sparsely populated today than in 1970. The low average national population densities may mask the impact of high local population concentrations.

With the exception of Haiti and Guyana, the majority of the populations in all countries in the region live in urban areas. Urbanisation (as a percentage of the overall population) has increased significantly over the past 20 years in all of the countries and can be expected to continue. Urbanisation in the Caribbean is approximately 10% above the average in Latin America. A common feature throughout the Caribbean is the increasing location of population centers in the coastal zones.

Urbanisation concentrates pollution and creates significant environmental health challenges. It also presents significant public service challenges, as the basic design and infrastructure of the urban areas in the region was not designed for large concentrated populations. Although no mayor cities on a world scale exist in the region, Havana, Kingston, Santo Domingo are cities that have all common

negative side effects of large urban areas in developing countries.

Urbanisation contributes to biodiversity loss in the Caribbean SIDS and LLCS, through habitat destruction and conversion. Urbanisation has been a major force for economic growth, modernization and improvements in human well-being, but it often causes depletion of natural resources in surrounding areas.

Urbanisation leads to a concentration of infrastructure in the form of roads and buildings and requires important sanitary and drinking water infrastructure which is often given only secondary priority. Ports and airports, especially in the touristic SIDS are disproportionately important infrastructural sites, from an environmental point of view.

- **Industries and private sector**

Industrial activity is generally speaking very low in the region. The more industrialised countries are Jamaica, Trinidad & Tobago (petroleum, chemicals, gas, steel, cement, asphalt, iron), Barbados (gas, petroleum), Dominican Republic (steel), Suriname and Jamaica (alumina) and Cuba (oil, sugar). Fuel and mining industries are the main large scale activities in the region, which are mentioned separately in the concerning paragraph. Most of the industrial activities are small scale manufacturing, food and beverage, some chemical industries, oil refineries, sugar factories and distilleries, extractive industries, pulp and paper and intensive animal rearing.

Although the region has light carbon footprint, Trinidad and Tobago ranks the highest in the region with CO₂ emissions averaging 24,68 MT/capita, resulting from its industrial activities. Lagging very far behind are Suriname with 5,08 MT and Barbados with 4,36 MT.

Main environmental pressure caused by industrial activities are; water pollution, generation of waste and toxic waste, water consumption for the processes, noise production, emissions of toxic substances to the atmosphere, energy consumption and CO₂ production, impact on landscape and odour production.

Small scale industrial activities are most frequent in all Caribbean countries. Although their direct impact is small compared to large plants, their number and distribution throughout the countries make them an important environmental factor. Especially the fact that small plants are difficult to control, most of the time do not possess modern clean production technologies and have a lack of knowledge, make them an important source of pollution of water bodies and local atmospheric conditions.

- **Tourism including cruise ships**

Tourism is the first or second most important economic activities in most countries in the region in terms of foreign exchange and labour opportunities (especially in SIDS tourism ranks high). Tourism accounts for 20% of the labour force and absorbs 25% of capital expenditure. In the OECS region it has surpassed agriculture as the leading foreign exchange earner. Highest yearly tourism arrivals in the region are in The Bahamas (1,5 million), Jamaica (1,4 million), Barbados (550 thousand), St. Lucia (300 thousand) and Belize (200 thousand). At the lower end are Grenada (140 thousand), Guyana (100 thousand), Dominica (70 thousand) and St. Vincent (80 thousand).

There are important differences per country in the available tourism attractions, facilities, levels of investment capital and also in the know-how with respect to environmental protection. At one extreme are Barbados, The Bahamas, the Dominican Republic and Jamaica with well-established tourism industries built around diversified activities, strong reputations and a solid infrastructure including roads, telecommunications utilities, airline services, and airport and seaport facilities. The middle of the spectrum are Antigua and Barbuda, Belize, Saint Lucia, Trinidad and Tobago, with Grenada and St. Kitts and Nevis growing quickly. St. Vincent and the Grenadines, Dominica and Guyana are at the lower end of the spectrum mainly due to weaknesses in air transport infrastructure and related facilities. In Belize, tourism is reported to account for 1 in every 4 jobs and 18% of the GDP. The Caribbean hosts approximately 50% of the berths of the world's cruise tourism. Many of the

Caribbean SIDS have invested significantly in port facilities.

Tourism generates a disproportionately high level of waste and domestic waste water in areas where resorts and hotels concentrate. Tourism generates important air pollution from aircrafts and cruise ships.

Caribbean SIDS need to complement the traditional sun and beach holidays with ecotourism, nature-based tourism and community based tourism. However, those new forms of tourism have important impacts on untouched areas. There is a growing awareness that to make tourism sustainable, because of the fact that tourism has been one of the major sources of revenue for protected areas management, but also has simultaneously become the greatest threat to protected areas in the insular Caribbean. In the Caribbean, the economic sectors most affected by widespread bleaching and coral reef degradation are fisheries and tourism. The Caribbean, for instance, attracts about 57% of the world's 10 million active scuba divers. Tourism causes pressures on the existing scarce resources in the countries. For example in Jamaica tourists consume almost 10 times more water than the local population. Because of the seasonal nature of tourism, this presents a high additional burden on water supply.

The tourism industry in small island developing states is vulnerable to climate change and rising sea levels. Increased dependence on tourism therefore makes adapting to climate change critical to their sustainable development. Conservation of natural resources and biodiversity is an imperative for the development of the niche market of eco-tourism in many states.

Summarised, the main environmental pressure caused by tourism are: waste production, water consumption, domestic waste water production, deterioration and disturbance of untouched areas; impact on landscape and coastal zones, by massive buildings of resorts, infrastructure, air pollution and noise by flight movements, waste and water pollution from cruise ships, disturbance of local cultures.

- Waste water and effluent management

A major cause of the deterioration of water quality in the Caribbean is the discharge of industrial and sewage waters into water bodies. Waste water is often drained into rivers, lakes and ponds without any, or with minimal treatment. An important source for phosphorous and nitrogen inputs are domestic wastewaters and related discharges from poor functioning sewage treatment plants. Excessive nutrients lead to the eutrophication of water bodies, which is the excessive growth of algae, and may result in the subsequent depletion of dissolved oxygen, thereby affecting aquatic life. Many Caribbean SIDS receive bad publicity related to disease outbreaks and the destruction of fisheries, which can have major adverse economic impacts. The main variables that indicate a too high organic load are related to the oxygen regime are biochemical oxygen demand (BOD), chemical oxygen demand (COD), dissolved oxygen (DO), total dissolved solids (TDS) and total suspended solids (TSS).

Untreated domestic wastewater can also be detrimental to both human health and the health of aquatic ecosystems because of the elevated concentrations of bacteria (faecal coliform) and viruses that spread water-borne diseases. Improperly constructed pit latrines can allow hazardous leachate to contaminate groundwater supplies. Insufficient drainage which allows standing pools of contaminated water, leading to the spread of vector-borne diseases.

Other sources of water pollution are industry, agriculture, ships, oil industry and solid waste dumped into water bodies. Mayor concern goes to toxic components such as heavy metals such as lead, zinc, copper and industrial chemicals, (persistent organic) pesticides, nutrient loads such as fertilizer run-off (phosphates and nitrates). Polluting industries and waste dumps are often located right on the coastal zones, estuaries and shorelines of large lakes, apart from infrastructural advantages, also because they offer easy solution for waste disposal and for the intake of process waters. Contaminated water from solid waste landfills offer reaches groundwater bodies and finally rivers and marine ecosystems. In addition, solid waste generated by ships (oil and cargo rests, solid waste), commercial fisheries (oil and outboard oil, fishing lines, domestic waste) and the offshore petroleum industry (oil and chemicals,

solid waste) is affecting coastal areas.

Hydrocarbon pollution in the Caribbean is one of the most significant threats to its marine biodiversity. Maritime- and land-based activities are the major sources of hydrocarbon pollution in the region, and the threats posed from oil spill incidence are very high. Many countries are looking for appropriate measures for the disposal of used oil on land as prescribed by MARPOL.

Siltation of nearshore areas is another major problem facing the Caribbean Region. High levels of sediment are deposited in bays via river systems which themselves have been degraded due to poor land-use practices, such as tree cover removal in Haiti. Deforestation along riverbanks and slopes, and uncontrolled and/or poorly controlled construction in coastal areas are common. Pumice and silt from quarry operations in islands such as Grenada and Jamaica have contributed to the smothering of nearby reefs, thereby causing major disturbances in the habitats. Farming steep gradients (for example coffee cultivation in Jamaica) also sends sediments to nearby coastal areas. Agricultural chemicals are important aspects for water pollution (see separate paragraph).

Pollution of water bodies is apart from their environmental impact extremely damaging to the Caribbean tourist industry which is based to a very large extent on the pristine beaches, coral reefs and clean water ecosystems and beautiful beaches and bathing areas.

- Solid waste disposal and management

In many Caribbean countries domestic waste comprises the largest proportion of total solid waste generated, followed by commercial waste. Population growth, increased urbanisation and improvements in the standard of living have led to an increase in the purchase of goods packaged in non-biodegradable disposable material (food containers, aluminium beverage cans and plastic bags). As a result, the composition of solid waste generated in the Caribbean SIDS and LLCS continues to change from mostly organic to inorganic material. The expansion of the tourism industry and the increase in the number of cruise ship tourist arrivals also contribute to the increase in the total quantity of solid waste. Goods are imported with their package which remains on the islands and the mentioned increasing share of non-biodegradable waste makes it difficult to set up sustainable waste management schemes. Due to the limited size of their economy and the scarcity of available land, waste is a critical issue in most Caribbean states. Although still in small quantities, the generation of hazardous waste (agricultural, industrial, medical, used oil, batteries, asbestos etc.) is also rising.

Solid waste collection coverage in major Caribbean cities varies from 60% to over 90% of the population, with the exception of Haiti where it is much lower.

Landfilling, the most common method of solid waste disposal in the Caribbean SIDS and LLCS, is insufficient to deal with the actual amounts of waste. Most of the countries in the Caribbean region lack proper sanitary landfill facilities and dump indiscriminately different types of waste in often unlined landfills. The poor management of solid waste disposal facilities is a common problem for the countries and these sites contaminate ground water resources and coastal ecosystems, apart from forming a serious threat to human health, (through bacteria, chemicals and vectors). In several countries the marine environment and completely uncontrolled dumpsites are still in use. The shortage of land, lack of investment in proper landfills or treatment facilities, combined to poor legislation and control contribute to this situation.

Several countries are therefore resorting to other methods such as incineration and recycling. Incineration without proper exhaust gas treatment implies the risk of serious air pollution by, among others, dioxine formation. Small scale incineration on SIDS is economically not feasible due to the high investment costs compared to landfilling.

On the positive side, Caribbean SIDS are improving their solid waste entities and legislation, collection, are upgrading existing dumps and are constructing new sanitary landfills. Environmental education programmes are being implemented. The International Convention for the Prevention of Pollution from Ships (annex solid waste), the Basel Convention on transboundary shipment of waste and other relevant conventions are being implemented by most of the States.

Prevention and re-use of waste are the most viable options for the Caribbean states. Some Caribbean

countries have implemented recycling programmes that significantly reduce the amount of waste to be deposited in landfills. Private sector waste recovery activities exist in Trinidad, St. Lucia and Barbados for items such as glass, paper, plastics and scrap metals. Private companies are now involved and manually operated vehicles have been replaced by mechanised compactor trucks on various collection routes in an attempt to improve efficiency

Transboundary movements

In the region, there is growing concern about the transboundary movement of toxic and hazardous waste, including the use of some countries for the disposal of waste generated by other countries. Most of the countries depend on a marine and limited terrestrial resource base that makes them highly vulnerable to contamination by toxic and hazardous wastes and chemicals, and even radioactive materials. Although most of the states are parties to the Basel Convention, data on the generation, exports and imports of hazardous wastes are not available. The passage of ships carrying toxic and hazardous wastes, chemicals and radioactive materials is of international concern and of priority concern to the region.

- **Atmospheric emissions**

While not of the highest priority in the region, air pollution is a significant concern in several countries on a more local scale. The principal causes of concern with regard to air pollution are motor vehicles in urban areas. For the region as a whole, the electricity-generating sector is the major source of air borne emissions. Other sources include industrial activities, methane from landfills, landfill fires, burning of fuel wood and forest fires. Another important issue in the Caribbean is the use of agricultural chemicals in the form of spraying. The transport sector, trucks, airplanes, cruise and cargo ships are other important sources of air pollution.

Air quality is not a major environmental issue, because of limited industrial development, size of urban areas and energy use. Measurements of air quality do not seem to be undertaken regularly in the region. If the air quality is impaired, which does occur near certain industries, it is usually a phenomenon of small geographical extension and can be evident without measurements. Such situations are of concern particularly near mining operations, cement production, chemical industries and oil refining.

The countries in the region are minor contributors to greenhouse gas emissions, except for their share in flight movements and cruise ship arrivals. The Caribbean states on the other hand are severely impacted by global climate change which originates from greenhouse gas emissions in other parts of the world (CO₂, methane and others).

The CO₂ emissions show an increasing pattern in all the countries represented. This indicates that the combustion of vehicle fuel, as well as fuel wood and charcoal, is increasing. NO_x is the most difficult pollutant to reduce in air emissions. Its main sources in the region are various kinds of combustion: oil refining, electricity production from petroleum products and emissions from vehicles. Jamaica and Trinidad & Tobago have the highest emissions of NO_x.

The emissions of SO₂ show a declining trend in several countries. The reason may well be the decreasing amount of sulphur in petroleum products. However, the increase in Trinidad & Tobago is caused by the expansion of the oil industry.

It is important that countries in the sub-region participate in efforts to reduce and stabilise greenhouse gas emissions, particularly where such participation will provide opportunities for foreign direct investment and technology transfer that will have immediate local environmental and economic benefits (Kyoto).

2.2.3 Poverty, health and living conditions in human settlements

The differences in economic standard in the region are important. It is impossible to speak about the

rather wealthy tourist island states in the same manner as about Suriname or Haiti. Haiti is by far the poorest and less developed country in the region. Here the environmental problems arise basically from exhausting of natural resources (wood) and lack of knowledge, technology and capital to invest in better waste, waste- and drinking water and agricultural practices and facilities. In the richer states the environmental problems basically arise as a consequence of over-consumption of water, energy, overproduction and import of waste from the tourist sector. However, environmental issues affecting health and living conditions are also here of high concern and in most cases affect the poor segments in all societies most.

As anywhere else, in the Caribbean, it is the poorest groups in society that most directly face the negative consequences of poor environmental management. The contamination of surface waters by industrial effluents, untreated sanitary water, pesticides and fertilizers from agriculture and mercury from gold mining, have direct impacts on their health situation (e.g. the lack of clean drinking/bathing water).

In industrial and agricultural companies, the lowest in the hierarchy are most exposed to dangerous labour conditions and toxic chemicals. Poor living areas are most affected by health problems caused by uncontrolled waste dumps, by extending erosion and by deforestation. The poorest groups most suffer from the decline in fish populations caused by over-fishing and the same group is the first affected by floods that might occur due to climate changes or poor water management. On the other hand it is also true that the poor participate in illegal logging, hunting and gold mining if no other resources are available.

Lack of clean and adequate water is often the main reason for diseases such as diarrhea, malaria or typhoid fever. Trachoma, schistosomiasis, cholera and lead poisoning are also attributed to the degradation of the environment. Poor people in many developing countries do not have access to safe drinking water. Their drinking water has often been contaminated because of pollution from human activities. Over the last five to ten years there has been a marked improvement in the quality of drinking water in the Caribbean, thus reducing the incidence of water-borne diseases. This improvement in water quality was a direct result of the following two main factors: the cholera outbreak in the early nineties in South America which forced Caribbean Governments to take measures to improve the quality of drinking water, and the sanitation decay of the eighties that focused attention on water supply and sanitation in the region.

The most significant environmentally-related diseases in the region are gastroenteritis, cholera and to a certain extent dengue fever and malaria. Malaria is mostly prevalent in Guyana and Suriname.

Fishing water often suffers high levels of oxygen demand by organic and inorganic pollutants, reducing the oxygen concentration in water, which makes water inapt to fish and other aquatic animals. Poor fishermen's populations that rely on fishing from shore and in rivers, ponds and estuaries are most affected.

Lead poisoning, mostly found in Trinidad, Jamaica and Barbados, as well as pesticide poisoning, are also of concern.

Air is another route of exposure to pollutants. Uncontrolled industrial activities, power generation, fuel combustion, traffic and transportation have contaminated ambient air to a certain extent. Pollutants such as nitrogen dioxide and sulphur dioxide cause respiratory diseases, and particulate matter is associated with asthma. Transport is the major cause of these pollutants in urban areas. Poor people often live right near waste dumps, in the worst contaminated parts of town and are therefore over exposed.

An increase in ozone depleting substances, i.e. chlorofluorocarbons, halons, etc., have affected the ozone layer in the upper atmosphere, which works as a shield against ultraviolet rays from the sun. Disruption of this layer will have a great impact on human health mainly in the form of raising

incidences of skin cancer.

2.3 Environment situation and trends

The countries in the region depend heavily on their natural resources such as agriculture, forestry, fishing and tourism. Especially the SIDS are very much limited by the scarcity of land and the small size of their economies. SIDS fully depend on import of energy, consumer goods and food. The grave vulnerability to natural disasters applies to all SIDS and LLCS.

Environmental trends indicate a rising pattern for the following pressures on the environment: watershed degradation, habitat conversion, overharvesting of fish grounds, contamination of aquatic ecosystems, salt intrusion, waste generation and disposal (including hazardous waste) and energy consumption.

Many countries in the region are working on more sustainable development, including better sewerage and water treatment, less use of persistent chemicals in the agriculture, extension of protected areas, forest preservation, the introduction of renewable energy production, programmes for waste recycling prevention of waste production and import, better control on overfishing and introduction of cleaner production processes in industry.

Given the special geographical situation, priorities should focus on issues relating to climate change and the protection of coral reefs since they are considered critical to the continued viability to the countries of the region. The region should give priority to sustainable development, towards economies that are consistent with the limits of the natural resource base, including diversification of the economies, with a focus on less direct dependence on natural resources.

An important trend in the region is the growing emphasis given to environmental values as assets and direct value for the economic development. The environment itself is more and more seen as a key resource for the region. Tourism, non-timber forests products, sustainable and certified timber products, sustainable agricultural and fishery products and the commercialisation of the regions unique biodiversity are examples of this resource based approach. The fight against poverty in some countries at the same time is seen as a basic challenge, necessary for any sustainable improvements in natural and environmental management. The involvement of indigenous peoples and the respect for their dependence on and close interaction with natural resources receives growing attention.

2.4 Environmental Indicators

Indicators translate physical and social information about complex systems into concise and manageable information. This way they can provide guidance for decision-making.

To be able to measure and compare developments in pressure on the environment (e.g. emissions, waste water discharges, waste production, energy consumption) or the state of the environment (e.g. concentrations of chemicals in surface waters, condition of coral reef, air quality) a well defined and widely accepted set of indicators is needed. By following trends in the indicators one can monitor the developments of and causes for deterioration or improvement and a decision can be made whether and where intervention is needed.

Indicators can also give information about the level of achievement of policy objectives and detect the need for adaptations in these policies. They can provide early warning to prevent economic, social and environmental damage. They are also important tools to communicate complex information.

In many Caribbean countries no good set of indicators for environment and for sustainable development is available. The lack of capacity or knowledge to generate sufficient and useful data and to go beyond purely statistics is often the mayor constraint. Apart from selecting the right indicator for

the specific information need and objective, the interpretation is the next difficulty. However important improvements are being made. The Caribbean countries are working together to formulate sustainability indicators. Some have developed sectoral sets of sustainability indicators that go beyond the traditional statistics and indicator fields for example for sustainable fisheries. Most countries now prepare State of the Environment Reports on a yearly basis. CARICOM (together with UN economics & statistics division) produces detailed environmental figures for the region. *The CARICOM Environment in Figures* provides an overview of the state of the environment in the CARICOM region through a presentation of the major issues, with supporting data in tables and charts and accompanying comments on the data. In addition, it is intended to describe the status of environment statistics in the region, including the indication of major data gaps. A list of used indicators is included in annex 6.2.6 to this report. International accepted indicators to measure Millennium Development goals progress, come for example from UNEP:

Atmosphere (climate change - ozone depletion)

- Energy use per unit of GDP
- CO₂ emissions, total
- CO₂ emissions, per capita
- Consumption of CFCs
- Mountain glacier mass balance

Natural disasters

- Number of people affected by natural disasters
- Number of people killed by natural disasters

Forests (Deforestation)

- Proportion of land area covered by forest

Biodiversity (species loss / habitat loss)

- Number of threatened species
- Ratio of area protected to maintain biological diversity to surface area

Coastal and marine areas (unsustainable use of living marine resources)

- Marine capture as a measure of exploitation

Freshwater (sustainable water use / access to improved water supply and sanitation)

- Water use per capita
- Water use as percentage of annual renewable resources
- Proportion of population with access to improved water supply
- Proportion of population with access to improved sanitation

Global environmental issues (international environmental governance)

Number of parties to multilateral environmental agreements

These indicators are difficult to apply on a regional level, such as the Caribbean. Some indicators are expressed in 'per capita' terms, others per 'unit of GDP', with the former giving an indication of population pressure on the environment and the latter of the pressure of the economic activity. Some of these indicators may as well give un-complete information: 'forest cover' does not give any indication about the degradation of these forests and the surface or amount of protected areas does not guarantee the effectiveness of this protection.

3 Environmental Policy, Legislative and Institutional Framework

3.1 Environmental policy and legislation

The 'Revised Treaty of Chaguaramas', establishing the Caribbean Community including the CARICOM Single Market and Economy, presents the regional legislative framework and involves sustainable development and environment protection in all economic sectors. Member states have incorporated the provisions of the revised treaty into domestic legislations.

- National Policies, Strategies and Action Plans for the Environment

Over the three decades following the Earth Summit, the Caribbean SIDS and LLCS have been moving from being reactive to proactive in dealing with environmental issues at the national, regional and international levels. Increased attention to sustainable development at the international level has triggered increased national awareness reflected by increasing projects and sub-sector policies. Only a few countries have developed National Sustainable Development Strategies, but most have formulated a national environmental policy, a national environmental management strategy, or equivalent. A wide range of policies and plans has been included under the rubric of national sustainable development activities. These include: National Protected Area Systems Plans, National Biodiversity Strategies and Action Plans, Land Management Programmes, National Poverty Elimination Strategies and Plans and in some cases a 'green economy' (for example in Barbados) (see annex 6.2.1). Several countries have enacted or drafted comprehensive environmental legislation including EIA procedures, and adopted National Environmental Action Plans. Several countries have integrated sustainable development objectives into Public Sector Reforms and National Strategic Plans to integrate sustainable development into the national policy process.

But the public policy framework for environmental management remains still largely oriented towards control, regulation and a reactive approach to environmental issues. Only few economic instruments, including environment service markets, have been promoted by some donors and governments as means of changing destructive patterns of behaviour. Integration of environmental issues is still seen as a supplementary expense for development activities and environment/economy links are poorly taken into account. Several countries have national plans for systems of protected areas (for example Saint Lucia, and Trinidad and Tobago), but these are not always implemented due to a combination of lack of capacity, resources and political will, and most countries do not have a systematic approach to the establishment of such management instruments. Only Jamaica is in the process of completing its Protected Area System Master Plan (PASMP) which will provide a framework for the sustainable management of Jamaica's existing and future protected areas.

Despite the achievements in policy and legislation development in the last years, most of the governments continue to be faced with serious obstacles in the effective implementation of some of the existing policy instruments due to financial and coordination/ institutional constraints. The population is not yet well informed about existing environmental regulations and they are often even unknown outside the concerned ministry. Furthermore avoids corruption in the licensing system in some sectors (especially tourism and forestry) and countries their effective application.

- International treaties

Caribbean countries are active participants in all the main international environmental treaties and conventions, especially the three Rio Conventions (United Nations Convention on Biological Diversity, United Nations Convention to Combat Desertification and United Nations Framework Convention on Climate Change). One mayor international agreement on marine resources with regional relevance is the Cartagena Convention and its Protocols. A table showing the status of adoption of the main conventions by the independent countries is presented in annex 6.2.3. The Dependent territories participate in these conventions through their respective metropolitan countries. This creates a situation that is a significant factor in environmental policy and diplomacy in this region: France, the Netherlands, the United Kingdom and the United States are all full participants in the regional multilateral agreements and processes.

The international and regional MEAs are the most important vehicle to address main environmental issues, especially climate change, in the Caribbean region. But international conventions place a substantial burden on small countries with limited staff and capacities because of the planning and reporting requirements that each convention carries. Reporting, particularly in the absence of adequate systems for monitoring and data management, is perceived by many as a costly exercise that yields few tangible benefits. Donors are prepared to fund projects to assist countries to 'build their capacity' to meet reporting obligations, which often means simply to engage external consultants to prepare reports. This 'projectization' of reporting addresses the issue in the short term, but may increase the dysfunctional nature of the arrangements over the longer term. This burden is rendered particularly heavy by the fact that international conventions and leading donor agencies frequently require countries to prepare specific programmes and plans of actions which often duplicate each other, fail to build on earlier efforts, and cause a significant drain in the resources of the agencies that are expected to prepare them.

- Regional Policies, Strategies and Action Plans for the Environment

Among the most important global action plans for the Caribbean is the Barbados Programme of Action (BPOA) adopted in 1994 to facilitate the implementation of Agenda 21 in SIDS. Fourteen sustainable development priorities for the Caribbean SIDS have been articulated through the BPOA and are embodied within the framework of other global, regional and sub-regional initiatives and agendas (Barbados +5, Millennium Development Goals, WTO agendas related to the Doha Round and the Monterrey Consensus, JPOI, various environmental charters developed by CARICOM, St George's Declaration of Principles for Environmental Sustainability, UNEP/ROLAC initiative for Latin America and Caribbean). The recent Mauritius Strategy (2005), known as Barbados +10, is based on the review of BPOA. Integrating new priorities, the strategy includes 20 priorities for sustainable development.

The Caribbean Action Plan is another important plan in the Caribbean context that has been signed by more than 30 countries. It was adopted in 1981 at the first intergovernmental meeting held in Montego Bay, Jamaica, and covers the Wider Caribbean Region. The Caribbean Action Plan led to the creation of the Caribbean Environment Programme (CEP) and the Convention for the Protection and Development of the Marine Environment in the Wider Caribbean Region, also known as the Cartagena Convention.

Also important in the region are the OECS Environmental Management Strategy (2000), the OECS Development Charter (2002) and the St. George's Declaration (SGD) of Principles of Environmental Sustainability in the OECS. The St. George's Declaration was signed by all OECS Member States in 2001 and seeks to provide an indigenous approach to implementing the BPOA within the context of the specific vulnerabilities and special needs of the OECS sub-region. Further an Agricultural Policy Framework and Strategic Plan for the OECS and a OECS Fisheries Management and Development Strategy and Action Plan have been developed.

Caribbean States are further committed to the wider Latin American and Caribbean regional initiative for Sustainable Development (2002).

One of the major regional programmes is the Caribbean Environment Programme (CEP). It was developed in 1981 to promote the integration of environmental considerations into development planning. The programme is based on the Cartagena Convention and consists of four sub-programmes: Assessment and Management of Environmental Pollution (AMEP); Specially Protected Areas and Wildlife (SPA); Information Systems for the Management of Marine and Coastal Resources (CEPNET); and Education, Training and Awareness (ETA).

Marine issues are further addressed at regional level through the IWCAM project (Integrating Watershed and Coastal Area Management in Small Island Developing States of the Caribbean), the development of integrated coastal resource management (ICRM)/integrated coastal zone management (ICZM) policies and plans and ongoing projects as the Meso-American Barrier Reef Project and the International Coral Reef Action Network.

Adaptation to climate change is addressed at regional level mainly through the Caribbean Planning for Adaptation to Climate Change Project (CPACC) which involves a combination of national pilot/demonstration activities and regional training and technology transfer.

A Comprehensive Disaster Management Strategy and Framework has been developed by CDERA in 2001 to assist national actions by a more coordinated regional approach to disaster preparedness, management and recovery. The (CDM) Strategy recognises hazard exposure as an ongoing process and therefore the principles view the reduction of hazard risk as an integral part of the development planning process. All the countries have established disaster management agencies that play a key role in coordinating the inputs of other relevant agencies in disaster management initiatives.

The regional policies, strategies and action plans depend, like the implementation of international and regional MEAs, heavily on funding from the international donor community.

3.2 Environmental legislation and institutional framework

- National structures:

Caribbean countries have made significant progress in establishing comprehensive policy, institutional and legal frameworks for environmental management and sustainable development. The arrangements for the management of the environmental portfolio vary from country to country, and the main formulas are:

- establishment of ministries that are exclusively or principally dedicated to the environment, as in the case of Barbados (Ministry of Energy and the Environment), Belize (Ministry of Natural Resources, Environment and Industry), Cuba (Ministerio de Ciencia, Tecnología y Medio Ambiente), the Dominican Republic (Secretaría de Estado de Medio Ambiente y Recursos Naturales) and Haiti (Ministère de l'Environnement);
- establishment of a national environmental management institution, as in the case of Cuba, Guyana (Environmental Protection Agency), Jamaica (National Environment and Planning Agency) and Trinidad and Tobago (Environmental Management Authority);
- allocation of the environmental portfolio to the Ministries responsible for Agriculture (Dominica and St Kitts) or Health (Grenada, and St Vincent and the Grenadines);
- creation of a sustainable development or environment portfolio under the Ministries responsible for national planning and development (Nevis and Saint Lucia);
- creation of a coordinating body bringing together the main agencies responsible for environment, as in the case of Grenada's National Sustainable Development Council and Barbados' National Commission on Sustainable Development.

Some countries have also established agencies to deal with specific aspects of environmental management. Examples include the Coastal Zone Management Unit of Barbados and the Coastal Zone Management Authority of Belize. Most countries have well-established departments that are responsible for forestry, fisheries and water management, and these are typically (but not always) housed within the Ministries responsible for agriculture.

In the case of the dependent territories of the Netherlands, the UK and the USA, environmental management is the responsibility of the decentralised government, as in the case of Anguilla (Environment Department in the Chief Minister's Office), the British Virgin Islands (Ministry of Natural Resources and Labour), the Cayman Islands (Department of the Environment), Montserrat (Ministry of Agriculture, Trade and the Environment), the Netherlands Antilles (Department of Nature and Environment in the Ministry of Public Health), Puerto Rico (Department of Natural Resources and Environment), the Turks and Caicos Islands (Department of Environment and Coastal Resources in the Ministry of Natural Resources), and the US Virgin Islands (Department of Planning and Natural Resources). In each of the three French départements of Guadeloupe, Guyane, and Martinique, the central government is represented by a Direction Régionale de l'Environnement (DIREN).

Only a few countries have centralised and well-coordinated institutional arrangements for the management of protected areas. This is the case in Cuba, with the Centro Nacional de Áreas Protegidas, and in the Dominican Republic, with the Subsecretaría de Áreas Protegidas y Biodiversidad. In the case of the

Dominican Republic, protected areas are legally established but weakly managed but in both instances protected areas constitute important instruments of conservation and development at local and national levels. National parks and other protected areas are also well established in many dependent territories.

- National coordination

Some countries have responded to national requirements to build national capacity for sustainable development by establishing clearly delineated agencies to initiate and/or coordinate national policies and programmes. These take the form of National Commissions/Councils on Sustainable Development which are, invariably, Cabinet appointed entities. In some cases Sustainable Development Advisors has been appointed. Others use existing institutions as the agents for infusing the goals of sustainable development in national development policy and planning. Examples of such institutions or agencies include Cabinet committees or sub-committees on natural resources and environment, Ministries of Natural Resources and Environment, or specialised entities such as National Human Development Advisory Councils, Economic Advisory Councils or National Task Forces for Sustainable Development. Where no specific institution or body has been assigned responsibility for sustainable development matters, a common response has been to use Multilateral Environmental Agreements (MEAs), for example the Framework Convention on Climate Change, the Convention on Biological Diversity, the Convention to Combat Desertification and associated strategies (e.g. National Biodiversity Strategy and Action Plans, National Environmental Action Plans), as the means of channelling sustainable development goals into policies and programmes.

Some countries have strengthened institutional arrangements and administrative capacity in integrating environmental policy into national planning (p. ex. Antigua and Barbuda, Barbados), but national coordination in most countries is still characterised by overlapping mandates and confusion among responsibilities of sector ministries and a huge number of specialised institutions for environment issues, leading to important inefficiencies in the implementation of national policies. The structures with the mandate for coordination -often the Ministry of Environment- are not strong enough in competition with other, economically important, ministries (mining, tourism) to fulfil a leadership role. Environmental issues are not given priority in national decision making, even if they are mentioned in the national policy documents. Poor implementation of existing policies, strategies and regulations and lack of a holistic view are major challenges for environment management and sustainable development in the Caribbean region.

- Regional structures and coordination

Because of their small size, limited national capacity, and interlocking environmental, economic, political and social systems, both countries and international agencies depend heavily on a wide variety of regional mechanisms and institutions:

The formal regional mechanism with the broadest membership is the Association of Caribbean States (ACS), based in Trinidad and Tobago, which includes all countries around the Caribbean Basin except the USA. The ACS focuses on four areas: trade, transportation, tourism and natural resources. Its objectives are stated as "the strengthening of the regional co-operation and integration process, with a view to creating an enhanced economic space in the region; preserving the environmental integrity of the Caribbean Sea which is regarded as the common patrimony of the peoples of the region; and promoting the sustainable development of the Greater Caribbean". The main environmental focus of the ACS is sustainable tourism; it also hosts the Caribbean Sea Commission and is responsible for implementation of the UN Resolution of December 2006 which recognises a status of Special Protection for the Caribbean Sea.

The Caribbean Community (CARICOM), with a secretariat in Guyana, is the other major intergovernmental grouping. Its membership includes the countries of the Commonwealth Caribbean, plus Suriname and Haiti. Moves towards regional integration within CARICOM have recently been strengthened with the establishment of the Caribbean Single Market and Economy (CSME) and the Caribbean Court of Justice. The CSME provides for the free movement of people, goods, services, and capital, and will lead to harmonised laws and social, economic, environmental and trade policies in participating Member States. CARICOM has already developed regional policies for agriculture and energy (draft). Regional strategies for adaptation to climate change and natural resource management are planned (personal communication).

The Organisation of Eastern Caribbean States (OECS), with its headquarters in Saint Lucia, is a sub-regional grouping comprised of Anguilla, Antigua and Barbuda, the British Virgin Islands, Dominica, Grenada,

Montserrat, St Kitts-Nevis, St Lucia, and St Vincent and the Grenadines. It facilitates regional cooperation in a number of sectors, including education, environment, health and sports, and is in the process of establishing an Economic Union that makes provisions for common legislation across Member States. It is anticipated that environmental legislation is the first area in which Member States will move on this front.

The dependent territories of the eastern Caribbean are members of the OECS, most are not members of CARICOM or the ACS, but are part of the Caribbean Development and Cooperation Committee of the United Nations Economic Commission for Latin America and the Caribbean (UN-ECLAC), which provides assistance to the countries in the field of disaster assessment, disaster insurance (WB), and adapted regulations like the Caribbean Unique Building Code, which takes the impact of hurricanes into account.

During the 1990s the Caribbean witnessed a surge of specialised institutions of relevance to environmental management and biodiversity conservation that were created by the regional organizations such as CARICOM and the OECS. The work of these specialised institutions ranges widely from agriculture and food production to environmental health, disaster mitigation and meteorology:

- The Caribbean Centre for Development Administration (CARICAD) in Barbados is the CARICOM institution charged with “upgrading and strengthening the managerial capability of the public sector for the more effective implementation of public policy”. Although not currently active in environmental management issues, CARICAD has in the past supported the development of Sustainable Development Councils on several islands.
- The Caribbean Community Climate Change Centre (CCCCC) in Belize was established in August 2005 to coordinate research and provide expertise to help countries prepare for and adapt to climate change and to meet obligations under the United Nations Framework Convention on Climate Change (UNFCCC). It is also the official repository and clearing house for regional climate change data and is responsible for coordinating the GEF-funded Mainstreaming Adaptation to Climate Change (MACC) project.
- The Caribbean Disaster Emergency Response Agency (CDERA), based in Barbados, is charged with providing support to countries in response to disasters as well as offering guidance and assistance on disaster preparedness and management.
- The Caribbean Environmental Health Institute (CEHI), based in Saint Lucia, provides advice and technical assistance to governments on issues related to environmental health, including water and waste management. It is involved in environment monitoring in the OECS and it’s also a co-executing agency (with the UNEP Caribbean Environment Programme) of the recently launched Integrated Watershed and Coastal Area Management Programme.
- The Caribbean Regional Fisheries Mechanism (CRFM), established in 2002 and based in Belize, provides support to national efforts to manage and conserve fisheries resources, as well as those shared by CARICOM Member States.
- Caribbean Meteorological Institute (CMI);
- Caribbean Meteorological Organization (CMO);
- Caribbean Food Corporation (CFC);
- Caribbean Regional Centre for the Education and Training of Animal Health and Veterinary Public Health Assistants (REPAHA);
- Caribbean Food and Nutrition Institute (CFNI).
- CARIFORUM, the mechanism established to coordinate regional assistance programmes of the European Union, has recently become a function and directorate of CARICOM and therefore no longer exists as an independent entity.

The OECS has an Environment and Sustainable Development Unit (ESDU) that provides services related to natural resource and environmental management to its Member States. ESDU has been responsible for coordinating the development, implementation, review and revision of the SGD and has provided support to Member States to develop National Environmental Management Strategies (NEMS) for implementing the SGD at a national level. ESDU’s programme areas include biodiversity and protected areas; environmental management and planning; environmental training and awareness; and sustainable livelihoods.

Other mechanisms for regional cooperation are:

CaMPAM: The Caribbean Marine Protected Areas Network began as an initiative of the SPAW Programme to create a mechanism through which MPA managers could share information and experiences. It consists of an electronic forum as well as periodic meetings, which are currently linked to the annual meetings of the Gulf and Caribbean Fisheries Institute (GCFI).

Caribbean Foresters' meetings: These regional meetings held every two years are organized by the International Institute of Tropical Forestry, and they bring together foresters and other government officials working in forest and natural resource management at the national level. Each meeting addresses a specific theme.

Caribbean Hotel Association (CHA): based in Puerto Rico, has been a major supporter of sustainable tourism, particularly through the Caribbean Alliance for Sustainable Tourism (CAST) and through its promotion of the Green Globe and Blue Flag certification programmes. It has recently developed, in collaboration with the Caribbean Tourism Organisation a position paper on Caribbean tourism and climate change and is supporting an initiative to make Caribbean tourism carbon neutral. Caribbean Tourism Organisation (CTO), based in Barbados, is the region's main tourism trade organization, organizes an annual regional conference on sustainable tourism and works closely with CHA and CAST to promote Green Globe and Blue Flag certification initiatives.

WIDECAST: The Wider Caribbean Sea Turtle Conservation Network comprises scientists and conservationists from both the region and the international community concerned with the management and recovery of endangered, threatened, and vulnerable sea turtle stocks. Working through Country Coordinators and local partners, it has helped many countries to develop national Sea Turtle Recovery Action Plans and to implement specific sea turtle conservation measures.

In addition to these institutions, an initiative has been taken by Cuba, the Dominican Republic and Haiti in 2007 to establish the first Caribbean Island Biological Corridor in order to contribute to the reduction of biodiversity loss and to facilitate the human-nature relationship.

The region's fragmentation, by language, politics and colonial history, means that only a few mechanisms serve the entire Wider Caribbean. Both national governments and international, regional and sub-regional entities have endeavoured to strengthen or improve institutional arrangements in order to achieve more efficient implementation of environmental and sustainable development initiatives, especially in the areas of elimination of ozone depleting substances, biodiversity conservation, waste management, integrated watershed management, and climate change and disaster mitigation. But challenges in coordination/harmonisation, communication and duplication of efforts, overlapping mandates, limited practical outcomes from the regional institutions and dependency on donor funding remain major problems of the actual regional institutional framework. From consultations during the field visits it was learned that a real 'Caribbean identity' is not yet existing. It was mentioned that the functioning of CARICOM can be improved in terms of better integration of the interests of the non – Anglophone countries and increased transparency of decisions making procedures.

- Civil society integration

Most recent national and regional policies include provisions for stakeholder participation. Growing acceptance of participatory approaches has opened spaces for collaborative management arrangements. NGO in countries such as Jamaica, Saint Lucia, Trinidad and Tobago, and the Dominican Republic are included in policy development processes and consultations. NGOs have been leading efforts to increase awareness and understanding of environmental issues for the past 30 years, and since the 1980s, national environmental NGOs have proliferated, with many development NGOs also addressing the linkages between development and environment. Local NGOs are often the best institutional memory and depositories for environmental information about the local island. In some islands (e.g., British Virgin Islands and St. Lucia) NGOs based on the United Kingdom's model of the National Trust are actually the managers of protected areas. This model is currently under parliamentary debate for both St. Kitts and Nevis. Community-based organisations are important actors in environmental management, with many examples of collaborative and participatory management institutions, especially for protected areas. Because of its different political structure, there is limited scope for community-based initiatives, outside of local government, in Cuba. Community approaches

are also not significant in the French départements or the US Virgin Islands, where regulation and enforcement are seen as the central instruments for environmental management. Women's organisations have also played an important role in bringing attention to environmental issues and the community impacts of environmental devastation. A number of regional NGOs participate in the environmental programmes and in the intergovernmental decision-making process and they play an important role in shaping and facilitating the implementation of environmental and sustainable development policy. The main regional environmental NGOs are today the Island Resources Foundation (IRF) and the Caribbean Natural Resources Institute (CANARI) which is working actually on strengthening regional civil society integration in climate change. Some national NGO like IDDI in the Dominican Republic address regional issues.

Many efforts have been made over the years to increase the participation of the private sector in environmental protection initiatives. The records of many governments are improving with EIA as requirement of new developments in most countries. But private sector involvement in environmental management has largely come from small locally-owned businesses especially in the tourism sector. Efforts to encourage greater participation of mainstream tourism and major resort chains have had generally disappointing results. Larger foreign owned resort companies and the cruise ship and airline industries have been particularly impervious to attempts to secure their support. However there are signs of change resulting from external threats (e.g. possible change of travelling behaviour in countries where tourists come from) and external opportunities (e.g. markets for carbon offsets). Some private sector companies have sought environmental certification such as Green Globe (hotel industry), Blue Flag (beaches and marinas), ICRAN MAR standards (marine recreation) and ISO2000 and 1400 (industry).

More than 40 regional environmental information networks are active and provide environmental information. These networks involve a range of private, public, national, regional and international institutions, and are both conventional and internet-based in nature. A substantial amount of work is required to reduce duplication of effort, improve network integration and strengthen existing networks.

Universities play a major role in research in support of conservation, environmental management and sustainable development. There are three main groupings that bring together national and sub-regional research institutes: the Association of Caribbean Universities and Research Institutes (UNICA), created in 1967 to support regional cooperation in higher education and research, currently counts 26 full members in the Wider Caribbean; the concept of a SIDS Universities Consortium has been promoted in recent years, with the participation of organisations such as UNESCO and UNDP, for the purpose of supporting the implementation of the BPOA and Mauritius Strategy; the Consortium of Caribbean Universities for Natural Resource Management which offers a few courses that are jointly organized and taught by several participating institutions.

In addition to research centres within its universities, Cuba has a number of highly qualified public research institutes that specialise in areas relevant to conservation and sustainable development. Other key national and international research institutions in the region include: The International Institute of Tropical Forestry (IITF), the Institute of Marine Affairs in Trinidad and Tobago, the Iwokrama International Centre for Rain Forest Conservation and Development in Guyana, the International Research and Training Institute for the Advancement of Women (INSTRAW), the UNEP-CEP Regional Activity Center for Marine Pollution Emergency and Training for the Wider Caribbean (RAC/REMPEITC-Carib). The meteorological offices in the various countries are well equipped and qualified, and are all involved in collecting data that are particularly useful in monitoring climate change. In addition, there are a large number of research institutions in North America and Europe that are active in the region, usually in partnership with regional or national institutions.

Although spaces for government-civil society engagement exist, participatory processes have not been always adequately institutionalized. Government consultation processes in many countries, including Belize, Jamaica, and Trinidad and Tobago, have been criticised for being 'cosmetic'. The spaces for civil society participation are often restricted to social and environmental issues, and civil society does not yet play a significant role in policy discussions on macro-economic strategies. Environmentally damaging development projects remain a major source of friction between governments and environmental NGOs and community groups. Women's participation in these processes has also been negligible, as in other regions. Some governments are however starting to address the issue. The Government of Jamaica for example developed a

Code of Consultation for the Public Sector in 2004. This code establishes rules for the minimum acceptable level of consultation with the public, and a consistent process for doing so, with respect to any significant policy, programme or activity a government agency proposes to undertake.

- **Capacities (human, finances)**

Capacity challenges are a major problem for environment management and sustainable development at all levels. Regional bodies, especially CARICOM have insufficient staff for sustainable development (staff > 300, 3 persons for sustainable development) and capacities for regional coordination and cross sectoral thinking are missing. Regional specialised institutions (CDERA, CCCCC) are not given the necessary authority, power and mandate to act as a regional institute, coordination between them is still poor and impact and visibility especially of CCCCC is low outside the Anglophone CARICOM member states.

Most Caribbean countries have small populations of less than half a million. Considering the consequent small scale of the skilled labour force, national budget, as well as job market, it is not difficult to imagine the lack of institutional and individual capacity that exists in the region. The size of environmental departments, in terms of manpower and financial resources allocated to them, in competition with other ministries/departments, is low and insufficient to effectively manage environmental issues in the Caribbean; special equipment for control is often missing and the numbers of skilled individuals available to undertake roles in the fields of environmental management, conservation and policy development are constrained. The employment of existing skilled persons is often hampered by insufficient financial resources. Inadequate access to information on projects and studies undertaken in the region and lack of coordination/harmonisation at national level create duplication of efforts and contradictions. At the same time, other human resources are underutilised, due to insufficient capacity in implementing institutions. Limited employment opportunities in the region as well as the failure of environmental institutions to build on the capacity of skilled personnel has led, to a certain extent, to a loss of skilled individuals to metropolitan countries in the region and, even worse, outside the region (IUCN, 2007).

Some Caribbean governments have taken national action to develop human resources to address the lack of capacity. Barbados has introduced environment and development concerns into teacher-training programmes, while environmental education is an integrated part of primary- and secondary-level school curricula in The Bahamas. These initiatives will, in the long run, increase the proportion of the population with environmental awareness and interest, leading to an increase in the overall pool of individuals with skills required for environmental management. However, it will be difficult to maintain the built capacity in these areas and to obtain capacity to deal with emerging concerns, such as employment of new technologies (e.g. geothermal and solar – electricity, biotechnology) and industries, environment and energy (energy effectiveness) and environment and trade. Cross-cutting skills that have been recently identified as being in need of further strengthening are: capacity for modelling (Climate change, environment screening), tools for CC/disaster insurances, sustainability/economic impact assessment (SEA), project development and management, data and information management, and implementation of nationally and regionally relevant regulations, studies and researches.

3.3 Integration of environmental concerns into the main sectors

Most governments place environmental considerations high on the national agenda and have instituted measures to ensure the incorporation of environmental concerns in national policy, including in National Strategic Plans, Economic Development Plans, and Poverty Elimination Strategies. Nationally-funded initiatives have been undertaken in forestry management; community based sustainable development councils; development projects in agriculture, tourism, and infrastructure; and community-based projects to deliver basic services to the poor. Public sector investments in environmental management have been significant in many countries, particularly for sewage treatment, solid waste management and water catchment management. EIA are a requirement for all large development projects (industries, mining, construction, transport) in most of the Caribbean countries. In addition, Governments have found creative ways of raising funds for local sustainable development initiatives. These include establishing environmental funds; debt-for-nature swaps; local application of the polluter-pays principle; imposition of “environmental levies” in the waste management sector; and the provision of incentives for the private sector to adopt

environmentally - responsible actions. Some countries such as Belize and Jamaica have established Trust Funds. Environmental issues are further addressed in the main sectors as follows:

- Trade

The potential use of trade agreements to induce foreign companies to pay greater attention to environmental management remains to be explored. Most agreements between CARICOM countries and major trade partners are collectively negotiated by the Caribbean Regional Negotiating Machinery (CRNM), guided by WTO directives and rules. Because the WTO has taken no position on the environmental aspects of trade, the CRNM has not addressed environmental issues in its negotiations with WTO. However, particularly given the harmful effects of intensive tourism development on the environment, the need to do so is seen by CRNM staff as a priority and in some cases new trade agreements such as DR-CAFTA between the Dominican Republic and Central America include an environmental policy component and the recent CARIFORUM/EU EPA, signed in October 2008, includes environment issues in its chapter four.

- Agriculture and land use

The most recent articulation of regional agricultural policy in the Caribbean is outlined in the Revised Treaty of the CARICOM Single Market and Economy (CSME). Specific environmental goals are included in Article 56 of the Community Agricultural Policy that states that Policy's goal includes the efficient management and sustainable exploitation of the Region's natural resources, including forests and the living resources of the exclusive economic zone.

Key areas under the sustainable use, management and conservation of land resources, include land use planning, protected areas management, sustainable agriculture, forestry, watershed management, environmental protection and mining (Belize, Guyana and Jamaica). These areas are being addressed by a variety of programmes and projects with major outputs being the production of National Action Plans (NAPs) to Combat Desertification; National Biodiversity Strategies and Action Plans and a plethora of country -specific policy documents. Countries are at various stages of developing NAPs. Jamaica and Belize have recognised the need for integrating economic, social and physical planning activities related to these areas and along with Dominica have provided mechanisms for a participatory community input for natural resource management.

Many countries are addressing institutional strengthening and capacity building for sustainable land use management and some territories have either set up Committees or Secretariats to address critical land use issues or have revised their institutional framework for more effective land use management. Of note is the creation of the Ministry of Lands and Environment in Jamaica in 2000. In addition, most territories are in the process of reforming land use policies and are updating their legislative policies. Some countries, such as the Bahamas, Jamaica and Saint Lucia require Environmental Impact Assessments (EIAs) for large developments.

A wide spectrum of creative initiatives aimed at both broadening opportunities for sustainable rural livelihoods and diversifying agricultural products. These include promoting organic farming; the use of ethno-botanical products for the herbal and cosmetic markets; the strengthening of linkages between agriculture and tourism including through food festivals. The Fair Trade System is established within the Banana Industry and intended to have positive effect on the environment (e.g. protection of ecosystems of high ecological value and the protection of water sources from chemical pollution).

- Forestry

In the past decade, the forestry sector in the region has undergone significant changes and many countries have developed new forestry legislation that tends to promote the integration of sustainability principles into forest management, the use of planning tools such as sustainable management plans, and the decentralisation of management responsibilities, not only within forestry administrations, but also through devolution to local communities and the private sector. Recent efforts focus towards reforestation and restoration of degraded lands, the protection of watersheds and integrated ecosystem management. National forest programmes (NFPs) have become a major framework for policy and institutional development at the national level. The Code of Forestry Practices in several countries (p. ex. Guyana) establishes environmental management requirements for forest operations and some countries have introduced forestry certification programmes.

However, although many Caribbean countries have adequate forestry legislation focusing on sustainable forest management, the laws are often neither applied nor sufficiently enforced. Public forestry institutions lack the capacity, including the human and financial resources for effective enforcement and control. Encroachment, for agriculture and settlement, occurs on forest reserves in many countries, along with other unregulated use. Links with other sectors, especially in policy development, legislation and land use planning are still weak.

Several initiatives towards a 'Regional Strategy of Sustainable Forestry' within the Latin American and Caribbean region or at sub regional level (Regional Strategic Programme for the Management of Forest Ecosystems, adopted 4/2008 for Central America including the Dominican Republic; regional exchange on issues related to governance in the forest sector in the Amazon countries including Suriname and Guyana) are ongoing and several regional environment programmes address forestry issues in the Caribbean.

- Fisheries

CARICOM Regional Fisheries Mechanism (CRFM) (created 2002, headquartered in Belize) is a regional initiative funded by CARICOM Governments to sustainably manage fisheries resources especially straddling stocks of pelagic fish. The CRFM has a mission 'to promote and facilitate the responsible utilization of the region's fisheries and other aquatic resources for the economic and social benefits of the current and future population of the region'. The CRFM is the core of a complex interactive network of a wide variety of stakeholders in fisheries. CRFM has addressed the major challenges and priority needs within the region in the Strategic Plan for the Caribbean Regional Fisheries Mechanism. Other regional initiatives in the sector are:

- A Common Fisheries Regime (developed at the CARICOM level).
- Common fishing zone provisions are being pursued at the sub-regional level through the Environment and Sustainable Development Unit of the OECS.
- Caribbean Fisheries Unit: Fisheries data collection on resource exploitation is ongoing and analysis is being undertaken in reference to resources of the Wider Caribbean)
- The Caribbean Conservation Association (CCA) is managing a Coastal Resources Co-Management Project which seeks to develop guidelines for successful co-management. It addresses the natural resource and human institutional aspects of co-management.
- A successful database on marine resources developed by CFRAMP for CARICOM.

CFRM is actually mandated to establish a Common Fisheries Policy and Regime to modernise fisheries and marine resource use and management. The CFP bases on the principles of regional cooperation and integration, sustainable development, integrated ecosystems approach, and the precautionary principle.

- Mining

Most countries have made efforts to mitigate the negative environment impacts of mining development through instruments such as land-use regulations and EIA legislation. Most countries are moving forward a sustainable mining policy and have already a clear mining policy and strategy, complemented by strict mining laws and regulations like Environment Management Plans (Guyana, Trinidad and Tobago, Cuba). Jamaica has drafted a new Mineral policy including strong environmental provisions in 2008. Environmental considerations are today obligatory elements in mining ventures and those countries with modern regulations and competent environmental regulatory agencies have an advantage in the attraction of new investment.

However, capacity to implement and to control the new provisions is limited and political interference in favour of constituents and powerful economic interests is common. Environmental and social concerns of offshore hydrocarbon exploration (Guyana) are of a lower order of priority than those of mining. Control especially of small scale gold, sand and quarry industries remains a major challenge. Further shortcomings in the application of new Mineral Acts include conflicts with existing environmental legislative provisions, inappropriate legislative mechanisms, institutional weaknesses and absence of enforcement measures. Only very few countries (Trinidad and Tobago) are planning SEA (Strategic Environmental Assessment) in the mining sector.

Initiatives to develop a Regional Strategy for Sustainable Mining in the Latin American and Caribbean Region (with World Bank support) focus on the major mining countries of the Latin American continent and are only partly appropriate for SIDS.

- Water

The Caribbean Water Partnership (CWP) was developed in response to the priorities established by the BPOA, and motivated by the Global Water Partnership. The objectives of the CWP are to establish a framework for collaboration in integrated water resources management (IWRM), within the context of a network of institutions, agencies and stakeholders that will promote IWRM and assist in technology transfer; best practice replication; institutional strengthening; information dissemination and sharing; public awareness programmes and policy formulation. The Interim Secretariat (the Caribbean Council for Science and Technology) and Steering Committee of the CWP have been established and the CWP was launched in June 2004.

Over the past decade, several countries have sought to improve the legal, policy and institutional framework for water resources management. Barbados, Jamaica, Saint Lucia, and Trinidad and Tobago have designed national water policies and are seeking to streamline water laws and institutions. Planned and current measures in support of sustainable watershed management in the Caribbean include internalisation of all water production and watershed management costs into water rates; development of a water-pricing structure that rewards conservation and eliminates cross-subsidies; establishment of a surcharge on water rates to finance the purchase of critical upper watershed areas for conservation; and metering for agricultural users to encourage conservation and efficiency.

However, the efforts being made are still some distance away from the idea for Integrated Water Resources Management. In nearly all countries, there are multiple institutions and agencies involved in water resources management, but there is no effective institutional mechanism in place to coordinate the inputs of these entities. Jamaica (through its National Environmental and Planning Agency) and Trinidad and Tobago (through its Environmental Management Authority) are examples of two countries where some degree of coordination takes place, not only within the water sector, but between the water sector and other areas of the environment and the economy. Decision Support Systems (DSS) within the water sector are grossly inadequate, as reflected in the paucity of data on water resources generally and on water and climate in particular. Generally, regular water resources assessments are not undertaken. Where these are done, they do not include: Demand Assessment (which examines the competing uses of water with the physical resource base and assesses demand for water); and Environmental Impact Assessment (EIA) and Social Impact Assessment (SIA) (which examine how social and institutional structures affect water use and management) and risk and vulnerability assessment (which examines the likelihood of extreme events, such as floods and droughts as well as the vulnerability of the society to them and the appropriate mitigation strategies to deal with these events).

- Energy

CARICOM countries committed themselves in the Johannesburg Programme of Implementation (JPOI of 2002) to increase the contribution of alternative source of energy to at least 10% of the energy mix by 2010. Key regional energy initiatives include: The Caribbean Renewable Energy Development Project (CREDP) (financed in part by GEF and GTZ), Task Force on Regional Energy Policy to develop a comprehensive Regional Energy Policy (established in February 2003), Brasilia Platform on Renewable Energies (adopted at the Regional Conference for Latin America and the Caribbean in Brasilia, October 2003), Development of Energy Efficiency in the Caribbean Project, Caribbean Energy Information System (CEIS), Regional Energy Initiative (REI) to implement activities that are not being undertaken within the context of CREDP or the Task Force on Regional Energy Policy.

At national level some countries, including Barbados, Cuba, Dominica, Jamaica and St. Lucia, promote the use of alternative and renewable sources of energy, including solar, hydroelectric, biomass and biogas. Jamaica has attempted the use of wind energy, and biomass has been utilized in the sugar cane industry in Cuba and Jamaica. Barbados, Guyana and Jamaica have attempted to promote efficient renewable energy technologies through the application of economic incentives and policies. Most governments have been actively promoting the efficient use of non-renewable energy sources. Some countries have also adopted energy saving targets and some have introduced cleaner energy technologies and demand side management

programmes. Only a few countries (Barbados, Saint Lucia, Curacao, Cuba) have adopted (or are in the process of adopting) National Energy Policies and Action Plans. Grenada has completed a draft energy policy, which was reviewed and adopted by Cabinet.

However, with few exceptions consumers have not been offered sufficient inducements. Lack of progress in adopting alternative energy sources is attributed in part to costs – which are currently higher than traditional sources – and in part to the lack of public information about energy-efficient technologies and renewable energy options, although this is being addressed in some instances through public awareness programmes.

- Urbanisation

Much of the planning and development legislative framework for urbanisation throughout the Caribbean Region is inappropriate and unwieldy. Several countries still function under the 1947 Town and Country Planning Act of the United Kingdom, or others have modelled their legislation in the 1960s and 1970s on the same basis. Some countries in the region have looked to the United States of America and created Zoning and Development Acts more aligned to urban America than the Caribbean. Planning legislation in most countries has only recently started to incorporate environmental assessment and controls as an integral part of urban development. Previous legislation has been silent on policies of environmental protection and environmental sustainability. However, several Caribbean governments have created urban development corporations as a mean to address the environment and development challenges posed by rapid urbanisation, and recent funding requirements of international finance institutions like the Caribbean Development Bank demand environment considerations and the integration of natural disaster risks in urban development projects. But generally, public/private planners and developers do not give yet high priority to the principles of sustainable development, due to limited knowledge and an unwillingness to depart from traditional development approaches. Exceptions are Barbados, which has incorporated the Caribbean Unique Building Code into national legislation, and Cuba, which has been chosen as one of the pilot countries for the implementation of the joint Urban Environment Strategy (UN- Habitat/UNEP) for Latin America and the Caribbean since 2004.

- Infrastructure, construction and transport

EIA are a requirement for all large development projects in the transport and construction sector in most of the Caribbean countries. The land resource needs of these important development sectors, especially in coastal areas, compete with other sectors and most of the countries try to address these environmental issues through better land use planning tools. Since the United Nations Conference on Environment and Development in 1992, national and regional Transport policies (i.e. chapter 6 of the revised treaty of Chaguaramas (2002) for the CARICOM countries) include environmental issues like energy efficiency, environmentally sound and efficient transportation, pollution reduction and control and the use of safe technologies.

But up to now sea level rise and prevention of natural disasters are very few taken into account in infrastructure/transport and physical planning, although they are foreseen in the Caribbean Disaster Management Plan. Strategic instruments, like Strategic Environmental Assessments (SEA), are not yet used to imbed infrastructure and transport development in sustainable integrated development planning.

- Industries and private sector

The potential of economic instruments to protect the environment and to promote sustainable development has been recognised by decision-makers in the Caribbean. Most countries agreed to pursue and promote sound environmental practices, in part through the establishment of innovative means of generating public and private financial resources by means of fiscal incentives and market-based instruments and to provide economic incentives to encourage the adoption of sound environmental technologies and practices. The application of the polluter pays principle and EIA are the major instruments in the industries and private sector.

The region has a few examples of private conservation. PETROTRIN in Trinidad has devolved the management of 25 ha of wetland within its petrochemical complex as a nature reserve. The Asa Wright Nature Centre in Trinidad and the Springfield Guest House/Archbold Tropical Research and Education Centre in Dominica are also privately owned and managed for research and conservation. Several countries have prominent private sector environmental “champions” who promote the need for sustainable practices

and natural resource conservation, but the concept of Corporate Social Responsibility is not yet well developed. But it is coming to the region with the entry of foreign businesses. For example, the BHP Billiton, an international corporation involved, in Trinidad, in oil and gas exploration and which recently established a subsidiary in the northeastern part of the country, is emphasising its interest in community outreach and good corporate citizenship by assisting a local network of community organisations to develop a turtle conservation and ecotourism business plan for the area.

- Tourism

Important steps have been taken at national and regional levels to strengthen tourism planning and management to include environmental concerns and maximise social and economic benefits. A wide range of laws have been enacted to strengthen environmental management, including the establishment of standards for land use in tourism development and the adopting of integrated watershed and coastal area management systems.

A regional Caribbean Tourism Strategic Plan has been developed in July 2004 which addressed issues such as sustainable development including national environment, community development and health; human resource development; product development, institutional strengthening; investment; air access, airport safety and security; marketing; and information management.

But presently only few Caribbean states have converted the Caribbean Tourism Strategic Plan into National Sustainable Tourism Master Plans to ensure that the economic and social benefits of tourism are distributed as equitably as possible and that the environmental impacts of tourism are addressed. Some countries such as Jamaica and Barbados have formulated Tourism Master Plans with links to National Development Plans. Others, such as Grenada and Barbados have established National Sustainable Development Councils. Dominica has a number of tourism related initiatives including the Dominica Nature Island Standard of Excellence. The Caribbean Tourism Organisation (CTO) and the Caribbean Hotel Association (CHA) convene systematically each year, a Regional Sustainable Tourism Conference. The Caribbean Blue Flag Programme (implemented in 2000) is a voluntary certification scheme for beaches and marinas which includes criteria on safety, management and environmental awareness. The programme, which is being jointly coordinated by the CCA, the CTO and the Caribbean Alliance for Sustainable Tourism (CAST), is being implemented in Antigua and Barbuda, The Bahamas, Dominican Republic, Jamaica, Martinique, Puerto Rico and Venezuela. Further CAST has promoted the Green Globe tourism certification programme, which now counts more than 50 members in 12 countries.

Nevertheless these efforts of environment mainstreaming in the different economic sectors, the implementation remains still poor. Main challenges are the problems mentioned in chapter 3.2: lack of priority of environment issues in national planning, coordination / institutional challenges, lack of a holistic view and environment/economy linkage.

4 EU and other Donor Co-Operation with the Region from an Environmental Perspective

4.1 EU Co-operation from an environmental perspective

- Political framework and relevant financial instruments available for its implementation

Over the last decade, the Caribbean ACP States and the EU have clearly demonstrated a political will to strengthen their relationship, e.g. through enhanced political dialogue and the establishment of a strategic partnership which forms the basis for further cooperation agreements. This strengthened EU-Caribbean partnership also needs to be seen in the context of the wider EU-LAC partnership forged between the EU, Caribbean and Latin American States at their 1st Joint Summit in Rio in 1999.

The current political framework for the EU-CARIFORUM relations is mainly provided by (1) the EU-Caribbean Partnership for Growth, Stability and Development (2006) and by (2) the outcomes of the 3rd CARIFORUM-EU Troika Summit (2008).

(1) The *EU-Caribbean Partnership for Growth, Stability and Development (2006)* is generally based on the policy agenda of the CARIFORUM States and on the principles of the EU Development Policy, the European Consensus on Development (2005) and the ACP-EU Partnership Agreement ("Cotonou Agreement" 2000, revised in 2005). The document stipulates that future cooperation between the two regions will focus on 3 dimensions: (1) Shaping a political partnership based on shared values; (2) Addressing economic and *environmental opportunities and vulnerabilities*; and (3) Promoting social cohesion and combating poverty. With respect to "addressing environmental opportunities and vulnerabilities", the EU committed itself to continue and strengthen its support to the sectors of Environmental Management and Natural Disaster Management, with emphasis on climate change adaptation and mitigation, early warning, prevention, recovery and rehabilitation.

(2) In the Joint Communiqué of the *CARIFORUM-EU Troika Summit (2008)*, environmental issues are addressed in the following way:

- Both sides agreed to engage in renewed dialogue on issues related to food security and to explore avenues for enhanced collaboration within the framework of new and existing mechanisms for cooperation, including the appointment of a Joint Task Force. *The Task Force would address immediate, medium and long term issues of climate change, energy and food security and agricultural productivity and diversification, with a view to ameliorate the problems in CARIFORUM states and to contribute to their sustainable development.*
- CARIFORUM recalled the *high degree of vulnerability of the wider Caribbean Basin to natural disasters, the increased occurrence and severity of these phenomena as well as the fact that the Caribbean has been internationally regarded as being among those suffering most from the impact of climate change.* In this context, CARIFORUM welcomed the various activities launched recently under the 9th EDF in the area of natural and man-made disasters, including a contribution to the Caribbean Catastrophe Risk Insurance Facility (CCRIF), support to the Caribbean Disaster Emergency Response Agency (CDERA) and the creation of a € 22m standby facility on disaster preparedness and rehabilitation. Also the new ACP/EU Natural Disaster Facility under the 10th EDF was welcomed and the need to ensure its prompt implementation was emphasized.
- The Heads of State and Government welcomed the recent *EU Global Climate Change Alliance (GCCA)* with developing countries, which is designed to help LDCs and (SIDS) to increase their capacity to adapt to climate change and pursue sustainable development strategies. The GCCA is to provide a platform for dialogue and exchange as well as practical cooperation in support of the international negotiations on an ambitious post-2012 climate change agreement and of effective measures at national and regional level.
- A *CARIFORUM-EU Declaration on Climate Change and Energy* (annex 6.2.8) was adopted.

For the implementation of the above mentioned policies and cooperation agreements, several financing instruments are in place. Under the current aid programming cycle (2008-2013), the following instruments are relevant for environment-related cooperation with the Caribbean region:

The *10th European Development Fund (EDF)* (2008-2013), financing the EC's geographic cooperation with ACP countries and OCTs. The EDF consists of grants managed by the Commission and risk capital and (concessional) loans managed by the EIB under the "Investment Facility". The 10th EDF also includes the FLEX mechanism, established to assist countries in remedying the adverse effects of instability of export earnings. The FLEX mechanism is of considerable importance to several countries in the region. The EDF finances national, regional and intra-ACP programmes and initiatives.

The *Development Cooperation Instrument (DCI)* which includes an environmental thematic programme "*Environment and sustainable management of natural resources, including energy (ENRTP)*". ENRTP is contributing to the UNEP-managed Caribbean Biological Corridor with an amount of appr. 2.8 mio €. The DCI also covers the programme "*Accompanying measures for ACP countries affected by the EC's sugar reform*". Under this programme, the ACP Sugar Protocol countries can receive support for their efforts to adjust to the new conditions on the sugar market. Assistance is provided in the frame of the concerned countries' adaptation strategies, amongst other things to *address impacts generated by the adaptation process*, related to employment and social services, *land use and environmental restoration*, the energy sector, research and innovation and macro-economic stability. ACP Sugar Protocol countries in the Caribbean region are: Barbados, Belize, Guyana, Jamaica, St Kitts and Nevis and Trinidad and Tobago.

The *Instrument for Humanitarian and Emergency Assistance* managed through DG ECHO. Of particular relevance is the specific programme for disaster preparedness which was launched in 1996: *Disaster Preparedness ECHO – DIPECHO*. The regional DIPECHO Office for the Caribbean is situated in Santo Domingo, the Dominican Republic.

Before 2007/08, *some additional financing instruments* were of relevance:

- The *Special Framework for Assistance (SFA)* (1999-2008), created in 1998 as an instrument for the provision of financial and technical assistance to the ACP countries considered as traditional suppliers of bananas to the EC and whose economy was seriously affected by amendments in the EU banana regime at the time. Assistance was provided on the basis of an approved long-term strategy for the restructuring of its banana industry or/and economic diversification. To illustrate the relevance of the SFA in our context: The Natural Resource Programme in Saint Lucia was financed under the SFA (8 mio €). SFA eligible countries in the region include: Belize, Dominica, Grenada, Jamaica, St Lucia, St Vincent and the Grenadines and Suriname.
- The predecessors of the ENRTP: the programmes "Tropical Forests and other types of forests in developing countries" (1991-2006) and "Environment in developing countries" (1992-2006).
- The predecessors of the FLEX mechanism: Stabilisation of Export Earnings (Stabex) and System for mineral products (Sysmin) were established to protect export earnings of ACP countries from the effects of world market fluctuations due to market operations and/or production vicissitudes. Stabex was to provide an answer to primary products problems; Sysmin was to restore and maintain the viability of the mining sector.

In order to give an idea of the scale of financing, Annex 6.2.9 provides an overview of the EC development assistance budgets in the Caribbean (1) over the period 1975-2001 and (2) over the period 1986-2007.

- Past, present and envisaged EC cooperation in the field of environment

The *RSP/RIP related to the 9th EDF* (2003-2007) (modified in 2005 following a mid-term review) focused on regional integration including transport infrastructure, cultural cooperation and the implementation of the EPA process. 90% of the total budget of 98 mio € was allocated to this focal sector. However, considerable environment-related assistance was included in the non-focal sector, 6% of the total budget was allocated to "*Environmental protection, fight against major vulnerabilities and disaster management*". "Environment" was also explicitly mentioned as a cross-cutting issue in the support strategy: "A systematic and preventive approach on the basis of the precautionary principle will promote environmental sustainability".

The clear concern for environmental vulnerabilities and challenges embedded in the above-mentioned guiding policy papers is not really reflected in the *Caribbean Regional Strategy Paper for the current programming cycle (2008-2013, 10th EDF)*. The primary focus of the strategy is to provide support for regional integration and cooperation among CARIFORUM countries, taking into account the objectives of

the region and the needs related to the implementation of the Economic Partnership Agreement (EPA), which is considered to be a vehicle for regional integration. On that basis, the Regional Indicative Programme (RIP) (165 million €) is anchored in one single focal sector "Regional Economic Integration and Cooperation and EPA priority areas including Capacity Building" which is indicatively allocated 85-90% of the available 10th EDF resources. The non-focal sector of the RIP addresses vulnerability and social issues having the potential to negatively impact on the development efforts of the region. In that regard, particular attention will be paid to crime and security including the fight against illegal drugs, empowering non-state actors and capacity development. Indicatively, 10-15% of the RIP is allocated to activities in the non-focal sector.

In relation to the environment, the RSP merely stipulates:

- Cooperation in the areas of climate change and natural disasters will be established in the frame of the Global Climate Change Alliance (GCCA) and the implementation of the EU Strategy for Disaster Risk Reduction.
- Overall environmental mainstreaming must be guaranteed in the different priority and non-priority programmes of the strategy. For each sector, a screening will be made in order to determine what type and what level of environmental impacts could be expected. This will help decide whether a Strategic Environmental Assessment (SEA) is needed or not. If needed, SEAs will be undertaken and their conclusions will be integrated in the design of the proposed actions.
- Areas such as natural disaster preparedness, environment, health, SPS compliance, energy, science and technology, migration, education and biotechnologies are to be covered by Intra-ACP programmes and EC budget lines other than EDF.

As the RIP for the 10th EDF, also several of the National Indicative Programmes (NIPs) of the Caribbean ACP countries are oriented towards activities linked to the EPA: five programmes will target competitiveness, three programmes will contribute to governance and public administration reforms, and another three will focus on infrastructure. In total, this concerns 454 mio € out of some 600 mio, hence about 75% of the national programmes.

Specific cooperation programmes in the environment sector are :

- The *Caribbean Regional Environment Programme (CREP)*. CREP is an EDF assisted programme (9,15 mio €), arisen out of the recognition that communities and policy makers in the Caribbean region were not sufficiently alarmed about the rate of environmental degradation and how this impairs future development opportunities in the region. The CREP was launched in 2000 and received external funding until June 2006. CREP was meant to be sustained by regional and national environmental stakeholders under different funding regimes.
- The *Cross-border Environmental Programme in Haiti and the Dominican Republic (PET - Projet Environnement Transfrontalier)*, which forms part of a range of EDF supported bi-national Haiti/DR initiatives, probably leading to a general bi-national development strategy for the entire Quisqueya Island. PET has been allocated a budget of 4,4 mio € and aims at reinforcing the capacity and bi-national cooperation in sustainable development of the vulnerable lakes area. Currently, terms of reference are being developed for the identification study of a new bi-national project (budget 7 mio €) that will address watershed management, renewable energy, reforestation, forest management, eco-tourism and biodiversity.
- In the area of natural disaster relief and management substantial support has been provided:
 - The *Disaster Prevention Programme (DIPECHO)* of the ECHO. Since 1996 the ECHO Office in the Dominican Republic has been active in disaster prevention and preparedness. The 1st DIPECHO Action Plan for the Caribbean was launched in 1998 and currently the 6th DIPECHO Action Plan is under implementation. DIPECHO has been contributing to the improvement of capacity in the protection and preparedness of communities at risk, with focus on the interrelationship of the various levels of action (local, provincial, national and regional). ECHO also coordinates most of the disaster-related EC assistance and has been leading international responses to natural disasters in the region.

Some concrete examples of DIPECHO interventions: flood relief activities in Guyana at the beginning of 2005; combating effects of the floods of 2006 in Suriname; rehabilitation activities after passage of

Hurricane Dean in 2007 in Jamaica; relief efforts in Haiti and the DR associated with Hurricanes Noel and Olga at the end of 2007; operations during the floods of 2003 in the DR and the ones of 2004 in both the DR and Haiti; small-scale initiatives on disaster preparedness in the DR.

- The *Radar Warning System*, a regional project funded under the 8th EDF with a total budget of 13,2 million € and implemented in the period 2003-06. The Radar Network for Severe Weather Warning is coordinated from Trinidad. The project has contributed to mitigate the economic, social and environmental losses arising from adverse weather conditions, to improve weather data for sensitive productive activities and to develop early warning and public awareness systems.
- The *EDF B-envelope allocations (regional and national levels) set aside for unforeseen needs are in practice most often used for disaster relief and management*. For instance, 8 mio € of B-envelope funds were channelled to the Caribbean Catastrophe Insurance Facility, 7,5 mio € were provided to the DR following hurricane Noel, 14 mio € were allocated to the Disaster Stand-by Facility, 0,7 mio € were provided for assistance to victims of the volcano eruption on Montserrat, 6,5 mio € to the project *Strengthening the National Capacity for Disaster Prevention and Preparedness in the DR*, etc.
- The 9th EDF funded the *rehabilitation of the Nelson Dockyard seawall* who was badly damaged by hurricanes in 1995-1999 in Antigua and Barbuda.
- The *Sea Defences Programme* in Guyana (8th, 9th and 10th EDF) which included support for policy development on coastal management with SEA preparation, institutional capacity building and infrastructure construction.

Related to natural resources management, the following interventions should be mentioned:

Fisheries: The 7th EDF funded *CARIFORUM Agriculture and Fisheries Programme (CAFT)* with its component of "Fisheries Institutional Development" which was allocated 2,85 million € and implemented from 1998 to 2004. This component included initiatives in the areas of fisheries data information system, resource assessment, resource development and management, human resource development, strengthening of fisheries departments and organisations, strengthening of the legal and regulatory framework, public education and awareness building.

Also the intra-ACP *Programme to Strengthen Fishery products Health conditions* (42 mio €, 8th EDF) supports a number of Caribbean countries to improve market access of fisheries products to the world market, by strengthening the export health controls.

Natural Resources: A *Natural Resources Management Programme* in St Lucia is funded under SFA 2003 (8 mio €); its implementation is ongoing. The Haitian project *Programme d'Informations Territoriales pour le Développement Durable* has received EDF support for several subsequent phases. In the frame of this support, the Centre National de l'Information Géo-Spatiale (CNIGS) was created.'

Water resources:

- ✓ Water supply initiatives have been carried out during several years in Dominica under successive SFA allocations (2006, 2007, 2008);
- ✓ The *Water Supply Project* in Southern Grenada (8th EDF);
- ✓ Also Jamaica has received ample support for water supply and sanitation (8th and 9th EDF); the *Rural Water Supply Project Phase II* (10 mio €, completed in 2007), the *Water and Sanitation Project* under the Poverty Reduction Programme in Whitfield Town, Kingston; *Institutional Strengthening of the National Water Commission* (1,1 mio €), and the *Rehabilitation of the Negril Wastewater project/ Waste Stabilisation Ponds* (3 mio €).
- ✓ 8th EDF support of 21,8 mio € for the *Environmental Health Programme in the Santo Domingo Shanty Towns (SABAMAR)* in the DR (infrastructure, legislation, solid waste management)

Mining: Under the 7th EDF, Sysmin has provided the DR with very valuable instruments and studies in the mining and geological fields. A 9th EDF funded project is under preparation; this project will address the environmental legacy of the Pueblo Viejo gold mine, launch the National Geological Institute and support small artisan, mining enterprises.

Biodiversity and ecotourism: The EU has supported the establishment and management of protected areas such as the *Iwokrama Project* in Guyana and the establishment of national parks in Grenada. In Dominica, almost 6 mio € from the 8th EDF was allocated to the *EcoTourism Development Programme (ETDP)* which

includes the construction of the Waitukubuli National Trail. (2002-2007)

The European Invest Bank (EIB) has provided several loans to the region for the following environment (+renewable energy) - related investments: to the OECS for a waste management project (in collaboration with the WB); to the Bahamas Electricity Corporation to expand the reach of their services of water supply and sewerage; and to Dominica for the construction of an hydroelectric facility. The bank is also exploring operations in the energy sector in the DR, two of which are in the renewable energy sector (ethanol and wind power).

A good number of projects in the region are implemented under the EC-programmes for *tropical forests and environment (budgetline 21 02 05)*.

Environmental mainstreaming, heavily promoted by the general EC development policy, is often mentioned in the regional as well as in the national Strategy Papers. Still, it is very difficult to trace to what extent this mainstreaming is effectively implemented. For instance, in the performance grid for internal EC evaluation, not one single environment-relevant indicator is included. Generally, the consultations of resource persons during the country visits revealed that environmental mainstreaming is mainly done on paper. During implementation, environmental mainstreaming is rarely put in practice.

Some (paper) examples of environmental mainstreaming are:

- In Barbados: the *Tourism Support Programme* (8 mio €; 8th EDF) and the *Skills Development Sectoral Support Programme* (10th EDF);
- The Jamaica component of the regional *Integrated Development Programme for the Caribbean Rum Sector* (8th EDF) as it includes "plant modernisation and meeting environmental needs";
- The programme for *Support to the Sugar Cane Sector in Jamaica – 2007* (25 mio €) as it emphasises environmental sustainability and envisages the elaboration of a SEA for the sector. At the moment, the SEA is ongoing.

Most important perspectives for future environment-related EC cooperation are the Global Climate Change Alliance (GCCA) and the recently approved Intra ACP Natural Disaster Facility.

- EU Member States (MS) cooperation in the region

Only a few EU MS provide substantial assistance to the environmental sector in the region. Most support is thereby going to bilateral interventions; only DFID is running a genuine regional programme for the Caribbean and Germany supports some bi-national projects in Haiti/DR. Another important trend consists in the allocation of larger budgets to multi-donor programmes and initiatives (including to the EC budgets).

United Kingdom: In the recent past, DFID has implemented programmes at regional and sub-regional (OECS) levels providing a.o. support in the field of environment: natural resources management, support to the Caribbean Natural Resources Institute (CANARI), and solid waste management.

DFID's present Regional Development Strategy for the Caribbean (2008-2013) states that the UK will spend up to £3 mio a year to help prepare for natural disasters and to aid post disaster recovery. Further, they will also support the development of alternate energy sources. Specifically, the Strategy includes support to reduce vulnerability of communities most under threat and to reduce the losses caused by disasters; to improve prediction and coordinated responses to disasters through the CDERA and the CCCCC; to the multi-country catastrophe insurance; and to help the region deal with climate change, energy efficiency and environmental protection. DFID also implements a State Forest Management Project in *Grenada*.

France: The Agence Française de Développement (AFD) has no regional interventions in the Caribbean but supports environmental projects in different Caribbean countries. In the *Dominican Republic*, for instance, AFD's intervention strategy includes an important component for protection and development of the country's natural resources (environment and biodiversity): improving water quality in urban areas, combating deforestation and management of water resources in rural areas. In this respect, AFD currently supports the implementation of the Sierra Development Plan which entails support for reforestation, water supply and microfinance development. In *Haiti*, AFD focuses a.o. sectors on water supply and waste management. Environment-related projects under implementation in Haiti are: (1) an urban development project in Jacmel: flood prevention, drainage, support to the municipality; and (2) a drinking water project to supply the disadvantaged neighbourhoods of Port-au-Prince and to implement the emergency rehabilitation

of the drinking water network. In *Grenada*, France finances operations aiming at marine park protection and trail development in selected sites for tourism. Finally, in *St. Vincent and the Grenadines*, AFD provides support for the enhancement of the tourism sector and for the improvement of the water supply and quality on St. Vincent.

Current trend: allocation of larger contributions to multilateral cooperation (EU, UN,...); the budgets that remain for bilateral cooperation are steadily decreasing.

Germany: Environmental protection and climate change, as well as urban water supply and sanitation are priorities for the German cooperation (BMZ) with Latin America and the Caribbean. Recent cooperation initiatives in the field of the environment are:

- a Natural Resource Management project in the *Dominican Republic*;
- a project designed to Combating Desertification in the Caribbean/Central America;
- a binational project in *Haiti and the Dominican Republic* for Poverty Reduction through sustainable use of Natural Resources in the cross-border Catchment Area of the Rio Artebonito;
- another binational project in *Haiti and the Dominican Republic* for Reconstruction and Disaster Risk Management in the border area.
- the OECS secretariat in St Lucia receives technical assistance for the strengthening of the Natural Resources Monitoring Unit (NRMU).

Additionally, a programme for Emergency Aid Measures in Gonaïve, *Haiti* is under preparation.

GTZ is interested in – and has funds available for – (co-)financing regional programmes in the environment-related areas of renewable energy and NRM. GTZ is prepared to engage in larger multi-donor initiatives. For example, they are currently considering to contribute to the UNEP-managed *Caribbean Biological Corridor*.

The Netherlands: are providing sector-wide support to *Suriname* amongst others to the sector of environment.

Spain: Spain finances a project for “Access to Potable Water and Basic Environmental Health” in the *Dominican Republic*. Further, in the frame of its overall Araucaria programme (currently Araucaria XXI), the Spanish cooperation implements since 2007 a range of activities in *Haiti*. The objective is to contribute to improving the environmental conditions in the South-East Department of the country and to strengthen the local capacity and competence for environmental management. Among the envisaged results are: the elaboration of a Management Plan for the South-East Catchment; conservation of biodiversity in the National Park “La Visite”; support to the establishment of a Man & Biosphere Reserve comprising lake Azuëi, the mountain range of La Selle (National Park “La Visite”) and the districts Belle Anse and Jacmel; and a pilot reforestation project of 100 ha in the NP “La Visite”. Besides this environmental component, the project includes a number of livelihood improving activity lines. Total budget for Haiti: 1,8 mio €.

4.2 Co-operation funded by other agencies from an environmental perspective

Though the EU (EC + MS) can be considered as the main provider of development assistance (in grants) to the region, a range of other donor agencies and funds supporting initiatives in the field of environment and/or natural disaster management do exist. A summary of the environmental activities of these main donor agencies and international organizations is provided in the subsequent paragraphs as well as in Annex 6.4.

The Global Environment Facility (GEF)

Being the designated financial mechanism for the main MEAs (UNFCCC, UNCCD, UNCBD) and hence assisting countries in meeting their obligations under the conventions that they have ratified, the GEF finances many environmental projects in the Caribbean region. In practice, the GEF provides grants to projects that address one or more of the following 6 focal areas: biodiversity, climate change, international waters, land degradation, the ozone layer, and persistent organic pollutants (POPs).

The GEF-funded projects and programmes are implemented through “GEF Agencies”. These agencies assist eligible governments and NGOs in the development, implementation and management of the projects. Besides, they participate in the GEF governance as well as in the development of GEF policies and programmes. The main GEF Agencies involved in projects in the Caribbean are UNEP and UNDP; also IBRD is well represented and just a few projects are managed through the IDB.

The 16 CARIFORUM countries are benefiting from 14 global, 32 regional and 122 national projects. Annex

6.4 provides a full list of these past and ongoing GEF-financed projects in the region as well as some summarising tables: (1) the coverage of countries by the regional projects; (2) the coverage of countries by the global projects; (3) the allocated budgets by country (for the 122 national projects); and (4) the distribution of the 168 projects over the 6 Focal GEF areas.

Together the 46 (44 approved and 2 under preparation) regional and global GEF projects have been allocated GEF grants for a total amount of 220,331 million US\$. The amount of their co-financing being 698,421 million US\$, the total budget for these 46 projects is 918,752 million US\$. Regarding the national countries, the total GEF grant comes to 118,515 million US\$, what – the co-financing part being 303,052 million US\$ - adds up to a total cost of 421,567 million US\$. In relation to the focal areas, it is obvious that "Biodiversity" and "Climate Change" are the best covered areas. Still, as for the regional projects "International Waters" becomes an important area as well.

During the country visits, resource persons reported that GEF projects are generally very well designed but characterized by very long approval procedures so that the period between formulation and implementation can last for several years (up to 7 years).

Apart from the above mentioned projects, the GEF portfolio includes a huge number of smaller projects funded through the "Small Grants Programme". The Caribbean region as well as the 16 individual countries constituting the region are beneficiary of an important number of such smaller projects.

The Organisation of the American States (OAS)

Over the past years, OAS' Department of Sustainable Development has focused on assisting Caribbean States in anticipating and/or mitigating real or potential threats to their social, economic and environmental security such as: natural hazards; energy price shocks; food scarcity; land degradation; chemical contamination; loss of biodiversity and water scarcity. Concrete measures and efforts have been deployed in the areas of (1) Management of natural hazards risks (the Inter-American Network for Disaster Mitigation, the Caribbean Emergency Legislation projects, the Grenada Hurricane Resilient Home Reconstruction projects); (2) Renewable energy (support via the Global Sustainable Energy Islands Initiative – GSEII and the Eastern Caribbean Geothermal Project – GEO-Caraibes; beneficiary countries are St. Kitts & Nevis, Dominica and St. Lucia); (3) Sound management of chemicals (awareness raising, identification of toxic chemical stockpiles posing a serious hazard, regional strategy development, and development of innovative financial arrangements such as Payment for Ecological Services schemes); (4) Integrated Water Resource Management (support to design of national and regional policies, facilitating the Inter-American Dialogue on Water Management); (5) Management of the coastal and marine resources of the Caribbean Sea (Following the adoption of the UN Resolution on the Caribbean Sea and the establishment of the Caribbean Sea Commission, OAS/DSD is seeking to promote a collaborative approach to the design and implementation of a comprehensive Ocean Governance Programme for the Caribbean Sea. In this regard, collaboration has begun, with the UWI (in the context of the Caribbean Large Marine Ecosystem Project (CLME); and with the Cropper Foundation (in the context of the Caribbean Sea Ecological Assessment (CARSEA).); (6) Environmental law, policies and economics (capacity building, database development on environmental legislation, support in facing new challenges resulting from economic integration and trade liberalisation); and (7) Sustainable land management (GEF-funded project for Prevention of Land Degradation through Sustainable Land Management in 7 countries).

The Inter-American Development Bank (IDB)

Environment is one of the IDB's priority thematic areas. Two region-wide (LAC) IDB initiatives are under implementation:

- The Sustainable Energy and Climate Change Initiative (SECCI). This initiative seeks to support the LAC region in its urgent challenges to find economically and environmentally sound energy options. Core objectives are to expand the development and use of renewable energy sources, energy efficiency technologies and practices, and carbon finance in the region, as well as to promote and finance climate change adaptation strategies that reduce the regions climate vulnerability.
- The Water and Sanitation Initiative (WSI). Under this initiative, strategic guidelines, specific targets and special financial products have been developed to support solutions tailored to each country's needs.

The IDB has offices in all 26 LAC countries where it finances programmes and projects; concerned Caribbean countries are: the Bahamas, Barbados, Belize, the Dominican Republic, Guyana, Haiti, Jamaica, Suriname and Trinidad & Tobago. For the OECS countries, the IDB channels its funds through the CBD. Belize, Jamaica and Guyana have bilateral arrangements with the IDB and lending is done on a stand-alone basis. The most relevant IDB supported projects in the Caribbean countries mentioned above are included in

annex 6.4.

The World Bank (WB)

As stipulated in its Country Assistance Strategy for the OECS, the WB supports (granting assistance) regional integration through regional interventions, amongst others in the area of catastrophe risk insurance. Further, one of the two main pillars of the WB's lending strategy focuses on "reducing vulnerability, by promoting greater social inclusion and strengthening disaster risk management". The main regional initiatives receiving WB-support, include:

- The *Environmental Management Project*: To remain competitive in the tourism sector, the OECS countries need to enhance the management of their natural environment. This includes (i) strict enforcement of environmental policies for land use planning, urban-rural zoning regulations and landscaping; (ii) conservation and expansion of natural areas; (iii) monitoring of the quality of coastal waters and beaches; and (iv) additional efforts in solid waste management, waste water treatment and water and air pollution control. Moreover, to reduce vulnerability to natural disasters, measures to reduce erosion and promote reforestation are also necessary. To improve environmental management, the project focuses on policy reforms, region-wide monitoring of critical ecosystems and water quality, regional and national institutional strengthening, infrastructure investments and increasing public awareness. Cooperation with the private (tourism) sector and communities and participation in international environmental certification schemes are an integral part of the programme.
- The CARICOM-wide *Catastrophe Risk Insurance Project (CRI)*, institutionalising a comprehensive risk management approach. The concerned project strives to deepen insurance markets to allow for the improved sharing of insurable and uninsurable risks among the public sector, private sector, international insurance industry, international capital markets, and the domestic 'self-insured' population. The leveraging of scarce capital to diversify and better spread risks, as well as to significantly increase the efficiency of risk transfer mechanisms, requires a subregional risk pooling mechanism. The CARICOM countries indicated their commitment to increase their limited leverage while exploiting the best terms for reinsurance protection through shared risk diversification and faster accumulation of domestic insurance reserves. The project is designed to ensure that the "productive purposes" test is satisfied and efforts are made so that reporting mechanisms are in place to fully ensure that reconstruction of productive capacity is the primary target for such funding under a pre-planned risk mitigation approach, and used to reimburse the government for budgets displaced toward reconstruction due to emergencies.
- The *Mainstreaming Adaptation to Climate Change project* seeks to assist in the incorporation of climate change concerns in sector and regional planning for the OECS nations and to identify critical vulnerabilities.

Annex 6.4 presents some more (mainly national) WB-supported projects that address environmental issues in the region.

The Japanese International Cooperation Agency (JICA)

JICA is represented in the region through its Regional Support Office for Central America and the Caribbean located in Mexico and through national offices in Belize, Dominica, the Dominican Republic (also covering Haiti), Jamaica, St. Vincent and the Grenadines and St. Lucia. Subsequently, an overview is provided of JICA's support to the Caribbean region per relevant thematic line:

- *Water Resources and Disaster Management*: JICA is providing assistance to CDERA since 1997. The ultimate goal is to ensure that CDERA attains the ability to develop its own disaster-prevention plans. JICA programmes have included support for institutional capacity building, the establishment and strengthening of a system for flood hazard map creation, enhancing the regional disaster management planning capacity of member states, and increasing the functions of communication bases. JICA is currently concluding a technological cooperation project with the Regional Team composed of CDERA, the Caribbean Institute for Meteorology and Hydrology, and regional universities. Project topics include meteorological observation, flood analysis, creation of flood hazard maps, and the utilization of maps to prepare local disaster-prevention plans.

Besides disaster management, JICA is also very active in disaster relief. Though its activities in this respect date back to the late 1970s, disaster relief became a priority on the agenda with the revision of the JICA law which involved the addition of emergency relief supplies and led to the establishment of Japan's Comprehensive Emergency Disaster Relief System, also benefiting the Caribbean.

- *Fisheries*: JICA supports a Project for the Promotion of Sustainable Marine Fisheries Resource

Utilization in Trinidad & Tobago. To address problems of fishery resources depletion in the coastal waters, JICA embarked in 1996 on a project for training supervisory personnel, who subsequently conducted training sessions for fishing households. Currently, a second fishery project is under implementation including activities such as collection and analysis of data on resources, research on the introduction of appropriate fishing equipment and methods, and training in extension activities, all with a view to promoting an understanding of sustainable use of fishery resources.

JICA provides no assistance to the region in other relevant areas such as *Natural resources and energy, Natural environmental conservation, and Environmental management*. Still, JICA's recent cooperation strategy for the Dominican Republic includes "environment and natural resources" as a priority thematic area. A number of concrete actions are being implemented with the State Secretariat for Environment and Natural Resources (SEMARN): rehabilitation of degraded forest areas and the establishment of a reforestation system; training of technicians in management of protected areas; and improvement of techniques and practices for watershed areas management. Further, the Santiago Corporation for Water Supply and Sewerage (CORAASAN) is supported to establish and improve the sewerage system and the National Institute for Drinking Water (INAPA) receives assistance for the rehabilitation of the aqueducts.

The Canadian International Development Agency (CIDA)

At the regional level, CIDA provides assistance to the Caribbean through a new regional support programme, jointly developed with CARICOM. It was launched in 2008, will cover a period of 10 years and has been allocated CDN\$ 600 million. Environment / NR management / Natural disasters do not figure as focal areas in this programme. Nonetheless, it includes a major new project to increase the capacity of national governments and local communities to manage natural disasters such as hurricanes and flooding and thus reduce their impact on the people of the region. This project builds on Canada's \$20 million contribution to the World Bank's Caribbean Catastrophe Risk Insurance Facility, where Canada is the largest contributor. Further, comprehensive bilateral programmes are carried out in Haiti and Cuba but neither in these programmes environmental issues are given high priority.

Most countries of the region do benefit from important disaster relief assistance provided by CIDA (Jamaica, Haiti, the Dominican Republic, Grenada, Cuba). In Cuba, in addition to coordinating international aid efforts in response to the damage and hardship caused by hurricanes and other natural disasters, CIDA has established the Post Hurricane Reconstruction Fund under the Canada-Cuba Community Development Fund (CCDF). Important reconstruction projects have already been approved and carried out under this Fund.

Though not being a priority area in the strategic cooperation agreements, CIDA does provide assistance to a number of environmental regional and national projects. They are listed in annex 6.4. Some examples: development of the forestry sector in Cuba, watershed management in Haiti/DR, Trees for Tomorrow in Jamaica, the Caribbean Regional Oceans and Fisheries Project, etc..

The Caribbean Development Bank (CDB)

Since 1974, the Caribbean Development Bank (CDB) has been responding to requests from its member countries for assistance in post-disaster rehabilitation. The preparation of the Natural Disaster Management Strategy and Operational Guidelines in 1998 laid the foundation for a more comprehensive approach. The CDB's Project Services Division is responsible for leading the Bank's work programmes on disaster risk management, climate change, environment, gender, governance, regional public goods, procurement and social development. Disaster risk management and environmental sustainability are identified as cross-cutting themes in CDB's 2005-2009 Strategic Plan, having direct impact on the Bank's four externally focused strategic objectives: broad based economic growth, inclusive social development, good governance, and regional cooperation and integration. Supporting environmental sustainability and advancing the climate change agenda has been identified as a core theme for the Seventh Cycle of the Special Development Fund (2009-2012). CDB also manages the regional multi-donor Biodiversity Fund, operational in 8 CARICOM countries.

The United States Agency for International Development (USAID)

USAID conducts cooperation programmes in the OECS subregion (operating from Barbados), Cuba, the Dominican Republic, Guyana, Haiti and Jamaica. Most of the programmes include environment- and/or natural disaster- related activities, though at the moment the environmental sector is not longer a priority in USAID's cooperation strategy:

- OECS sub-region: high priority is given to collaborating with government and civil society to target

activities that support biodiversity conservation and related policy development (mitigation of human impacts, institutional framework for managing protected areas).

- The Dominican Republic: USAID's work includes a component of safeguarding biodiversity and natural ecosystems. The related objectives are to be achieved through strengthening capacity to develop and enforce national environmental and natural resources legislation; through increasing public sector capacity at both the national and municipal levels to identify and implement activities that promote environmentally sustainable economic growth; and through assisting civil society groups that advocate for and contribute to a cleaner environment and greater biodiversity protection.
- Haiti: USAID supports the National System for Disaster and Risk Management through the provision of training. Further, new watershed management programmes are under preparation.
- Cuba: Environmental mainstreaming in agricultural production projects is prominent.
- Jamaica: The USAID-Jamaica Rural Development programme clearly recognises the crucial importance of effective and sustainable natural resources management for development and economic growth. As a consequence, the programme include expected outcomes such as (1) improved management of ecosystems; (2) institutional capacity to manage natural assets increased and (3) more environmentally sustainable rural enterprises.

USAID also financed/carried out assessments of tropical forests and biodiversity conservation needs in the Dominican Republic (2002), Guyana (2008), Haiti (2006) and Jamaica (2003).

The United Nations Development Programme (UNDP)

UNDP Caribbean operates from Barbados (OECS sub-regional office), Jamaica (office covering 5 SIDS, amongst which Jamaica and the Bahamas), Cuba, Guyana and Haiti. The latter three offices are country-based offices. All these offices include "energy and environment" and "disaster risk reduction and disaster management" as focal themes in their respective cooperation strategies.

In relation to "energy and environment", most UNDP's initiatives and programmes are part of the GEF portfolio, including the Small Grants Programme, whereby UNDP acts in its capacity of GEF agency. (see annex 6.4 for further details)

Also in the area of disaster risk reduction and disaster management, many different initiatives are under implementation, most of them in the frame of coordinated multi-donor funded programmes. Worth mentioning here is the "Caribbean Risk Management Initiative (CRMI)" launched by the UNDP's Bureau of Crisis Prevention and Recovery (BCPR) and the Regional Bureau for Latin America and the Caribbean (RBLAC) in 2004 as an umbrella programme designed to build capacity across the Caribbean region for the management of climate-related risk. The CRMI is led by the Cuba and Barbados/OECS UNDP Country Offices, in close collaboration with partners and other UNDP country offices in the region.

The United Nations Environment Programme (UNEP)

UNEP is one of the main GEF agencies in the region and has as such an important stake in the formulation and management of the above-mentioned GEF-funded projects. The Regional Office for Latin America and the Caribbean (ROLAC) (based in Panama) mainly focuses its efforts on development and implementation of environmental law (including MEA) and policy; on environmental information, assessment and early warning; and on the understanding and knowledge of environmental issues related to industrial and urban development and to the use of natural resources and of chemicals.

Specifically for the region, UNEP administers the Caribbean Environment Programme (CEP). UNEP's Caribbean Regional Coordinating Unit (CAR/RCU) is located in Kingston, Jamaica and serves as the Secretariat to the CEP. The programme aims at promoting regional cooperation for the protection and development of the marine environment of the Wider Caribbean Region. The CEP is 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), which provides the legal framework. The Convention has been supplemented by 3 Protocols addressing specific environmental issues, namely oil spills, specially protected areas and wildlife and land-based sources and activities of marine pollution. The CEP provides the programmatic framework for the Cartagena Convention. CEP has 3 main sub-programmes:

- Assessment and Management of Environment Pollution (AMEP)
- Specially Protected Areas and Wildlife (SPAW)
- Communication, Education, Training and Awareness (CETA)

Other relevant current and future activities are:

- Update of the Regional Environmental Outlook for the Caribbean
- Caribbean Biological Corridor in Haiti, Dominican Republic and Cuba (with EC funding)
- The Caribbean element of the 9th EDF Intra ACP Capacity Building Programme for the Multilateral Environmental Agreements.

United Nations Food and Agriculture Organisation (FAO)

Relevant FAO core activities/departments include: FAO and Emergencies, Global Information and Early Warning System, Fisheries & Aquaculture, Forestry, and Natural Resource Management & Environment. Apart from activities directly framing in and contributing to FAO's global programmes such as the Global Forest Resources Assessment, the National Forest Programme Facility, the Land-Water linkages in Rural Watersheds, Code of Conduct for Responsible Fisheries, Organisation of Regional Fisheries, the State of World Fisheries, etc... the region also benefits from specific cooperation projects implemented through the Technical Cooperation Department (TCD):

- FAO currently implements emergency response operations in Cuba, the Dominican Republic and Haiti;
- Emergency and post-crisis management projects are ongoing in most of the countries in the region;
- Haiti is receiving support for a NRM-related project; and
- Belize, together with some other Central American countries, is beneficiary of a regional fishery project.

World Wide Fund for Nature (WWF)

WWF's largest programme in the Region is situated in Suriname and Guyana and managed from the WWF Guianas Regional Office (Paramaribo, Suriname). Relevant projects are listed in annex 6.4. The WWF Central American Programme (office in San José, Costa Rica) develops some activities in Belize in the frame of the regional project: *"Conservation of the Mesoamerican Reef (MAR)"*. This project aims at improving the management of protected areas and at influencing regional development in support of the conservation of the MAR.

Finally, Cuba has been receiving support from WWF-Canada for over two decades. WWF's involvement in Cuba has evolved from pilot projects to full-scale, national initiatives that are greening Cuban tourism, promoting sustainable fishing practices, and building a network of marine protected areas. With financial support from CIDA (400000 US\$) WWF-Canada currently implements a project for the conservation of the Hawksbill turtle. Thanks to the joint efforts of the Cuban Ministry of Fisheries and WWF/CIDA, Cuba decided to phase out the marine turtle fishery in its territory.

World Conservation Organisation (IUCN)

So far, IUCN's involvement in the region has not been very intensive. Until recently, IUCN's most relevant programme for the Caribbean was the Global Marine Programme (actively involved in the International Coral Reef Initiative and its operational framework the "Global Coral Reef Monitoring Network"). However, in September 2008, IUCN launched a new and important regional programme: the *Initiative for the Caribbean Region*. This programme includes a range of interventions aimed at improving the management of the region's major ecosystems by increasing knowledge, improving governance and empowering stakeholders at all levels (government, civil society and community) to be more effective in their natural resource management roles and responsibilities. The main components are: the preparation for a Caribbean Red List of Threatened Species; a programme on renewable energy; work in integrated planning, ecosystem management and sustainable livelihoods; and climate change adaptation.

Nature Conservancy (NC)

The Nature Conservancy (NC) is a North-American leading conservation organization working around the world to protect ecologically important lands and waters for nature and people. In the Caribbean region, the NC is active in the Bahamas, Grenada, St. Vincent and the Grenadines, Jamaica, Belize, and the Dominican Republic. Their activities include a bi-national fishery programme for artisanal fisherman in Belize and Jamaica and lots of conservation work in national parks and protected areas, e.g. Parque Nacional del Este in the DR. In Grenada and St. Vincent & the Grenadines – an area new to NC – they are working with a local partner to survey the area, to identify threats and conservation strategies, and map priority sites in need of protection.

Major support is however going to the programme: *The Caribbean Challenge*:

NC has pledged US\$20 million to support The Caribbean Challenge, a programme based on the

unprecedented commitment by the Caribbean governments to support and manage new and existing national parks and protected areas throughout the region. The Bahamas, the Dominican Republic, Jamaica and St. Vincent & the Grenadines are already fully involved in the project; Antigua & Barbuda, St. Lucia, St. Kitts and Nevis and Dominica are considering the initiative and are reported as likely to sign on. The overall goal is the protection of at least 20 percent of the Caribbean marine and coastal habitats by 2020. The Conservancy's participation in the challenge differs from its conservation efforts in the Caribbean in the past, which have primarily focused on protecting individual sites.

In view of creating a long term financial sustainability for conservation in the region, the NC is also pledging US\$8.6 million to seed national-level protected area public-trust funds in countries that are part of the challenge. More than US\$40 million will be endowed in these trust funds (e.g. also KiW is contributing to these trust funds).

- Donor Coordination

The previous chapters 4.1 and 4.2 and annex 6.4 clearly demonstrate the presence of a vast range of donor agencies in the region as well as the multitude of environment-related initiatives they (have) support(ed). Unfortunately, proper coordination among donors and hence optimisation of the efficiency of all these donor investments and contributions in addressing environmental issues, remains to be a difficult point. The practical outcomes of the support initiatives are still limited due to concentration on policy development and capacity building, and few support for field implementation. The fact, that donors' regional offices are in different countries in the region and that the CARICOM HQ is not in the easiest of countries to access, does not help. Donor coordination has improved over the past years but there is still room for further improvement and steps need to be taken to avoid overlapping funding.

Hence, a good number of donor and/or thematic coordination groups exist but for various reasons they do not seem to achieve significant improvements. Some of the main reasons include:

- many cooperation groups only operate at a national - sometimes sub-regional (OECS) - level but there are very few coordination mechanisms established at the Caribbean level;
- few cooperation groups have a long life: creation and dissolution rates are too high;
- many groups are not "complete" in the sense that important stakeholders are not participating;
- the cooperation does not operate beyond the political level; participants meet and draw up minutes and other documents but when it comes to the establishment of genuine cooperation, parties stick too much to their own agenda;
- regional institutions such as for instance CDERA and CCCCC, who have a clear regional coordination mandate, lack the institutional capacity to perform well in this capacity;
- though in the end aiming at an increased efficiency of donor assistance, the operational cost of a well-functioning Caribbean coordination group is quite high.

Some examples of existing donor cooperation initiatives and mechanisms:

- The donor community in the Eastern Caribbean has coordination groups under the umbrella of UNDP. The group on disaster management, climate change and environmental management is led by CIDA.
- Initiatives aimed at developing closer cooperation are being promoted through the setting up of CARIFORUM/DOM/OCT/EU Task Forces, amongst others in the area of Disaster Management.
- In the DR, EU MS conduct annual coordination meetings. The Secretariat of Environment and Natural Resources presides an Interinstitutional Technical Group for Environment where all important stakeholders – at national level – are represented. This coordination mechanism was established under a GTZ-financed project and hence continues operating under the concerned Ministry.
- In Haiti, there is a close coordination among the different UN Agencies present in the country. Amongst other things, they developed the "UN Master Plan for Development Aid" in Haiti. A coordination platform also exists for the thematic area of "Watershed Management". Finally, USAID organizes monthly stakeholder/donor meetings for issues related to land use planning and natural resource management. Apart from USAID, the participants include IDB, EU, UNDP, WB, CIDA, French Cooperation and the Spanish cooperation.

5 Conclusions and Recommendations

5.1 Conclusions

The main conclusions of the precedent analyses can be summarised as follow:

Conclusion 1:

Environmental degradation and the unsustainable use of natural resources have continued in the Caribbean SIDS and LLCS, with negative consequences for social and economic development. The key economic sectors such as tourism, agriculture, fisheries and forestry depend heavily on more and more stressed natural resources. The ability of the Caribbean to reverse the trends of increasing environmental vulnerability and degradation is one of the key factors that determine whether or not development in these countries will be sustainable

Conclusion 2:

The key environment concern of all countries in the region is adaptation and preparation for climate change and natural disasters. Although the contribution of the Caribbean countries to this global phenomenon is very low, the potential impact is enormous. Other high ranked concerns, which originate from the countries own activities and policies are: land use management in a holistic way (water, forest etc), especially for coastal areas and watersheds; marine environment (important economic role of tourism, important fragile ecosystems), renewable energy/ energy effectiveness (to reduce deforestation/climate change and to reduce high expenses for energy) and waste/waste water management. Depending on the sub-regional specific situations (population density, economic activities, and development level of the countries) the ranking of environment problems after climate change and disasters varies as follows:

- Guyanas' sub - region: marine flooding, water drainage, avoid deforestation/protect standing forests, establishment of protected areas
- OECS region: waste from cruise ships (marine pollution), waste and waste water management, renewable energies
- Greater Antilles: water/watershed management, deforestation (energy supply), soil management/ erosion, renewable energies to reduce deforestation

Conclusion 3:

The Caribbean SIDS and LLCS have begun to take action towards achieving sustainable development at national and regional level and the countries have made significant progress in establishing comprehensive policy, institutional and legal frameworks for environmental management. But limited capacities and coordination difficulties – at national and regional level - are still major challenges in implementation/enforcement of existing policies/regulations and effective sustainable environmental management.

Conclusion 4:

Integration of environmental concerns into the main economic sectors is very varies between the countries and the sectors. Significant efforts have been made the last years in most sectors and countries, but up to now sea level rise and prevention of natural disasters are very rarely taken into account in urban development, infrastructure/transport and physical planning. The use of strategic instruments, like Strategic Environmental Assessments (SEA), environment/economic growth modelling and mainstreaming of climate change in national development agenda remain poor due to low priority of environment issues in decision making on national development planning.

Conclusion 5:

The importance given to the environment in the EU-CARIFORUM policy statements is not reflected in the current Regional Indicative Programme. Indeed, initially planned environment and disaster management components were left out of the 10th EDF RIP, since numerous complementary programmes in favour of the environment and climate change are currently on-going or in the pipeline, including the Global Climate Change Alliance (under which the region stands to benefit from €8 million), intra-ACP programme on

Disaster Risk Reduction for a total amount of €180 million, and the intra-ACP programme on renewable energies (under which the region stands to benefit from €1,5 million). The same – though to a lesser extent – goes for the respective National Indicative Programmes (2008-2013). Only in a few cases is environment addressed as a focal sector and environmental mainstreaming in the selected focal areas is generally reported to be deficient. Further, the environmental initiatives (CARIFORUM Regional Task Force, GCCA, intra ACP-EU Natural Disaster Facility) referred to in the EU-CARIFORUM Troika Summit Agreement are not yet known by most of the EC Delegations and Ministries of Environment. Most are not put in place yet. The upcoming mid-term review is a key occasion to assess the validity of the RSP/NIP and the complementary environmental programmes ongoing and planned taking a holistic view of overall EU development assistance at regional level.

Conclusion 6:

The region accommodates an important donor community active in the environmental sector supporting a multitude of recently concluded and ongoing programmes and interventions addressing environmental issues. Priorities for donor assistance are the natural disaster-related programmes, ranging from relief and rehabilitation to management and preparedness. Adaptation to climate change – which is a very broad subject – is rapidly gaining importance. Donor coordination has improved over the last decade but still remains a difficult point. In general, the donor community displays a certain tendency towards contributing to multi-lateral and multi-donor initiatives rather than investing in smaller bilateral programmes.

Conclusion 7:

Authorities in the visited countries have a clear preference for national or sub-regional (Bi-national Haiti/DR, OECS, ...) field projects and programmes. The benefits from regional (pan-Caribbean) initiatives are perceived to be significantly less than those that are generated through national or sub-regional projects.

5.2 Recommendations

A code (1, 2 or 3) is attached to each recommendation to separate the recommendations addressed to Caribbean National Governments (1), the regional structures/institutions (2) and the donors (3). Recommendations which concern especially the EC cooperation are indicated (*) and linkages to the conclusions of the mission are shown below each recommendation. Performance indicators are proposed for thematic recommendations related to environment mainstreaming and management which involve EC and which are of relevance especially in the next RSP/CSP reviews and future planning / financing cycles of EC - Caribbean cooperation.

The most important key environmental priorities for future EC - Caribbean cooperation are high - lighted (written in bold) to facilitate future priority ranking and decision making concerning financial support of EC to environmental concerns in the Caribbean.

Preliminary remark:

Previous recommendations from UNEP Outlook 2004 and review of the Barbados Plan of Action 2005 are still considered valid. (see details in annex vol. 3 of this report, workshop report)

General and transversal recommendations

- As a regional priority EC/donor support should go to the **implementation of existing regional policies and strategies** coordinated by regional institutions, to multi-donor programmes (basket funding in a medium to long term) and to the implementation of MEA-related action plans (incl. harmonisation of these action plans at regional level). Within this priority framework for cooperation and based on the availability of significant budgets, the EC should put emphasis on the larger investment components such as infrastructure, construction, etc. Furthermore should a certain percentage of regional and national funding from EU be used for the implementation of measures proposed in chapter 4 of the CARIFORUM/EU EPA (2, 3)*
(Conclusion 2, 5)

- The close inter-linkages between environment and development have since long been recognised by the global community. In the context of the present study, this leads to the recommendation that environmental aspects should be part and parcel of all development programmes. Further, it should be taken into account that the implementation of predominantly socio-economic development programmes can be very effective in preventing further environmental degradation (e.g. programmes that focus on poverty reduction or employment creation and therefore reduce the pressure on natural resources).
(1, 2, 3)*
(Conclusion 1, 2, 5, 6)
- Environmental and natural resources are very important assets in the further development of the Caribbean region. A focus on the opportunities that are provided by these assets rather than on environmental problems could lead to a more positive attitude towards environmental management and to an increased environmental awareness both at decision-making and general public level. This positive opportunity approach should also be reflected in the regional development programmes. (1, 2, 3)*
(Conclusion 1, 4)
- Countries have to improve interdisciplinary coordination / harmonisation between technical ministries / institutions in order to increase effectiveness of the provided donor assistance. This includes simplification of the institutional framework for environmental management and clarification of the mandates. (1)
(Conclusion 3)
- The role of civil society as well as private sector in development processes should be enhanced.
(1, 2, 3)*
(Conclusion 3)

Specific recommendations per thematic areas:

NATURAL DISASTER RISK REDUCTION AND PREPAREDNESS, CLIMATE CHANGE ADAPTATION

- **Support the implementation of regional strategies to prepare and respond to CC ("Adaptation to Climate Change", "Enhanced Comprehensive Disaster Management Strategy and Framework (2007-2012)") as a central issue for development of the region incl. especially 'Support significant infrastructure investments in the key sectors of the countries for adaptation to the expected climate changes' (3)***
(Conclusion 2, 3, 4, 5, 6)
Indicators:
 - Damage in % of GDP / victims as % population from natural disasters.
 - Level of risk reduction achieved
- Support countries in making use of funds available from the clean development mechanism (CDM) , Adaptation Fund (UNFCCC) and GCCA (2, 3)*
(Conclusion 2, 5, 6)
Indicators:
 - Number of initiatives and projects in the region funded by the mentioned mechanisms
- Support assessments of climate change/hurricane impact on the economies (2, 3)
(Conclusion 1, 2, 4)
- Include natural disaster/climate change risk assessment in procedures for funded projects (3)*
(Conclusion 5, 6)
Indicator:
 - % of damage in donor funded project outputs
- Support regional cooperation initiatives for preparation of human resources, update of technology and

equipment, to improve early warning systems. (2, 3)*

(Conclusion 2, 3)

Indicator:

- % of population evacuated in time :

- Strengthen the institutional capacity of existing monitoring and observation centers for early warning of natural disasters and support regional networking among these. (2, 3)
(Conclusion 2)

FOOD, WATER AND ENERGY SECURITY

- **Support energy efficiency and alternative/renewable sources of energy such as waste-to-energy initiatives (landfills, biogas), wind, solar, geothermal, (bio)fuels making use of existing alternative energy technologies in the region. (1, 2, 3)***

(Conclusion 1, 2)

Indicator:

- % of renewable energies in the national energy balance

This should include:

- * **Contribute to the Caribbean Renewable Energy Development Programme (3)***

(Conclusion 1, 2, 4)

Indicator:

- % of renewable energies in the national energy balance

- Support employment programmes in order to reduce poverty and reduce environmental stress Incl ecotourism, fishery programmes, sugar cane energy), (1)
(Conclusion 1, 2)

- Support the implementation of regional water management strategies, as currently under development by CARICOM and the implementation of food security strategies ("Promoting CARICOM/CARIFORUM Food Security, Jagdeo Initiative, Common fisheries policy for CARICOM countries) (3)*

(Conclusion 1, 2, 5)

Indicators:

- Damage in % of GDP / victims as % population from flooding

- Level of achievement of the objectives of the strategies

- Number of specific actions supported under these strategies

- Support water use, saving, drinking water supply (loss prevention through better maintenance, in particular of main water distribution systems) (3)(* CSP, facility)
(Conclusion 1, 2, 5, 7)

Indicators:

- Effectiveness of water use (% of water loss)

- % of population connected to safe water supplies

WASTE WATER AND WASTE MANAGEMENT

- **Support significant investments in waste water treatment, sewerage systems and waste disposal/treatment (3)(*CSP, water facility)**

(Conclusion 1, 2, 5, 7)

Indicators:

- % of population connected to sewerage systems

- % of water treated

- Quality of discharged treated water

- Quality of receiving surface water

- **Support infrastructural and management support for reception and treatment of ship generated waste (1, 2, 3)***
(Conclusion 1, 2, 5)
Indicators:
 - Amount/capacities of reception facilities installed
 - % of ship generated waste received and treated on – shore
 - Water quality in the coastal waters
- Support institutional strengthening with respect to waste and waste water treatment (1, 2, 3)
(Conclusion 2, 3)

INTEGRATED ECOSYSTEM MANAGEMENT

- **Continue/increase support to sub - regional environment initiatives which address shared resources in similar eco - regions (Caribbean Biological Corridor Initiative; bi-national Haiti-Dominican Republic Programme, with focus on NRM, watershed management; transformation of Dominica into an “organic island” (regional relevance) within the Caribbean SIDS programme) (3)***
(Conclusion 2, 5, 7)
Indicators:
 - Surface of intervention areas (marine/terrestrial) taken into account in sub - regional environmental projects
 - Income generated from sustainable use of biological resources
- **Establish partnership with Caribbean Environment Programme (as part of the UNEP Sea Programme) with special focus on treatment and management of marine ecosystem via the Caribbean Sea Commission (3) (*)**
(Conclusion 5, 6)
Indicators:
 - Existence of a formal cooperation contract EC – UNEP
- Support the implementation of national Coastal Zone Management programmes (2, 3)(*CSP)
(Conclusion 1, 2, 3, 4)
Indicator:
 - Level of achievements of the national programmes’ objectives
- Design and support a regional programme on indigenous knowledge on biological resources, including protection of intellectual property rights and improvement of management, processing and commercialization of these products. (3)

REGIONAL AND DONOR COORDINATION / PROGRAMMES

- Develop a mechanism for better exchange of information between donors and regional agencies (including civil society organisations) on current priorities, specific projects planned and under implementation, etc. (2 CARICOM)
(Conclusion 3, 6)
- Set up a Caribbean-owned fund or a facility allowing exchange of human and technical expertise among countries of the region (added value: develop South-South cooperation, strengthen regional expertise, establish a database of country thematic experts, country focal points and key institutions).(2 CARICOM, 3)*
(Conclusion 3, 4)
Indicator:
 - Number of exchange programmes realised by CARICOM

GOVERNANCE AND DECISION MAKING

- **Support the implementation and the enforcement of existing environmental regulations (1, 3)***
(Conclusion 1, 4)
Indicators:
 - Number of control entities operational
 - Number of violations recorded and sanctioned
- Encourage SEA for the strategic economic sectors and make SEA a precondition for EC sector budget support to those sector with a high potential environmental impact (1, 2, 3)*
(Conclusion 1, 4)
Indicators:
 - % of sectors subject to SEA
- Develop environmental 'core' indicators for National/Regional Development Plans (1, 2)
(Conclusion 4)
- Support countries to develop a 'green economy', to show that environmental integration is not only a supplementary expense (2 CARICOM)
(Conclusion 1, 4)

INSTITUTIONAL STRENGTHENING/CAPACITY BUILDING

- Support capacity building on Environmental mainstreaming with emphasis on SEA, indicators, EIA environment screening) (2, 3)*
(Conclusion 1, 3, 4)
Indicators:
 - Number of people trained, % of programmes adequately mainstreamed

This has to include:

 - * **Reinforce capacity within EC delegations to ensure proper environmental mainstreaming in the RIP/NIP implementation and inclusion of environmental indicators in the 'internal evaluation grid at EC delegation levels'. (*EC Delegation/Helpdesk Environment)**
(Conclusion 5)
Indicators:
 - Level of inclusion of environmental mainstreaming in the programming
 - Number of EC staff trained by Environment Helpdesk
- Strengthen technical (new technologies energy, waste, water sector) and methodological (management, approaches) capacity of existing regional, national and local organisations and institutions involved in environmental management and control varying strongly per institute and per country;(1, 2, 3)
(Conclusion 1, 4)
- Support training/capacity building of the private sector in environmental management and cleaner production, technology and promote PPP and private sector international cooperation (1, 2, 3)*
(Conclusion 1, 4)
Indicators:
 - Existence of PPP agreements
 - Environmental initiatives undertaken by the private sector
 - Amount of international PP exchange initiatives realized
- Support regional cooperation initiatives that contribute to better preparation of human resources and update of technology and equipment with the view to improve the countries' early warning systems and

made regional funding available for capacity building (2, 3)*
(Conclusion 2, 3)

Indicators:

- % of population evacuated in time
- Number of people trained in this specific area
- Number of institutions well equipped

- Facilitate exchange and cooperation between the Caribbean Sea Commission (ACS) and other regional sea commissions, especially the Baltic Sea Programme (3)*
(Conclusion 5)

Indicators:

- Number of meetings/agreement between the ACS and other regional sea commissions

- Provide equipment to government institutions for emission control, environmental inspection (3)
(Conclusion 1, 4)

INFORMATION/COMMUNICATION/SENSIBILISATION/MONITORING

- Increase public knowledge on environmental regulations (1)
(Conclusion 1, 4)

- Provide information to interested parties and facilitate their access to EU funding opportunities (*)
(Conclusion 5)

Indicators:

- Number of new proposals submitted

- Increase access to information technology and improve capacity to apply it (e.g. GIS, remote sensing, IT, videoconferencing) (1, 2, 3)
(Conclusion 1, 4)

- Support programmes for the exchange and dissemination of existing knowledge and experience between countries (2, 3)
(Conclusion 3, 4)

- Support the CNIGS in Haiti to develop regional services throughout the Caribbean in satellite data collection and interpretation. The CNIGS would as such take on the mission of an Environmental Observatory for the Caribbean (3)*

Indicators:

- Number of services provided to structures in other countries within the region

Constraints to preparing the profile

During the mission the following practical problems were experienced:

- since the amount of mission days did not allow visits to all countries, the level of information per country varied substantially;
- since for Cuba a special 'cooperation' visa was required, a serious delay occurred with respect to this field mission;
- response to the invitations sent out for the workshop was around 50% . However, it was felt by the workshop participants that for this reason the WS conclusions do not correctly reflect the vision of the

region.

- support of EC-delegations during the fact finding. Workshop organisation was sometimes poor in terms of identification of adequate contact persons, logistical support like support for money transfer for the organisation of the Workshop