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## **Integrated Coastal Zone Management in small islands: A comparative outline of some islands of the Lesser Antilles \***

### ***Gestão integrada da zona costeira em pequenas ilhas: uma abordagem comparativa de algumas ilhas das Pequenas Antilhas***

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#### **ABSTRACT**

Small islands are ipso facto largely coastal entities. Therefore, ICZM is important in the Lesser Antilles which border the Eastern Caribbean Sea – i.e. from Virgin Islands to Grenada – and includes French territories (Guadeloupe, Martinique, St. Barthelemy and St. Martin), independent States and self-governing territories.

The Lesser Antilles, as we define them above, are very similar: located in the same geographical area they have common handicaps (small size, remoteness from mainland, insularity, small but concentrated population, narrow markets, economic dependence on a few products or services for export or import); they are very vulnerable to natural phenomena (hurricanes, earthquakes, erosion, tsunamis, volcanoes, global warming, rising sea levels, etc.); and they must protect their coastline and coastal waters because they are an important natural capital for them, which attracts tourist incomes strongly contributing (for some of them) to the economy. Because of these characteristics, the islands have mostly adhered to common international principles. This is particularly the Cartagena Convention (1983) prepared under the auspices of the United Nations Environment Programme, and its protocols (OSP 1983, SPAW 1990 and LBS 1999), Earth Summit (Rio 1992) and Chapter 17 of the “Agenda 21”, the Global Conference on the Sustainable Development of Small Island Developing States (Barbados 1994), the World Summit on Sustainable Development (Johannesburg 2002).

Yet, despite these similarities, the Lesser Antilles islands differ in the implementation of integrated coastal zone management. These differences are illustrated in the article with examples from Guadeloupe (Desirade and Marie-Galante islands), Martinique (Le Robert bay), St. Lucia (Soufriere Parish) and others islands taking part in Coast and Beach

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Stability in the Caribbean Islands Program, and Caribbean Coastal Marine Productivity Program (CARICOMP).

We advocate that the divergences of ICZM in the Lesser Antilles can be mostly explained by the way in which the economic valuation of coastal zones is considered (or is not considered) in each island.

Thus, in the case of the French islands, the value of coastal zones is in general not economically estimated, because the goods and services they provide are regarded by nature as non-market, belong to no one in their own and are to the free disposal of all. As a result, these goods and services are little managed or managed by defect by a mosaic of public authorities. Hence, the ICZM is concentrated on coordinating public programs and services. In Guadeloupe and Martinique, ICZM reflects this approach.

In the case of independent islands and self-governing territories in the Lesser Antilles, where the natural capital concretely plays an important role in the economy through tourism revenue, the economic valuation of goods and services "output" of the coastal zone is more developed. By measuring external economies and diseconomies, ICZM can become more operational as well in management itself as in the assessment of stakeholders interests and political prioritization in terms of town and country planning. So that it is less a question of coordinating policies and means, than having human and material means sufficient for the control of the policies.

We conclude that the absence of a protection policy based on the economic valuation of coastal areas hinders, in the French Lesser Antilles, the awareness of the degradation of coastal and marine environment.

**Keywords:** Caribbean Sea; Economic Valuation; Guadeloupe; Integrated Coastal Zone Management ; Martinique; Natural Capital; Outermost Regions of European Union; Positive and Negative Externalities; Small Island Developing States.

## RESUMO

*As pequenas ilhas são, por definição, entidades essencialmente costeiras. Neste contexto, a Gestão Integrada das Zonas Costeiras (GIZC) assume um papel importante para as Pequenas Antilhas situadas a leste do mar do Caribe (das Ilhas Virgens, a Norte, até Grenada, a Sul) incluindo os territórios franceses (Guadalupa, Martinica, Saint-Barthélemy e Saint-Martin), as ilhas independentes e os territórios autónomos.*

*Estas pequenas ilhas das Antilhas são muito similares: localizam-se na mesma área geográfica apresentando desvantagens também comuns (pequena superfície, afastamento, insularidade, população pouco numerosa mas concentrada, mercado económico limitado, dependência económica de um pequeno número de produtos ou serviços para exportação); apresentam ainda vulnerabilidade aos fenómenos naturais (furacões, terramotos, erosão, tsunamis, vulcões, aquecimento global, etc.), e a necessidade de proteger o litoral e as águas costeiras uma vez que estes constituem um capital natural atractivo, que permitem captar rendimentos do turismo que contribuem significativamente para a sua economia. Face a tais características, estes territórios insulares têm vindo a aderir a princípios comuns internacionais, em particular os da Convenção de Cartagena (1983) e seus protocolos, da Cimeira da Terra e do Capítulo 17 da "Agenda 21" (1992), do Programa de Acção Barbados para o Desenvolvimento Sustentável dos Pequenos Estados Insulares (1994), e da Cimeira Mundial do Desenvolvimento Sustentável (Joanesburgo 2002).*

*No entanto, apesar das semelhanças, as Pequenas Antilhas divergem na aplicação dos princípios da GIZC. Estas divergências são ilustradas no presente artigo a partir de exemplos de Guadalupa (ilha de Desirade e ilha de Marie-Galante), Martinica (município litoral do Robert), Santa Lúcia (freguesia da Soufriere) e diversas ilhas anglófonas que participam nos programas Coast and Beach Stability in the Caribbean Islands Program, e no Caribbean Coastal Marine Productivity Program.*

*No presente artigo, demonstra-se que as divergências da aplicação dos princípios da GIZC nas Pequenas Antilhas pode ser explicado, fundamentalmente, pelo modo como a avaliação económica das zonas costeiras é considerada (ou não é considerada), em cada ilha.*

*Assim, no caso das ilhas francesas, o valor das zonas costeiras, em geral, não é economicamente tido em consideração, uma vez que os bens e serviços que oferecem são considerados, por natureza, como não pertencendo a ninguém e, por isso, disponíveis gratuitamente para todos. Como resultado, as zonas costeiras encontram-se literalmente sem valor comercial explícito e são pouco geridas, ou então administradas por defeito por um mosaico de poderes públicos. O exemplo de Guadalupa e Martinica demonstram o modo como a GIZC se focaliza na coordenação de programas e serviços públicos.*

*Nas ilhas independentes e territórios autónomos das Pequenas Antilhas, o capital natural desempenha um importante contributo para a economia que resulta das receitas provenientes do turismo. A valoração económica dos bens e serviços gerados pelas zonas costeiras é muito mais desenvolvida.*

*Através da medição das economias e "deseconomias" externas, a GIZC poderá tornar-se mais operativa quer na sua própria gestão, quer igualmente na avaliação dos interesses locais e na classificação das prioridades políticas, em termos de ordenamento do território. Desta circunstância observa-se tratar-se de uma questão de dispor dos meios humanos e materiais suficientes para a condução das políticas, mais do que de coordenar políticas e meios.*

*Conclui-se do estudo efectuado nas ilhas francesas das Pequenas Antilhas que a ausência de uma política de protecção apoiada no valor*

*económico estimado da zona costeira, poderá ser responsável pelo atraso na tomada de consciência e na degradação dos ambientes litorais e marinhas dos territórios insulares, de pequena dimensão.*

**Palavras-chave :** *Mar do Caribe; Guadalupe; Gestão Integrada da Zona Costeira; Pequenas Antilhas; Capital Natural; Martinica; Regiões Ultraperiféricas da União Europeia.*

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## 1. INTRODUCTION

Initiated in the late 1970s, the policies of integrated coastal zone management (ICZM) aim at a rational management of coastal areas but also taking into account all factors that influence and/or interact with the marine environment. Clearly, this is a holistic policy based on linkage between land and sea.

This new policy had to be plural, because the factors at the origin of the destruction of coastal resources and their depletion are also numerous : geometrical growth of the population, “littoralization” of men and their activities, misunderstanding of the role that economics should play in managing coastal resources. In other words: coastal, marine and land environments are not managed sustainably.

An integrated coastal management policy should therefore allow: to preserve natural habitats, to control the pollution and shoreline degradation, to manage with sustainability the activities carried on watersheds, rehabilitate degraded areas, finally to develop tools to rationalize resources management.

At these targets, it is important to add another that seems fundamental: not oppose economics and environmental sustainability, both being combined perfectly to create jobs. This is the very meaning of the concept of sustainable development.

For various reasons, the approach of ICZM is therefore important for those environments that are micro-islands of the Lesser Antilles. In this article we will limit the Lesser Antilles to the islands of the Eastern Caribbean which form an arc from the Virgin Islands in the north to Grenada in the south and include the French territories (Guadeloupe, Martinique, St. Barthelemy and St. Martin), the independent islands (Antigua and Barbuda, Barbados, Dominica, St. Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Grenada) and self-governing territories (U.S. Virgin Islands; British Overseas Territories : Anguilla, British Virgin Islands,

Montserrat; the Netherlands Antilles : Sint-Maarten, Saba, Sint-Eustatius).

A presentation will be carried out starting from the example of the French departments of America (Guadeloupe and Martinique) and of that independent islands and self-governing territories Islands of the Lesser Antilles (mainly Saint Lucia, etc.).

This article aims to address the integrated coastal zone management (ICZM) in the Lesser Antilles as follows.

First we recall the common features of ICZM (2.) noting that on this matter the independent and non-independent islands share closely related problems especially in terms of vulnerability and sustainable development (2.1.), which led them to adhere to common international principles (2.2.).

In a second step, we will however note starting from some illustrations that ICZM is implemented in very different ways (3.) in the French islands (3.1.) and in the independent islands (3.2.).

In a third step, we will wonder about some French and European features that affect the management of coastal areas in Guadeloupe and Martinique (4.1.). Then we will do the same about the characteristics of ICZM in the independent islands and self-governing territories Islands of the Lesser Antilles suggesting that economic valuation of coastal areas is one of the essential characteristics distinguishing the implementation of ICZM in the Lesser Antilles (4.2.).

Concerning the integrated coastal zone management we will conclude (5.) that the strong similarities between all the islands of the Lesser Antilles disappear because of adhesion with different economic philosophies. These philosophies separate them and it will be a long way before the French islands of the Lesser Antilles become aware of the degradation of coastal and marine and adopt a policy of protection based on economic valuation of coastal areas.

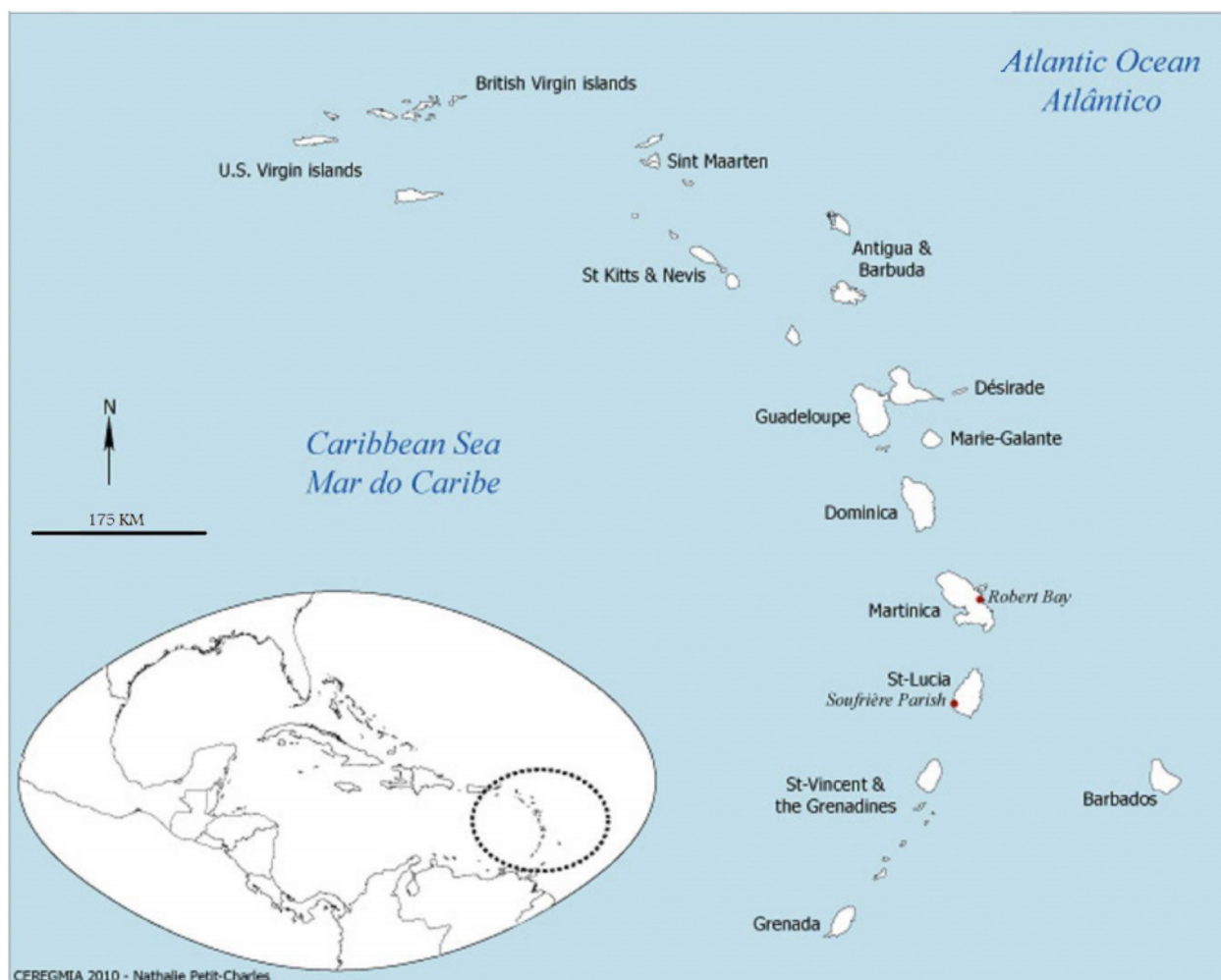


Figure 1: Chart of the Lesser Antilles.  
 Figura 1: Mapa das Pequenas Antilhas.

## 2. SOME COMMON FEATURES OF THE COASTAL ZONE MANAGEMENT IN THE LESSER ANTILLES

### 2.1 The Lesser Antilles islands share similar problems

#### 2.1.1 Fragile and vulnerable economies

Insularity and remoteness are recognized since 1972 as characteristics of the Lesser Antilles. But as structural handicaps, these characteristics appear only in 1991. It should however be noted that the economic disadvantages associated with the size of small states or their remoteness from markets are not absolute

and may even seem politically built concepts. In any case, the link between economic development and size – especially between a weak development and a small size – remains under debate (Srinivasan, 1986; Armstrong *et al.*, 1998; Easterly & Kraay, 2000; Logossah, 2007).

Anyway the Lesser Antilles share a sense of vulnerability defined as the relative inability of these territories to shelter themselves from forces outside their control (Briguglio, 1995).

With caution on economic level, the criterion of vulnerability was established around some items allowing a common qualification of these territories.

The small size (territory and/or number of inhabitants) is the first component of vulnerability that characterizes the small island economies. It is frequently associated with a weakness in natural resources, a dependency in terms of imports and exports (monocultures, a few industrial products, tourism) or the difficulty to benefit from economies of scale. The small size also limits the resources available locally, especially to elaborate and implement coastal management zones policies (Mahon & McConney, 2004).

Insularity and remoteness are the second component: these elements increase the price of the imported or exported products and hazards in deliveries. They also impose additional costs of storage and insurance.

A third characteristic is susceptibility to natural disasters and their high impact on small territories: hurricanes, rain, mudslides, earthquakes, tsunamis, cyclonic waves, global warming and rising sea levels, etc. Furthermore the area is subject to volcanic threats because of around twenty active volcanos, that induce a special vulnerability and give the size of each territory - as with most natural disasters - a very particular importance for protection against the volcanos and, if necessary, the reception of the moved populations (Lesales, 2007).

Although the compound indexes of vulnerability built from the early 1990s (Briguglio, 1995) are questionable in economic terms (Logossah, 2007), “they make it possible nevertheless to synthesize the handicaps” (Logossah, 2007).

The European Union has also used these factors (remoteness, insularity, small size, relief and climate difficult, economic dependence with respect to a few number of products) to characterize its “outermost regions” now number nine - among the 271 in the Union – since the entry into force of the Treaty of Lisbon (1 December 2009): Guadeloupe, French Guiana, Martinique, Reunion, St. Barthelemy, St. Martin (France), Azores, Madeira (Portugal) and Canary Islands (Spain).

Moreover small size increase environmental impact of urbanization (concentration of manpower or tourists, sanitation, waste, urbanization of the sea fronts and erosion of the beaches, etc.) or agriculture (soil erosion, fertilizers, pesticides, etc.).

In these circumstances – and in spite of the economic growth of the last two centuries based on cheap natural resources – the preservation of the natural capital of these islands to an high level is expected to help increase resilience (Gibbs, 2009), itself threatened by human activities “doped” by technology (Pritchard *et al.*, 2000).

### **2.1.2 A strong interaction between humans and the marine environment.**

The coastal environment can be easily undermined by man as mentioned in Chapter 17 of “Agenda 21” (§17.18; §17.19).

The small islands are ipso facto largely coastal entities (United Nations, 1994), so they are heavily dependent on the marine environment. Still under Chapter 17 of Agenda 21: “Small island developing States have all the environmental problems and challenges of the coastal zone concentrated in a limited land area. They are considered extremely vulnerable to global warming and sea level rise, with certain small low-lying islands facing the increasing threat of the loss of their entire national territories. Most tropical islands are also now experiencing the more immediate impacts of increasing frequency of cyclones, storms and hurricanes associated with climate change. These are causing major set-backs to their socio-economic development.”(Agenda 21, Chapter 17, § 125).

The Barbados Conference of 1994 summarizes these common issues, especially concerning land-based sources of pollution and the problem of solid and liquid wastes generated by urbanization (Declaration of Barbados, Part One, § III.)

These factors determine a special vulnerability of their environment.

Finally, the dependence with regard to the coastal environment is remanent even though it has evolved. Thus, fishing activities may be relatively important in terms of incomes and occupation of the active population, but tourism, most of the time, supplanted these traditional activities in terms of jobs and economic benefits (public and private) (Dehoorne & Saffache, 2008; Burke *et al.*, 2008). However, the quality of coastal areas (beaches, bathing waters, habitats protected, etc.) is a key factor in attracting tourists (Schleupner, 2008).

In turn, tourism, by the development of the urbanization and the infrastructures (tourist waterfront residences, highway network, etc.) and by the increase in attendance of coastal waters, etc. changes the features of the anthropic pressure and increase the threat on the coastal areas. Thus, in Martinique for example, most coastal structures are built between 5 and 10 meters above sea level – number of resorts are even built well below those 5 meters i.e. in zones prone to flooding or erosion (Schleupner, 2008; Saffache, 2008).

## 2.2 To address these problems, the islands of the Lesser Antilles adhere to common international principles

The United Nations Environment Programme (UNEP) – adopted in 1972 – initiated since 1981 the Caribbean Environment Programme (CEP). The CEP is at the origin of the movement of regional co-operation that was deployed on the marine environment issues in the Wider Caribbean in order to jointly tackle the problems of this regional sea (Colmenares & Escobar, 2002; Singh & Mee, 2008).

This movement came to support the existing provisions, in particular the Treaty of Chaguaramas establishing the Caribbean Community (CARICOM) in 1973. Because the management of coastal areas often exceeds political borders, cooperation has become a necessity and not less than 36 international organizations today support initiatives to coastal management in Latin America and in the Caribbean (Rivera-Arriaga, 2005). However, the Caribbean Environment Programme (CEP), acting under the mandate of the Cartagena Convention is the only – and the oldest – organization dedicated to supporting ICZM in the Caribbean. Other international organizations or States – World Bank, Inter-American Development Bank, Organization of American States, Intergovernmental Oceanographic Commission of UNESCO, United States Agency for International Development (USAID), etc. – also support ICZM but in a more general framework of environment and development.

## *Cartagena Convention of 1983 (United Nations, 1983a)*

This Convention covers the Wider Caribbean (Gulf of Mexico, Caribbean Sea and adjacent areas in the Atlantic) with a comprehensive approach concerning the threats of pollution (ships, dumping, land based, offshore drilling) and appropriate responses (definition of special areas for ecosystem protection, cooperation in case of emergency, assessment of the impact on the environment, scientific and technical assistance).

This Convention is specified by three specialized protocols:

- a) The Oil Spills Protocol (United Nations, 1983b), signed in 1983 and ratified by all the Lesser Antilles, advocates an integrated protection which covers and protects the marine environment for itself and the activities closely linked (maritime, coastal, harbour, or estuarine activities; historical and tourist interests, including water sports and recreation; health of coastal populations; fisheries and conservation of natural resources) against “oil spill incidents which have resulted in, or which pose a significant threat of, pollution to the marine and coastal environment” (Oil Spills Protocol, art. 2). The States undertake to prevent and combat oil spills, and to promote technical cooperation among them (preventive or operational after a disaster).
- b) The SPAW Protocol of 1990 (United Nations, 1990) aims to protect ecosystems, habitats of rare and fragile and endangered species. It entered into force in 2000 but was not ratified by St. Kitts and Nevis, Dominica, Grenada and the United Kingdom (for British overseas territories : Anguilla, British Virgin islands, Monserrat and Turks and Caicos islands).

The SPAW Protocol is a kind of prototype for integrated coastal management zones. Three levels of integration are indeed envisaged. The integration of the objectives: to protect spaces and the species in danger, while recognizing “the productivity of ecosystems and natural resources that provide economic or social benefits and upon which the welfare of local inhabitants is dependent” (SPAW Protocol, art.4 c). The integration of the

levels and a participative management: for the SPAW Protocol, the interdependence of the ecosystems in the Wider Caribbean requires a regional agreement (even if the implementation remains the responsibility of each territory concerned (Art.3). Lastly, the integration of the means is sought through the creation of protected areas in which each State will focus a set of measures of different kinds (discharges, urban planning, mining, human frequentation, occupational or recreational, etc.) within special provisions for planning, management and scientific monitoring (Art. 5 and 6).

- c) The Land-Based Sources Protocol (LBS Protocol) signed in 1999 (United Nations, 1999b) is the third protocol. It aims to reduce marine pollution from land, in particular by the implementation of “most appropriate technology and management approaches such as integrated coastal area management” (Art.3 §2) and the definition of types of pollution, of pollutant types and levels of pollution. Although not yet in force because of a insufficient number of ratifications – only 6 States out of the 29 signatories of the Cartagena Convention ratified this Protocol: Belize, France (for the French departments of America), Panama, St. Lucia, Trinidad-and-Tobago and the United States – this protocol is interesting.

It attempts to concretely define specific requirements and procedures for government action in the region. It defines such pollutant sources and activities taking into account the specific context of the Wider Caribbean: domestic sewage, agricultural non-point sources, chemical industries, extractive industries and mining, food processing operations, manufacture of liquor and soft drinks, oil refineries, pulp and paper factories, sugar factories and distilleries, intensive animal rearing operations.

On the other hand, the LBS Protocol was signed after the 1992 Rio Conference, the Barbados Programme of Action for the Sustainable Development of Small Island Developing States Action (1994) and the Global Programme of Action of Washington (1995). So it integrates in the Cartagena Convention the aspects mentioned hereafter.

***The United Nations Conference on Environment and Development (UNCED), also called Rio Conference or Earth Summit, held in Rio de Janeiro in 1992.***

The Earth Summit adopted a Programme related to sustainable development (Agenda 21) declined in several chapters, including one in particular (Chapter 17) deals with both “Protection of the oceans, all kinds of seas, including enclosed and semi-enclosed seas, and coastal areas and the protection, rational use and development of their living resources” and the “Sustainable development of small islands”.

One finds there idea of integration of

- objectives – and naturally of the three pillars of sustainable development which are environmental protection, economics and society –,
- policies and decision-making processes,
- land and marine areas considered interdependent,
- but also time itself (preserving the future; taking account of the past), etc.

Thus, given the degradation of the marine environment, States must have an anticipatory approach partly based on the integrated management of coastal areas (§ 17.21) and adopt standards for the protection of the marine environment against land-based pollution or activities at sea.

Furthermore, provisions for the sustainable development of small island countries are envisaged because they are deemed ecologically fragile and vulnerable, economically handicapped because of their small size, limited resources, geographic dispersion and remoteness of markets. According to Agenda 21, these States must implement programs that facilitate sustainable development and utilization of their marine and coastal resources “maintaining biodiversity and improving the quality of life for island people” (§17.128a). In practice, these include “adapt coastal area management techniques, such as planning, sitting and environmental impact assessments, using Geographical Information Systems (GIS), suitable to the special characteristics of small islands, taking into account the traditional and cultural values of indigenous people of island countries” (§17.129d).

***Global Conference on the Sustainable Development of Small Island Developing States held in Barbados in 1994*** (United Nations, 1994).

The Barbados Programme of Action for the Sustainable Development of Small Island Developing States has been adopted by 111 Governments at the Global Conference of Barbados in 1994. By placing special emphasis on technical assistance, it specifies Agenda 21 concerning the Small Island Developing States and is itself an integrated framework for sustainable development small island states (United Nations, 1999a). Part of the Barbados Programme is dedicated to the management of coastal areas that must take place within coastal watersheds and help collect data on ecosystems, in particular as regards traditional knowledge and practices of management.

***Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities adopted in Washington in 1995*** (United Nations, 1995).

Adopted by 108 governments – and the European Union – in November 1995 on the initiative of UNEP, the GPA (Global Programme of Action – GPA) considers that the marine environment is threatened by the human activities at sea or from land. But, contrary to an international agreement, the GPA does not legally bind the States. Furthermore, it is not expressly designed for the islands.

Nevertheless the GPA is a continuation of the guidelines of the Cartagena Convention (1983) and prefigures LBS Protocol (1999). In terms of method, the GPA recommends that States following the Rio Conference prevent degradation of the marine environment – including by precautionary approach –, assess the impact of potentially harmful activities to the environment, integrate environmental protection into the other public policies – including economic development, town and country planning, etc. – and promote the internalization of environmental costs - in particular the “polluter pays” principle.

***World Summit on Sustainable Development held in Johannesburg in 2002*** (United Nations, 2002).

The application of GPA to small islands has been

the subject of special attention at the Summit of Johannesburg. Hence the Plan of Implementation of the World Summit on Sustainable Development includes a Chapter VII on Small Island Developing States. This Plan focuses on the accelerated implementation of the Barbados Plan (international financial support, cooperation and technology transfer), the action on the conservation of marine resources and the control and reduction of land-based pollution in accordance with the GPA.

***Caribbean Memorandum of Understanding on Port State Control*** (Caribbean MoU, 1996).

Finally the principle of control of ships by the port state is adopted in the Caribbean. Thirteen Caribbean States have thus agreed to check the application of international standards for ship safety when ships are at call. The goal is to improve the safety in the Caribbean by banning sub-standard ships, without creating new rules but applying those which exist at the global level of the International Maritime Organization.

In summary, the Lesser Antilles islands are sharing common issues of Small Island Developing States and the Caribbean Sea. Hence they adhered, directly or by their metropolitan States, to international agreements aimed at sustainable development, including ICZM. However, the implementation of ICZM leads to very different practices. One will illustrate hereafter these practices with some examples drawn from islands under French sovereignty and independent English-speaking islands.

### **3. THE IMPLEMENTATION OF THE ICZM IN THE LESSER ANTILLES HOWEVER REMAINS CONTRASTED: EXAMPLES**

#### **3.1. Three examples of ICZM in Guadeloupe and Martinique (French West Indies)**

##### **3.1.1 *The cases of Desirade and Marie-Galante (Guadeloupe)***

Covering an area of 22 km<sup>2</sup> (11 km long by 2 km wide) with a population of 1591 inhabitants (2006), the island of Desirade is located about ten kilometres east of the Grande Terre of the Guadeloupe. Only its southern coast is inhabited. The northern portion of the island is uninhabited and consists of sharp



cliffs that provide shelter to a large marine avifauna. Although this island is wild and lonely, it has a natural site of a great richness categorized as “remarkable area” and as such protected by French legislation for town planning.

Because of its double insularity, its history (“*Île des Reclus*”), the shallow depth and low fertility of its soil, its limited water resources and more generally the weakness of the economic activities (fishing – the island count today 122 professional fishermen –; breeding goats and fruit production), the island of Desirade joined with Marie-Galante to answer a national call for applications for local projects

Three objectives were pursued:

- the preservation of natural areas (terrestrial and marine);
- the valorisation of the knowledge and know-how;
- the reversal of migration flows – the total population having passed from 1621 to 1591 inhabitants between the two general censuses of 1999 and 2007.

More precisely, the island of Desirade wanted part of a true dynamic tourism by promoting its natural assets, because it is one of the oldest island entities in the Lesser Antilles (creation of a “cactuseum”, visit of the old buildings of the French Meteorological Office, a lighthouse, etc.).

Located forty miles south of the Guadeloupe, Marie-Galante is a limestone island of 158 km<sup>2</sup>, which counted 12,459 inhabitants in 1999 and 11,939 in 2007, spread over three municipalities (Saint-Louis, Capesterre, and Grand-Bourg). Its economy remains fragile, because focused on the monoculture of sugarcane and processing sugar (1 factory) and rum (3 distilleries); fishing activity employs currently 106 fishermen.

To revitalize its activities, three objectives were pursued:

- balancing the exodus of the population towards the “mainland” (the total population dropped by 4% between 1999 and 2007);
- mitigating the effects of double insularity;
- finally, revitalizing the territory with a true policy of sustainable development.

Two major projects were identified: creating a nature reserve, in order to assert the ecological and cultural heritage of the island, and building a “House of Nature”, for educational purposes and tourism.

Given the tourism and leisure weakened, the construction of a “House of Nature” was expected to make it possible to create some jobs, but also boost this new sector.

These projects were part of a true logic of sustainable development with a mixed nature protection and economic development targeted on coastal areas.

To sum up, in Desirade and Marie-Galante, ICZM is entirely public managed to stem demographic and economic problems of these micro-islands, and attract tourists from Guadeloupe.

### ***3.1.2 The case of the Municipality of Le Robert (Martinique)***

The Municipality of Le Robert is located on the east coast of Martinique. With 24,068 inhabitants (2007) for an area of 47 km<sup>2</sup>, it has high population growth rate (+13.6% between 1999 and 2007) mainly due to net immigration. It is indeed very attractive by its relative proximity to the capital of the island – Fort de France, which lies about 15 km – while being on a deep bay and favourable to water sports and beach but that also serves as a receptacle to watersheds.

The demographic dynamism of the Le Robert was accompanied by an occupation of the hinterland, where resides from now on more than 85% of the population of the municipality. This urbanization coupled with strong agriculture (bananas, sugar cane) has led to degradation of coastal water.

Since 2003 the Municipality has initiated a new way to manage the marine environment with a program of environmental data collection, developing a master plan for the coastline, a study of frequentation of the islets of bay and the construction of a wastewater treatment plant. Lastly the administration of maritime affairs and the professional fishermen (91 today) engaged in a project of restoration of Robert Bay ecosystem with the creation of a marine protected area.

The initiative of the Municipality of Le Robert illustrates the difficulties of implementing the concept

of integrated coastal zone management in the French Lesser Antilles.

While the general objectives are shared by many, the contradictions remain strong on the short and medium term (economic development, town and country planning, agriculture, employment, water quality, public health, climate change, etc.).

Some of these contradictions are based on the defence of sectors (agriculture, construction and public works, tourism accommodation, etc.) - themselves supported by administrative services which remain fragmented even opposite. The bay of Le Robert also illustrates the “mosaic” of the public authorities in coastal area (Angelelli & Saffache, 2010) which also doubles an administrative “layer cake”: in a centralized State like France the decisions which have a local impact are not made all locally. In other words, the principle of subsidiarity – which means essentially that public decisions are developed and implemented as close as possible to their recipients (territories and populations) – does not integrate the different levels (Europe, French Government, “Région”, “Département”, Municipality) or different sectors (public / private, but also agriculture, fisheries, urban planning, sanitation, public health, public works, etc.). Moreover, integration in time suffers from the difficulty for individuals or public authorities – “social decision maker” – to project themselves in the long run.

In spite of the Cartagena Convention and other international provisions, the territories are far from being integrated. The French way of integrated coastal zone management remains based on the coordination of services and the different geographical, political or administrative areas remain themselves largely partitioned.

Lastly, the integration of the human, financial and material means is far from being achieved. The initiative of the Municipality of Le Robert is an illustration of the difficulty in managing not only the goals, the sectors, the territories but also the means. For example, the municipality functions with a multi-field team that does not have specialist of coastal environment able to integrate other disciplines. Other example, the municipality raises a coastal “brigade”; because not being closely supported by scientists, the brigade could take non-relevant measures (Angeon

& Saffache, 2008) in contradiction with the principles of Agenda 21 which prescribe that the decision-making process – and of action on the ground – must be based on a good scientific knowledge of the environment.

It remains in practice far from an ICZM as usually defined.

After all, two situations coexist in the French Lesser Antilles:

- on one hand, ICZM programs have been launched but have not yet been implemented, as in Guadeloupe (Desirade; Marie-Galante) ; moreover, in that case, ICZM aims to launch economic activities based on natural sites and landscapes that already are naturally protected by remoteness and economic and demographic collapse ;
- on the other hand (Le Robert, Martinique), the program has been developed and employed, in a quite different context (degradation of coastal water due to urbanization and strong agriculture) but results will not be reached because they do not exactly correspond to the theoretical requirements of ICZM. Just as marine protected areas, we are once again in a rationale of announcement or almost advertising.

However, the situations of Guadeloupe and Martinique are both characterized by public initiative and management. The ICZM decisions are public and the system is based upon subsidies, prohibition and taxes. Citizens or private stakeholders do not decide, manage or directly finance the system.

### 3.2 ICZM and the independent islands of the Lesser Antilles

#### 3.2.1 A case of ICZM at St. Lucia: the Soufriere Marine Management Area

Located at the south-west of the island of St Lucia, the Parish of Soufriere has 7665 souls and 154 registered fishermen (Pierre-Nathonié, 2003). They practice a craft inshore fishing, which reflects the nature of their boats (wooden deckless crafts less than 8 meters long). Their low incomes (less than 300 Eastern Caribbean Dollar (ECD)/ month for many

of them, i.e, around 90 Euros) and the fragility of their activities are intensified by many conflicts: with owners of yachts (of which wastewater accentuate the degradation of marine environment), divers (the latter being accused of deliberately damage the traps and nets), hoteliers (accused of prohibiting their sites to fishermen and polluting the marine environment), and more generally with the official authorities which seem not very sensitive to their claims.

In July 1992, in order to support the activities of fishermen and to stem tensions, the Government identified five areas with different purposes over the 11 km coastline of the Parish of Soufriere (from the Anse Jambon in the north to Caraibe Point south):

- Marine reserves to protect natural resources;
- Fishing priority areas to maintain the traditional activity of the Parish;
- Multiple use areas to enable and facilitate the meeting between the various users;
- Recreational areas open to all recreational activities and bathing;
- Lastly, yacht mooring sites dedicated exclusively to anchorage of pleasure boats.

The objective of this zoning was not to exclude any user, preserving the ecosystem characteristics of the site. A Technical Advisory Committee was established to monitor the site, assess the progress (economic and ecological) made, discuss problems and plans and budgets needed to solve them, and finally facilitate environmental awareness. This committee was open to a large number of local authorities: Department of Fisheries, Soufriere Regional Development Foundation, St. Lucia Air and Sea Ports Authority, Soufriere fishermen's cooperative, Ministry of Planning, Ministry of Tourism, Parks and Beaches Committee, St. Lucia tourist board, etc.

If the establishment of these five areas gave a protective image in the whole area, it did not prevent degradation of the environment (Sandersen & Koester, 2000). Indeed, administrative, technical and political problems appeared: limited resources of the rangers charged to control the area, stopping the Jalousie Hilton Hotel and the fish processing plant – both consuming the most of the production of local fishermen, many of them losing their jobs – and a new government team.

Furthermore, the years 1995 and 1996 having been particularly rainy (Pierre-Nathaniel, 2003), large volumes of sediment were evacuated from the watersheds to the marine environment; ensued an increase in the turbidity of sea water, a fossilization of coral table reefs and more generally a rarefaction of underwater fauna and flora.

In order to preserve the basic philosophy of the Soufriere Marine Reserve, drastic measures were taken by the St Lucian Government:

1. a monthly subsidy of 400 ECD (for one year) was given to approximately 20 fishermen who agreed to leave and hence no longer fish within the reserve;
2. fishing nets and traps were banned on the entire marine protected area because of their harmfulness to the environment;
3. a fish market with a large freezer capacity was created in the Parish of Soufriere and managed by a cooperative.

Finally the goal was to encourage fishermen to adopt new fishing methods (no longer fishing with nets and traps and adoption of the long-line fishing line, for example). Training sessions were also implemented to train fishermen in this new technique; although interesting, this technique did not allow them to invest in larger and more secure boats (despite investment subsidies). Fishermen therefore continued to use their nets and traps and, despite the protection of the area, its degradation went on.

If the Soufriere Marine Reserve appears consistent with the policy of ICZM, it however offers only nominal protection to the environment since the measures are hard to implement and to respect because of socio-economic context of St. Lucia.

### ***3.2.2 Overview of other ICZM projects in the independent States and self-governing islands of the Lesser Antilles***

Other projects are also involved in the integrated coastal zone management in the Lesser Antilles.

This applies to the Coast and Beach Stability Program in the Caribbean Islands. Developed since 1996 on the initiative of UNESCO within the framework of Environment and Development in Coastal Regions and in Small Islands (CSI), this

programme covers mainly English-speaking Lesser Antilles without distinction of political status (independent States or self-governing territories), namely: Anguilla, Antigua and Barbuda, British Virgin Islands, U.S. Virgin Islands, Dominica, Grenada, Montserrat, Saint Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, but also the Turks and Caicos Islands, and recently Haiti.

It aims to help small Caribbean islands for a rational development of coastal areas from the environmental, social and cultural point of view.

Funded by the Caribbean Development Bank, UNESCO, the Organization of American States (OAS) and the Organization of Eastern Caribbean States (OECS), the program has three main objectives:

1. carrying out a comprehensive inventory of beach conditions and to quantify their physical dynamics (erosion and/or filling);
2. developing a methodology (developed mainly in Anguilla, Antigua and Barbuda, Montserrat, Saint Kitts and Nevis and St. Lucia) adaptable to other Caribbean islands, allowing the monitor of the coastline evolution;
3. lastly, encouraging schoolboys to relay scientific information near their parents.

Ultimately, the objective would be to continue surveys, in order to make spatiotemporal comparisons and integrate these new results into a Geographic Information System (GIS). It would also be interesting to develop new palliative methods; experiences sharing with the other environmental agencies of the region are needed too.

Although not following exactly the same goals, the Caribbean Coastal Marine Productivity Program (CARICOMP) implemented under the aegis of UNESCO since 1985 (and revised in 2001) also aims to contribute to integrated management of coastal and marine areas in determining the factors involved in the productivity of coral reefs, seagrass beds and mangroves. 29 sites from 22 States and territories participated in the project, but only two belong to the Lesser Antilles as we define them above (Barbados and Saba).

This program aims

- monitoring the evolution of mangroves, seagrass beds and coral through survey stations

- centralizing all data at the Data Management Centre (University of the West Indies - Jamaica)
- and assessing the anthropogenic factors that induce major ecosystemic changes in the long run.

This multifaceted approach is facilitated by the networking of research centres, protected areas and marine parks, in order to create a true scientific synergy. Results have been obtained and led to the publication of a reference book (Caribbean Coastal Marine Productivity (CARICOMP, 2001), and the establishment of a research network on the Caribbean coastal areas.

#### **4. REFLECTIONS ON THE DIFFERENCES IN THE INTEGRATED COASTAL ZONE MANAGEMENT IN THE LESSER ANTILLES**

##### **4.1 The European and French characteristics in Guadeloupe and Martinique**

Guadeloupe and Martinique are French departments and outermost regions of the European Union. They have no political autonomy. Unlike the independent States and self-governing islands of the Caribbean, ICZM in Guadeloupe and Martinique is exercised not only in the international framework mentioned above but also in respect of French and European laws.

##### **4.1.1. National aspects of ICZM in the French Antilles**

Recent adoption by the French government of a National strategy for the sea and the oceans (French Government, 2009) – which is the first synthetic document on the matter – extended by Act of July 2010 (“*Engagement national pour l’Environnement*”) should not make forget that the concern for the sea and the coastline is relatively old.

France has indeed an Exclusive Economic Zone that covers 11 million km<sup>2</sup> and a coastline of 5500 km, and these are 5,8 million people who live today on the metropolitan coasts of France and 1,2 million in the overseas departments. As example, if the average density (on French continental territory) is 108 inhab./km<sup>2</sup>, it is 186 inhab./km<sup>2</sup> in the coastal districts and is higher than 300 inhab./km<sup>2</sup> in the

coastal municipalities Overseas (except French Guyana).

There is also a very fragile environment, due to the “littoralization” of people and activities that implies widespread damages: coastal erosion, pollution, hyper-sedimentation, etc.

Hence, the situation of Guadeloupe and Martinique is alarming because of the exiguity of their territories and the problems of town and country planning that underlies (Saffache & Desse, 1999; Saffache, 2000). The north-western part of the Martinique coast moves back at the average rate of 0,5 meters / year, but certain more exposed sections fold up at a rate three times higher. The situation is basically the same in Guadeloupe, where the most exposed coastal portions are moving back from 0.4 to 1.2 m / year.

Given these facts, and especially the seniority of the first policies of coastal management – the “*Rapport Piquard*” on the French Coast (1973) – and their inadequacy with contemporary reality (urbanization, development of water sports, etc.), new management methods for French coasts were necessary.

Since 2001, the French Committee for Town and Country Planning and Development (*Comité Interministeriel d'Aménagement et de Développement du Territoire - CIADT*) proposed to initiate a policy of integrated coastal zone management: “[...] the struggle against the “trivialization” of the coastline is vital if our country wants to preserve for the future its environmental and economic capital. The Government fully integrated this dimension in its policy of town and country planning and sustainable development. This policy is based on a new philosophy founded on the concept of integrated coastal zone planning. This integrated planning must now go beyond strictly legal and regulatory approaches based on constraint logic but have to focus on project and partnership” (French Government, 2005). The aim was “to reverse the current “hunting and gathering economy” that ruin the coastal identity to the detriment of any prospect of valorisation of this unique, fragile and coveted legacy” (French Government, 2005).

In fact, one of the problems first identified concerned the lack of coordination between different programs (management, protection and development

more generally) that were initiated on the coastline, and with often contradictory effects. So, the solution was to try to better coordinate the vision of different stakeholders and their actions. First, all of them were identified (Government, local authorities, socio-economic associations, citizens, experts), their actions and projects listed and linked with various levels of decision-making (local, regional and national).

To implement this new policy, the CIADT launched a national call and selected 25 local projects totalling 1.5 million Euros in “technical and financial support”, i.e. an average 60,000 Euros per project. It is precisely in this context that the projects of Le Robert bay (Martinique) and those of Desirade and Marie-Galante (Guadeloupe), mentioned above, were supported.

However, despite the new policy, the French principles of coastal management are remained: no ownership on coastal zone, not much prohibition for collective use by stakeholders, and of course no privatization. Free public access, gratis use of public goods, management by regulation also remain the basic principles. The underlying economic model thus remains completely public: public ownership, management by public officials, public financing – mostly by taxes and more rarely by fees paid by users – lack of access rights, a reluctance to delegate to private agents or even groups (associations, federations, etc.) management of the zones, etc.

We think one management aspect is missing: the coastal area is not subject to sole possession (*dominium*), nor, alternatively, a single authority (*imperium*). Authorities, uses, regulations, objectives, funding, personnel, threats, etc. telescope themselves on the same area. This one is also – paradoxically in a world where natural capital is scarce – poorly managed and allows to a few “stowaways” to make money. They use that capital with the detriment of all. The French coastal areas are often the place of “fait accompli” or lawlessness because of the excess of rules. Moreover, being non-market goods, they literally do not have a price, which poses problems in valuation of direct or indirect losses for damage as has been found following the great maritime disasters for instance.

Finally, this vision has ramifications at the international level, judging by the methods advocated

by UNESCO in ICZM (Henocque & Denis, 2001) that might be compared or opposed – although it is not ICZM but biodiversity – at the analysis carried out at the same time under the auspices of the OECD (OECD/OECD, 2001).

#### **4.1.2 The European framework of ICZM in Guadeloupe and Martinique**

National aspects of ICZM were gradually added European aspects.

The interest of the European Union for the sea is relatively recent: 1970 for sea fishing; 1987 for environmental protection; and, in 1997, sustainable development became part of European policies concerning the marine environment.

The first European text on Integrated Management of Coastal Zones (European Union, 1995) innovates: integrating together, on defined areas, objectives of the Fifth European Environmental Programme 1992-1995, sectors (industry, energy, transportation, agriculture and fisheries, tourism, urban planning, etc.) and levels (European, national, regional and local).

Faced with legal competences and experiments of the Member States, the EU will intervene through financial incentive rather than regulation, and basing on linkage between land and sea. The focus will be on four terrestrial fields having an impact on the sea: reduction of water pollution and improvement of the quality of bathing water in 1976, quality of shellfish waters in 1979 and urban waste-water treatment and industrial waste from 1991. A kind of synthesis is carried out from 2000 with the Directive named “Framework for Community action in the field of water policy” (European Union, 2000d) which mainly relates to fresh water but also coastal waters within “a distance of one nautical mile on beyond the point closest to the baseline” (EU Directive, Art.2).

From 2000, the rhythm thus accelerates. Learning the lessons from the demonstration programme launched in 1995-1996, the EU develops its concept of integrated management of coastal zones (European Union, 2000a; European Union, 2000c). As in France, EU starts from the observation of

- the importance of coastal areas in Europe (habitat, food, tourism, transportation, etc.)
- the threats (water quality, destruction of habitats, coastal erosion, depletion of natural resources)
- and the existence of “many inter-related

biological, physical and human problems presently facing these zones. Their cause can be traced to underlying problems related to a lack of knowledge, inappropriate and uncoordinated laws, a failure to involve stakeholders, and a lack of coordination between the relevant administrative bodies.” (European Union, 2000a). Meanwhile, the Integrated management is becoming a tool of the EU fisheries policy to improve the planning and management of coastal areas and reduce the intensity of conflicts between fishermen and other coastal users.

In 2007 (European Union, 2007b), by critics of the sector-based policies of member States, the EU underlines the importance of ICZM in terms of governance.

Lastly, in 2007 the EU adopted an integrated maritime policy (European Union, 2007a) involving the use of ICZM, improvement of knowledge about the marine environment and activities occurring there. It is in this context that France has adopted a National strategy for the sea and oceans (December 2009) extended by a set of laws regarding the “integrated management of sea and shore” (July 2010).

In parallel, following the maritime disasters which polluted the coasts of the continent of Europe (especially, the oil tanker Erika which broke within 40 nautical miles off the coast of Brittany on December 1999) the Union took the initiative to reinforce and standardize legislation of ship safety, prevention and marine fight against pollution (legislations known as “*First Erika Package*”, “*Erika II Package*” and “*Erika III Package*”), and created in 2002 the European Maritime Safety Agency (EMSA).

The provisions mentioned above appear as an additional legislative layer – where the objectives and implementation levels are not necessarily consistent to allow the establishment of priorities and choices (McKenna *et al.*, 2008) – they also seem to reinforce the “top-down” and move away stakeholders and decision makers from co-management advocated as a sign of good governance – in the sense of “structures and processes used to govern behaviour, both public and private, in the coastal area and the resources and activities it contains” (Ehler, 2003) – and successful management of coastal areas (Pomeroy *et al.*, 2004).

However, we think that the EU makes it possible to

standardize and simplify the national regulations around minimum requirements and common principles to the 27 States that compose it – and through a set of international standards such as Cartagena Convention and other Global Conventions, such as the United Nations Convention on the Law of the Sea, or the conventions of the International Maritime Organization, for example.

With incentive programs, the European Union may provide to the ICZM in the French departments of America some tools of governance that are alternative or complementary to the centralized (but still split) French model (Angelelli & Saffache, 2010).

Similarly, although the modalities of the financial assistance of EU – that underlie this incentive approach – often seem complex, the reality in the French Antilles is basically simple (Angelelli & Célimène, 2010): European subsidies are massive and concentrated on a small set of areas and procedures; they are foreseeable, negotiated with local authorities and transparent; they usually are a support and not a substitute for local policies. This situation is not comparable with complexity of multilateral or bilateral international cooperation for the benefit of independent States and territories in the Lesser Antilles (Rivera-Arriaga, 2005).

## 4.2 ICZM in self-governing territories and independent islands of the Lesser Antilles

### 4.2.1 From the paradox of simplicity to the paradox of scale

The political system of self-governing territories and independent islands of the Lesser Antilles seems to be more simple than the French system: in general, four levels (local, national, regional, international) (Fanning *et al.*, 2007) or even three in the very small territories such as the British Virgin Islands (Gore, 2007), whereas Guadeloupe and Martinique count at least six (local, regional, national, Caribbean, European, international); less departments; less territorial districts. This situation presents a kind of paradox: the political complexity is in large part at the origin of the problem that ICZM must solve; so, the political simplicity should *a contrario* contribute to facilitate this management. But it is not necessarily the case.

Indeed, first, the small size of territories is often – but not always (Easterly & Kraay, 2000) –, linked with

relatively low domestic incomes. This situation can lead to insufficient financial and human resources devoted to public policies and in particular the management of coastal areas. Now, in the cycle of adaptive management of coastal zone management (“data collection”, “analysis and advice”, “decision-making process itself”, “implementation”, “evaluation and monitoring” (Fanning *et al.*, 2007; Mahon *et al.*, 2009), the support of specialists from various disciplines, including traditional knowledge, is essential. But because of the lack of personnel or material resources (Lorah *et al.*, 1995), the implementation of coastal management fails. Moreover, the governments of the self-governing territories and independent islands are primarily faced with the challenge of maximizing income from the use of domestic resources (Spurgeon, 1999); hence, they support certain forms of development that induce income and employment at short and medium terms (Dehoorne & Saffache, 2008).

In this context, the appreciation of the complexity or simplicity of governance of coastal areas must take into account the number of levels, sectors or administrative districts, but also the capacity of action of each level or sector.

Second, as noted above, ICZM in the Lesser Antilles is based on a corpus of texts and regional and international programs, which gives way to cooperation and technical assistance. The formal simplicity of domestic levels of decision is thus balanced by the complexity of regional and international supports – technical assistance, financing, etc. – and also by the implementation of programmes. More than 36 organizations of international cooperation, having their own areas of intervention, their fields of expertise, their priorities, policies and procedures for assessments of programs, project selection and funding cover the Wider Caribbean (Rivera-Arriaga, 2005). Near these bodies, obtaining the means of managing coastal areas is complex and requires institutional capacity from States and territories; capacity which is sometimes lacking.

The success of ICZM in general (Olsen, 2003) or in France (Henocque, 2003) probably is not correlated to the number of levels of management, administrative departments or territorial districts. Empirically, the U.S. example would tend to show that the complexity of political organization (levels x departments x areas) is not in itself an obstacle to ICZM. But a “paradox of

scale” (Murawski, 2007) exists indeed which makes that when the ecosystem is small size, the number of “layers” of managers and consultants is high. Thus, in the United States, management of estuaries and bays requires work with private landowners, local governments (city, township), the regional government (county), state government, federal government, regional management organizations, international management organizations, non-governmental organizations and, of course, the scientists involved at all levels of the scale (Murawski, 2007).

The size of a country or its level of development (GNP *per capita* for instance) are not always relevant in order to compare the experiences of ICZM. Hence, to better compare experiments conducted in the Lesser Antilles, we propose to use an additional criterion: the way the concept of economic value of the coastal zone is treated.

#### **4.2.2. The economic valuation of coastal areas: the distinctive feature of ICZM among the islands of Lesser Antilles?**

Although the economic valuation of ecosystems remains a controversial subject (Zhang & Li, 2005; Tol, 2005), the model that prevails in the self-governing territories and independent islands of the Lesser Antilles admits, unlike the French system applied in Guadeloupe and Martinique, four basic economic principles. We believe that these principles and their applications in the Lesser Antilles characterize ICZM more than any other factor.

The principles:

First economic principle: the production is based on a combination of factors (land – or, by extension, natural capital – labour and technical capital. In the absence of constraints on natural resources, the Western economic growth was essentially founded since the nineteenth century on labour and capital. Second principle: economic growth, population growth and its mobility have increased the demand for renewable and non-renewable natural capital. Gradually, this capital (and the services linked) became in their turn a limiting factor of development (Costanza, 2000). And even the sustainability of development is become conditioned by the conservation of natural capital (Costanza & Daly, 1992).

Third principle: since demand of natural capital has become higher than supply, the natural capital found itself ipso facto included in the field of economics. However, the confusion often persists in the public opinion – especially in France – between economics and market. It is considered that certain elements of the natural capital such as the air, sea water, the landscapes, the sun, etc, although contributing to the satisfaction of human needs, escape the field of economics because being “non-market”. But the link between supply and demand of goods and services can be regulated apart from the market, either within the framework of the planned economies, whether within a single firm (Coase, 1937) or by positive or negative externalities balanced by taxation or subsidies in accordance with Arthur Pigou and its “*Economics of Welfare*” (1920) (Scitovsky, 1954; Baumol, 1972), etc.

For example, the beauty of a landscape or the existence of a fish stock can generate income directly or indirectly by attracting tourists, by contributing to the rise of the real estate values, by generating income from the fishing and gathering activities, etc. Conversely, a landscape may be threatened or damaged by natural causes or artificial, reducing the natural capital (and induced incomes), even creating additional costs (cleaning, decontamination or “depollution”, monitoring costs, waste of time and fuel over-consumption for catching fish farther, etc.). These aspects are generally regarded as “external economies” (or “external diseconomies”) that benefit (or cost) to companies or individuals without having to pay (or be compensated) (Coase, 1960; Buchanan 1969). That leads to the distinction between “private costs” – which are compensated, like for example wages which are paid for a work – and “social costs” – which can be compensated (for example, by the person responsible for damage or by public authorities (European Union, 2000b) or not being and remain in charge of the Society (Pearce & Sturmeay, 1966).

Fourth Principle: unlike classical model of economics that only distinguishes private and public sectors, valuation of natural capital usually involves a more complicated system of ownership or use of natural capital, distinguishing at least between private, collective and public (Costanza, 2000) – and even more if we match with the distinction between goods



and services market and non-market as in the ancient Roman law.

The ideas which are associated with these four principles are that

- a) with indirect approaches to surrogate the market system and pricing, the positive (or negative) value of ecosystems and their services provided to individuals and society can be quantified. So economic valuation of natural capital can thus appear – at least (Pritchard *et al.*, 2000) – as a tool for managing the coastal zone, in particular in order to classify the different management options by objectifying the costs and benefits;
- b) economic valuation is not necessarily underpinned by a liberal or neo-liberal philosophy. It may even strengthen the role of “social decision-maker” in relation to the individual and the market (Buchanan, 1954). The decision maker might then be this one that “integrates” the components and the stakes of the zone. This may be a government, a public agency, a trustee under the laws of the United Kingdom, a trade union, a cooperative, an association, or a large corporation or organization within which are identified and arbitrated the various costs apart from the market (Coase, 1937; Coase, 1960).

We think that these principles and ideas help to understand the differences in implementation of ICZM in the Lesser Antilles.

First, whereas it is often occulted in France, the issue of economic valuation of coastal zone is not “taboo” in English-speaking islands of the Lesser Antilles. They follow the current developed in the United States and Great Britain where the fields and methods of natural capital valuation in general – or biodiversity specially (Nijkamp *et al.*, 2008) – have been refined (River and Harbor Act, 1902; recognition of intangible assets since the end of the Second World War). In particular, in 1972, the Coastal Zone Management Act and the Marine Protection, Research and Sanctuaries Act promoted the Cost-Benefit Analysis and the taking into account public gains and socio-economic benefits, while encouraging the creation of specially protected areas (“Special Area Management Plans”) (Lipton *et al.*, 1995). Many valuation methods of natural capital are then developed (substitution method; habitats equivalency analysis from the U.S. Oil Pollution Act of 1990, methods of investigating the “willingness to pay”) to maintain the

quality of the environment (Arrow *et al.*, 1993; Lipton & al., 1995), etc.).

English-speaking islands of the Lesser Antilles wish valuation of their natural capital, because it is one of the major pillars of tourism. Indeed, tourism incomes account for more than 60% of gross domestic product of St. Lucia, more than 70% in that of Antigua and over 80% in the British Virgin Islands (Dehoorne & Saffache, 2008). With little labour force and technical capital, as well as alternative income to tourism, these islands shall therefore more likely to develop economic valuation of their coastal zone than in Martinique and Guadeloupe, where the contribution of tourism to GDP and employment is less than 4% (Hugounenq, 2007).

Then, this economic valuation implies that goods or services provided by coastal ecosystems are identified, evaluated and classified : such as fishing, shore protection against erosion or rising sea levels, cyclonic waves, assimilation of wastewater, recreational uses, bathing, etc.

For example, in St. Lucia (Burke & al., 2008) the contribution of coastal zone to tourism and leisure was estimated between 160 and 194 million USD for the year 2006 (hotels and restaurants, scuba diving, marine park revenues, miscellaneous expenses, indirect effects on employment, tax revenue, etc.). In the same way, the contribution of coral reefs to coastal protection was estimated between 28 and 50 million USD – on the basis of avoided damages – while the contribution of fishing activities was between 0.5 and 0.8 million USD. The total was compared to St. Lucia GDP that was 825 million USD in 2005, in order to identify policy recommendations focusing on approaches to integrated coastal zone management.

Lastly, the economic valuation is generally linked with land tenure that allows a kind of possession of coastal zone. Although the scheme also led to a boom in real estate tourism having a negative impact on the coastal area (Lorah & al., 1995), it recognizes the possibility of long-term leases or collective properties including the Natural Resource Trustees replacing public authorities in order to coordinate, to develop, to pay and to collect local fees or taxes by visitors or operators. Thus it is an approach which tends to establish an integrating authority based on property (*dominium*) even if not unique (*imperium*).

Table n° 1 hereafter grossly summarizes the main similarities and differences interesting ICZM between

French islands of the Lesser Antilles and mostly English-speaking islands.

## 5. CONCLUSION

Finally, the strong similarity of the islands of the Lesser Antilles could have led to a homogeneous management of the coastal areas.

The reality appears different, so that the usual geographical data (land, population, relief, natural or economic handicaps, vulnerability, etc.) seem to us here marked by adherence to different economic philosophies.

To explain divergent patterns of ICZM in the Lesser Antilles it is necessary to seek in the way in which is considered (or is not considered) in each island the economic value of coastal areas as part of natural capital.

Thus, in the case of the French islands, the value of coastal areas is not economically estimated, because the goods and services they provide are considered – by nature and historical tradition derived from Roman law – as non-market; they do not belong to anybody and are in the free disposal of all. As a result, these goods and services are little managed, or else administered by a mosaic of public authorities. Hence ICZM is concentrated on coordinating public programs and services. In Guadeloupe and Martinique, ICZM is the exact reflection of this approach.

In the French system of Guadeloupe and Martinique, it is true that many old regulations – the 1913 Act on protection of the surroundings of historic monuments; 1930 Act about natural monuments and landscapes; 1964 Act on Water; 1985 Act on impact studies, etc. – or more recent regulations evoke notions of legacy, development and management of public or non-market goods – the Act of 12 July 2010 about national commitment to the environment says that “The marine environment is part of the common heritage of the Nation” – and reinvent the concept of “polluter pays”, or assess the impact of environmental damage before certain work, etc. In addition, approaches to certification, eco-labelling and internalisation of external costs are developing and recognizing the existence of a value guaranteed by public authorities out of the market, particularly for biodiversity (Nunes & Riyanto, 2005). Similarly, the current reform of EU fisheries policy (European Union, 2010) suggests, following some European countries, individualization and transferability of fishing quotas, giving so economic value to fish to be caught, and giving up the system of

external economies (or diseconomies) associated with gathering economy.

However, in practice, these terms are deprived of significance in economic valuation of the natural environment itself. This one remaining by principle out of the market generally escapes the valuation. ICZM remains thus public, even with the creation of specialized bodies – always public (National Parks, reserves, agencies, etc.).

In the case of independent islands and self-governing territories in the Lesser Antilles, where natural capital plays actually a very important role in the economy through tourism revenue, the economic valuation of goods and services “output” of the coastal areas is more developed. By the assessment of economies and diseconomies on the basis of Anglo-Saxon practices, ICZM can then become more operational, as well in management itself as in the assessment of stakeholder interests and prioritization policies of town and country planning. So the problem is less coordinating policies and means, than having adequate human and material resources for the conduct of policies.

Ultimately, if there is in the French islands a beginning of degradation awareness of coastal and marine Caribbean environment, the implementation of protection policies is not yet optimal. Even when programmes are initiated, they look like more advertising than a real willingness to protect the environment.

The policies of ICZM have made illusion during a few years but cannot really improve the management of the coastal zone because the political, cultural, and socio-economic contexts do not offer a favourable framework. Especially, the absence of a protection policy based on the economic valuation of coastal areas hinders in the French Lesser Antilles the awareness of the degradation of coastal and marine environment. To enforce the coastal environment and manage it, we must give it a value.

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Table 1. Some similarities and differences between islands of the Lesser Antilles.

Tabela 1. Algumas semelhanças e diferenças entre as ilhas das Pequenas Antilhas.

	<b>Guadeloupe and Martinique</b>	<b>Independent States and self governing territories of the Lesser Antilles</b>
<b>Size</b>	Small islands (surface < 1000 km <sup>2</sup> and Population < 1 million inhabitants)	Small islands (surface < 1000 km <sup>2</sup> and Population < 1 million inhabitants)
<b>Gross Domestic Product per capita</b>	Martinique : 24600 USD (2007) Guadeloupe : 21700 USD (2007)	- Anguilla : 12200 USD (2008) - Antigua & Barbuda : 13200 USD (2008) - British Virgin Is : 38500 USD (2004) - Dominica : 4750 USD (2008) - Grenada : 5880 USD (2008) - Netherlands Antilles : 16000 USD (2004) - St.Kitts & Nevis : 10870 USD (2008) - St.Lucia : 5410 USD (2008) - St.Vincent : 5050 USD (2008) - Turks & Caicos : 11500 USD (2002) - U.S. Virgin Is : 14500 USD (2004)
<b>Political Status</b>	French « <i>Départements</i> » without autonomy. They are included in the French territory and also in the European Union territory, as « Outermost Region of EU ».	- Independent States members of the United Nations (Antigua & Barbuda, Dominica, Grenada, St.Kitts & Nevis, St.Lucia, St.Vincent and the Grenadines)  - Self-Governing Territories (Anguilla (GB), British Virgin islands (GB), Montserrat (GB), Saba (NL), Sint- Eustatius (NL), Sint-Maarten (NL), Turks & Caicos (GB), U.S. Virgin islands (USA)). GB and NL overseas territories are not included in the EU territory.
<b>Government levels</b>	At least 6 (and even more) : - Local (Municipalities, so called « <i>Communes</i> ») - Local (set of « <i>Communes</i> », called « <i>Communautés de Communes</i> ») - Local (« <i>Départements</i> ») - Regional (« <i>Régions</i> ») - Caribbean (safety of life at sea, maritime search and rescue, regulation of nautical activities in Guadeloupe and Martinique) - National (by central government and Parliament in Paris) - European (mostly, the rules are made by EU (EU Regulations) or made at French level according with EU (EU Directives) - International (treaties and international conventions ratified by France legally bind Guadeloupe and Martinique)	No more than 4 levels (and even less) : - Local (city, township or parish) - National (government) - Caribbean (OECS, OAS, CARICOM, etc.) - International (International treaties and conventions that exceed the Lesser Antilles geographical framework: Cartagena Convention, etc.)

Table 1. Some similarities and differences between islands of the Lesser Antilles.

Tabela 1. Algumas semelhanças e diferenças entre as ilhas das Pequenas Antilhas.

<b>Regulations in following matters : territorial sea, coastline, urban and country planning</b>	French government (territorial sea, coastline, urban and country planning) + European Union (fisheries ; water policies, including quality of bathing waters, urban waste-water treatment, ship safety and marine pollution)	Independent States and self governing territories without external intervention (excepted of course when complying with international conventions).
<b>Part of Tourism in GDP</b> (* Sudrie & al., 2008 ** Dehoorne & Saffache, 2008 )	Martinique: 2%* Guadeloupe: 4%*	St. Lucia: 64% ** Antigua & Barbuda: 74% ** British Virgin Is.: 82% ** Turks & Caicos Is.: 91% **
<b>Coastal zone as economic value</b>	There is no economic valuation of coastal zone.  Despite important legal and financial resources, coastal zone (« non market » and public managed) remains little protected or valorised.	Because of (1) their general philosophy concerning the law, (2) their independence or large autonomy and, (3) the need to enhance their economic assets especially with tourism, independent states and self governing territories developed economic valuation of coastal zone.

Source : Authors and World Bank, CIA WorldFact Book and *Institut National de la Statistique et des Etudes Economiques* (INSEE – France). All figures are in current US dollars.

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