



ELSEVIER

Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

SCIENCE @ DIRECT®

Ocean &  
Coastal  
Management

Ocean & Coastal Management 45 (2002) 905–924

[www.elsevier.com/locate/ocecoaman](http://www.elsevier.com/locate/ocecoaman)

# Ocean and coastal issues and policy responses in the Caribbean

Nelson Andrade Colmenares\*, J. Jairo Escobar

*United Nations Environment Programme (UNEP), Caribbean Regional Co-ordinating Unit (CAR/RCU),  
14-20 Port Royal Street, Kingston, Jamaica*

---

## Abstract

The Paper presents the regional perspective on the conditions and efforts for the integrated coastal management (ICM) that exist in the Wider Caribbean Region (WCR).

The Caribbean Action Plan was adopted in 1981 with an initial workplan of activities of evaluation and control of marine pollution, evaluation of impacts on the coastal area, fishing studies, watershed management, evaluation of natural hazard effects, energy accounting systems studies, urbanisation of the coastal area, building capacity and training. The Convention for the Protection and Development of the Marine Environment of the WCR is the only regional legal framework for the protection and sustainable development of marine resources.

The Paper describes some region-wide ICM-related programme initiated or supported by the CEP as well as actions at the national level. Other ICM-related general activities and training programmes of CEP are also presented.

Trends in national policies in ICM and current developments and issues are also highlighted and recommendations made.

© 2002 Elsevier Science Ltd. All rights reserved.

---

## 1. Introduction

The Caribbean Regional Coordinating Unit of the United Nations Environment Programme (UNEP-CAR/RCU) prepared this document to inform on the leadership and support provided by the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention, 1983) in the regional application of Chapter 17 of Agenda 21 of the United Nations

---

\*Tel.: +1-876-922-9267; fax: +1-876-922-9292.

E-mail address: [nac.uneprcuja@cwjamaica.com](mailto:nac.uneprcuja@cwjamaica.com) (N. Andrade Colmenares).

Conference on Environment and Development. The Paper presents the regional perspective on the conditions and efforts for the integrated coastal management (ICM) that exist in the WCR and deals specifically with:

- results and constraints for land use planning and ICM within the context of Caribbean Environment Programme and of the Cartagena Convention,
- trends and patterns in national policies on ICM,
- identification of new developments and issues requiring special actions in ICM, and
- recommendations for future actions in ICM.

## **2. The Action Plan of the Caribbean Environment Programme and Integrated Coastal Management**

The WCR is one of 12 regions of the world where UNEP, in collaboration with national governments, established Action Plans to reduce environmental problems by improving the knowledge on the marine and coastal environments and by strengthening environmental administration [1]. The WCR comprises 36 continental and insular states and territories (Caribbean Sea and/or to the Gulf of Mexico) [2].

The Caribbean Action Plan was adopted in 1981 with an initial workplan of activities of evaluation and control of marine pollution, evaluation of impacts on the coastal area, fishing studies, watershed management, evaluation of natural hazard effects, energy accounting systems studies, urbanisation of the coastal area, building capacity and training. The programme has been periodically evaluated and adapted to the changing political and environmental realities and to the regional necessities. Agenda 21, and more specifically Chapter 17 [3] on the marine environment, is thus reflected in many programmatic elements of CEP. It has supported its regional application with activities such as: protection from marine pollution by land-based activities (paragraph 17.24) and evaluation of the effect of the sea level rise from global warming (paragraph 17.97). These measures have been developed in the framework of the sub-programme on Assessment and Management of Environmental Pollution (AMEP). There are also measures to protect the biological resources in areas under national jurisdiction (paragraph 17.70), through the sub-programme for Specially Protected Areas and Wildlife (SPAW). Other measures include improving the exchange and dissemination of information through the sub-programme for Information Systems for the Marine and Coastal Resources (CEPNET). Finally, the sub-programme for Education, Training and Awareness (ETA) strengthens capabilities through training and dissemination activities. All these activities have contributed to the development of regional experiences on ICM with a strong regional perspective [4].

Following the development strategy of CEP [4], activities from area “A” of Chapter 17 of Agenda 21 were included in the regional programme for Integrated Planning and Institutional Development for the Management of Marine and Coastal Resources (IPID). The long-term objective of IPID consisted in “the invigoration of

the institutional capacity of the region with the preparation and implementation of plans of Integrated Management for Small Islands and Coastal Areas". IPID was developed with Pilot Projects in Planning and Integral Management of Small Islands and Coastal Areas [5] under AMEP [6] and with the support of the Global Environment Funds (GEF). The plan aims "to elaborate a methodology for integrated planning of the coastal areas for Small Island Developing States (SIDS), specifically for small islands, islands with low shorelines and for coralline islands" [7].

### **3. The Convention for the Protection and Development of the Marine Environment of the WCR, its related Protocols and Integrated Coastal Management**

The Cartagena Convention is the only legal framework of regional reach available to the States of the WCR for their combined and/or singular activities for the protection and sustainable development of marine resources. There are currently 21 contracting parties [8]. The Convention, from provisions of articles 16 and 17, is complemented by three protocols:

- the Protocol concerning Cooperation in Combating Oil Spills.
- the Protocol Concerning Specially Protected Areas and Wildlife (SPAW).
- the Protocol Concerning Pollution from Land-Based Sources and Activities (LBS).

ICM activities were implemented under this legal framework of the Cartagena Convention [9]. Article 4 of the Convention, Parties are invited to, individually or jointly, take measures "to prevent, reduce and control pollution...and ensure sound environment management". This corresponds to the main objective of the programmatic area "A" of Chapter 17 in which States commit "themselves to integrated management and sustainable development of coastal areas" (paragraph 17.5). The measures promoted by the Convention also refer to the protection of ecosystems and species and to the establishment of protected areas. Article 12 on environmental impact assessments (EIA), Parties commit "to develop technical and other guidelines to assist the planning of their major development projects...". Article 13 invites Parties "to cooperate... in fields relating to pollution and sound environmental management of the Convention area, taking into account the special needs of the smaller island developing countries and territories". Among management activities that have been agreed upon by the States in relation to ICM in Chapter 17 (and also corresponding to the dispositions of the Convention), the following ones exist: "Prior environmental impact assessment, systematic observation and follow-up of major projects, contingency plans, etc." (paragraph 17.6).

#### *3.1. The Protocol Concerning Specially Protected Areas and Wildlife [9,10]*

Adopted in 1990, the SPAW Protocol guides ICM activities by assisting the Contracting Parties in adding coastal and marine protected areas to the ecosystems they already preserve. In addition, the Parties work at strengthening cooperation

network in the WCR. They are also committed to protect key species. Article 6 of the Protocol supports ICM by stating that the Parties “shall adopt and implement planning, management and enforcement measures for protected areas...”. These measures include among others: (a) the formulation and adoption of appropriate management guidelines for protected areas (b) the development and application of a management plan (c) the development of public awareness and education programmes for users (d) the active involvement of local communities.

The specific objectives of the SPAW Programme in regard to ICM are the following [11]:

- to establish in the WCR a network for cooperation in Coastal and Marine Protected Areas and a System for Coastal Integrated Planning,
- to monitor impacts of human activities on ecosystems, and
- to develop Caribbean practical experiences in management and campaigns of public education.

The SPAW Protocol is conceptually adequate to be the legal framework for the application of programmatic area “A” of Chapter 17 of Agenda 21. For example, from paragraph 17.5, the States are committed to:

- promote the development and application of methods, such as national resource and environmental accounting, that reflect changes in value resulting from uses of coastal and marine areas, including pollution, marine erosion, loss of resources and habitat destruction,
- provide access, as far as possible, for concerned individuals, groups and organisations to relevant information and opportunities for consultation and participation in planning and decision-making.

Chapter 17 (paragraph 17.6) also points out that the coordination mechanisms “should include consultation, as appropriate, with the academic and private sectors, non-governmental organisations, local communities, resource user groups, and indigenous people”. These mechanisms will allow for “Preparation of coastal profiles identifying critical areas”. Paragraph 17.7 invites coastal States “to undertake measures to maintain biological diversity and productivity of marine species and habitats under national jurisdiction”. They might include: “surveys of marine biodiversity, inventories of endangered species and critical coastal and marine habitats; establishment and management of protected areas; and support of scientific research and dissemination of its results”. In Data and Information (paragraph 17.8), coastal States “should improve their capacity to collect, analyse, assess and use information for sustainable use of resources”, etc.

### *3.2. The Protocol Concerning Pollution from Land-based Sources and Activities [12]*

The LBS Protocol (adopted in Oranjestad, Aruba, on October 6, 1999) supports States and Territories of the WCR to apply the Convention of the United Nations on the Law of the Sea (1982) and participate in the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA, UNEP).

It is the first regional instrument designed to support the GPA as it deals with marine pollution from the point of view of sources and categories of pollutants. It also establishes source specific regional effluent limits for the discharge of pollutants and also indicates best practices for non-point sources of pollution [13].

The Protocol has four annexes:

- Annex I: Source categories, activities and associated pollutants of concern.
- Annex II: Factors to be used in determining effluent and emission source controls and management factors.
- Annex III: Domestic wastewater.
- Annex IV: Agricultural non-point sources of pollution [14].

The Protocol is an appropriate regional instrument because it is guided by Agenda 21, as is stated in its preamble: “Considering the principles of the Rio Declaration and Chapter 17 of Agenda 21 adopted by the United Nations Conference on the Environment and Development (Rio de Janeiro, 1992), and the Programme of Action for the Small Island Developing States (Barbados, 1994)”.

Article 3 of the LBS Protocol on General Obligations states that Contracting Parties shall “...take appropriate measures to prevent, reduce and control pollution of the Convention area from land-based sources and activities, using for this purpose the best practicable means at its disposal and in accordance with its capabilities”. Article 6 on Monitoring and Assessment Programmes points out that each Party should “...systematically identify and assess patterns and trends in the environmental quality”.

In Article 7 on Environmental Impact Assessment, it is established that Parties shall develop and adopt guidelines concerning EIA, and review and update those guidelines as appropriate. Also, if a Party “has reasonable grounds to believe that a planned land-based activity on its territory, or a planned modification to such an activity, which is subject to its regulatory control in accordance with its laws, is likely to cause substantial pollution of, or significant and harmful changes to, the Convention area, that Contracting Party shall, as far as practicable, review the potential effects of such activity on the Convention area, through means such as an environmental impact assessment”. Article 10 on Participation states that “in accordance with its national laws and regulations, promote public access to relevant information and documentation concerning pollution of the Convention area from land-based sources and activities and the opportunity for public participation in decision-making processes concerning the implementation of this Protocol”. These specific dispositions coincide conceptually with some of the commitments of the States in the programmatic Area “A” of Chapter 17 of Agenda 21. Paragraph 17.5 relative to the Objectives points out that “Coastal States commit themselves to integrated management and sustainable development of coastal areas and the marine environment”, for which one must “Apply preventive and precautionary approaches in project planning and implementation. This includes prior assessment and systematic observation of the impacts of major projects”.

Chapter 17 (paragraph 17.6) also points out that the coordination mechanisms must provide for “prior environmental impact assessment,...contingency plans for human induced and natural disasters,...improvement of coastal human settlements, especially in housing, drinking water and treatment and disposal of sewage, solid wastes and industrial effluents,... Development and simultaneous implementation of environmental quality criteria, etc.”. Finally, paragraph 17.8 on Data and Information, refers to the States obligation “to conduct regular environmental assessment of the state of the environment of coastal and marine areas:”

#### **4. Results of CEP on Integrated Coastal Management**

CEP has initiated or supported various ICM-related activities in the WCR. This experience was built in collaboration with numerous international organisations to answer to the demands from the national governments of the region. Different aspects of ICM were dealt with, for example resources management (fisheries), protection of ecosystems and species (including tourism impacts). In some cases, those activities have lead to important management programme with integrated approaches. The level of ICM capabilities varies in the WCR [15] and most of the experiences are in first generation programmes oriented towards protected areas and specific uses of resources.

Twenty-two countries of Latin America and the Caribbean were involved in ICM in 1998 [16], mostly in resources conservation, coastal tourism and fisheries. Of these countries, five (three from the WCR) had activities that were intensive enough to influence decision-making [17]:

- the Programme of Coastal Conservation of Barbados,
- the Initiative of Coastal Area Management in Belize, and
- the Coastal–Marine Programme of Costa Rica.

As discussed above, IPID has lead most of the ICM activities of the CEP that were implemented by the AMEP sub-programme. Previous to AMEP, pollution-related activities were developed in a joint effort with IOC/UNEP under the Control of Domestic, Industrial and Agricultural Land-Based Sources of Pollution Programme (CEPPOL). It develops activities on:

- control of domestic, agricultural and industrial sources of pollution,
- pollution from pesticides and formulation of control measures,
- monitoring and sanitary quality control for recreational waters and shellfish cultivation,
- monitoring and control of the pollution by petrol and floating garbage,
- damaged ecosystems and development of proposals of mitigation measures, and
- developments of environmental approaches for water quality.

#### *4.1. List and description of some region-wide ICM-related programme initiated or supported by the CEP*

##### *4.1.1. Guidelines for integrated planning and management of coastal and marine areas in the WCR [11]*

Directed to decision-makers, government organisations, NGOs and other institutions interested in ICM, it contains principles and experiences adapted to the needs of the WCR.

##### *4.1.2. Climatic changes in the intra-America seas [18]*

It is a regional evaluation of the ecological and socio-economic impacts of climatic changes that identifies the most vulnerable areas of the WCR.

##### *4.1.3. Environmental planning and management of highly contaminated bays [5,15]*

The first phase was a GEF funded project implemented by the United Nations Development Programme (UNDP) and UNEP for the bays of Kingston (Jamaica), La Habana (Cuba), Cartagena (Colombia) and Puerto Limón (Costa Rica). The second phase had the support of the Swedish Government and was aimed at overcoming barriers to best practices to reducing pollutants of inputs and to strengthen the institutional capabilities. This second phase was concentrated on the bays of Kingston and La Habana with pilot studies in the bays of Bluefields (Nicaragua), Santo Domingo (Dominican Republic), Point Lisa (Trinidad and Tobago) and the bays of Barcelona and Pozuelos (Venezuela).

##### *4.1.4. Pilot studies and activities in ICM [5,11]*

Supported by SIDA and national institutions, this activity has the following components: (a) improvement and implementation of the Park Management Plan of the Rosario's Corals National Park (Colombia); (b) conditions and needs assessment for integrated management on Margarita Island (Venezuela); (c) climate change related sea level rise impacts in St. Lucia; (d) integrated management on the coast of San Pedro de Macoris- Punta Caucedo (Dominican Republic); (e) establishment of a multi-use area in the estuarine districts of Commewijne-Marowijne in the Republic of Suriname; (f) establishment of an integrated management plan on Union Island, Mayreau and Cayos Tobago in St. Vincent and the Grenadines; (g) case study of integrated management and rational resource use on the Southeast coast of St. Lucia; and (h) integrated management plan for sustainable development on the Atlantic coast of Guatemala.

##### *4.1.5. Several GEF projects [19] in ICM or part of ICM*

“Integrating Management of Watersheds and Coastal Areas in Small Island States in the Caribbean”. The project will produce 13 national and one regional integrated management plan. “Planning for Rehabilitation, Environmental Management and Coastal Development in the Wake of Hurricane Mitch” designs plans for coastal waters management and development of collection and treatment systems in Nicaragua, Honduras and Guatemala. “Reducing Pesticide Run-off to the

Caribbean Sea” is implemented in Costa Rica, Panama, Nicaragua and Colombia. “Sewage Collection and Treatment” in Belize, Venezuela, Colombia and St. Lucia for the design of regional guidelines for Annex III of the LBS Protocol. The “International Coral Reef Action Network” (ICRAN) [20] is supporting a training programme in all aspects of management in 20 Marine Protected Areas (MPA). “Training for Rehabilitation of Contaminated Bays” will be realised in Cuba and Jamaica.

#### *4.2. Examples of CEP actions in ICM at the national level [5,11]*

##### *4.2.1. Rosario Islands' National Park (Colombia)*

At 45 km northwest of Cartagena, this small coralline island has been a national park since 1977. CEP supervised an assessment and provided recommendations to improve the management plan putting special emphasis on the threats from continental discharges, residential development, tourism and destructive fishing.

##### *4.2.2. Municipalities of Maniera and Arismendi on Margarita Island (Venezuela)*

The Districts of Arismendi and Maneiro rely largely on tourism. In 1994, the Ministry of Environment and Renewable Natural Resources of Venezuela initiated a pilot study to assess the natural conditions of the area, its potential and limitations to strengthen the important tourism industry. The management plan was to include elements of coastal ecosystem protection and the design of policies.

##### *4.2.3. Case study on climatic change in St. Lucia*

The study provided examples of impacts of climate changes and recommended mitigation measures applicable to the WCR. The study was carried out by the Atmospheric and Marine Institute of the University of Miami and allowed linkage to the socio-economic, environmental and climatologic variables to forecast changes. The Dutch Institute of Investigation used the RISKS system for modelling.

##### *4.2.4. Miskitos Keys (Nicaragua)*

Designated as a Biosphere Reserve, the management plan of the area was elaborated by the Ministry of Environment and Natural Resources (MARENA) with support from USAID, WWF, and the Caribbean Conservation Association (CCA). UNEP-CEP supported it technically in the early stages of development.

##### *4.2.5. Portland Bight (Jamaica)*

The Natural Environment Planning Agency (NEPA) and the South Coast Conservation Foundation (SCCF) have developed a management plan focusing on the socio-economic environment of the fishing communities, creating associations and monitoring mechanisms to control over-fishing practices.

##### *4.2.6. Coast of San Pedro de Macoris-Punta Caucedo (Dominican Republic)*

An integrated management development plan was developed with a multi-disciplinary and inter-institutional approach and served as institutional

strengthening in the Dominican Republic for coastal and marine resources management. Realising the technical study, the National Office of Planning (ONAPLAN) demonstrated the importance of needs assessment and information dissemination to successfully conclude ICM studies.

*4.2.7. Estuarine area of the districts of Commewijne-Marowijne (Republic of Suriname)*

The management plan objective was to optimise the productivity of the area with a long-term perspective on conservation. The multi-uses of the area were planned from a baseline study of the natural and human resources. The project was executed in 1994 and was satisfactorily completed. Institutional capabilities of Suriname in ICM were increased through this project as all stakeholders were involved.

*4.2.8. Union Island, Mayreau and Tobago Keys (St. Vincent and the Grenadines)*

An environment management and development programme was produced for this coral-rich area. United Nations Centre for Human Settlements (HABITAT) assisted in assessing the current conditions with basic information and identified the areas and coastal resources that must be a part of the ICM.

*4.2.9. Southeast coast of St. Lucia*

The objectives of the project in this representative ecosystems of St. Lucia was to develop an integrated management plan for the sustainable use of coastal and marine resources and to provide educational and demonstrative materials on protected areas, community-based monitoring techniques. The Caribbean Natural Resource Institute (CANARI) was the main partner of CEP.

*4.2.10. Lagoon of Terminos, Campeche (Mexico)*

This area has a very high biological productivity, which competes with an important traditional fishing sector. CEP supported the initial stage of the elaboration of the integrated management plan with EPOMEX (Programme for Fisheries, Oceanography and Ecology of the Gulf of Mexico), which was already supported by various local and national organisations. At the beginning, the project had a very strong participation from the public and the local communities because of the high threats on the lagoon.

*4.2.11. Atlantic coast of Guatemala (County of Izabal)*

The integrated management plan of the coast aimed at sustainable development (including tourism), conservation and protection of typical ecosystems and critical habitats. Consensus from the local communities about the importance of the coastal and marine resources was constantly looked for. After Hurricane Mitch in October 1998, the project was modified to adapt the plan of the most vulnerable areas to such natural hazards.

#### 4.3. Other general actions from CEP in ICM

Under the SPAW sub-programme, experiences are being developed and information is being disseminated in different projects:

- rehabilitation of sand dunes in Anguilla.
- improvement of residual treatment operations in coastal hotels of St. Lucia.
- development of action plans for local tourism in the Dominican Republic [21].
- support to the Caribbean Marine Protected Area Managers Network (CaM-PAM).

Various guidelines are prepared and disseminated:

- Sand Dunes Management in the Caribbean Islands.
- Green Resources Directory (environmental management of hotel facilities).
- Coastal Tourism in the WCR: Impacts and Better Management Practices (CEP Technical Report No. 39) [22].
- Behaviour Code for Hotels.
- Manual for the Monitoring of Coral Reefs (with the Global Coral Reef Monitoring Network, GCRMN).
- Common Guidelines and Criteria for Protected Areas in the WCR: Identification, Selection, Establishment and Management (CEP Technical Report No. 37) [23].

Under the sub-programme AMEP, the following activities were executed in collaboration with CEPOL:

- Epidemic Studies for Coastal Waters for Recreation in Trinidad.
- Monitoring, Control and Sanitary Quality of Bathing and Shellfish-Growing Marine Waters (CEP Technical Report No. 23) [24].
- Permanency of the Persistent Pesticides associated with Banana Tree Cultivation: Great Carbet Case Study (Guadeloupe, France).
- Guidelines for Sediment Control Practices in the Insular Caribbean (CEP Technical Report No. 32) [25].
- Organochloride Pesticides in the Laguna de Terminos, Campeche Mexico.
- Colifagous and Columns of H<sub>2</sub>S like alternative indicators of the Microbiologic Quality of the Tropical Coastal Waters; Puerto Rico.
- Pilot Study on the Relationship of the Bacterium *Decline's Rats* (T90) as indicator of the microbiological pollution of Costa Rica's coastal waters in the Caribbean Sea.
- Epidemic Prospective Pilot Study to evaluate the risks to human health associated with bath in recreational waters in Trinidad.

Other outputs of AMEP are:

- Regional Overview of Land-Based Sources of Pollution in the WCR (CEP Technical Report No. 33) [26].
- Environmental Impact Assessment for the Establishment of a Marina/Small Craft Harbour in Southwest Tobago (CEP Technical Report No. 29) [27].

- Environmental Quality Criteria for Coastal Zones in the WCR—A Compilation (CEP Technical Report No. 14) [28].
- Appropriate technology for Sewage Pollution Control in the WCR (CEP Technical Report No. 40) [29].
- Best Management Practices for Agricultural Non-Point Sources of Pollution (CEP Technical Report No. 41) [30].
- Reduction of the Pesticide Run-off to the Caribbean Sea, Project for the Southwest Region of the Caribbean Sea. Regional Earth Report, 2000.

#### *4.4. Training activities in ICM by CEP*

The ETA sub-programme of CEP has allowed for different training activities at the managerial level, such as:

- Seminar/workshop on planning and ICM for government officials (Venezuela).
- Training in the ICM for the tourism industry (Jamaica).
- Management of solid and liquid wastes related to tourism (St. Lucia and Mexico).
- ICM for the tourism industry (Barbados and Puerto Rico).
- Monitoring of coastal changes in the WCR, with IOCaribe (Trinidad and Tobago).

Dissemination of data, information, experiences and knowledge is done through the sub-programme CEPNET using, as much as possible, Internet-based tools such as an electronic information bulletin, website, e-groups, clearinghouses, etc.

### **5. CEP perspective on constraints to integrated coastal management in the WCR**

The WCR as a region and the individual states have slowly overcome many constraints in the application of ICM. The experience of CEP allows for the identification of some of those that have been slowing down projects or even causing their premature termination. The following sub-sections illustrate some specific and general situations.

#### *5.1. Focus of attention is not towards the marine environment but towards land issues*

Because of the larger political visibility of land issues, the marine problems are often tackled through sectorial activities such as fisheries, transports, defence or conservation. This is also reflected in the absence of planning in relation to the carrying capacities of the coastal and marine ecosystems. However, marine issues are now given a higher priority in many states of the WCR. Colombia, for example, has mandated its Commission of the Ocean to prepare a national policy of the ocean [31]. Mexico's National Fishing Plan has introduced concepts and principles of ecosystems in fisheries' management. The Zona Federal Maritima Terrestre y de Terrenos Ganados al Mar (ZFMT) was also innovated by including land use planning in its activities [32]. Costa Rica and Belize offer other interesting examples.

### 5.2. *Inadequate institutional framework for ICM*

Many States and Territories of the WCR lack institutional instruments to properly mobilise resources for ICM. Most of CEP's initiatives in the WCR are done jointly with national sectorial institution, most of them guided by environmental policies. Although efficient in their sector, these agencies may not have all the instruments needed for the real multi-disciplinary approach required by ICM. Very often, more than 10 different institutions look at marine and coastal issues, each with its own level of priority. This situation has serious impacts on decision-making and creates duplication of efforts. The integration of sectorial policies is often only done at a very high macroeconomic level where ICM is often left out [5].

Fortunately, there are good examples and models of countries making progress in ICM where integration is lead by coordinating or facilitating agencies. For example:

- Mexico uses ecological classification of its territory as a planning process. It also has a cross-sector environmental strategy for ICM [32,33].
- Nicaragua has prepared the Environmental Action Plan PAA-NIC that incorporates the concept and the principles of ICM [34].
- Panama has the Law of the Channel which support integrated watershed and coastal management [35].
- Colombia bases the coastal land use planning on ICM [36].
- In the Northern Caribbean, fishery plans prepared by the Caribbean Fishery Management Council (CFMC) are based on analysis of environmental systems, sustainable yields, recruitments, water quality, habitats, etc.
- The Coastal Zone Management Unit in Barbados, and the
- Colombian National Environment Council.

### 5.3. *Limited use of environmental impact assessments for environmental planning*

EIAs are becoming a common tool for monitoring and enforcement of environmental regulation in the WCR. However, it is not yet clear how EIAs are an efficient tool in ICM considering the limited economic and human resources available for a comprehensive monitoring and enforcement programme.

### 5.4. *Lack of project sustainability*

Very often the integration initiatives do not have the duration needed to bring results through ICM as most of them are not pursued after the implementation phase. Monitoring, evaluation and enforcement is often weak. When the efforts are sustained over a longer period, as in the case of the formulation of a management plan for the South coast of Jamaica, which first created monitoring associations for illegal fishing practices and then established the Fishery Management Council of Portland Bight [11]. In the same sense, the Programme of Coastal–Marine Management of Costa Rica, the Programme of Coastal Conservation of Barbados and experiences in the US Virgin Islands and British Virgin Islands must be noted. These successes are often built upon what were initially small projects that were transformed into regional or national programmes.

### *5.5. Lack of evaluation and monitoring programmes*

There are very few examples of programmes and/or experiences of ICM in the WCR with efficient monitoring and evaluation components. This is explained by the complexity of data and knowledge that is required and seldom available in many countries [37].

### *5.6. Different perception of ICM*

The concept of ICM is not properly defined or understood across the WCR and significant conflicting perspectives may even exist between institutions of the same country. Furthermore, this can also be said of the individuals working within one single institution. Fortunately, the basis of ICM is recognised by all: stakeholder involvement in decision-making, consultations, sectorial integration. Many of the national projects in ICM supported by CEP promote these concepts and the importance of aiming at a full implementation of ICM [5]. National planning agencies must also be part of the integration process so that ICM becomes a priority of the national agenda. CEP has done so in the Commewijne-Marowijne Districts pilot project, in Suriname and with the project of San Pedro of Macoris Punta Caucedo in the Dominican Republic (with ONAPLAN) [5].

### *5.7. Reduced technical capability for fully integrated coastal management*

Very few examples of a fully implemented ICM exist because the agencies administrating the environment and/or natural resources have insufficient capabilities to cover the ICM requirements exhaustively. Most of the projects are demonstrative or pilot projects where training for regional or local authorities is provided. Although CEP has provided training to hundreds of individuals in different countries, the multiplicative effect in many countries is not happening. CEP also developed guidelines that were complementary to other regional initiatives [38–41]. Training has been offered as follows:

- the pilot project of the Coast of San Pedro of Macoris-Punta Caucedo, in the Dominican Republic, with ONAPLAN,
- to representatives of the Ministry of the Environment and other organisations on the use of methods and techniques in ICM in Venezuela (Margarita Island pilot project) [5],
- the coastal management programme of Haiti,
- the coastal management programme to increase capabilities for the management of the Guianese coast,
- environmental Management Project of Bay Island in Honduras that created the first integrated marine area of Honduras (with support from IDB) [17],
- the Mahogany wetlands and lagoon management plans (with support from PROARCA) in Nicaragua [42].

Finally, there is a lack of an “intersectorial, inter-institutional and multi-disciplinary curriculum” to prepare experts for ICM although the academic sector has made more progress to provide courses in ICM [43].

#### *5.8. Limited access to adequate data and information*

Most of the basic information required for ICM is not available or organised to be used in ICM. Most of the experiences supported by CEP have implied important time reallocation for evaluations of data quality and availability. Data and information in oceanography and on the ocean/coast interface are often missing or inadequate. CEP is promoting monitoring networks with initiatives to measure biological answers to pressures, such as the International Coral Reef Initiative (ICRI), the Intergovernmental Oceanographic Commission that carried out information needs assessment of SIDS [44], and UNESCO through the Programme on Beaches and Coast Stability in the Small Antilles (COSALC) [7].

#### *5.9. Reliance on international and non-WCR organisations for ICM*

As many of the development in ICM are lead by international organisations [35], in some States and Territories there is dependence on information and on the ability to formulate and operate programmes [11]. This is true for forecasting and monitoring of atmospheric/oceanic phenomena [45] and in socio-economic valuation [16].

#### *5.10. Communication capability of stakeholders*

All ICM initiatives of CEP in the WCR have provided all stakeholders with the opportunity to present their needs and expectations (fishing communities, conservationist associations and NGOs, the academic sector, authorities and the private sector). Some groups lack organisational mechanisms to properly express their interests in the planning of marine and coastal areas (specifically to integrate long-term view). This communication barrier limits the integrity and coherence of the ICM process and can bring in a bias towards the better-organised groups. It is thus essential to reduce the technical and scientific content in the ICM process, where technicians and scientists communicate their knowledge in an understandable language to all interested parties. CEP has been very active in facilitating the participation of those more vulnerable groups in the formulation of democratic programmes of ICM.

#### *5.11. Lack of economic resources*

One of the main obstacles to a fully implemented ICM is the lack of economic resources. Paradoxically, the SIDS with small and fragile economies have the most urgent needs in ICM, specifically in relation to tourism. Resources will be needed to better understand the uncertainties of climatic change impacts on SIDS [45].

## **6. Trends and patterns of national policies in ICM**

ICM in the WCR is developed in the framework of post Río policies. This is reflected in different national environmental plans:

- The strategy for the integrated management of the coast of Mexico: Besides having an integrated long-term perspective, it must integrate, guide and define the administrative and institutional mechanisms for the integration of policies and agreements between the sectors involved [32].
- The National Environmental Policy of Colombia: Serves as the framework for the policy of integrated classification and sustainable development of the Colombian coastal areas, promoting integrated and strategic planning of their uses [36].
- The Environmental Action Plan of Nicaragua (PAA-NIC): PAA-NIC since 1993 provides the framework for the implementation of the integrated management of coastal areas (MAIZCO) [34,46].
- The Environmental Protection Record of Belize: Since 1993, constitutes the regulatory scheme for environmental impact studies that are part of the ICM programmes [47].
- The Programme of Coastal Management of Barbados: has as juridical mark the Coastal Area Management Record on which it is building the important experience of ICM in this country [42].

Coastal land use planning is often used in the WCR to guide new ICM policies and to expand programmes of ICM to more integrated plans, as in the case of the United States Virgin Islands [48]. In Colombia, the national policy for ICM uses a land use planning strategy to create environmental units of the coast. In Nicaragua, a holistic, participative and democratic perspective [36] guides the MAIZCO initiative [46].

As mentioned above, most of the ICM experiences in the WCR are from pilot projects and are not necessarily, specifically targeted to coastal areas only. The more successful or more advanced cases of ICM have gone through a learning process during implementation that allowed them to evolve towards a more integrated profile. Most areas under ICM in the WCR are protected areas, culturally important, under high risk, special landscapes or have a high scenic value [5,49].

Another trend is to use long-term sectorial planning to introduce changes, innovations and to reorient activities accordingly [5]. Some sectors are more compatible with ICM, for example tourism, vulnerability to natural hazards, fisheries and freshwater. With this practice the development of coastal and marine areas in many of the States and Territories of the WCR has been improved. For example, the 5-year national development plan for Sciences and Technologies of Colombia uses sectorial evaluations to formulate strategies and changes [11,43].

## 7. Developments and issues

*Development and globalisation* have increased access to goods and services in the WCR. This is very important to the tourism industry that has increased by 6.7% in 1996 and contributes to approximately 25% of the GDP in insular nations and territories (an expected 36% in 10 years)[47]. It now generates about 2.4 million jobs. Region wide, tourism is responsible for more than 34% of the GNP and more than 75% of hotels have more than 50 rooms[50]. This puts a lot of pressure on the coastal area, and not only in high peak seasons. Many areas will become overpopulated and conflicts with other land-use will increase. Many treatment systems will reach their limit or lose their efficiency. Fragile ecosystems and biodiversity will be more threatened. Coastal areas will become overpopulated in 10 years if the current trend continues (the population of the WCR in 2000 exceeds 70 million inhabitants) [47]. This has started to happen in smaller island states and governments are forced to restrict population movements towards the coastal areas and to present family planning policies.

*Insurance costs* in many States and Territories of the region has increased by 300–400% after events such as Hurricanes Gilbert in Jamaica in 1988 and Andrew in the Bahamas in 1992 [51]. The region is located in one of the seven areas of regular tropical storms, of which around 10 per yr on average transform into hurricanes (of these at least 3 reach the Islands and Territories of the WCR) [45]. Effects of storms and hurricanes, and of their changing pattern, will increase because of sea level rise associated to global climate change. These changes in vulnerability of SIDS in the WCR must be included in ICM. For this, oceanic and atmospheric data and information collection must be supported. It is also necessary to support the GOOS regional system and make its data available to the community so that it can be integrated in the social, cultural and economic aspects of the region.

*Domestic wastes* have been identified as the main source of pollution of the WCR's coastal waters. In 1993, only 10% of the waste generated in the region was treated [52]. The little coverage (2–16%) and poor condition of existing systems of water treatment combined with poor education on waste disposal have severe impacts on coastal waters. All the issues described above are inter-related and cannot be looked at independently in ICM.

The development of *port facilities* for tourism, international trade (including petrol transport) is often done in areas of high fragility and where the population's livelihood is dependent on the coastal and marine resources. MARPOL provided certain guarantees that these activities would be mitigated in a classification done with the support of the World Bank and the OMI [53]. Actual sea traffic and the expected increases (with a possible alternate canal between the Pacific and the Atlantic) have brought a higher risk of *oil spills* in the region. Port rehabilitation for cruise ships is another important source of change. The WCR has 50% of the cruise passenger of the world, generating around US\$3 billion/yr [47]. The dimension of port activities must be integrated into any ICM.

*Natural resources extraction* will increase because of population increase and development activities that could go over the yield limits or recovery rates. This

increase has already put many species in danger of extinction. In the Eastern Caribbean, fisheries are now managed with an ecosystem approach that could be used as a model for other natural resources.

## **8. Recommendations in integrated coastal management in the WCR**

Programmes of ICM should be initiated with small case studies that take into account the following fundamental aspects:

- the required resources (economic and human) and time,
- the training needs of local and more vulnerable groups,
- promote community participation to maintain common approaches and goals,
- use of standardised methods and techniques (including geographic information systems and remote sensing),
- opportunities of international cooperation,
- develop a shared perception and objectives among decision-makers and stakeholders.

The integration of all sectors and stakeholders must be facilitated to avoid ICM becoming a technocrat effort. The precautionary principle must also guide the exercise. Concessions and sharing of information and knowledge between the fisheries, tourism, ports administration, transport and conservation sectors are also to be facilitated. Sectorial guides on how to reach the integration for ICM can be prepared.

Specifically adapted ICM programmes for the WCR should highlight the links between climate changes, the stability of coasts and coastal ecosystems and the tourism industry (for example). The regional perspective must be based on regional scenarios but with a global signification.

Guidelines must be produced on how environmental impact studies can support ICM, and on what are their limits.

Although data and information analysis identify gaps and needs, it is important that studies indicate which data and information are better suited for ICM and how they must be organised, interpreted and disseminated.

An international strategy for ICM could be developed for activities such as fisheries, shared ecosystems and watersheds, etc. The regional legal framework already in place would facilitate this strategy.

## **Acknowledgements**

Ileana Espejel of Mexico, Jacobo Sánchez of Nicaragua, Carmen Lacambra of Colombia provided important contributions on the experience of their respective country. Carmen Artigas of ECLAC and Anders Alma of the World Bank were very helpful on regional issues. Alexandra Vanzella Khouri, Tim Kasten and

Luc St-Pierre, Programme Officers at the Secretariat of the Cartagena Convention kindly provided valuable references and edition.

## References

- [1] UNEP/CEPAL. Development, Environment in the Wider Caribbean Region: a synthesis. UNEP Regional Seas, Report and Studies No. 14, UNEP, 1982.
- [2] UNEP. Action Plan for the Caribbean Environment Programme, UNEP Regional Seas Reports and Studies, No. 26. UNEP, 1983.
- [3] United Nations. Earth Summit, Agenda 21: a Plan of Action for Sustainable Development.
- [4] UNEP. The Strategy for Development of the Caribbean Environment Programme, CEP Technical Report No.5, UNEP, Kingston, Jamaica, 1990. Also in UNEP-CAR/RCU, Draft Evaluation of the Caribbean Environment Programme 1992–1995, Document of the Eighth Intergovernmental Meeting on the Plan of Action for the Caribbean Environment Programme and Fifth Meeting of the Contracting Parties to the Convention for the Protection and Development of the Marine Environment of the Greater Caribbean Region. Kingston, December 9–13, 1996. UNEP(Water)/CAR IG.13/5, 1996.
- [5] UNEP-CAR/RCU. Integrated Coastal Planning and Management in the Wider Caribbean Region Pilot Projects of the Caribbean Environment Programme with support of the Swedish International Development Co-operation Agency.UNEP-SIDA, 1999.
- [6] Kasten T.J. Marine Pollution in the Wider Caribbean—Regional Co-operation-Local Action—article. Kingston, Jamaica: UNEP–Caribbean Regional Co-ordinating Unit.
- [7] United Nations. Report of the World Conference on the Sustainable Development of the Small Island Developing States, Bridgetown (Barbados), April 26 to May 1994, 6 A/CONF.167/9, United Nations New York, 1994.
- [8] United Nations.Convention for theProtection, the Development of the Marine Environment of the Wider Caribbean Region—Protocol Concerning Co-operation in Combatting Oil Spills in the Wider Caribbean Region—United Nations Environment Programme (UNEP). Publication: Nairobi, New York, NY, 1983.
- [9] UNEP-CAR/RCU. FinalAct, Conference of Plenipotentiaries Concerning Specially Protected Areas and Wildlife in the Wider Caribbean Region. Kingston, Jamaica, January 15–18, 1990, (UNEP(OCA)/CAR IG-5).
- [10] UNEP-CAR/RCU. FinalAct, Conference of Plenipotentiaries for the Adoption of the Annexes to the Protocol Concerning Specially Protected Areas and Wildlife in the Wider Caribbean Region. Kingston, Jamaica, June 10–11, 1991. UNEP(OCA)/CAR.IG.7/3, 1991.
- [11] UNEP. Guidelines for Integrated Planning, Management of Coastal and Marine Areas in the Wider Caribbean Region—Prepared in co-operation with Island Resources Foundation, Kingston, Jamaica, 1996.
- [12] UNEP-CAR/RCU. Final Act, Conference of Plenipotentiaries to Adopt The Protocol Concerning Pollution from Land-Based Sources and Activities to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region, Oranjestad, Aruba, September–October 6, 1999
- [13] Kasten TJ. GPA Regional agreements, now what do we do? A Caribbean perspective, paper. Kingston, Jamaica. UNEP–CAR/RCU.
- [14] UNEP-CAR/RCU. Land-Based Sources of Marine Pollution in the Wider Caribbean Region: A Protocol for Action. UNEP-CAR/RCU, Kingston Jamaica, 2000.
- [15] UNEP-CAR/RCU. Draft evaluation of the Caribbean environment programme: 1992–1995, Eighth Intergovernmental Meeting on the Plan of Action for the Environmental Program of the Caribbean and Fifth Meeting of the Contracting Parties of the Agreement for the Protection and the Development of the Marine Environment in the Wider Caribbean Region. Kingston, December 9–13,1996. UNEP(WATER)/CAR IG.123 WG/5, 1996.

- [16] Escobar RJ. Una Visión Regional del Desarrollo del Capítulo 17 del Programa 21 en América Latina y el Caribe: 1992–1998, documento de la Reunión Regional sobre el Año Internacional del Océano, Santiago de Chile, 30 de noviembre al 1 de diciembre 1998 — Comisión Económica Latina y el Caribe CEPAL, Doc CL/R.1881, 1999.
- [17] Lemay M. Strategy for coastal, marine resources management in Latin America and the Caribbean. Strategy Paper IDB, Environment Division Sustainable Development Department, Washington DC, December 1998, No. ENV-129.
- [18] Maul G, editor. Climatic change in the intra-Americas Sea, United Nations Environment Programme (Wider Caribbean Region) and Intergovernmental Oceanographic Commission (Caribbean and Adjacent Regions), 1993.
- [19] UNEP-CAR/RCU. Caribbean Environment Programme GEF-Projects Executed by CAR/RCU, 2000–2001, Biennium.
- [20] UNEP-CAR/RCU. Major Projects, Activities of CEP, 2000–2001, Biennium, not including GEF projects.
- [21] UNEP-CAR/RCU. UNEP's Caribbean Environment Programme, Coral Reef Conservation in the Wider Caribbean Region through Integrated Coastal Area Management, Marine Protected Areas and Partnerships with Tourism Sector, 1988.
- [22] UNEP-CAR/RCU. WIDECASST Sea Turtle Recovery Action Plan for Trinidad, Tobago. CEP Technical Report No. 39, 1996.
- [23] UNEP-CAR/RCU. Common Guidelines, Criteria for Protected Areas in the Wider Caribbean Region: Identification, Selection, Establishment and Management (English and Spanish only). CEP Technical Report No. 37, 1996.
- [24] UNEP-CAR/RCU. Second CEPPOL Seminar on Monitoring, Control of Sanitary Quality of Bathing and Shellfish-Growing Marine Waters in the Wider Caribbean, Kingston Jamaica, August 9–13 1993, CEP Technical Report No. 23, 1993.
- [25] UNEP-CAR/RCU. Guideline for Sediment Control Practices in the Insular Caribbean Developed in Co-operation with: island resources foundation, University of the Virgin Islands, Eastern Caribbean Centre, Virgin Islands Resource Management Co-operative (English only). CEP Technical Report No. 32, 1994.
- [26] UNEP-CAR/RCU. Regional overview of land-based sources of pollution in the Wider Caribbean Region. CEP Technical Report No. 33, 1994.
- [27] UNEP-CAR/RCU. Environmental impact assessment for the establishment of a Marina/Small Craft Harbour in Southwest Tobago (English only). CEP Technical Report No. 29, 1993.
- [28] UNEP-CAR/RCU. Environmental quality criteria for coastal zones in the Wider Caribbean Region (English only). CEP Technical Report No. 14, 1992.
- [29] UNEP-CAR/RCU. Appropriate Technology for Sewage Pollution Control in the Wider Caribbean Region. CEP Technical Report No. 40, 1998.
- [30] UNEP-CAR/RCU. Best management practices for agricultural non-point sources of pollution. CEP Technical Report No. 41, 1998.
- [31] Ministerio de Defensa Nacional de Colombia. Derecho No. 066902 de 1999.
- [32] Espejel I. et al. Programa de Acción Mundial para la Protección del Medio Marino frente a Actividades Realizadas en Tierra (PAM) y Convenios Ambientales del Programa de Naciones Unidas para el Medio Ambiente, PNUMA, Evaluación Nacional de México. UNAM/UNBC Mexico DF, 2000.
- [33] Espejel I. Contribución para el Informe Regional del Gran Caribe para Río + 10. UNAM México, Documento Ocasional, 2001.
- [34] Sánchez J. Evaluación Nacional—Fuentes de Contaminación y Actividades Humanas originadas en Tierra que afectan los ambientes marinos, costeros y dulceacuicolas de Nicaragua. Borrador, Informe al PAM-PNUMA, 2001.
- [35] Díaz JH. Manejo Integrado en la Cuenca y zonas Costeras del Canal de Panama, Conferencia Taller CDG, OMI, DIRECTEMAR sobre Manejo de Desechos y la Gestión Integradas de Zonas Costeras en América Latina, Viña del Mar, Chile, 29–25 de octubre 1999.
- [36] Ministerio de Medio Ambiente de Colombia. “Política de Ordenamiento Integrado y Desarrollo Sostenible de las Zonas Costeras Colombiana” (Grupo de Zonas Costeras y Humedales) Ministerio de Medio Ambiente, 2000.

- [37] GESAMP. (IMO/FAO/UNESCO-COI/WMO/WHO/IAEA/UN/UNEP Joint Group of Experts on the Scientific Aspects of Marine Environment Protection), 1996. *The Contributions of Science to Coastal Zone Management*, Rep. Stud. GESAMP (61).
- [38] Clark JR. *Integrated Management of Coastal Zone*, CAM Fisheries Technical Paper, No. 327, Rome CAM, 1992.
- [39] UNEP. *Guidelines for Integrated Management of Coastal, Marine Areas with Special Reference to the Mediterranean Basin*, UNEP Regional Seas Report and Studies No. 160 Croatia, CEP/RAC (MASP-UNEP), 1995.
- [40] World Bank. *Guidelines for Integrated Coastal Zone Management, Environmentally Sustainable Development Studies and Monographs No. 9*, Washington, DFC, 1996.
- [41] Scialabba N, editor. *Integrated coastal area management and agriculture, forestry and fisheries CAM guidelines*, Environment Natural and Resources Service, CAM, Rome, 1998.
- [42] Westmacott S, Jones V, editors. *Management Arrangements for the Development and Implementation of Coastal Zone Management Programmes—International Conference of Coastal Zone Management—World Coast Conference 1993*, The Netherlands, November 1–5, 1993.
- [43] Artigas C, Escobar J. *Perfil de la Cooperación para la Investigación Científica Marina en América Latina y el Caribe*. Comisión Económica de la Naciones Unidas para América Latina y el Caribe, CEPAL; Serie Recursos Naturales e Infraestructura. Santiago de Chile, 2001.
- [44] UNESCO/COI. *IOC Workshop on Small Island Oceanography in Relation to Sustainable Economic Development of Small Island Developing States*, Fort de France, Martinique, November 8–13, 1993 IOC Workshop Report No., 97, 1993.
- [45] Escobar RJ. *Fenómenos Climáticos y Vulnerabilidad: La Educación Determinante de los Desastres—El Caso de los Pequeños Estados Insulares en Desarrollo*. Comisión Económica para América Latina y el Caribe (CEPAL), Doc. LC/R.1935, 1999.
- [46] Sánchez J. *Contribución al Informe Regional Rio + 10 de la Región del Gran Caribe*. Nicaragua, Documento Occasional, 2000.
- [47] UNEP. *Assessment of Land-based Sources, Activities Affecting the Marine, Coastal and Associated Freshwater Environment in the Wider Caribbean Region*. UNEP Regional Seas Reports and Studies No. 172. The Hague, 1999. UNEP/GPA/WGCAR.INF/3.
- [48] Cincin-Fat B, Knecht RW. *Integrated coastal and ocean management: concept and practices*. IOC/UNESCO and University of Delaware Graduate College of Marine Studies. Washington, USDA. Island Press, 1998.
- [49] Lacambra C, et al. *Contribución al Informe Regional del Gran Caribe Rio + 10*, Instituto de Investigaciones Marinas de Colombia INVEMAR. Documento Ocasional, 2001.
- [50] Miller ML, Auyong J. *Coastal zone tourism: a potent force affecting environment and society*. *Marine Policy* 1991;15:75–90.
- [51] Obasi GOP. *Natural disasters, sustainable development on small developing islands*, Case Study 3, Global Conference on the Sustainable Development on Small Developing Islands OMM, A/CONFIG 167/CPR4, 14 April, 1994.
- [52] UNEP. *An overview of land based sources of Marine Pollution*, AMEP paper (Assessment and Management of Environmental Pollution). UNEP-CAR/RCU.
- [53] International Maritime Organization. *Summary Report—Wider Caribbean Initiative for Ship-Generated Waste (WCISW) Trinidad and Tobago*, WI, 1997.