United Nations
Educational, Scientific and
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Kingston
Office

The Shades of Blue

Upgrading Coastal Resources for the Sustainable Development of the Caribbean SIDS

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UNESCO Office for the Caribbean
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INTRODUCTION

The Caribbean Sea and its coastal resources hold the key to the sustainable economic development of Small Island Developing States (SIDS) of the region. Coastal resources are clearly identified by policymakers, scholars, and by the population at large as a critical factor in the economy, society, culture and politics of Caribbean SIDS and therefore there is much interest, opinions and passion around the topic which is a mobilizing subject matter in the Caribbean.

This publication was prepared in the framework of the UNESCO Social and Human Sciences (SHS) Strategy on Caribbean Small Island Developing States (SIDS) which is coordinated and implemented by the UNESCO Kingston Cluster Office for the Caribbean in Kingston, Jamaica.

The initiative is carried out in consultation with other programmes in the Kingston Office, in particular the Natural Sciences Programme, and in coordination with the UNESCO Cluster Office in Havana. The initiative reflects the Social and Human Sciences programme efforts to strengthen the linkages between social and human sciences and the sustainable development agenda in Small Island Developing States of the Caribbean as part of UNESCO's contribution to the achievement of the UN Millenium Development Goals and Programme of Action.

In the ***Mauritius Declaration for the Further Implementation of the Programme of Action for the Sustainable Development of Small Island Developing States*** (January, 2005) SIDS reaffirmed the continued validity of the Barbados Programme of Action as the 'blueprint' for the fundamental framework for the sustainable development of Small Island Developing States, eradicating poverty and improving the livelihoods of their peoples by the implementation of strategies which build resilience and capacity to address their unique and particular vulnerabilities.

The *Mauritius Declaration* reaffirms the principle that achieving sustainable development will require holistic approaches at all levels and integrated programmes that take account of the economic, social and environmental aspects' which are the pillars of sustainable development. There is an urgent need for research and dialogue on a framework for sustainable development of SIDS which puts people actively into the picture, shows how the economic, social and environmental 'pillars' interact, incorporates culture and recognizes the effects of global action.

Following up the Mauritius Meeting, the Social and Human Sciences programme presented two strategic lines as vehicles for piloting an integrated framework for action. The thematic focus for the Caribbean strategy is coastal resources and for the Pacific, poverty, women and youth. Each presents a hub and entry point for further research and dialogue on social transformation themes such as gender and youth equity, participation in decision-making, migration and poverty. Two main categories of activities are included in the Strategy for the Caribbean: a research programme, and a policy-oriented outreach agenda. Throughout all phases of implementation of the initiative, particularly during the development of the research programme, the Social and Human Sciences Strategy for the Caribbean will make extensive use of techniques of participatory research.

The UNESCO SIDS Caribbean Programme was launched at a Regional planning meeting on UNESCO SHS Strategy on Caribbean SIDS, in Port of Spain, Trinidad and Tobago (May, 2006) which was followed up by a *Call for Paper Proposals* that could be used to compile a comprehensive document to be presented before policymakers in key meetings and fora, as well as to provide the framework for the design of the research programme of the strategy. The Second Meeting of the UNESCO Social and Human Sciences SIDS Strategy for the Caribbean was held on Salvador de Bahia, Brazil, (May, 2007) concurrently with the 32nd Conference of the Caribbean Studies Association (CSA). It was attended by a selected group of scholars who assessed and offered suggestions on essential aspects of the design of the research programme and the process of its implementation. Participants at the meeting focused on three topics: main research areas; potential research groups and modalities of collaboration; and capacity-building areas for

junior social and human sciences researchers.

This publication is made up of five chapters. The first presents an overview of the UNESCO Strategic Response to the issue of promoting sustainable development in the SIDS. The second chapter on ***Coastal Resources and Sustainable Economic Development in Caribbean SIDS: An Overview*** by Dennis Pantin and Marlene Attzs analyses the pivotal role of Caribbean Coastal Resources (CCRs) in the Caribbean economic development and captures this in the 'source, sink and threat' functions of the resources. These three areas - source, sink and threat - relate to the use of the CCRs as the main ingredient in the Caribbean tourism product, the role of CCRs in the assimilation of land and marine waste and the threats to or from CCRs due to climate change and global warming. The authors conclude that, notwithstanding the challenges to sustainable economic development in the Caribbean using CCRs, there are at least seven reasons why sustainable tourism may be the most efficient and effective way of managing Caribbean CCRs to achieve regional sustainable economic development.

The third chapter, ***The Impact of Climate Change on Small Island Environments in the Caribbean: the Challenges Ahead,*** by Rawleston Moore presents an evaluation of climate change, considered by the author as the most serious environmental and developmental issue facing the small islands in the Caribbean. The small islands of the Caribbean will have to address the impacts of climate change and global warming. These impacts will affect the social and economic fabric of countries in the region, and require substantial financial and economic resources to address. The reality may also be that in some instances some countries in the region may not be able to adapt to climate change. Caribbean countries must, therefore, invest inwardly, and adapt for themselves. The cost of implementing adaptation activities and policies now will be cheaper than putting measures in place in the future. The author proposes that for adaptation to be effective, climate change must be considered a cross-cutting issue in the region. Climate change and adaptation can no longer be seen as an isolated environmental issue, it must be viewed as integral to the development process. The fourth chapter, ***Sustainable Management in Small Coastal Communities in the Caribbean: Policy Lessons from Case Studies***, by Michelle Mycoo and Judith Gobin is an analysis that seeks to distil policy lessons in sustainable management derived from studies in two coastal communities, namely Praslin in St. Lucia and Sarteneja in Belize. The studies were based on the premise that in small coastal communities in the Caribbean sustainable management remains a challenge largely because of the gaps in policy formulation and implementation. The chapter first presents a contextual framework of the case studies and the methodological approach adopted. This is followed by an examination of opportunities, constraints and threats to sustainable management in relation to the case studies. The last section of the paper distils the policy lessons learnt in addressing the opportunities, constraints and threats to sustainable management in the context of small coastal communities of the Caribbean.

The fifth chapter, ***Capacity Development for Caribbean Small Island Developing States: Focus on Coastal Zone Management*** by Nicholas Watts, analyses the specific needs for capacity development for integrated coastal zone management in Caribbean SIDS. The study reflects on the rationale for selecting integrated coastal zone management as the point of entry for a consideration of sustainable development SIDS and defines the concept of vulnerability and the main issues involved in capacity development for SIDS. The author concludes that each state in the region needs its own source of research and capacity development for monitoring and evaluating the impacts of policy choices on local coastal communities and environments; but that each state also needs to be able to draw on a regional bank of data and expertise. Therefore, the issue requires relevant generalist training for professionals at the national level, and specialist training at the regional level, with specialists available for deployment across the region. The chapter also supports the 'University in the Community' initiative, a project to identify ways in which universities and their outreach institutes interact with local communities to promote their sustainable development.

The last two chapters were prepared by graduate students from the University of the West Indies who received support from the UNESCO Office for the Caribbean, as part of a programme designed for encouraging the work of young professionals in the field of sustainable development. The sixth chapter, ***A Feasibility Study on the Use of***

Structural Mitigation to Reduce the Economic Vulnerability of Caribbean Small Island Developing States (SIDS) to Natural Disasters, by Jason M.A. Alexander, deals with the crucial process of reducing the vulnerability of Caribbean SIDS while the last chapter, ***An Examination of the Contribution of Community-Based Organizations (CBOs) in Poverty Reduction Efforts and Environmental Management in Soufriere, St. Lucia,*** by Donna Devika Ramjattan, examines experiences regarding the role of actions at the community level for poverty reduction actions in the context of coastal areas.

In sum, the publication provides authoritative arguments and data that support the notion that improving the life of people in SIDS needs an integrated framework for sustainable development, which combines programme and policy focused actions across social, economic, physical and cultural dimensions. They also support UNESCO's assertion that the Social and Human Sciences in combination with other programmeme areas can make valuable contributions to policymaking by providing the intellectual, methodological and theoretical resources that are required to elucidate the linkages between alternative strategies for the management of coastal resources and ecological, economic, and social outcomes in the Caribbean. In this sense, the case for the management of coastal resources of Caribbean SIDS should not rely so much on risk aversion as on asset buildup. The lavishness of coastal resources is not just an exotic attribute of the so-called 'paradises' of the Caribbean nor is it a 'luxury' that should be preserved mainly to maintain an attractive playground for foreign tourists. It is, above all, a public good that is a crucial asset for the economic, social, cultural and spiritual well-being of the Caribbean people.

Kwame Boafo
Director, UNESCO Office for the Caribbean

Coastal Resources and Sustainable Economic Development in Caribbean SIDS: An Overview.

Dennis Pantin and **Marlene Attzs**

Coastal Resources and Sustainable Economic Development in Caribbean SIDS: An Overview

Dennis Pantin and Marlene Attzs[1]

Introduction[2]

This overview paper on the topic of coastal resources and sustainable economic development in Caribbean SIDS begins with a definition on what is the meaning of each of the key terms in the title.

Section 1 defines and elaborates on the concept of sustainable development with a particular focus on the economic dimensions of Sustainable Development. Also included in this section is an introduction to some of the linkages that exist among the environment, the economy and society - the three fundamental tenets of Sustainable Development.

In Section 2 we define the concept of 'Caribbean' and related coastal resources of the Caribbean. The section also provides some empirical data on trends in these coastal resources.

The final section, Section 3, draws some conclusions and advances some proposals on a policy research agenda to realize sustainable economic development in Caribbean SIDS drawing on their coastal resources.

Section 1: Definition of Sustainable Development

The concept of sustainable development links two concepts which are themselves complex: sustainability and development. This definitional review begins with some distinct definitional and conceptual elaboration of each concept, before the terms are adjoined.

Sustainability
Common notes that: *'To sustain is to support without collapse.'* (Common, 1985:1). In more specific economic terms, Peezey (1992) interprets sustainability to be: *'...a non-declining utility of a representative member of society for millennia into the future.'*[3]

Development
Seers defines development simply as the 'realization of the human potential' identifying three key measurable development indicators as adequate nutrition, a job and equitable distribution of income and wealth. (Seers, 1969). Sen (1983), in a similar vein, sees the development challenge as that of facilitating human beings to develop the 'capabilities' required to meet 'entitlements' of food, security, etc.

Sustainable Development
The term Sustainable Development was itself popularized by the 1987 World Commission on Environment and Development: more popularly known as the Bruntland Commission or Report. Sustainable Development was defined as: "….development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987:43).

Economic Definitions of SD
Pearce and Munasinghe, two economists, have sought to include a disciplinary perspective to their definitions with Pearce defining sustainable development, for example, as: *".....about being fair to the future. It is about leaving the next generation a similar, or better, resource endowment than that which we inherited."* (D. Pearce, 1989:1)

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[1] Dennis Pantin and Marlene Attzs are Professor and Lecturer, Department of Economics, University of the West Indies and also members of the Sustainable Economic Development Unit located in this Department

[2] The authors acknowledge the research assistance provided by Petal Thomas and Jason Alexander in preparation of this paper

[3] As cited in Turner ed. 1993

Munasinghe, on the other hand, suggests that the economic goal in a sustainable development context is: *"... to maximize the net welfare of economic activities while maintaining or increasing the stock of economic, ecological, and socio-cultural assets over time (to ensure the sustainability of income and inter-generational equity) and providing a safety net to meet basic needs and protect the poor (thereby advancing intra-generational equity.)" (Munasinghe, 1993:16).*[4]

1.1 Common Sustainable Development Imperatives of all Societies

All societies face the same four (4) imperatives in the quest for sustainable development. These are economic, social, political and environmental in nature.

The economic imperative is to clear the labour market based on the realization of a concomitant adequate level of production including an unavoidable growing share of globally competitive production.

The social imperative is to ensure that one does not solve the economic imperative at the cost of a society's soul implying that the foundation values and culture of a society should not be sacrificed in seeking to achieve the economic imperative,[5] although values and culture are dynamic in space and time and admittedly, also marked sometimes by dysfunctional components.

The Political Imperative is to create a democratic society of self-governing citizens: i.e. a population that takes responsibility for its destiny and realizing the economic, social and environmental imperatives.

The Environmental Imperative is similar to the social. It is to ensure that the three imperatives cited above are not achieved at the cost of the biodiversity which, at the core, protects life itself (e.g. greenhouse function and the ozone layer).

In summary, one may define Sustainable Development as an approach to national, regional and international development based on the ethical principle of fairness or equity within and between generations in terms of the economic, social, political and environmental dimensions of human existence. Sustainable development can otherwise be perceived as realization of the human personality through enhancement of capabilities on a non-declining trajectory.

1.2 The three-sided interface/functional linkage among the environment, society and economy

The four aforementioned imperatives need to be located within the triple-sided functional relationship between the environment and the society and economy as a source, sink and threat.

Source Function

As Figure 1 illustrates the environment provides a source of useful natural resources and amenity values for human consumption including leisure and life itself. Human beings depend on nature as a (re)source for air, soil and water resources together with energy and biodiversity. Such natural resources are either depletable in use (i.e. exhausted as, for example, minerals), or renewable in use (e.g. fisheries, forests, etc).

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4 The concept of sustainable development is not without critique. See for example O'Riordan, 1988 and Lele, 1991

5 For example, in prostitution-based tourism

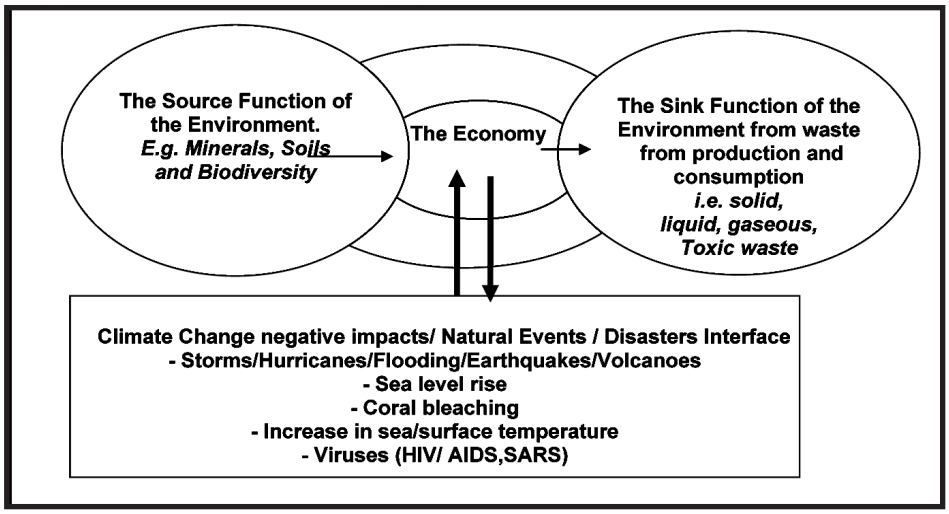
Sink Function

The environment also serves as a sink for the wastes generated in production and consumption. The conversion of nature's resources into inputs of production which are processed and then finally consumed simultaneously generates waste at each stage of the production/consumption process (including recycling) as well as a heat sink. A deterioration in the quality or quantity of any of the renewable natural inputs into society - resulting from use beyond their absorptive or carrying capacity - contributes to a deterioration in the quality of human life. At the most obvious, industrial pollution leads to health problems via its negative impacts on air, water and soil quality and also through negative feedbacks into the human food chain such as polluted fish, livestock or food stocks.

Threat Function

Finally, the environment also poses a threat to the socio-economy in terms of earthquakes, volcanic eruptions, wind storms and hurricanes or tornadoes and their knock-on effects including the sometimes combination of these as in the December 2004 earthquake - induced Tsunamis that resulted in mass death and destruction in south Asia and the Pacific and, more recently, in Java in July 2006.

Figure 1



1.3 Rising to the Economic Challenge of Sustainable Development

A society which has achieved SD would be marked by a socially acceptable standard of living and quality of life on an equitable basis which could be continued indefinitely. As such SD involves the human and natural environment as a source of inputs into production (natural resources and human resources) and the concomitant fruits of production (goods and services, employment, income and wealth creation as well as leisure) and as a sink for the residue of production (industrial and consumer wastes). Realization of SD therefore requires:

1. sustaining material reproduction and quality of life;
2. sustaining non-material quality of life including the quality of the environment (air, water, soil); the healthiness of consumed food; environmental bio-diversity and socio-cultural assets or social capital.

Section 2: Coastal Resources and Sustainable Development in the Caribbean SIDS context

Definition of the Caribbean

There are two main approaches to defining the Caribbean. The first approach, as Girvan notes, utilizes a socio-historical perspective and distinguishes between 'the insular Caribbean (the islands, the three Guianas and Belize)

and the Greater Caribbean (the entire Caribbean basin)' (Girvan, 2005:306). The second and geographic approach would define the Caribbean as all the islands and mainland territories 'washed' by the Caribbean Sea and is similar to the concept of the 'Greater Caribbean'.

Definitions of Coastal

One of the debates within the literature, certainly in terms of small islands, is whether one can distinguish between the coast and the remaining physical areas given two features. First, small size of the islands and second, the related fact that what occurs 'inland' quickly impacts on the coast. This is best captured in the concept of 'Ridge to Reef'[6] which connotes the symbiotic relationship between watersheds and the coral reefs into which they ultimately empty. In fact, definitions of coastal vary depending on the perspective from which one is conducting analysis. From a management perspective, for example, coastal may refer to the use to which the coastal zone is being put. Fabbri (1998) suggests, in this context that the 'the boundaries of the coastal zone should extend as far inland and as far seaward as necessary to achieve the objectives of the management programmeme.' (Fabbri, 1998: 52).

Cicin-Sain (1993) and Clark (1996) identify five (5) distinct areas or sub-zones:

- inland areas;
- coastal lands (e.g. wetlands and marshes);
- coastal waters (e.g. estuaries, lagoons and shallow waters);
- offshore waters (to the edge of the national jurisdiction, usually 200 miles offshore);
- high seas (beyond the limit of the national jurisdiction).

There is also the legal question as to what demarcates a country's marine ecosystem. In the context of the Caribbean Sea, the complexity is very evident since the Caribbean Coastal zone (including the Caribbean Sea) is defined under Article 122 of the International Law of the Sea as 'an enclosed or semi-enclosed sea'. This definition arises because the entire area of the Caribbean Sea consists of Exclusive Economic Zones (EEZs) over which the insular and littoral states of the region exercise legal and institutional jurisdiction (even though island-specific maritime boundaries may not yet be clearly identified). The Caribbean Sea project of the Cropper Foundation points out, for example, that: 'The semi-enclosed Caribbean sea is a distinct ecological region, bounded to the North by the Bahamas and the Florida Keys, to the east by the Windward Islands, to the South by the South American continent, and to the West by the isthmus of Central America.' (CARSEA, 2005:2). At an estimated 3.2 million square kilometers, the Caribbean Sea is the second largest in the world[7].

Some of the key characteristics of the Caribbean marine ecosystem include:

- almost 90% of the Caribbean Sea is enclosed by insular and continental landmasses, commonly called the greater Caribbean;
- more than 200 million people live in the 25 independent states and 13 affiliated territories in the Caribbean Basin. For these populations, the protection and sustainable management of the Caribbean Sea, in the broadest sense, are a vital necessity;
- the Caribbean Sea is rich with unique biodiversity[8] located within highly fragile ecosystems;
- the countries located within the Caribbean Sea are highly vulnerable to the effects of climate change and its variability including sea level rise and the increase in the frequency/intensity of natural disasters caused by hurricanes, floods and droughts.

This overview paper therefore defines the Caribbean coastal resources as all those source and sink functions provided from the Ridge to the Reef and, also, by the wider Caribbean marine space captured within the exclusive economic zone of Caribbean countries.

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6 A concept traced to the title of a watershed project in Jamaica in the 1990s
7 The Mediterranean being the largest
8 The Caribbean Sea is home to the second largest coral reef system of the world.

2.1 Delineation of the coastal resources within Caribbean SIDS

Given this definition above Caribbean islands can be readily understood as being heavily dependent on the coastal resources for their livelihoods. Further details are now provided below in terms of the source and sink contributions of Caribbean coastal resources. The issue of the threat function also is addressed at the end of this Section.

2.1.1 Source value of Caribbean Coastal Resources (CCR)

In terms of the source function, the natural setting of the Caribbean which is a product of the marine, island and coastal ecosystems of the region, constitutes an immeasurable asset to the region. The main source functions of the Caribbean coastal resources begin with:

- the upstream forests which perform an array of watershed functions;
- the middle forest areas which serve as sources of agro-forestry, agriculture, eco-tourism and some settlement;
- the lower forest areas which provide agriculture, settlement functions;
- the coastal strips on which are concentrated settlement, commerce, industry: particularly tourism, physical infrastructure, shipment and trans-shipment facilities and mineral production;
- in addition, fringing beaches, mangroves, lagoons and coral reefs provide shoreline protection;
- while the near and offshore marine environment serves as a source of fishing, cruise and yacht tourism and also as shipping lanes: not merely for Caribbean bound vessels but also as a conduit for international shipping.

Some summary empirical details are now provided below on the main coastal resources and their source and sink functions together with the impact of the threat function on these coastal resources.

Watershed Protection

Ground and surface water sources of both potable and irrigation water are dependent - both in quantity and quality - on the state of the upper and middle watersheds in particular. The same holds for biodiversity and an incipient but growing industry in natural products and eco-tourism. These watersheds also serve to protect downstream assets from sedimentation flows and the risk of flooding. Unfortunately, watersheds throughout the region are under threat.

Settlement, Commerce and Industry

The vast majority of the Caribbean population lives within one kilometre of the coast. There are two main reasons for this. The first is the fact that most of the flat land which facilitates a lower construction cost for settlement, commerce and industry exists on the coast. The second reason is that, for historical reasons, Caribbean populations have settled close to the ports which are responsible for the export of much of regional production and also, as ports of entry for most merchandise imports.

Tourism

The coastal region is the core of the regional tourism product as visitors flock to the region to bask in the sun, sea and sand.[9] The sector contributes significantly to the economic growth of many of the islands in terms of its impacts on employment and foreign exchange earnings. It also has the potential to facilitate sustainable economic livelihoods through linkages with other sectors such as agriculture, manufacturing and cultural services.

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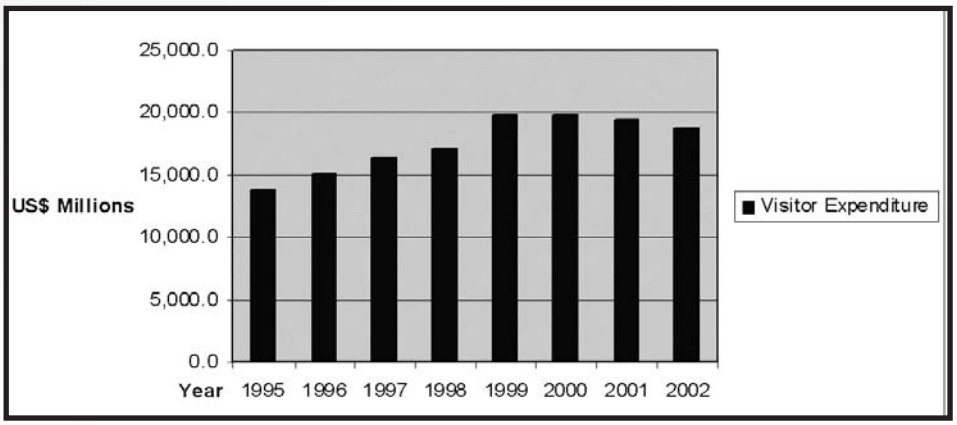
[9] Although, as noted earlier, inland terrestrial biodiversity has a small but growing role in the region's tourism earnings

In 1999, the Caribbean Tourism Organization estimated, in its annual statistical report that the tourism sector in the region employed approximately 900,000 persons, directly and indirectly. By 2003, the number of persons employed in the industry is estimated to have increased to 1.3 million. Caribbean tourism provides some 16% of total employment: double the global average. A similar pattern prevails in terms of capital investment in tourism as a share of total capital investment.

Figure 2: Estimates of Visitor Expenditure in the Caribbean 1995-2002



Source: CARIBBEAN TOURISM STATISTICAL REPORT, 1993-2003

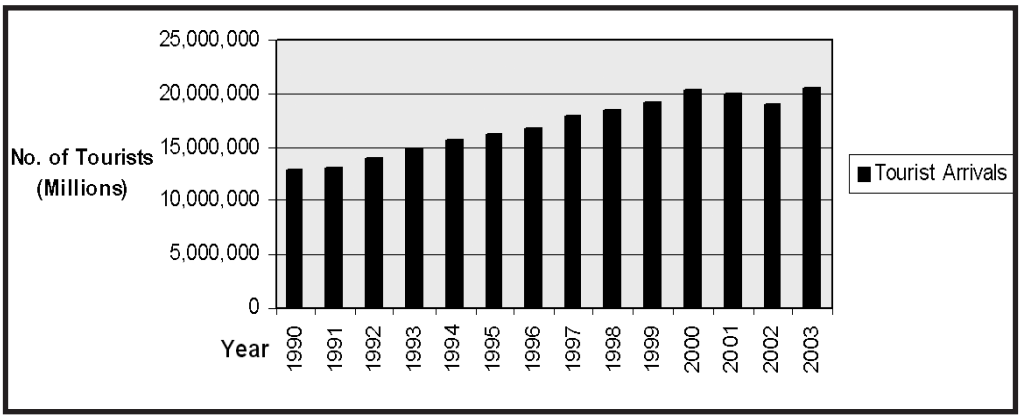
Visitor Expenditure[10]

Figure 2 illustrates foreign exchange that enters the region through the tourism industry. In 1995, visitor expenditure amounted to some US$14 billion. Eight years later, in 2002, visitor expenditure increased to US$19 billion. The expenditure generated by visitors to the region increased during a five year period 1995-2000 by an average of 7.3%. The dip in expenditure in 2001 mirrors the decrease in the number of visitors in the same year.

Tourist Arrivals

In 1990, 12.8 million people visited the Caribbean. At the end of 2000, this increased to 20.3 million - a 63% increase. The years 2001 and 2002 saw small decreases in numbers to 20 and 19 million, respectively. However, there was a recovery in 2003 to 20.4 million.

Figure 3: Tourist Arrivals to the Caribbean 1990-2003



Source: CARIBBEAN TOURISM STATISTICAL REPORT, 1993-2003

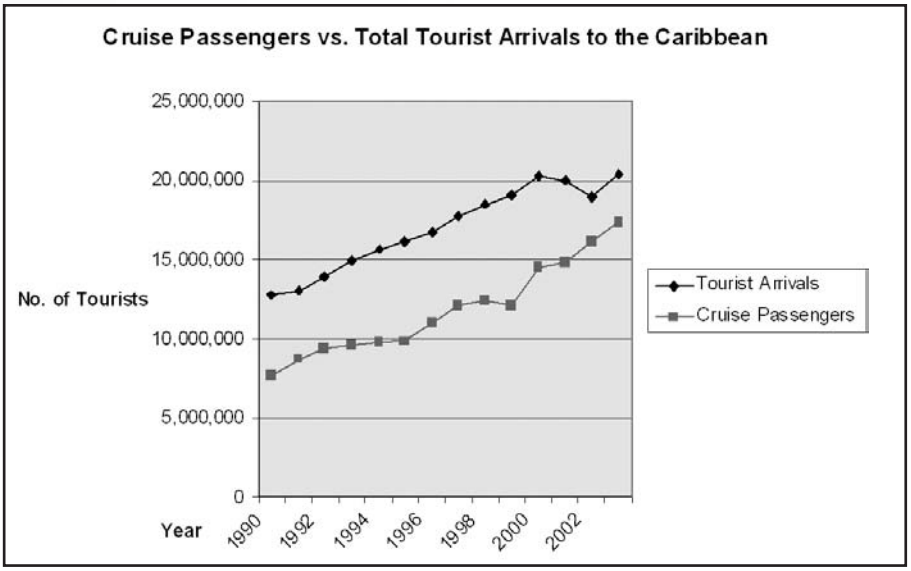
[10] Caribbean Tourism Organization, Caribbean Tourism Statistical Report 2000-2001.

Cruise Ship Arrivals

The Florida-Caribbean Cruise Association (FCCA) states in its 2006 overview that the cruise industry's growth is spearheaded by the Caribbean region, the industry's number one destination in the world. The region has a market share of 46.4% of all global itineraries. The cruise industry has grown on an average of 8.5% per year since 1980.[11]

Figure 4 shows the increasing significance of cruise tourism to the region. In 1990, cruise arrivals accounted for 60.5% of total tourist arrivals to the region. This tourism sub-sector, unlike land tourism did not show signs of decline in 2001. In that year, cruise arrivals increased by 2.8% from 71.6% in 2000. By 2003, cruise arrivals constituted 85.2% of total arrivals in the region.

Figure 4: Cruise Passengers vs. Total Arrivals to the Caribbean



Source: CARIBBEAN TOURISM STATISTICAL REPORT, 1993-2003

Shipment and Transshipment

The Caribbean Sea is the lifeline, as it were, of the region's population since it serves as the main transport route for both exports and also imports. The Caribbean Sea also serves as a major transshipment route for goods destined for other regions of the world.

Minerals

Petroleum is the most important Caribbean coastal mineral resource. CCA (2005) cites Jackson (1991) as pointing out that: *'commercial quantities of crude oil and natural gas occur in sedimentary rocks along the continental shelf extending from Panama to Trinidad.'* (CCA, 2006:95). Sand and gravel deposits also are mined from beaches across the region.

[11] Florida-Caribbean Cruise Association, "Cruise Industry Overview - 2006"

Fisheries

A wide range of fish resources exist in the Caribbean and these resources are exploited by traditional fishers from the Caribbean and, as well, by commercial fishing fleets from many countries of the world. The fishing industry is estimated to employ some 200,000 people on a full-time or part-time basis[12]. In addition, another 100,000 persons are estimated to be employed in processing and marketing, net-making, boat-building and other support industries. This Caribbean fishing industry is responsible for some US$1.2 billion annually in export earnings. Perhaps equally as important is the fact that fish products make up 7% of the protein consumed by Caribbean peoples.

Shoreline protection by Mangroves, Lagoons, Coral Reefs

As noted earlier coastal wetlands, mangroves, lagoons and coral reefs provide protection from erosion by restraining waves and also serve as a nursery for fish stock and as a habitat for reptiles, mammals, fish, crabs and birds. (CCA, 2006).

2.1.2 Sink Function of Caribbean Coastal Resources

The Caribbean coast and, in particular, the marine environment serves as a major sink both for land-based sources of pollution and marine waste.

Land-based Sources of Pollution which empty into the Marine Environment

There are several factors which contribute to the land-based pollution which empties into the Caribbean Sea.

Deforestation and Agricultural Practices

The first is watershed deterioration which then leads to sedimentation loads beyond the carrying capacity of the rivers and marine environments. Since 1980, arable and cropland in the Caribbean has grown by 20% while forest loss has been estimated as occurring at an annual rate of close to 2% (1.7%) (UNEP, 2000:116-117). As a result, UNEP estimated in 2000 that more than 10 million tons of eroded sediment is deposited annually in coastal waters of the wider Caribbean as a result of deforestation and poor agricultural land practices.(UNEP, 2000:44)

In addition, as the CARSEA project points out: '*River discharge from the Magdalena, Orinoco and Amazon basins can cause significant damage to the marine environment of the Caribbean, through an excess of sediments or contamination resulting from deforestation or pollution in distant regions.'* CARSEA, 2006:10)

Inadequate Sewage, Chemical and Solid Waste Disposal

In 1991 only 10% of the Caribbean population was served by a central sewage system and close to 60% of then existing treatment plants in the Eastern Caribbean were operating inefficiently. (Vlugman, 1992) Although there would have been some improvement over the last 15 years, sewage pollution still remains a major problem (exacerbated, as we shall discuss below) by the high growth coastal tourism industry. UNEP (2000) also estimates that over 80% of improperly treated municipal waste is discharged directly into the sea.

Moreover, urban growth in the Caribbean was 50% higher than overall population growth between 1980 and 1999 (UNEP, 1999). There is nothing to suggest that this trajectory would have changed, if not for the worse, since then.

[12] This empirical estimate and the others which follow below come from the CARSEA report (2006:3)

Other liquid wastes - including chemical and sometimes toxic waste - end up in the watercourses and meander their way to the sea. There also is a problem of solid waste disposal which also impacts partially on the marine environment.

Intensive Tourism Development

According to UNEP (1999:11) the most intrusive impacts of tourism development is the result from the construction phase and later, from waste treatment and disposal. Condominium clusters and road works on steep hillsides have damaged forests and watersheds thereby causing erosion, silting over of streams and wetlands and the pollution of lagoons. (McElroy and Albuquerque, 1998) Wilkinson (1989) also notes mangrove forests and salt ponds have been destroyed to construct large-scale resorts, marinas and infrastructure along shorelines thereby contributing to depletion of endemic species, archaeological artifacts and reef systems.

One important dimension which tends to be under-estimated is the tourist demand for water, electricity and also for proper waste disposal facilities. In terms of water demand, UNEP (1999) points out that, as a result of tourism, the Caribbean has one of the highest per capita withdrawal rates in the world, although its per capita water resource base is significantly lower than comparable insular regions in the Pacific and Indian oceans.

The concomitant demand for energy and for waste disposal also needs to be recognized. Over the decade of the 1990s, for example, the demand of the tourism industry for energy and the generation of solid waste is estimated to have doubled. (Pantin et al 2001)

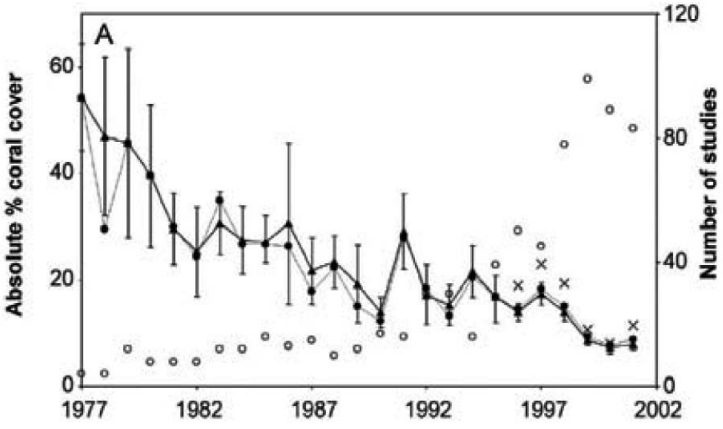
Marine-based sources of Pollution

Marine sources of pollution although not as well documented also need to be factored into the analysis. There are an estimated 63,000 annual ship calls in the Caribbean which, for example, generate an estimated 82,000 tons of garbage.

An estimated 1,500 fishing vessels also operate in the Caribbean Sea. Large oil shipments can negatively impact the marine environment. It has been estimated, for example, that about: '*seven million barrels of oil are dumped into the Caribbean Sea annually, about 50% of it from tankers and other ships in violation of IMO treaties…. With resulting destruction and damage to mangroves, sea grasses and coral reef ecosystems along tanker routes.'* (CCA, 2006:108). Trans-shipments of nuclear waste also pose potentially horrendous implications if an accident were to occur.

Caribbean Coral Reefs: where the wash all comes out

Figure 5



The cumulative impact on the marine environment of both land and marine sources of pollution have been impacting most transparently on the fringing coral reefs of the region. As the CARSEA project points out: '*A number of factors, each interacting with the other, are causing the degradation of coral reefs. They include: increased sedimentation from rivers discharging into the Caribbean; excess nutrients due to pollution from farmland run-off and sewage - including from cruise ships; over-fishing; diseases affecting coral reef features such as sea fans and sea urchins*

critical to the ecological balance of the reef; physical damage through dynamiting and dredging; and 'bleaching' of corals in which rising sea temperatures upset the symbiotic balance between coral polyps and the algae on which they feed.' (CARSEA, 2005:5)

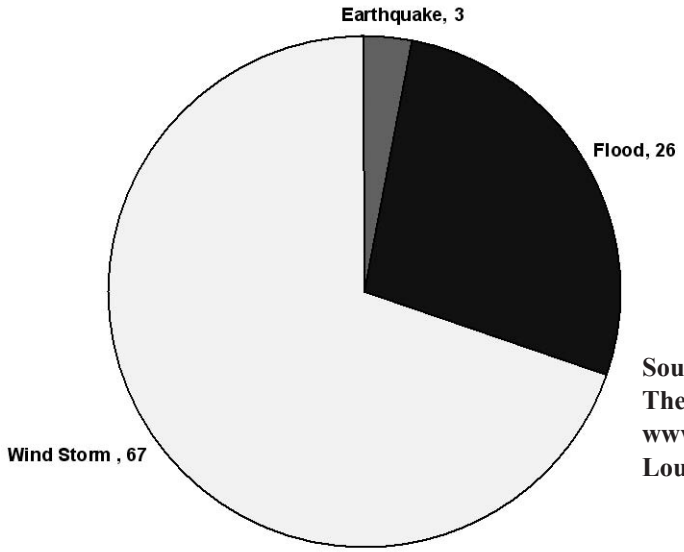
As a result some 80% of living coral in the region is estimated to have been lost over the past 20 years. Figure 5 tracks the absolute percentage of coral reef cover across the Caribbean basin from 1977 to 2001.

2.1.3 The Threat Function

The four aforementioned imperatives need to be located within the triple-sided functional relationship between the environment and the society and economy as a source, sink and threat.

The threat function poses a major developmental challenge as, for example, in the case of the Caribbean island of Grenada where an estimated 90% of buildings suffered damage as a result of Hurricane Ivan in September 2004. Figure 6 shows the major types and incidence of natural disasters between 1990 and 2006. Windstorms and flooding dominate.

Figure 6 : The Type and Incidence of Natural Disasters on 15 Caribbean Countries for the period 1990-2006



Source: EM-DAT:
The OFDA/CRED International Disaster Database
www.em-dat.net - Université Catholique de Louvain - Brussels - Belgium

Haiti and Jamaica experienced the most disasters for this period with the most number of deaths occurring in Haiti, Jamaica and Belize. A proportionally higher number of lives (7,000 more), were lost in Haiti when compared to all the other countries. In contrast, less than 10 deaths occurred in nine countries and no lives were lost in Anguilla, for this period. Jamaica, Grenada and the Bahamas experienced the most economic damage from natural disasters. The data above excludes the impact of natural disasters on environmental assets and the goods and services that they provide to Caribbean countries.

Table 1: Impact of Natural Disasters on 15 Caribbean Countries (1990-2006)

Country	Total no. of Disasters[13]	Total no. of Deaths	Total no. of Persons Affected	Total Damage (US$ '000)
Anguilla	1	0	150	50
Antigua and Barbuda	5	5	93,261	360,000
Bahamas	7	7	13,700	500,000
Barbados	3	1	3,000	0
Belize	7	44	145,170	330,240
Dominica	4	4	3,991	3,428
Grenada	4	40	62,045	894,500
Guyana	3	34	347,774	630,100
Haiti	28	7,052	2,221,815	101,000
Jamaica	13	49	943,734	1,808,787
St. Kitts and Nevis	4	5	12,980	238,400
St. Lucia	3	4	950	0
St. Vincent and the Grenadines	5	3	1,834	0
Suriname	1	3	25,000	0
Trinidad and Tobago	7	6	1,787	25,127
TOTAL	**95**	**7,257**	**3,877,191**	**4,891,632**

Source: EM-DAT: The OFDA/CRED International Disaster Database www.em-dat.net - Université Catholique de Louvain - Brussels - Belgium

Hurricane Ivan's Impact on Grenada

As noted earlier, Hurricane Ivan had a devastating impact on Grenada in 2004. The two tables below provide estimates of the damage caused.

Table 2: Direct and Indirect Damage caused by Hurricane Ivan to the Grenadian Economy

Generic Sector	Specific Sector	Direct Damage EC $M	Indirect Damage EC $M	Total EC $M
Social	Housing	1,372	9	1,381
	Health	11	0	11
	Education	195	1	196
Productive	Agriculture	54	46	100
	Manufacturing	18	4	22
	Wholesale and Retail	n/a	11	11
	Tourism	305	101.2	406.2
Infrastructural	Electricity	70	21	91
	Water and Sewage	7	1	8
	Telecommunication and Broadcasting	76.5	62.4	138.9
	Cable	8	5	13
	Transport	10.3	1.2	11.5
	Total	2,127	263	2389.6

Source: OECS 2004, 72

[13] Disasters include earthquake, flood and wind storms.

Table 3: Total Damage Costs (Direct and Indirect), Cost of Loans Incurred, Aid Flows and Grants related to Hurricane Ivan

TOTAL DAMAGE COST AND COST OF LOANS INCURRED (US$ Mn)		TOTAL AID FLOWS AND GRANTS (US$ Mn)	
TOTAL DAMAGE COST TO 12 SECTORS	**912**	- CDB Emergency Relief Grant	0.1
Total Direct Damage	812	- Trinidad ad Tobago Regiment	1.3
Total Indirect Damage	100	- World Bank*	4.48
TOTAL COST OF LOANS INCURRED	**36**	- PAHO/WHO	0.5
		- UNDP	1.63
Six(6) Caribbean Development Bank Loans:		- United States of America (US AID)	40.3
- Hurricane Reconstruction Report	5.4	- UKDFID	11.79
- Disaster Mitigation and Restoration	5.2	- UNOCHA	0.1
- Sites and Services for Low Income Earners	2	- Taiwan Government	4.5
		- CIDA	2.5
- Reconstruction Recovery and Development	10	- WRB Enterprise Incorporated	0.25
- Hurricane Reconstruction Support	8	**TOTAL RECEIPTS**	**67.35**
- Emergency Restoration	0.5		
World Bank Loan*	4.9		
TOTAL COSTS	**948**		

*The World Bank contributed US$9.38M. This was disaggregated to include US$4.9m for loan and US$4.48 for grants.
Source: CDB, OECS 2004 & World Bank 2005

Section 3: Policy Implications and Conclusions for a Coastal Resource-based Sustainable Economic Development (SED) Strategy for Caribbean SIDS

A Coastal resource-based sustainable economic development for Caribbean SIDS requires the management of the region's coastal resources in order to maximize the benefits of the source functions; minimization of the sink function and adaptation to the threat function in such a manner as to achieve intra and inter-generational equity.

These three objectives are not independent of each other and the challenge is to solve simultaneously for all three including benefiting from potential synergies while recognizing areas of overlap and conflict.

The importance of economic valuation and policy instruments

One of the major problems in addressing all three functions of the environment is the limited extent to which economic valuation has been undertaken in Caribbean SIDS together with related policy instruments for achieving desired outcomes. This begins with the source functions where the value of watersheds including for water supply, soil conservation and biodiversity is hardly documented. As a result, the immediate economic benefits - or direct use values - of changes in land-use tend to persuade policymakers. A classic example is Jamaica, where Blue Mountain coffee fetches a premium price in a foreign exchange scarce economy. However, there are negative implications of such coffee production in the Blue Mountains of Jamaica - where it grows best - on downstream communities. This can be mitigated through a shift in cultivation practices including shade coffee production and, as well, reforestation. A recent study has estimated that the cost of the latter would be relatively insignificant compared to the benefits.[14] Similarly there is limited economic valuation of the biodiversity benefits of both terrestrial and marine resources in Caribbean SIDS.

The challenge of integrating the unavoidable and hence legitimate livelihood demands of the population also requires reconciliation with the use of coastal resources in order to realize their sustainable utilization. Again, economic analysis becomes important here together with identification of policy interventions and instruments.

14 See Pantin and Reid, 2005.

There also has only been limited economic analysis of the benefits of pro-active, ex ante adaptation to climate change as opposed to post-facto rehabilitation.

3.1 The National, Sub-Regional, Regional, and Global Levels

Global

Perhaps arguably the major longer-run challenge facing the region is to adapt to climate change given an existing vulnerability to natural disasters. The Caribbean - as well as other SIDS - has an interest therefore in the reduction of the emission of greenhouse gases particularly by the major hydrocarbon consuming countries of the OECD, China and India. In the immediate present, there also is the problem of depletion of fish stocking by marauding bands of long line fishing fleets from other parts of the world. Dumping of waste and the dangers of the transshipment of nuclear waste also need to be taken into account.

The Caribbean has no policy leverage by itself over these global trends and therefore need to make common cause with others to achieve some workable global governance system in the interest of all. Again, the economic analysis of the implications of climate change and natural disasters, as discussed immediately above, can help to sharpen the discourse. A similar observation can be made re the economic implications of depletion of fish stocks and pollution of the Caribbean marine environment.

Regional

As noted earlier, the Caribbean Sea is semi-enclosed and is impacted upon by surrounding terrestrial land including the major south American rivers. Sustainable economic development of individual Caribbean SIDS cannot therefore be considered in isolation of their neighbours. In a more restricted but equally real sense this also is true in terms of relative economic conditions among neighbouring countries. Haitian migration to the Dominican Republic is one example. Another is migration to oil-rich Trinidad and Tobago by neighbouring countries of the Eastern Caribbean.

The greater Caribbean is therefore the initial context in which the term regional needs to be used. At present, the Association of Caribbean States (ACS) is the only existing inter-government body which incorporates all of the relevant parties which impact on the Caribbean marine and coastal environment.

Sub-regional

At the sub-regional level we can identify the Caribbean Community (CARICOM) and its sub-grouping: the Organization of Eastern Caribbean States(OECS) with the larger having actually agreed to collaboration on environmental matters.

The National Level

Although sustainable economic development of the coastal resources of individual Caribbean SIDS is not fully realizable without regional and international collaboration, rising to the challenge naturally begins within the national framework where the greatest degrees of freedom to act exists. It is also at the national level that the main constraints are revealed. Perhaps the most significant of these is the absence of an overarching holistic approach to national policymaking integrating the physical, environmental, social and economic. Rather, even where these dimensions are being simultaneously addressed in some Caribbean SIDS this is predominantly being undertaken in 'silos' with very limited, if any, inter-face with the other aspects of what is really one common reality. The constraint is not the failure to recognize the need but to give effect to it. Thirty-two years ago, for example, in 1975 the United Nations Ocean Economics and Technology Office prepared a study on ‘Coastal Area Management and Development’ which

is reported in the proceedings of a 1976 Seminar in Berlin ...*'to have been well received by UN Member States.'*[15] The report on this Seminar notes that:

'Coastal areas also are, or becoming, focal points for tourism, trade, industrial production and waste disposal….the unmanaged growth of competing demands for coastal space, both landward and seaward of the shoreline, cannot continue without producing congestion and serious conflicts among uses, leading to the deterioration of the coastal environment itself…..Proper planning and co-ordination of marine activities can…not only help to manage conflicts but also take advantage of positive interactions between coastal activities.'

In fact, the papers included in the proceedings of this two-week Seminar still are relevant in terms of the outline of what ought to be done in terms of management of coastal resources. There are perhaps, however, two missing gaps. First, is in terms of recognition of the need to estimate the economic benefits and costs of ALL impacts in terms of coastal area development. Second, is the absence of any discussion on the criticality of the need for governance arrangements. The latter has been recognized, for example, in a recently initiated project by the Centre for Resource Management and Environmental Studies (CERMES), UWI, Cave Hill entitled: The Caribbean Large Marine Ecosystem(CLME) Governance Framework.

3.2 Sustainable Tourism as an Ideal Case Model for Global, Regional and National Collaboration

Sustainable Tourism is proposed as a practical case model around which to fashion a coastal resources strategy for sustainable economic development in Caribbean SIDS for several reasons:

First, tourism is the common industry which exists in ALL Caribbean SIDS.

Second, it is already the dominant industry in several of these economies and is, everywhere, growing at a significant rate.

Third, the Caribbean has natural comparative advantage in tourism and is therefore a globally competitive industry.

Fourth, the potential value added of the tourism industry in terms of linkages with other sectors which provide inputs has only been partially tapped to date. The Caribbean therefore has the potential to enhance its net foreign exchange and fiscal earnings together with employment even with a constant tourist expenditure by increasing the share of the latter which is retained regionally.

Fifth, the sustainability of the industry - as detailed earlier in Section 2 - already is under risk.

Sixth, the ACS, which, as noted above embraces the Greater Caribbean, has already targeted tourism and the achievement of a Sustainable Tourism Zone in the Caribbean by 2020.

Seventh, in addition to the man-made vulnerabilities of the regional tourism industry there also are the challenges from the general vulnerability to natural hazards and climate change challenges to sustainable tourism development, climate change and impacts on coastal resources. General vulnerability to natural hazards.

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15 Study is cited as Doc.E/5648 in proceedings of Interregional Seminar on Development and Management of Coastal Areas. May 21-June 14, 1976.

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The Impact of Climate Change on Small Island Environments in the Caribbean: The Challenges Ahead

Rawleston Moore

The Impact of Climate Change on Small Island Environments in the Caribbean: The Challenges Ahead

Rawleston Moore

Climate Change and the Potential Consequences for the Island States of the Caribbean

Climate change is the most serious environmental and developmental issue which is facing the small islands in the Caribbean and the rest of the world. There is more than enough evidence confirming that climate change is occurring and that the greenhouse gas emissions from human activities are causing the changes in the climate.

The Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) has stated that the understanding of anthropogenic warming and cooling influences on climate has improved since the Third Assessment Report, leading to very high confidence that the global average net effect of human activities since 1750 has been one of warming, with an increase in the global atmospheric concentration of carbon dioxide the most important greenhouse gas, from a pre-industrial value of about 280pmm to 379pmm in 2005. The atmospheric concentration of carbon dioxide in 2005 exceeds by far the natural range over the last 650,000 (180 to 300ppm) as determined from ice cores, with eleven of the last twelve years (1995-2006) ranking among the 12 warmest years in the instrumental record of global surface temperature. The linear warming trend over the last 50 years (0.13°C per decade) is nearly twice that for the last 100 years. Warming of the climate system in unequivocal as it is now evident from observations of increases in global average air and ocean temperatures, and widespread melting of snow and ice.[16]

In terms of the future The Fourth Assessment Report of the IPCC has also noted that since the first IPCC report there have been observed increases of 0.2°C per decade for the period 1990-2005, and for the next two decades, there are projections for a warming of about 0.2°C per decade for various greenhouse gas emission scenarios. Even if the concentrations of all greenhouse gases and aerosols are kept constant at year 2000 levels, a further warming of about 0.1°C per decade would be expected.[17] Thus the impacts of climate change will occur even if greenhouse gas emissions were to be reduced immediately.

With regards to sea level rise the outputs of the fourth assessment report of the IPCC provide cause for concern. Global average sea level rose at an average rate of 1.8 mm (1.3 to 2.3mm) per year over 1961 to 2003, with a high level of confidence that the rate of observed sea level rise increased from the 19th to the 20th century. The total 20th -century rise is estimated to be 0.17m (0.12 to 22m).[18] With regards to sea surface temperature over the period 1961 to 2003, global ocean temperature has risen by 0.10°C from the surface to a depth of 700 m.[19]

In the future, global sea level rise is projected to rise by 1-7mm per year.[20] *Ruosteenoja et al* (2003)[21], using seven coupled atmosphere-ocean general circulation models (AOGC Ms), has projected that for the Caribbean that there will be the following temperature increases: (i) 0.48-1.06 °C during the period 2010-2039, (ii) 0.79 to 2.45°C during the period 2040-2069 and (iii) 0.94 to 4.18°C by 2070-2099. With regards to water resources, models have indicated that many islands of the Caribbean will suffer water shortages under the various IPCC SRES scenarios.[22]

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16 IPCC, 2007: Summary for Policymakers. In: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M.Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

17 Ibid 1

18 Ibid 1

19 Bindoff, N.L., J. Willebrand, V. Artale, A, Cazenave, J. Gregory, S. Gulev, K. Hanawa, C. Le Quéré, S. Levitus, Y. Nojiri, C.K. Shum, L.D. Talley and A. Unnikrishnan, 2007: Observations: Oceanic Climate Change and Sea Level. In: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

20 Meehl, G.A., T.F. Stocker, W.D. Collins, P. Friedlingstein, A.T. Gaye, J.M. Gregory, A. Kitoh, R. Knutti, J.M. Murphy, A. Noda, S.C.B. Raper,I.G. Watterson, A.J. Weaver and Z.-C. Zhao, 2007: Global Climate Projections. In: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S.,D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

21 Ruosteenoja, K., T.R. Carter, K, Jylha, and H. Tuomenvirta, 2003: Future climate in world regions: an intercomparison of model-based projections for the new IPCC emissions scenarios. The Finnish Environment 644, Finnish Environment Institute, Finland, 83 pp.

22 See Arnell, N.W., 2004: Climate change and global water resources: SRES emissions and socio-economic scenarios. Global Environmental Change, **14,** 31-52

For the Caribbean these types of climatic changes will have disastrous consequences. Sea level rise will lead to increased erosion rates and loss of highly valuable coastal lands. Coastal ecosystems such as mangroves and coral reefs will be at risk. There is the possibility of salt water intrusion into the freshwater aquifers, thus reducing the quantity and the quality of available freshwater. Soil salinization could also occur as a result of sea level rise on low lying islands such as Antigua, Barbados and Bahamas. Changes in rainfall patterns will affect agricultural production and food security in many islands as well as reduce the amount of surface water available which many islands are dependant upon. There are also projections for increases in the occurrence of vector borne diseases such as dengue fever. With projected increases in temperature there is also the possibility for increased occurrences of heat stress related illnesses.

The small island states in the Caribbean characteristically have the majority of their critical infrastructure located in coastal areas. Throughout the Caribbean key infrastructure such a hospitals and schools are located in the coastal region, along with numerous population centers. These coastal areas are the most susceptible to sea level rise. Tourism is one of the key industries in the Caribbean and for many countries in the region it is the major economic earner. The Caribbean tourism and travel industry is expected to contribute 5.1% to the gross domestic product of the Caribbean in 2007 (US$12.5 billion), with approximately 2.5 million persons in 2007 employed by the travel and tourism industry. The industry is expected to grow by 3.3% in real terms per annum between 2008 and 2017[23]. The tourism industry will be affected directly by climate change. The changing climate will cause damage to tourism infrastructure, along with damage to ecological tourism attractions such as coral reefs, and other resource bases for tourism.

The small islands of the Caribbean will thus have to address the impacts of climate change and global warming. These impacts will affect the social and economic fabric of countries in the region, and require substantial financial and economic resources to address. For a region which has to address issues related to globalization, free trade, HIV/AIDS and education, addressing climate change impacts will prove to be an additional burden which the Caribbean could do without.

Occurring Climate Change and the Vulnerability of the Caribbean

While the islands of the Caribbean are not necessarily a homogenous group, they are characterized by limited physical size, a high susceptibility to hurricanes and tropical storms, limited funds and human resource skills, and in some cases limited natural resources. The economies of the Island states of the Caribbean region are generally very small, low resilience economies which are extremely vulnerable to external market forces, have an inability to obtain benefits from economies of scale, and are dependent for the most part on external trade. There is thus a natural vulnerability not related to climate change which the countries of the region have to address. The issues of globalization, changing trading regimes and removal of preferential trading agreements are further enhancing the vulnerability of the region. The limited natural resources which are present in the region are heavily exploited, as a result of unsustainable human activities and consumption patterns. Thus the vulnerability in the Caribbean is thus compounded by climate change. Unlike other countries in the world, when a disaster of any form affects an island in the Caribbean it often leads to a complete breakdown of processes and structures in the country.

With the natural vulnerabilities which islands have in the region, climate change will only enhance these vulnerabilities and the effect which climate change will have will only be compounded as a result of the natural vulnerabilities. The Caribbean islands like other islands in the world are thus extremely vulnerable to climate change more so than any other group of countries in the world. Currently there is enough evidence to suggest that climate change is occurring in the Caribbean.

[23] World Travel &Tourism Council (2007), Caribbean Travel and Tourism - Navigating the Path Ahead. The 2007 Travel and Tourism Economic Research

The Caribbean region experienced on average a mean relative sea-level rise of 1 mm per year during the 20th century.[24] There are some variations in different areas of the Caribbean due to local conditions, for example, variations in sea level on the west Trinidad coast indicate that sea level in the north is rising at a rate of about 1 mm/year while in the south the rate is about 4 mm/year, the difference being a response to tectonic movements (Miller, 2005).[25] The percentage of days having very warm maximum or minimum temperatures increased strongly since the 1950's while the percentage of days with cold temperatures decreased (Peterson *et al* 2002).[26] The Caribbean has been warming generally. Outputs from the Fourth Assessment Report have shown that warming has ranged from 0 to 0.5°C per decade for the 1971 - 2004 period in the Caribbean. Thus there is no question that climate change is occurring in the region.

The susceptibility of the Caribbean region to hurricanes is indeed indicative of the vulnerability of the region. The Caribbean experienced its highest level of hurricane activity during the period 1995-2000 ***(see figure 1)***.

In the Caribbean, intense hurricane activity was significantly greater during the 1950s and 1960s, in comparison with the 1970s and 1980s and the first half of the 1990s except, during 1988, 1989 and very recently during 1995. The years 1995 - 2000 experienced the highest level of North Atlantic hurricane activity in the reliable record ***(see figure 1)***. The year 2004 was particularly devastating as it relates to hurricane activity in the Caribbean region. There were six major hurricanes in 2004 which caused approximately US$6,059 million worth of economic damages and losses to The Bahamas,[27] The Cayman Islands,[28] Dominican Republic,[29] Grenada,[30] Haiti[31]and Jamaica[32] (***see table 1).***

The destructive impact hurricanes have on small Island states in the Caribbean is a timely reminder of the total vulnerability of island states. Unlike larger continental countries a natural disaster such as a hurricane can virtually wipe out an island's entire social and economic fabric and structure. Hurricane Ivan directly affected 83% of the population of the Grand Cayman, with the other 17% indirectly affected. Tourism contributes over 50% to the GDP in Grand Cayman and 27% of the employment. Damage to tourism infrastructure such as hotels, condominiums, apartments and guest houses, as a consequence of Hurricane Ivan was to the tune of CI$281.5million (1 CI$ 1.2US$).[33] Grenada too suffered shocking damage as a result of Hurricane Ivan, with more than 90% of hotel rooms damaged, and over 80% of the nutmeg trees lost. In addition 90% of the housing stock was damaged, totaling EC$1,381 million or 38% of the gross domestic product of Grenada.[34]

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[24] Bindoff, N.L., J. Willebrand, V. Artale, A, Cazenave, J. Gregory, S. Gulev, K. Hanawa, C. Le Quéré, S. Levitus, Y. Nojiri, C.K. Shum, L.D. Talley and A. Unnikrishnan, 2007: Observations: Oceanic *Climate Change and Sea Level. In: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

[25] Miller, K., 2005: *Variations in Sea Level on the West Trinidad, Marine Geodesy,* ***28***, (3), 219-229

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[27] See, Economic Commission for Latin America and the Caribbean, Interamerican Development Bank (2004) *Hurricanes Frances and Jeanne, Their Impact in the Commonwealth of the Bahamas*

[28] See Economic Commission for Latin America and the Caribbean, United Nations Development Programmeme, Cayman Islands Government (2004) *The Impact of Hurricane Ivan in the Caymans*

[29] See Economic Commission for Latin America and the Caribbean, United Nations Development Programmeme (2004) *Los Efectos Socioeconómicos del Huracán Jeanne en la República Dominicana*

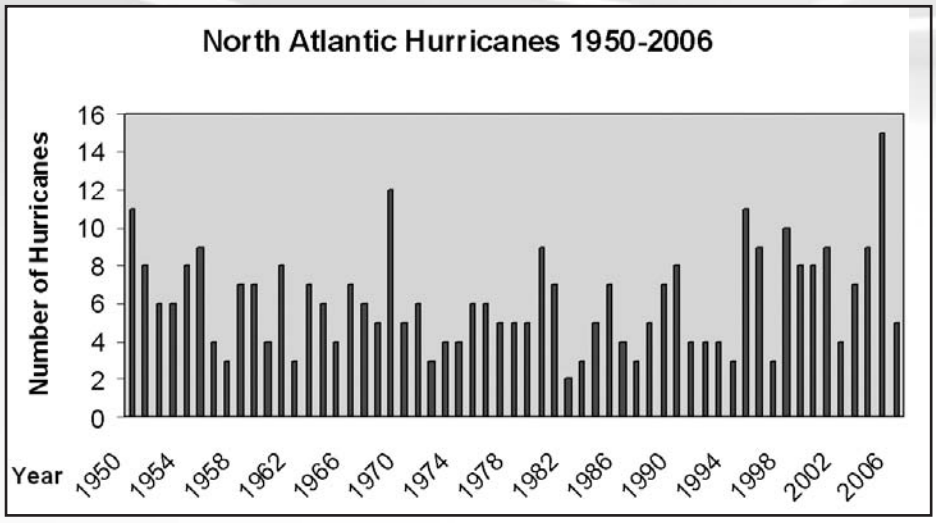
[30] See Organization of the Eastern Caribbean States (2004), Grenada: *Macro Socio-economic Assessment of the Damages Caused by Hurricane Ivan*

[31] See, Economic Commission for Latin America and the Caribbean, United Nations Development Programmeme (2004). *Le Cyclone Jeanne en Haïti: degats et effets sur les departements du nord-ouest et de l'artibonite : approfondissement de la vulnerabilite*

[32] Economic Commission for Latin America and the Caribbean, United Nations Development Programmeme, Planning Institute of Jamaica, *Assessment of the socioeconomic and environmental impact of Hurricane Ivan on Jamaica*

[33] Ibid 13

[34] Ibid 15



Source:
Compiled by the Author

With the limited ability of Caribbean islands to cope with extreme events such as hurricanes, climate change will be an additional concern for countries which are already extremely vulnerable. It is therefore imperative that the island states of the Caribbean initiate processes to reduce their vulnerability, and enhance their resilience to climate change. The Caribbean will need to adopt strategies and policies to assist in reducing their vulnerability. This will involve allocating resources specifically to address climate change and ensuring that climate change is considered in every social and economic sector in each country.

Table 1 Economic Impact of the 2004 Hurricane season in the Small Island States of the Caribbean

Country	Natural Event	Econc Economic Impact US$Million Millio
The Bahamas	Hurricanes Frances and Jeanne	551
The Cayman Islands	Hurricane Ivan	3432
The Dominican Republic	Tropical Storm Jeanne	296
Grenada	Hurricane Ivan	889
Haiti	Hurricane Jeanne	296
Jamaica	Hurricane Ivan	595
Total		**6059**

Source:
Compiled by the Author

The Global Political Dynamic and Greenhouse Gas Emissions

The United Nations Framework Convention on Climate Change (UNFCCC) came into force in 1994. It was a major output of the Rio Conference on Environment and Development, which was held in 1992. The UNFCCC is the key international agreement to address climate change. Initially the parties of the UNFCCC agreed for developed countries to voluntarily reduce their greenhouse gas emissions to 1990 levels by the year 2000, while for developing countries there would be no new commitments to reduce greenhouse gases, recognizing the principle of common but differentiated responsibilities. Further UNFCCC negotiations resulted in the Kyoto Protocol which required developed country parties to the UNFCCC to reduce emissions of six greenhouse gases: carbon dioxide, methane, nitrous oxide, hydro fluorocarbons, per fluorocarbons and sulphur hexafluoride, by a global average of 5.2%, by the period 2008-2012, the first commitment period. To assist the developed countries in meeting the country differentiated targets to achieve the global reduction of 5.2%, flexibility mechanisms in the form of emissions trading, joint implementation and the clean development mechanism were put in place. Unfortunately the Kyoto Protocol did not come into force immediately after it was agreed in December 1997. Further negotiations resulted in the Kyoto Protocol coming into force on February 16, 2005, however the United States of America and Australia, refused to sign up to the Protocol.

With the first commitment period approaching, negotiations have already begun on a second phase of commitments. Article 3.9 of the Kyoto Protocol states that the consideration of such commitments shall be initiated, at least seven years before the end of the first commitment period. Currently there is a process established - The Ad Hoc Working Group (AWG) on the Kyoto Protocol-with the aim of establishing future emission reduction commitments for developed countries. Concurrently an additional process under the UNFCCC - The Dialogue on Long Term Cooperative Action, has also been initiated to identify and agree on future strategies for responding to global climate change.

For the Caribbean small island developing states there are a number of concerns with regards to future considerations of greenhouse gas reductions. The first relates to the absence of Australia and the United States of America from the Kyoto Protocol and future commitments, on the basis of economic reasons. Both the United States of America and Australia are major emitters of greenhouse gases (see Table 2), thus their absence from any agreement to reduce greenhouse gases is a cause of key concern, as their contribution to the global problem of climate change will increase in the absence of legally binding reduction commitments. The second issue for Caribbean countries is the position of major developing country emitters such as India, China and Brazil. The Caribbean SIDS are members of the same negotiating group as many of the large major developing country emitters, the G77, as are many OPEC countries. These large members of G77 often refer to the Berlin Mandate, the issue of common but differentiated responsibilities and the fact that there should be no new commitments for developing countries to reduce greenhouse gases. As a consequence the Caribbean islands are at variance with their developing country negotiating colleagues with regards to the position of greenhouse gas reductions, as it is clear that there is a need for the major developing country emitters to reduce greenhouse gas emissions. The situation has become even more critical with reports that China has now surpassed the United States of America as the world leader in greenhouse gas emissions.[35]

Table 2: Total Emissions of Major Emitters of Greenhouse Gases 2003 (Excluding land use change and forestry)

Country	MtC	% of World Total
United States of America	1,576.90	22.27%
China	1,227.40	17.34%
European Union (25)	1,092.60	15.43%
Russian Federation	431.5	6.10%
Japan	343.4	4.85%
India	313.4	4.43%
Germany	236.1	3.34%
United Kingdom	150.8	2.13%
Canada	148.3	2.10%
Korea (South)	133.5	1.89%
Italy	127.8	1.81%
Mexico	109.2	1.54%
France	107.5	1.52%
South Africa	104.4	1.47%
Iran	102.1	1.44%
Indonesia	94.7	1.34%
Australia	93.2	1.32%
Spain	91.5	1.29%
Brazil	90.7	1.28%
Saudi Arabia	89.3	1.26%

[35] See http://www.mnp.nl/en/dossiers/Climatechange/moreinfo/Chinanowno1inCO2emissionsUSAinsecondposition.html

The Caribbean SIDS are thus in a quite difficult position, as it relates to international global politics with regards to legally binding commitments to reduce greenhouse gas emissions. Caribbean countries traditionally have contributed little to the problem of global carbon dioxide emissions (see Table 3), yet will suffer the most from the impacts of the changing climate. In addition the Caribbean countries are members of a negotiating group, - the Group of 77 and China -, which has members who are large emitters and opposed to any attempt to reduce their greenhouse gases. OPEC countries are also members of the G77, and thus their interest is in keeping markets for their various oil products, and thus preventing any agreement of greenhouse gas reductions.

A further problem relates to the role of the United States of America. The USA has consistently argued that unless key developing countries take binding commitments to reduce greenhouse gases then the USA will never be able to accept a binding commitment to reduce greenhouse gases.[36]

It is highly unlikely that there can be the stabilization of atmospheric carbon dioxide without the inclusion of the largest emitters. Projections clearly show that the majority of growth in greenhouse emissions is occurring in developing countries (see figure 2). The International Energy Agency notes that under certain scenarios using 2004 as a base year global energy-related carbon-dioxide (CO_2) emissions increase by 55% between 2004 and 2030, or by 1.7% per year, with developing countries accounting for over three quarters of the increase of global emissions, overtaking members of the Organization for Economic Cooperation and Development soon after 2010.[37] It is therefore clear that concerted action needs to take place to address the increasing emissions of developing countries.

Table 3: Greenhouse Gas Emissions of Selected Caribbean Countries 2003 (Excluding Land Use Change and Forestry

Caribbean Country	MtC	% of World Total
Cuba	7.2	0.10%
Trinidad & Tobago	6.9	0.10%
Dominican Republic	5.8	0.08%
Jamaica	2.9	0.04%
Bahamas	0.5	0.01%
Haiti	0.5	0.01%
Barbados	0.4	0.01%
Antigua & Barbuda	0.1	0.00%
Saint Lucia	0.1	0.00%
Grenada	0.1	0.00%
Saint Vincent & Grenadines	0.1	0.00%
Dominica	0	0.00%
Saint Kitts & Nevis	0	0.00%

Greenhouse Gas Concentration Targets and Their Implications for the Caribbean

Currently the international negotiations on the second commitment period under the AWG, are focused on finding an atmospheric limit for carbon dioxide concentrations which is achievable along with limiting global temperature increases within a certain range, so as to minimize the impacts of climate change. The current level of CO_2 in the atmosphere is approximately 380ppm. Many of the discussions related to the AWG have focused on limiting the temperature increase to 2OC, the proposed European Union temperature target.

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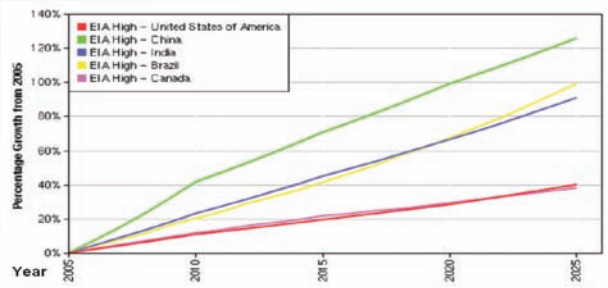
[36] See J.Parikh (2001), No going back on climate change convention . Indira Gandhi Institute of Development Research, 2001

[37] International Energy Agency (2006), World Energy Outlook 2006, Paris France.

This target will require a stabilization of greenhouse gas emissions at 450ppm, with a peak in emissions by 2015, with a 50-60% reduction by 2050[38]. In order for this target to be reached developing country emissions need to be 15-20% below their current baseline emissions, while developed countries emissions would have to be 15% below 1990 levels by 2020. Table 4 shows various greenhouse gas concentration targets and the global temperature increase associated with these concentrations, along with the percentage change of carbon dioxide emissions which will be required.

Figure 2 CO_2 Emission Projections-Energy Information Administration-Scenario High



Source:
www.cait.wri.org,
Energy Information Administration (EIA)
www.eia.doe.gov

For the Caribbean islands it is necessary to consider the associated impacts which can occur with a minimum temperature increase such as 2OC. Oppenheimer and Alley [39],[40] , have indicated that changes in the West Antarctic ice sheet, could possibly occur with a temperature increase of CO_2, and atmospheric carbon dioxide concentrations of 450ppm-550ppm. The Fourth Assessment Report of the IPCC has stated that sea level rises will result from the widespread deglaciation of Greenland and West Antarctic ice sheets, as a consequence of an increase of the global average temperature of 1-4°C(relative to 1990-2000). Partial deglaciation of the Greenland ice sheet, and possibly the West Antarctic ice could cause sea level rise of 4-6, while the complete melting of the Greenland ice sheet and the West Antarctic ice sheet would lead to a contribution to sea-level rise of up to 7 m and about 5 m, respectively.[41] Sea level rise of one metre will be catastrophic for the small islands of the Caribbean, causing severe disruption to every social and economic sector.

Fragile ecosystems in the Caribbean will also suffer with a 2OC increase in temperature. Coral reefs are already known to undergo coral bleaching when the sea surface temperature goes beyond the maximum monthly mean (the climatological mean temperature during the warmest month of the year) by 1°C or more for 1 month or more. During 2005, as a result of elevated seawater temperatures, an extensive coral bleaching event occurred in the Caribbean.[42] This caused bleaching of 90% of coral cover in the British Virgin Islands, 80% in the U.S. Virgin Islands, 66% in Trinidad and Tobago, 52% in the French West Indies, and 85% in the Netherlands Antilles.[43]

A 2°C temperature increase could be therefore catastrophic for many of the region's coral reefs. Coral reefs in the region are already suffering from other anthropogenic impacts such as land-based sources of pollution. Gardner et al[44] note that there has been a massive region-wide decline of corals across the entire Caribbean basin, with the average hard coral cover on reefs being reduced by 80%, from about 50% to 10% cover, in three decades and that the ability of Caribbean coral reefs to cope with future local and global environmental change may irretrievably compromised. Recent studies have put forward the argument that bleaching events may become biannual events in the next 20-30 years unless corals and their symbionts can adapt and adjust their thermal tolerance by 0.2-1.5°C. [45, 46]

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[38] den Elzen, M.G.J. and Meinshausen M., (2005). Meeting the EU 2OC Climate target: global and regional emission implications. Netherlands Environmental Assessment Agency.
[39] Oppenheimer, M and Alley, R.B (2004): The West Antarctic ice sheet and long term climate policy, *Climatic Change*, 64:1-10
[40] Oppenheimer, M and Alley, R.B (2004): Ice sheets, global warming and Article 2 of the UNFCCC, *Climatic Change*, 68:257-267
[41] Meehl, G.A., T.F. Stocker, W.D. Collins, P. Friedlingstein, A.T. Gaye, J.M. Gregory, A. Kitoh, R. Knutti, J.M. Murphy, A. Noda, S.C.B. Raper,I.G. Watterson, A.J. Weaver and Z.-C. Zhao, 2007: Global Climate Projections. In: *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [Solomon, S.,D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
[42] See 2005 Caribbean Basin Bleaching Event http://coralreefwatch.noaa.gov/caribbean2005/
[43] Data available from http://coralreefwatch.noaa.gov/caribbean2005.
[44] Gardner, Côté, Gill, Grant. Watkinson1,2,3 Long-Term Region-Wide Declines in Caribbean Corals Science 301, 958 (2003);
[45] Donner, Knutson, and Oppenheimer (2007) Model-based assessment of the role of human-induced climate change in the 2005 Caribbean coral bleaching event, Proceedings of the National Academy of Sciences of the United States of America Vol. 104;5483-5488
[46] Donner, Skirving, Little, Oppenheimer, and Hoegh-Guldberg (2005) Global Assessment of Coral Bleaching and Required rates of Adaptation under Climate Change. Global Change Biology Vol 11, 2251-2265

Mangrove ecosystems in the region are also at severe risk with a 2°C rise in temperature, with subsequent sea level rise, which will occur as a result of thermal expansion of the oceans, and the melting of the polar ice caps. Many studies have shown that mangroves in the Caribbean could be lost as a consequence of sea level rise. Sea level rise of 1 metre will cause more than 300 hectares of mangrove forest in Cuba to be at risk.[47] There are also projections of a complete collapse of the Port Royal mangrove wetland in Jamaica,[48] and damage to mangroves in Puerto Rico.[49]

Habitats of other biodiversity such as turtles will also be impacted with the sea level rise associated with increase in the global mean temperature of 2°C. Fish et al,[50] have identified that one of the major effects of sea level rise will be a loss of beach habitat, which provides nesting sites for endangered sea turtles.

Table: 4 Greenhouse Gas Concentrations and Temperature Increase [51]

Concentration ppm -CO2 equiv	Global Mean Temperature Increase ºC	Peaking Year	%CO2 Emission Change
445-490	2.0-2.4	2000-2015	-85 to -50
490-535	2.4-2.8	2000-2020	-60 to -30
535-590	2.8-3.2	2010-2030	-30 to +5
590-710	3.2-4.0	2020-2060	+10 to 60+
855-1130	4.9-6.1	2060-2090	+90 to +140

A 2°C increase in temperature will lead to adverse impacts as far as the health of the populations in the Caribbean is concerned. There will be naturally more people affected with heat stress, while given the projections for reduced rainfall in the Caribbean,[52] there will be shortages in the amount of available freshwater, which could lead to increases in water borne diseases. Amarakoon et al[53] examined reported cases of dengue during the period 1980 to 2000 in Barbados, and Trinidad and Tobago, with relation to the variability in precipitation and temperature. The annual patterns of reported cases were nearly periodic and compared closely with the periodicity of ENSO events, and that warmer temperatures and less abundance in rainfall appeared to be influencing dengue epidemics.

The island states of the Caribbean will thus be severely impacted with an increase in temperature of 2°C. It is clear that many of the impacts associated with an average increase of 2°C will cause damage to Caribbean islands environments which in many instances will be irreversible. Many Caribbean islands clearly will be unable to adapt to impacts associated with an increase of 2°C. There will be devastating impacts to the infrastructure and economies of the region, along with social impacts which will affect the quality of life in the region. Given the impacts associated with a 2°C increase in average global temperatures, it is clear that impacts of an increase in the global average of temperature of 3°C or 4°C will be even more catastrophic. It is clear for the Caribbean there is a need to limit the global average temperature increase to below 2°C. This however will be no easy task.

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47 P e re z , A.L., C. Rodriguez, C.A. Alvarez, and A.D. Boquet, 1999: A s e n t a m i e n t o s humanaos y uso de la tierra. In: Impactos del Cambio Climatico y Medidas de Adaptacion en Cuba [Gutierrez, T., A. Centella, M. Limia, and M. Lopez (eds.)]. Proyecto No. FP/CP/2200-97-12, United Nations Environment Programmeme/INSMET, La Habana, Cuba, pp. 130-163.

48 Alleng, G.P., 1998: Historical development of the Port Royal Mangrove Wetland, Jamaica. *Journal of Tropical Research*, 14(3), 951-959.

49 Suman, D.O., 1994: Status of mangroves in Latin America and the Caribbean basin. In: El Ecosistema de Manglar en America Latina y la Cuenta del Caribe: Su Manejo y Conservacion [Suman, D.O. (ed.)]. Rosentiel School of Marine and Atmospheric Science, Universidad de Miami, FL and the Tinker Foundation, New York, NY, USA, pp. 11-20.

50 Fish, M.R., I.M. Cote, J.A. Gill, A.P. Jones, S. Renshoff, and A. Watkinson., 2005: Predicting the impact of sea level rise on Caribbean sea turtle nesting habitat, Conservation Biology, 2 (2), 1523-1739.

51 IPCC, 2007. Climate change 2007: Mitigation. Contribution of Working group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [B. Metz, O. R. Davidson, P. R. Bosch, R. Dave, L. A. Meyer (eds)], Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

52 Ibid 7

53 Amarakoon, A., A. Chen, S. Rawlins, and M. Taylor. 2003. Dengue Epidemics-its association with Precipitation and Temperature, and its Seasonality in some Caribbean Countries. University of the West Indies, Jamaica.

Future Strategies for the Small Island Developing States of the Caribbean to address Climate Change

There is sufficient evidence to confirm that climate change is occurring, and that the island states of the Caribbean are amongst the most vulnerable in the world. Climate change will influence the development strategies of the countries in the region and will lead to significant social and economic dislocation if effective action is not taken. Even if there were emissions reductions today which limited carbon dioxide levels to 1990 levels climate change will continue to occur, with further warming unavoidable.[54] This was highlighted by the Stern report,[55] which examined the economics of climate change. The issue of climate change is thus here to stay.

For the Caribbean, to reduce the impacts of climate and remain viable countries, it is clear there is a need to limit the average global temperature increase to between 1°C and 2°C. Currently there has been an increase of 0.74°C in the average global temperature, and the world is committed to an increase of 0.2°C per decade for the next two decades, a total of 1.14°C.[56] Thus in order to limit the temperature increase to less than 2°C significant reductions in greenhouse gas emissions will be required. This will involve not only developed countries taking significant emission reductions, but also key developing countries. Nurse and Moore (2007) have argued that all countries that emit significant amounts of greenhouse gases should commit to binding reduction targets in the UNFCCC second commitment period, with the targets for developing countries being less stringent than those for developed countries.[57] The cost however to reduce global greenhouse gases emissions to reach the required levels is high. Table 5 below from the IPCC fourth assessment report indicates the reduction in global gross domestic product which is required to reach certain greenhouse gas reduction targets. There will need to be significant investments in technologies to reduce greenhouse gases. The Caribbean should lobby at the UNFCCC and other international fora, for reductions of greenhouse gases from the major developing countries, with some form of binding commitment. This commitment should be linked however, to the provision of technologies to the developing countries to assist them in sustainable development and reducing greenhouse gases. Caribbean countries will have to work with their G77 colleagues to ensure that an effective greenhouse gas reduction target is attained during negotiations at UNFCCC, while still enforcing the long-held concept of common but differentiated responsibilities between developed and developing countries.

Politically Caribbean leaders need to play a greater role in the international climate change debate, lobbying their international colleagues to reduce emissions. Recently at the Twenty-Eighth Meeting of the Conference of Heads of Government of the Caribbean Community (1-4 July, 2007 Barbados), the communiqué issued at the end actually addressed the issue of climate change. The communiqué expressed grave concern over the threat posed by global climate change to the sustainable development and future existence of the countries of the region.[58]

Table 5 Estimated Global Macro-Economic Costs in 2030 for least-cost trajectories towards different long term stabilization levels [59]

Stabilization levels (ppm CO2-eq)	Median GDP reduction[1] (%)	Range of GDP reduction [1][2](%)	Reduction of average annual GDP growth rates (percentage points) [1][3]
590-710	0.2	-0.6 - 1.2	< 0.06
535-590	0.6	0.2 - 2.5	<0.1
445-535[4]	Not available	< 3	< 0.12

[1] This is global GDP based market exchange rates, [2] The median and the 10th and 90th percentile range of the analyzed data are given. [3] The calculation of the reduction of the annual growth rate is based on the average reduction during the period till 2030 that would result in the indicated GDP decrease in 2030. [4] The number of studies that report GDP results is relatively small and they generally use low baselines.

The main challenge for the Caribbean region will be one of adaptation. Climate change is already occurring and thus there is a need to put effective adaptation measures in place. The adaptive capacity of the region may be considered low, while the cost of adaptation in some instances may be prohibitive. For example studies in Jamaica have estimated that it could cost US$462 million to protect the coasts of Jamaica from a sea level rise of one metre.[60]

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54 See Hare, W., and Meinhausen (2004). How much warming are we committed to and how much can be avoided
55 Stern, N., (2007). The Economics of Climate Change-The Stern Review. Cambridge University Press, Cambridge, UK
56 Ibid 5
57 Nurse, Moore (2007) Critical Considerations for future action during the second commitment period: A small island perspective
58 See http://www.caricom.org/jsp/pressreleases/pres167_07.jsp
59 Ibid 36
60 Government of Jamaica, Jamaica's First National Communication to the UNFCCC (Government of Jamaica 1999)

There is no alternative for the region other than adaptation. The Caribbean must adapt to the changes in the climate, and this will be a costly business. Adaptation to climate change will require a wide cross section of activities which will have to address all sectors of the economy. Areas such as agriculture, water resources and human health will require special attention, while considerable resources will have to be allocated to coastal protection.

Internationally there have been some global funds which have been established to assist countries such as those in the Caribbean with the cost associated with adaptation. One of these funds, the Adaptation Fund, which is not yet operational, obtains its resources through a 2% levy on the Clean Development Mechanism projects of the Kyoto Protocol. Some estimates have established that the fund could have approximately US$270-600 million[61] for adaptation projects, globally. The World Bank has estimated that between US$10-40 billion will be required by developing countries for adaptation.[62] It is clear that the Adaptation Fund will not be able to supply the resource required for adaptation in the region, given the estimates of the requirements for adaptation in the Caribbean, and the amount of money globally which is required for adaptation. With declining sources of official development assistance to small island states in general,[63] the Caribbean will have to look inward in order to reduce its vulnerability to climate change and improve its resilience to climate change.

The reality may also be that in some instances some countries in the region may not be able to adapt to climate change.[64] Caribbean countries must therefore invest inwardly, and adapt for themselves. The cost of implementing adaptation activities and policies now will be cheaper than putting measures in place in the future. In order for adaptation to occur effectively, climate change must now be considered a cross-cutting issue in the region. Climate change and adaptation can no longer be seen as an isolated environmental issue, it must be viewed as integral to the development process.

The region now must consider climate change in every aspect of its economy and every sustainable development and planning decision which is made must address the ongoing and future climatic changes. Future coastal developments must take into consideration sea level rise, while agricultural polices must recognize the need for new types of cultivars to address the changing climatic conditions and food security issues. Water policies too which encourage the conservation of water and in some cases the recycling of water along with desalination will have to be put in place. Energy policies need to move towards renewables simply to address issues related to energy security and to divert resources towards adaptation issues.

The Mandate of the centre is to support the people of the Caribbean as they address the impace of climate variability and change on all the aspects of economic development. Through the provision of the timely forecast and analyses of the potentially hazardous impacts of both natural and man-included climatic changes on the environment, special programmes can be developed to mitigate the dangers and create opportunities for sustainable development.[65]

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61 See Muller B, (2006) CLIMATE OF DISTRUST: The 2006 Bonn Climate Change Adaptation Fund Negotiations.http://www.oxfordenergy.org/pdfs/comment_0606-1.pdf

62 World Bank Environmentally & Socially Sustainable Development and Infrastructure Vice Presidencies, 'Clean Energy And Development: Towards An Investment Framework' Development Committee (Joint Ministerial Committee of the Boards of Governors of the World Bank and the International Monetary Fund on the Transfer of Real Resources to Developing Countries), Washington D.C./USA: 5 April 2006

63 Nurse, Moore (2005) Adaptation to Global Climate Change: An Urgent Requirement for Small Islands Developing States. Reciel 14 (2)

64 Ibid 47

65 See http://www.caribbeanclimate.bz

Sustainable Management in Small Coastal Communities in the Caribbean: Policy Lessons from Case Studies.

Michelle Mycoo and **Judith Gobin**

Sustainable Management in Small Coastal Communities in the Caribbean:

Policy Lessons from Case Studies

Michelle Mycoo and Judith Gobin

Introduction

Sustainable management is interpreted as the judicious use of available resources in the interest of ensuring that this and future generations of humankind have access and are able to utilize resources to meet not just their basic needs, but also secondary needs in the entire hierarchy of needs. In small coastal communities in the Caribbean sustainable management remains a challenge largely because of the gaps in policy formulation and implementation. This paper seeks to distil policy lessons in sustainable management derived from two coastal case study communities, specifically Praslin in St. Lucia and Sarteneja in Belize.

The paper first presents a contextual framework of the case studies that have been the subject of investigation and the methodological approach adopted. This is followed by an examination of opportunities, constraints and threats to sustainable management in relation to the case studies. The last section of the paper identifies the policy lessons learnt in addressing the opportunities, constraints and threats to sustainable management in the context of small coastal communities of the Caribbean.

Background

Over the period 2002 - 2005 detailed studies were conducted in the coastal communities of Praslin and Sarteneja, which were aimed at examining the potential and constraints in achieving income-generating natural resource-based and non-natural resource-based sustainable livelihoods in small coastal communities, and which by extension involve the challenges in attaining sustainable management. The case study selection criteria were the existence of poverty among the population, and whether the study areas had coastal natural resources and target habitats, including coral reefs, mangroves, coastal lagoons, sea grass beds and beaches that could be threatened by a range of issues linked to policy and practice.

Praslin is a small coastal village located on St. Lucia's east coast with a population of 497 persons, the majority of whom were formerly engaged in banana cultivation, but have shifted to near-shore sea moss cultivation and processing, and tour-guiding. According to a poverty map using data from the 2000 census Praslin is classified as extremely poor.

Sarteneja is a small Mayan/Mestizo community located on the north coast of Belize with a population of roughly 1,644 persons. The main livelihood of the population is fishing, but more recently the villagers, especially the young people are shifting to tourism.

Methodology

The findings of this paper were based on field work involving site visits to the respective coastal communities over the study period, interviews with multi-level stakeholders including policymakers and policy implementers in the public and private sector and communities, focus group meetings and workshops with communities and a literature review of reports done by government and non-governmental organizations.

Opportunities, Constraints and Threats to Sustainable Management

Sustainable management in small coastal communities of the Caribbean is integrally linked to the manner in which natural resources are utilized, and how this determines whether coastal people are attaining income-generating sustainable livelihoods which lead to poverty eradication in the present as well as the future. Several opportunities, constraints and threats present themselves to the sustainable management of small coastal communities of the Caribbean as demonstrated by the selected case studies. This section of the paper focuses on these issues, first briefly in the broad context of the Caribbean, and then specifically in relation to the two case studies examined in St. Lucia and Belize.

Small coastal communities of the Caribbean are found in the coastal zone, which is defined by Brown et al. (2002) as the set of landward systems function and use directly affects the marine environment and the set of marine systems that exist in proximity to land, and that tend to be the jurisdiction of one country. In small islands as are found in the Caribbean, this land/water interface where both aquatic and terrestrial resources systems co-exist, may in effect define an island in its entirety as the coastal zone.

The coastal zones of the Caribbean possess a rich diversity of natural resources that provide a wide range of goods and services that fuel economic growth and development, and if properly managed, help promote sustainable development. These natural resources include coral reefs, sea grasses, mangroves, the proximal coastal and marine areas and intertidal ecosystems, beaches and sand dune systems, which are all inextricably linked and have synergistic relationships that sustain the functioning of these systems. However, the coastal zone is very fragile since it is here that a series of dynamic processes occur and these are highly susceptible to anthropogenic activities. The coastal zone is in effect a sink for receiving a myriad of effluents from land-based activities which contribute to coastal degradation, pollution, eutrophication, sedimentation, and water quality decline.

The human impact on the natural resources of the coastal zone found in small island states of the Caribbean is significant. The main factors that contribute to deleterious impacts are unmanaged land and natural resource practices both by the poor and commercial interests and in some islands high population densities in the coastal zone itself aggravated by inadequate infrastructure to cope with waste disposal. At the policy level, weak management policies, or management policies that are simply not implemented contribute to natural resources degradation in the coastal zone. Also, in the Caribbean, natural disasters including tropical storms and hurricanes cause damage to natural resources especially coral reefs, mangroves and beaches.

The following sub-sections examine, under the headings of fishing, agriculture and tourism, sustainable management in relation to the livelihood practices of small coastal communities in the two case studies of Praslin and Sarteneja.

Fishing

Capture fisheries in the Caribbean include subsistence (consumed by the local community), artisanal (small commercial operations) and industrial fisheries (sophisticated vessels and modern technology). Jackson et al. (2001) suggest that fishing and, more specifically, over-fishing is a prime cause of coastal ecosystem degradation worldwide.

Over-fishing causes depletion in fish stocks, such that the natural recovery of the fish is hampered. In addition, juvenile fish continue to be caught and their essential habitats for spawning are destroyed, thus further extending recovery time. As Gobin (2003) has noted over-fishing reduces the grazers on coral reefs and allows algae to compete with corals for living space. The natural response by fishers to reduced catches is to increase their effort. This tends to involve a greater investment of time and money, and they may use smaller meshes which compounds the situation and leads to over-exploitation of the fish stock.

Many fishing vessels in the Caribbean utilize destructive methods as noted by Gobin (2003) as follows:

- Trawling which is the 'bulldozing' or 'dragging' of the ocean floor; takes everything of all sizes. In particular, such action destroys coral and rocky reefs, sponges, sea turtles and other such species. It is to be noted that Turtle Exclusion Devices (TEDS) have still not been legislated in many Caribbean countries so that trawling continues to be a threat to turtles;
- Long-lining boats which spool out miles of baited hooks in a single set, deplete swordfish and billfish;
- Drift nets and "ghost nets" are left out for extended periods and tend to trap very large catches of all sizes, including turtles;
- Cyanide and dynamite are also indiscriminately used to dislodge the fish from their cover which destroys coral reefs, rocks and other organisms; and
- Commonly practised small-scale commercial and artisanal fishing methods, which include hand lining, gill net, seines, trawlers also cause damage to Caribbean coastal and marine fishing grounds.

All of these unsustainable practices have depleted fisheries resources to the extent that according to the United Nations Environmental Programme (2000), the marine fish catch in the region is down by 50 per cent in gross tonnage since 1984.

In both Praslin and Sarteneja income from fishing has been declining because of unsustainable livelihood practices, land uses and policy changes. As noted by Gobin (2003) coastal communities in St. Lucia and Belize are affected by reduced fish stocks, pollution of coastal waters, inappropriate destructive fishing techniques such as dynamiting and trawling used by foreign and local vessels, nationals harvesting juvenile fish arising from the use of illegal mesh sizes and transnational fishing out of season.

It is evident that artisanal fishing methods damage Caribbean coastal and marine fishing grounds, while over-harvesting has led to the decline of some species such as the white urchin in St. Lucia (Gobin, 2003). In St. Lucia, the white urchin Trypneustes ventricosus, for which the gonads are a delicacy, are harvested close to the shore and in sea grass beds. The urchins are virtually immobile and very vulnerable to over-fishing. From what was once a very productive fishery, over-exploitation caused a severe decline by the mid 1980s when a three-year ban was imposed, beginning in 1987. The fishery continues to recover and decline with successive implementations of bans and open seasons. This policy combined with unsustainable practices has resulted in declining income for Praslin fishers and many have turned to exploiting other fish species.

Another specie that has declined because of unsustainable management of the resource is the Nassau grouper Epinelphus striatus, which from as early as the 1950s was fished by the tens of thousands per year in Belizean waters, and has been depleted steadily over time to less than 1,000 individuals in 2001 (Paz and Grimshaw, 2001). The mature Nassau grouper gathers at specific 'aggregation sites' and research suggests that over-fishing at these sites is responsible for the fishery approaching near extinction. Estimates of the number of fishers in Belize range from 3,000 to 3,500. Fishers from Sarteneja make up as much as one third of this number. The fishers of Sarteneja who have been over-dependent on fishing as a source of income have been affected by the threat of near extinction of this specie. The Green Reef Environmental Institute, a private non-profit organization, is spearheading work to prevent the Nassau grouper's extinction in Belize.

According to the Fisheries Department, fisheries in Praslin is just one aspect of its natural resources as Praslin is one of the most productive bays in St Lucia (GOSL, 1997) because of the interactions of three ecosystems; mangroves, sea grasses and the coral reef (See Plate 1). At Praslin, the viability of coral reefs was described as 'fair' in The Nature Conservancy (TNC) Report, 2002. This was due to the degradation in the physical and ecological conditions of the coral community and to the state of its landscape connections. Human activities in the upper watersheds of Praslin have resulted in increased siltation, which leads to eutrophication and altered coastal and marine water quality. In addition to the overall degradation, the ability of the coral reef ecosystem to recover from normal disturbances - severe storms and disease - is compromised.

The TNC survey (2002) described the sea grass beds at Praslin as having good viability. They are, however, being affected by increased sedimentation from poor agricultural practices which cause increases in erosion and sediment loads in the freshwater discharges to the coast and the sea grass beds.

The mangrove area of Praslin is a declared marine reserve under the jurisdiction of the Department of Fisheries. St Lucia's mangrove ecosystems, which are largely confined to the east coast are important producers of organic matter for marine and coastal species, and provide protection against coastal erosion and pollution. In rural production systems, the mangroves have been traditionally important sources of wood for charcoal, fodder for livestock and other renewable goods and services. Although protected, the Praslin mangrove areas continue to be encroached upon by banana growers (GOSL, 1998). This is as a result of the lack of legal demarcation for marine reserves and the fact that many of them fall on privately owned lands. The coastal area of Praslin was also declared a Protected Landscape in 1990.

Plate 1: Marine Protected Area at Praslin showing Coastal Ecosystems

Source:
Mycoo (2005)

In the context of the project, the TNC report (2002) described mangrove viability at Praslin as good, but the landscape context of mangroves were "only fair" due to the loss of essential connectivity between mangroves and interior terrestrial habitats. Similarly, siltation caused by a variety of human activities has created a sand bar across the main channel of several mangrove forests. This impedes the circulation of both fresh and salt water and partially isolates these mangroves from coastal marine communities and ecological processes. Such silt bars have disrupted movements of fish between coastal waters and mangroves, both to feed and to spawn.

Not much information is available on the quality of coastal waters of St Lucia. Water quality in the immediate coastal areas of Praslin is, however, expected to be poor since presently only 43.84 per cent are on a flush-toilet system with 56.16 per cent using pits (GOSL, 1994). Much solid waste is also running off into the waters here.

The villagers of Sarteneja do not fish in the proximal coastal waters of Sarteneja, but off the various cays and coral reef areas of the barrier reef. Mainly lobster and conch fishing is concentrated in these areas, and where the ecosystems of sea grasses and coral reefs are interacting, since those are very productive areas. Fishing in Sarteneja is mainly concentrated in the Glovers Reef area and further south for lobsters.

Agriculture

Agriculture in small coastal communities of the Caribbean often occurs on hillsides given that the coastal zone is very narrow as the land rises steeply a short distance from the coast. McGregor (1995) notes throughout the Caribbean high rates of natural soil erosion arising from the combination of sloping terrain, thin and highly erodible soils, and the intense nature of tropical rainstorms make slopes vulnerable to landslides.

The Government of St Lucia (GOSL, 2000) in its report on the Convention to Combat Desertification drew attention to the landslide prone sub-soil in some regions of St. Lucia. Physical characteristics and human activity such as poor land use practices contribute to land degradation and ultimately undermine agriculture as a sustainable livelihood. The very resource communities are dependent upon for a livelihood is also being destroyed through mismanagement. A symptom of unsustainable agriculture in St. Lucia is watershed destruction, the root cause being the manner in which the country's key natural resources (land and forest) have been utilized in the past.

It is estimated that Belize has approximately 343,982 hectares of arable land and of which slightly over a half (186,155 hectares) are used for agriculture (King et al. 1993). The land judged to be most suitable for agriculture is located in hard-to-access remote areas. King et al., (1993) determined from land resource assessments conducted by the Natural Resources Institute from 1989 to 1992 that only 16 per cent of the land in Belize is suitable for sustained agricultural production without skilled management. Most of the high potential land is already cultivated (33 per cent) and the rest is undeveloped public or private land (67 per cent). Spatially, the majority of the latter is located north of the Western Highway where there is only limited land pressure. At the time this study was done, it was reported that only 2,833 hectares of viable agricultural lands existed in the protected areas.

Agriculture, particularly banana cultivation was once the mainstay of Praslin, but banana farming has virtually disappeared. The World Trade Organization ruling on the European Union's Banana regime, which basically cut preferential treatment for high cost banana producers like St. Lucia, led to the demise of this activity. Sea moss cultivation has substituted bananas as the cash crop in this coastal community. The Nature Conservancy of St Lucia identified sea moss cultivation among the "eco-friendly", businesses established in Praslin as livelihood strategies alternative to the historical near-shore fishing and agro-chemically intensive agriculture. This marks the shift from growing traditional crops to new crops that have greater income-generating potential. Pantin et al. (2003) also noted that the decline in banana farming creates a shift in livelihood activities to other available natural resources, such as fisheries, thereby endangering the long-term sustainability of the related natural resources.
The population of Sarteneja some 30 to 40 years ago was involved in agricultural production though mainly sugar cane farming and transported produce by sea to settlements inaccessible by land. However, technological and infrastructural transformations influenced a shift from agriculture to fishing. Improvements in road transport allowed other competing agricultural areas to grow more crops and transport produce to markets.

As revealed by a focus group meeting in October 2002, for reasons of poor infrastructure, poor land capability, lack of technological knowledge, and politics, the practice of agriculture is minimal in Sarteneja. Water shortages,

particularly in the dry season, have seriously hampered agriculture. The land capability in Sarteneja is said to be low because the lands are composed of limestone. Although at various times sugar cane, papaya and peppers have been cultivated on a small scale by villagers. At this meeting it was revealed that today, young people of Sarteneja have little or no interest in, or knowledge of, land cultivation (Mycoo, 2003).

The decline in agricultural land use is also evident from the land tenure patterns and inaccessibility. Some 20 per cent of the residents of Sarteneja still own agricultural land, although the land is distant from the village. The closure of the sugar factory at Libertad, which had provided an assured market for small cane farmers, farmers have been selling out their lands, noted Toppin-Allahar (2003).

The government has attempted to reverse the biased land tenure trends by compulsory acquisition of lands belonging to villagers and granting them 4,047 hectares of land at Fireburn (Mycoo, 2003). However, these lands are not farmed because of inaccessibility. Additionally, two-to-four-hectare parcels of state land have been leased to persons to promote subsistence agriculture. Despite these attempted reforms nepotism and political favouritism are alleged based on the grounds on which land has been granted to some and agricultural loans to others. A focus group meeting with villagers held in October 2002 revealed that the population was not made aware of the land redistribution or loans offered as incentives to become involved in using the land for agriculture.

Additionally, a decline in agricultural land in Sarteneja has arisen from growing pressure for its conversion to housing. Between 1998 and 2001 the Physical Planning Unit received three applications for conversion of agricultural lands for residential purposes, all of which were approved. Foreigners have entered into sub-leasing agreements with villagers and have transformed land use from agriculture to non-agricultural purposes. This has been exacerbated by the repeal of the Alien's Landholding Act, to allow the sale of land to non-Belizeans. "The Warree Bight development was able to buy 12,000 acres of land on the local market for resort development…which suggests the land market is working well. On the other hand, this trend also means that the villagers are losing the option of reverting to agriculture, if fishing is curtailed". (Toppin-Allahar, 2003:124)

Sea Moss Cultivation and Processing

Sea moss production in the Caribbean has been aimed at both the extraction industry and traditional uses. Products derived from sea moss are gels and sea moss drinks. The development of cultivation of the algal species used for food in the Caribbean began in 1981 (Smith et al. 1984, Smith 1990). Sea moss cultivation (Gracilaria sp. and Eucheuma sp.) has been practised in St Lucia and Belize since the 1970's. In Belize it was not very successful because of hurricane damage, and was never continued. Smith (1999) also sees good potential for this activity in Belize and recognizes that bad timing rather than lack of technical feasibility was the problem with the initial trials in the 1970's.

The cultivation methods are very basic consisting of durable stakes or poles which are anchored in the sediment and culture lines are tied across the poles. Attached to the culture lines are spores of the species. A raft system, which secures a number of lines, is another method. The species cultivated is originally from Belize (Eucheuma sp.) which is ideal since it is more resistant to epiphytic growth, siltation and additionally has a good gel quality.

The approach taken in St. Lucia was to develop low-cost, labor-intensive methods that could be transferred to people in coastal communities (Smith, 1998). The Praslin community has benefited from this practice since the following favorable conditions are all present:

- a firm substrate (such as sea grass beds or sand);
- moderate wave action;
- good water exchange;
- an offshore reef for protection from heavy wave action; and
- water depth of at least one metre at low tide.

However, these conditions are threatened by pollution of the coastal waters and seas from land-based activities, sewage, industry, unsustainable agricultural practices, as well as tourism-related activities. Another constraint in cultivation is that there is much praedial larceny in coastal areas, which involves the theft of boats, engines and sea moss rafts.

The sea moss farming continues with reasonable success. Interviews with Smith in 2002 maintain that the presence of good water circulation and reasonable water quality makes Praslin an ideal location for sea moss cultivation. For this reason, Praslin continues to have the largest of the three sea moss farming areas in St Lucia; the other two are at Laborie and Aupiscon.

Sea Moss Processing

The fieldwork in Praslin revealed that the sea moss processing techniques were relatively basic and the drying facility was inadequate (See Plate 2). Furthermore, producers lacked the tools and techniques for successful marketing of the product including proper labelling and aesthetically pleasing packaging of the product. The villagers were also uncertain as to whether the gel product fetched a more lucrative price when compared with the sale of the sea moss drink. Research findings also suggested that there were problems with the sea moss farmers' ability to access new public and private credit facilities.

Plate 2: Sea moss drying in Praslin

Source:
Mycoo (2005)

Tourism

The tourism sector is common to and the fastest growing industry in most Caribbean economies. In several islands it is the dominant industry as a source of national income and employment. Tourism depends largely on the resources of the natural environment and not surprisingly there are increasing conflicts, as the two countries case studies will reveal, between traditional natural resources users (Pantin et al., 2003:37). Furthermore, it can be stated that the growth of the tourism industry has increased the competition for coastal space and hence natural resource access and quality (Pantin et al., 2003).

The experience in the Caribbean is that of policy failure in attaining sustainable tourism. McElroy's (2002) research on sustainable tourism coastal development attributes failure to four factors. The first factor, notes McElroy (2002) is a history of environmental neglect arising from the Caribbean islands' role as peripheral colonial export-oriented

enclaves, without an indigenous population and tradition of resource conservation. He argues this persists today because of under-funded monitoring and weak enforcement of protective legislation.

The second factor that accounts for policy failure in sustainable tourism is the promotion of mass tourism in the Caribbean which McElroy (2002) suggests stems from 'domestic economic policy of island governments tied to the colonial tradition of high volume, low-value-added mono-cultural exports', which in turn provided generous tax incentives to draw investors to develop mass tourism facilities. He elaborates this point in what he describes as 'aggressive promotion of low-multiplier, low-value-added mass visitation and partly a response to the labor-intensive requirements of an economy buffeted by declining agriculture, high-cost industry, and the damaging contours of globalization'. He further adds that manifestations of globalization are the drastic decline in aid from the United States since 1990, job losses in the manufacturing sector to Mexico especially textiles because of the North American Free Trade Agreement, and the demise of the banana industry through the removal of preferential quota agreements. The Caribbean as a result of these forces of change has become increasingly tourism dependent. This is substantiated by data drawn from the World Tourism Trade Council (2001), which estimated that tourism is more significant to the economies of the Caribbean than any other region of the world as tourism accounts for 17 per cent of the GDP, 21 per cent of capital formation, 20 per cent of exports and 16 per cent of employment.

The third and fourth factors influencing policy failure in sustainable tourism are directly related to the specific nature of international tourism. 'The scale discrepancy between heavily capitalized, high-volume international travel interests such as air and cruise lines, hotel chains, tour operators, and the small fragile insular ecosystems produce an inherent propensity for environmental overrun' (McElroy, 2002:2).

McElroy and de Albuquerque (1998) contend that mass tourism in small islands of the Caribbean has been largely a disequilibria strategy. Examples of policy failure are to be found in almost every island that has pursued mass tourism. Hillside development of hotel clusters and roadways have damaged forests, triggered soil erosion, river and wetland siltation and pollution of lagoons. Wilkinson (1989) found that mangroves have also been destroyed by the construction of large-scale resorts, marinas, infrastructure along delicate coastlines, depleting endemic species, and archaeological artifacts and reef systems weakened by sand mining, yachting and sewage dumping. McElroy (2002) has concluded that the Caribbean is the most tourism penetrated region in the world.

In both coastal communities, tourism has emerged as an alternative income-generating activity to the traditional natural resource dependent fishing and agriculture. However, the research findings show that in the two case studies, the tourism policy is not designed with a focus on small scale tourism or for that matter community-based tourism. Historically, tourism policy has been geared to satisfying the needs of large-scale tourism enterprises such as the big hotels, resorts, and tour operators (Mycoo, 2003).

In response to a large-scale tourism bias, the St Lucia Heritage Tourism Programme (SLHTP) was initiated. The programme has undertaken product development and management, marketing, capacity building, awareness and communication, policy and programmeming. Among other policy reform areas, the SLHTP focuses on financing for sustainability, including re-orientating the banking sector's interface with small tourism enterprises.

To facilitate access to credit by small entrepreneurs, the SLHTP is working with a non-traditional financial institution, the National Research and Development Foundation (NRDF), to provide soft loans to these micro-businesses. However, experience with other donor-funded projects is that with the withdrawal of the donor, the projects lose their dynamic and the sustainability of the project is compromised.

The sustainability of small-scale, community-based tourism in St Lucia's coastal villages is also questionable as the Praslin case study demonstrated. The study of this coastal community revealed constraints to the success of tourism. One constraint was that although small scale community-based tourism consumes less land than large-scale resorts,

negative environmental externalities deter visitors from over-nighting and spending in the communities. These environmental impacts are not necessarily the result of the tourism activity per se; they are traceable to overall infrastructure deficiencies within the coastal villages, for example, inadequate water and sewerage infrastructure. Whereas the upscale resorts have both financial and technical resources to correct the environmental stresses, these small, community-based tourism ventures like guesthouses are less well endowed, and are not in such a favourable position to attract stay-over visitors (Mycoo, 2003). SLHTP has been working on developing criteria for the suitability of village accommodation and facilities.

Several bed and breakfast workshops have been organized in Praslin by the St. Lucia National Trust. However, a bed and breakfast operation tried on an experimental basis failed. The main constraint to developing a booming guesthouse market is that individuals have no access to loans in the absence of collateral, which is the peculiarity that exists given the family land situation.

Another constraint revealed by the case study was that tours are conducted for visitors as a means of generating income, but there is some conflict arising from competition among the public and private tour operators including small communities. For instance, the Forestry Division operates tours and big private tour operators compete with small community-based tour guides.

Despite several constraints, economic benefits have occurred from efforts at promoting tourism in the coastal community of Praslin, although there is much room for improvement. Employment was generated through the construction of trails, but the sustainable livelihood possibilities were weakened by limited staff to market the trails. Generally, tourism on the east coast of St. Lucia is not well marketed and therefore not as many visitors are drawn to the east coast villages as to those on the west.

Tourism in Sarteneja has never taken root in spite of numerous incentive loans offered by the international community and the Belizean government. This stands in contrast to statements by some villagers in the focus group meetings that improved access to loans could help stimulate the involvement of more persons in tourism. The Belize Tourist Board had also provided free tour-guide training. Several reasons were identified as constraints to developing the sector (Mycoo, 2003):

- the product being offered was not properly defined and guest houses were just built;
- Sarteneja does not attract stay-over visitors because there is too little to see and do in one day;
- access is limited due to the poor roads and a ferry service from the southern end of Corozal, transporting visitors and their vehicles to Sarteneja takes approximately 90 minutes which is considered too lengthy a journey;
- the infrastructure of Sarteneja is in need of upgrading, particularly the poor road condition from Orange Walk to Sarteneja, low voltage in electricity, and the break down of the pump which affects water transmission;
- sea front land is sold out to local elites and foreigners and marginalizes the poor; and
- mosquito infestation because of swamplands has retarded the success of tourism.

In recognition of declining income from fishing and to enhance income-earning opportunities, Sartenejan fishers have been targeted beneficiaries of a newly approved COMPACT project for training as marine tour guides, but as found in the Praslin case study training may not lead to improved income.

The two case studies revealed that there are several constraints to sustainable management of tourism and in particular to the variant of tourism that can be feasible, namely community-based tourism.

Small-scale operators in both Praslin and Sarteneja have limited access to the tourism market which has been historically dominated by well-established and connected elites whether village-based or otherwise. There is a monopoly by the economic elite which understands the policy 'landscape', the advantages of economies of scale, is able to work with the existing regulations, and capitalizes on incentive legislation that is biased toward the large operators (Mycoo, 2003). Women also encounter entry barriers to tourism generally, but especially at the village level.

The lack of marketing strategies among communities in both case studies severely hindered the attraction of visitors to the area. Where success was experienced in attracting tourists to the coastal communities it was the result of the initiative of independent small operators.

Product quality is extremely important in an industry such as tourism that is highly sensitive to international standards of comfort. The coastal communities' undeveloped, basic infrastructure such as water supply and sanitation and proper drainage was a deterrent to the success of community-based tourism in both Praslin and Sarteneja.

The case studies revealed that sustainable management of the tourism sector requires a multiplicity of sources of funding including, government, non-governmental and donor-funding. However, there should not be an over-reliance on donor funding because with their withdrawal the sustainability of the sector can be seriously threatened.

Policy Lessons

Three main policy areas are the focus of this section of the paper and are dealt with under the thematic headings of fishing, agriculture and tourism.

Fishing

Over-fishing, pollution and degradation and destructive fishing techniques are practised by the population of small coastal communities. Several policy lessons have been learnt from these unsustainable practices.

- Over fishing on an industrial level has severe direct effects on the natural resources identified in this project. Scientists suggest the solution is simple but extremely difficult to put into practice, and they suggest that the recovery of the fishery industry requires an overall reduction of fish mortality. This issue must then be dealt with as a top, national-level priority. In this context, consideration should be given to banning "industrial fishers", such as long liners and trawlers, since they are major contributors to reduction in fisheries stocks;

- Pollution and degradation at a regional and national level have severe and direct negative impacts on the natural resources identified in the project. This issue must then be addressed as a top priority, at a national level;

- Destructive fishing methods and techniques employed by local artisanal fishers must be banned; and

- Restrictions on artisanal fishers should be imposed: among them, quota restrictions, closed seasons, licenses/permits for fishers, registration of boats and mesh size limitations for trawlers.

While some of these measures are already in place in both St Lucia and Belize, they are often not adhered to and/or enforced. Consideration must be given at a governmental level of the need to subsidize poor people's incomes if they are asked to reduce or cease fishing activities. Social security may be used to protect those households who may be marginalized by the imposition of these policy measures.

Improved Management and Designation of Marine Protected Areas (MPAs).

- **MPA Management**

Management of a MPA is difficult if the responsibility rests solely with a governmental department whose fees will all go directly into the consolidated fund and may never reach the park itself. Non-governmental organizations (NGOs) may not have adequate systems (resources - human or financial) to run an MPA efficiently.

- **MPA Funding**

Partnerships between the two groups may be ideal - government for legislation, policy and financial oversight; the NGO being responsible for implementation of the revenue generation systems (Geoghegan, 1994). Funding mechanisms should include government subventions; international agency assistance; foundation grants; donations and membership association; user fees; souvenir sales; and concessions and trust funds.

- **MPA Monitoring**

The MPA needs to be monitored to examine the success of the management efforts, for example, in protection of species.

- **MPA Designation**

Designation of MPAs should be based on scientific assessments which should inform the size, ecological boundaries and the demarcation of zones. Zones within a MPA are meant to confine a particular need or use to a specific area, where it does not conflict with other uses. In effect, it separates the incompatible uses for example, fishing and recreational use; sets aside damaged areas to recover; protects breeding populations such as the Nassau grouper) and demarcates no-take zones.

Designation of MPAs or reserves needs to be carefully considered to achieve the objectives, but not at the risk of compromising poor communities. In this respect, compensation of some form should be considered.

- **Stakeholder Consultation**

The designation of MPAs, which affects the small coastal communities livelihoods and the resource use conflicts which occur in fishing areas between seine fishers and yachters and between pot fishers and recreational divers, require stakeholder participation to arrive at conflict resolution. Furthermore, in the designation of MPAs Renard (2001) identified one of the greatest threats to the success of effective participatory management as 'the accidental or deliberate exclusion of one or more groups of stakeholders from the planning and negotiating stages' (See Plate 3).

Plate 3: Consultation with stakeholders in Praslin

Source: Mycoo (2005)

Monitoring of Management

The processes of natural resource management take place in constantly evolving situations. Participatory planning and conflict management often suffer from the incorrect assumption that conditions are static. The damage caused by hurricanes and storms to fishing boats and coral reefs, as has occurred in small coastal communities of St. Lucia and Belize, needs to be monitored. Important changes such as these must be factored in if the participatory management approach is to be successful. In this respect, new conflicts may evolve.

Cultivation and Marketing of Sea Moss

Overall the techniques of cultivation, processing and marketing of sea moss being used by farmers at Praslin do not appear to be sustainable. A number of policy lessons have been learnt from the Praslin case study. There needs to be public awareness programmes and education on effects of pollution on the regional seas and coastal ecosystems. Proper disposal practices and infrastructural measures to reduce wastes at sea must be implemented. Reduction in coastal releases, by industries, of pollutants such as toxic chemicals, sewage and other potential industrial contaminants must be enforced. Moreover, effective legislation and improved policing is necessary in order to afford protection to the sea moss farmers.

The Caribbean's sea moss expert Smith has confirmed in an interview in 2002 that an expansion of the sea moss farming is a very viable alternative at Praslin. However, the marketing of products has also been recognized as a main problem plaguing the commercial enterprise at Praslin. With respect to the quality and standards of the products, the Saint Lucia Bureau of Standards has a standard specification for the labelling of commodities, which is a compulsory national standard. At present, there is no product standard for sea moss drinks or jellies. However, the Bureau offers advisory services and is willing to work with the farmers toward improving their products

Community-based tourism

The challenges in tourism in the Caribbean originate from the bifurcation within the sector of high-return activity for large commercial resorts with access to capital and skills, and low-return activities and limited social capital of the poor. The lessons derived from the two case studies highlight the need for policy reforms to promote tourism at the community level and are discussed here under (Mycoo, 2003):

- **Product diversity**

The ecotourism assets of coastal communities should be exploited to improve the diversity of products offered to tourists. Fishers need not only be engaged in fishing as a source of income, which the case studies show may be on the decline with falling fishing stocks and restrictions on fishing seasons and areas for fishing. They can diversify their activity into tourism by providing water-taxi services to tourists wishing to visit the marine parks. Moreover, the protected areas that are both land-based and marine can be used for both recreation and education as part of the product diversity drive.

- **Reducing Infrastructure Constraints and Mitigating Environmental Impacts**

The upgrade of physical infrastructure which would increase capacity to mitigate environmental impacts along with the re-design of coastal villages to be more aesthetically pleasing are both critical measures that are needed to capitalize on opportunities for tourism development.

- **Multiple Interventions**

Community-based tourism interventions should incorporate both eco-tourism and conservation as well as community-

based tourism that concentrate on the involvement of local people. These multiple interventions work toward attaining sustainable management in the long term.

- **Reduce Entry Barriers**

Among the obstacles to involvement of the communities in tourism initiatives are limited training and access to credit. The experienced private sector should work with small communities to transfer knowledge and provide training in the areas of product quality improvement. This can be mainstreamed through the provision of apprenticeships to persons from the communities. The area of weakness at the community level is that of limited business skills among villagers so that training needs to focus on this limitation.

- **Partnerships and Linkages**

Partnerships are the key to unlocking synergies and it is important to encourage the more experienced private sector to not compete with small community-based operators, but to complement their activities. For example, tour operators can include tours to the coastal communities as part of the visitor itinerary and this can be packaged with meals prepared by villagers or visits to village craft markets or the local entertainment centres. In this way employment and income are generated at the community level.

- **State Intervention**

Sustainable management of resources used to promote tourism requires some degree of state intervention via policy change and legislative reform. Supportive policy arenas include the upgrade of physical infrastructure, training in marketing and product development, changes in legislation and the introduction of fiscal measures that are designed to accommodate the needs of small operators.

Land Tenure and Accessing Credit Facilities

A major policy lesson in sustainable management is that biased land tenure patterns favour the rich over the poor. Furthermore, family lands provide no collateral to access credit in formal lending institutions. This makes it difficult for the poor to access credit facilities for fishing, sea moss cultivation and processing, and tourism. Land tenure reform is therefore needed to improve sustainable management in small coastal communities. It will help persons to shift from activities which deplete natural resource to more sustainable livelihoods.

Conclusion

The people living in the small coastal communities of the Caribbean are dependent on the natural resources of these areas for their livelihood. These livelihoods are fishing, agriculture (bananas and other crops such as sea moss) and to a lesser, but growing extent agro-industry and tourism. These livelihoods are in some cases undermined by a wide range of constraints and threats and a failure to sustainably manage the natural resources on which they are dependent. They are also affected by the lack of prudent management of the skills and abilities of the users who harvest these resources. These problems originate from policy gaps. The hiatus in policy occurs from the non-existence of policy in some instances, or where policy exists they may be poorly formulated because of a lack of cognizance of the root of the problem and therefore do not correct failures, and the gap may develop where policies exist but are just not properly implemented.

The challenge to sustainable management is in closing the policy gap. This gap can only be filled if there were collaboration and partnerships among all stakeholders in the policy arena. Moreover, such collaboration and partnerships need to be built around practical, concrete, 'do-able' activities which would impact positively on the livelihoods of the people living in small coastal communities (Pantin et al., 2005). The prerequisite for such focused collaboration is an acknowledgement by policymakers and policy implementers that the people living in small coastal communities of the Caribbean have some knowledge of the root of unsustainable management practices and can help craft some solutions if given a voice to be heard in the right policymaking and implementation arena.

Sustainable management in small coastal communities, which seeks to ensure that the needs of the present and future generations are not undermined by a misappropriation of the wealth of natural resources that should be inherited, can only be guaranteed by the political will to formulate and implement policies which focus on coastal people's needs.

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Capacity Development for Caribbean Small Island Developing States: Focus on Coastal Zone Management.

Nicholas Watts

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Introduction

This paper will first address the rationale for selecting Integrated Coastal Zone Management (ICZM) as the point of entry for a consideration of Sustainable Development (SD) of Small Islands Developing States (SIDS). Second, it will define the concept of vulnerability of SIDS. Third, it will consider the main issues involved in capacity development for SIDS. Fourth, it will cover special characteristics of Caribbean SIDS and the opportunities and constraints peculiar to the Caribbean Sea region. Finally, it will address the specific needs for capacity development for Integrated Coastal Zone Management (ICZM).

While ICZM will be an illustrative theme throughout the paper, the overriding aim is to identify key principles for sustainable development of Caribbean SIDS, using ICZM as the most appropriate form of entry.

Why ICZM?

For SIDS, the coastal zone is now the main source of both income and threats. The sustainability of coastal communities is threatened by a number of factors: competition between uses of natural resources and between sectors, as well as risks posed by climate change and its environmental impacts on biodiversity and in the form of extreme weather events. The coastal zone thus presents a key challenge of policy integration, both vertically, in terms of coordination of different levels of governance from the global to the local, and horizontally, across different departments of national and local government. It serves, for SIDS, as a litmus test of the efficiency, effectiveness and equity of national policy.

Spatial scope and horizontal integration

In the context of an integrated approach to CZM, the policy has to cover the geographical area that materially affects the coastal zone. This implies an area that reaches inland to the water catchment, including mountains, forests, river basins and urban settlements, where changing patterns of use of natural resources such as logging, dam building and sewerage systems can materially affect the quality and volume of freshwater coming into the coastal zone. This spatial range is addressed in the approach adopted in the White Water to Blue Water Partnership (WW2BW).

The spatial range must also extend out from the shore, to include natural sea defences such as mangrove swamps, marine ecosystems including coral reefs, marine parks and protected areas. This range needs also to include aspects of fishing practice, both artisanal and commercial, as they affect the coastal fishing economy and biodiversity.

Competing activities

The obvious competing uses of the coastal zone are between tourism and fisheries. Both need to be rendered sustainable, and the paper will include consideration of instruments to this end. Sustainable tourism needs also to address questions of equity and access. The paper takes a normative position regarding sustainability, namely that an environmental policy that does not include equity will lack the legitimacy required for successful implementation. If local communities are prevented from accessing the coast, and their traditional resources, and from participating in decisions relating to these resources, the coastal community and the related policies are not likely to be sustainable in the long term. Policy must ensure that resources are used to the benefit of the local, and wider community and not merely as a source of rent for external investors. Any study needs therefore also to include consideration of the means of engaging the local community in the discussion of its sustainable development. (Tourism also includes coastal development.)

Horizontal policy integration needs therefore to take account of the competing interests of public, private and voluntary sector actors, and the means for resolving conflicts between them.

Levels of governance and vertical integration

Decisions affecting the coastal zones of Caribbean SIDS are made locally, nationally, regionally and globally, sometimes as part of policy explicitly addressing SIDS sustainable development in the context of multi-level governance (BPoA, MIM, OECS-ESDU) and sometimes in different policy domains such as trade or economic policy, including enforcement of the neo-liberal trade regime, with direct if unintended consequences for CZM. Therefore, any consideration of SD of SIDS must consider governance arrangements, including public, private and voluntary, or third, sectors.

Of course, levels of governance also imply spatial scales, and it is important to recognize that decisions affecting the coastal zones of Caribbean SIDS may be taken in international meetings that address SIDS holistically (BPoA, MIM), that address specific issues affecting SIDS, for example in the context of the Conferences of the Parties to Multilateral Environmental Agreements and the Law of the Sea, or regionally, in the context of conventions that address the Caribbean Sea itself (e.g. the Cartagena Convention and its protocols, and CREP). Also, Caribbean SIDS share many problems with SIDS from the Pacific and the AIMS regions, and find representation in AOSIS, so that the support for, and performance of, AOSIS, especially in the context of the G77 negotiating positions, are important.

Vulnerability of SIDS

There is an active and productive epistemic community researching vulnerability of SIDS, both classifying vulnerabilities, and identifying the means of addressing these vulnerabilities. The recent emphasis has been on the impact of climate change and the relative roles of mitigation and adaptation activities. First, let us define SIDS' vulnerabilities.

In popular perception, the most poignant and immediate vulnerability of SIDS is in extreme weather events and natural disasters. Hurricanes, tropical storms, earthquakes and tsunamis are now captured and communicated with a harrowing immediacy by the global media. Sea level rise, for now gradual, can have similar media impact.

However, there is more than this to the vulnerability of SIDS. They suffer a number of disadvantages that are less than evident to those international tourists visiting the islands.

First, comes indivisibility. Any civilized state in the modern world has to fill a number of key posts, even if one individual may occupy a number of roles. A state needs a head of government and ministers, whether it has a population of a billion or ten thousand. The same goes for health workers, teachers, law enforcement officers and so on. The result is a disproportionately large public sector, a number of professionals particularly adept at multi-tasking (and hence at risk of predation from regional and international organizations in public and private sectors), and, with the internationalization of policy, the frequent absence of key officials at international meetings (including especially those addressing the vulnerability and sustainable development of SIDS).

Second, come distance and communications. Even SIDS close to one another or the mainland (Trinidad is nine miles from Venezuela) face high costs of international travel, especially air travel. They may also lack the infrastructure needed to make the most of modern information and communications technologies, although these present one of the major opportunities for SIDS, if competition and deregulation can be introduced.

Capacity Development for SIDS - Key Issues

Capacity development for SIDS can be addressed in terms of the addressees of capacity development, i.e. public, private and voluntary sector organisations and the public/community; in terms of the knowledge, technology, methodologies and providers of capacity development and related training, and in terms of capacity for dealing with domestic and international dimensions of capacity analysis and development.

A number of these dimensions have been included in the SEASCAPE model, developed by the author in co-operation with a number of partners both in the region and outside it, from both the higher education and civil society sectors. This model includes analysis and development of capacity both for domestic policy and diplomacy for sustainable development. It is also an approach that should be consistent with that of international agencies and national environmental administrations, as evidenced in the UNEP/UNDP/GEF National Capacity Self-Assessments.

The SEASCAPE project is designed to analyse and enhance environmental governance capacity for sustainable development in vulnerable Small Island Developing States in the Caribbean. For this, it will be necessary to review SIDS' domestic strategies, Caribbean regional mechanisms that aim to support or integrate these strategies, and also SIDS' foreign policies in pursuit of sustainable development. (It is planned that this approach should be transferable also to SIDS in the AIMS and Pacific regions.)

SIDS face critical problems of loss of institutional memory at both domestic and foreign policy levels. For example, at domestic level, staff mobility rates are high, undermining domestic efforts at sustainable development, and frequently resulting in repetition of research and analysis as external consultants are called in. At the international level, delegations to international meetings are frequently so small that there is no opportunity for junior or mid-level officials to participate and engage with the diplomacy of sustainable development. As a result, there is limited opportunity for them to develop negotiating skills prior to their taking on senior responsibilities.

As well as conducting analysis of the current state of national capacity for environmental governance, any project addressing the human and social sciences aspects of sustainable development should aim to develop training appropriate to the development of an integrated international cadre of junior- to mid-level environment professionals (especially public and voluntary sector, but also private sector as appropriate). These professionals would then be in a position to continue, and deepen, the work on capacity analysis in their substantive fields and to form the core of a South-South network for continuing capacity development. (For example, Masters level postgraduate level training could include a dissertation component constituting a sectoral or specialist environmental governance capacity analysis for the student's country, where appropriate working on a comparative basis, in concert with colleagues from other SIDS. This would allow gradual development of a data bank of best practice projects across the region.)

SIDS are under-researched. For example, the exemplary review of national environmental policy capacities of 30 countries undertaken by the Free University Berlin Environmental Policy Research Unit, in collaboration with the Science Centre Berlin and UNU-WIDER, did not highlight SIDS or small developing states.[66] Only Costa Rica, as a representative of small, mega-diverse countries, was included. This is representative of the literature. The broader inclusion of SIDS could, however, go some way to redressing the imbalance between North and South in research on national approaches to governance of sustainable development. Also, from the perspective of a project approach that aims to identify transferable best practice, including identification of the necessary contextual conditions for such transfer, inclusion of a number of small states should enhance the reliability of findings. Usually, cross-national comparative policy analysis is hampered by the small number of cases, and by the difficulty of accounting for external factors that may influence policy outcomes. Larger numbers of smaller states in the analysis would counteract both of these problems.

At the World Summit on Sustainable Development (WSSD) in Johannesburg in 2002, and the Mauritius International Meeting (January 2005), little was done to enhance the prospects for SIDS of escaping their increased vulnerabilities to the effects of global climate change, for development of a sustainable energy infrastructure, or for required changes in the international regime of agricultural subsidies in the North. The recent disappointments of CSD-15, where the G77 had the chair, but the incumbent was from Qatar, and subsequently for CSD-16, with the chair going to Zimbabwe, have muted SIDS expectations of the CSD biannual series of meeting.

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66 (Jänicke and Weidner, 1997; Weidner and Jänicke, 2002)

The BPoA and the WSSD deliberations did, however, engage national governments and NGOs in SIDS in a series of capacity reviews, as part of a multifaceted UN programme to facilitate capacity development in the public, the voluntary, and to a lesser extent, in the private sector in SIDS. These reviews, the National Capacity Self-Assessment, should provide an excellent first source for a comparative country-by-country analysis of achievements and capacity development needs in Caribbean SIDS. However, they have now moved from a 12-18 month delivery plan at the outset (2002) to an 18-60 month delivery schedule at present (June 2007). Least Developed Countries and SIDS are particularly likely to be behind schedule in delivery, largely because of their capacity problems in conducting the analysis, let alone addressing its conclusions.

In discussions at international meetings, across a number of countries in the region, and in Europe and Canada[67] a wide group has helped develop this proposal, support projects addressing parts of the proposal, and agreed in principle to collaborate in the longer term in its delivery - in whole or in part. In addressing SD of Caribbean SIDS, a further important dimension is the relationship between sovereign states in the region, the UK Overseas Territories, and the francophonie. Given also the political nature of the designation of SIDS (including as they do, Belize and Guyana), and the prominent role of Cuba in various aspects of sustainable development in the region, it makes sense to include in such a model the small, mega-diverse states of Central America that share a number of the vulnerabilities of SIDS.

Any such project, or programme, should include a complementary programme of research and training.

The Research Agenda

One model, adapted from the SEASCAPE approach, is of a collaboration between regional and international NGOs,[68] universities[69] and agencies, in this case most directly UNESCO, but also with the potential for inclusion of relevant UNEP and UNDP offices, the ACS, the OECS-ESDU and the EU office in Guyana. Such a multivalent approach is important, as it will facilitate progress on a related set of projects in the context of the SEASCAPE type approach.

The analysis has a twin-track approach to sustainable development capacity, treating both domestic capacity and the capacity for foreign policy in pursuit of sustainable development in each selected country. The analysis of domestic sustainable development capacity would build on the approach to analysis of environmental policy capacity previously adopted by Jänicke and Weidner, together with the approach to analysis of capacity for strategic management for sustainable development taken by Dalal-Clayton and Bass (2002) and Swanson et al. (2004). The analysis of environmental foreign policy capacity draws on the approach developed by Steinberg (2001, 2002).

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67 (WSSD Johannesburg, 2002, Belize: May 2003, Cuba: February 2004, St Kitts and Nevis: May/June 2004, the New York SIDS/CSD-12 meeting, April 2004, at the Mauritius International Meeting, January 2005, Trinidad: May 2006, Vancouver World Urban Forum 3, June 2006; Salvador de Bahia, Brazil, May 2007; London, Institute for Commonwealth Studies, June 2007)

68 In the region, CANARI, the CCA, CPDC, internationally, the Commonwealth Human Ecology Council (CHEC) and ActionAid. The Commonwealth Human Ecology Council, (Chair: Professor Ian Douglas, Emeritus Professor of Geography, Manchester University; Executive Vice-Chair Zena Daysh CNZM), whose past Chairs include Sir Julian Huxley, first Director-General of UNESCO, and Sir Hugh Springer, inter alia Secretary General, Association of Commonwealth Universities and then Governor-General, Barbados, has a long track record in running international meetings, especially prior to the biannual Commonwealth Heads of Government meetings and HE Lakshmi Singhvi (then Indian High Commissioner, London) has a long tradition of organizing high-level international meetings on human settlements and environment in anticipation of the biannual Commonwealth Heads of Government meetings.

69 London Metropolitan University, the Free University Berlin (Environmental Policy Research Unit) and the University of Twente, Netherlands (Centre for Clean Technology and Environmental Policy), together with local in-country experts and institutions, in particular at the University of the West Indies, University of Havana, but also potentially the universities of Guyana, Belize and the UAG. On the international scale, the University of Mauritius, the University of the South Pacific and the University of Malta, founder members of the University Consortium of Small Island States [UCSIS], are further potential partners from the SIDS.

In the case of Caribbean SIDS, by definition small and vulnerable, the regional level aggregation and mediation of national interests is also of critical importance, where the role of the Association of Caribbean States (ACS), CARICOM, Organization of Eastern Caribbean States (OECS) and UN regional offices, but also the Latin American range of international agencies and initiatives, will require consideration. At the global level, particular attention will be paid to AOSIS, the G77/China and European development partners, including the EU. Part of the research is, therefore, devoted to analysing the remit and effectiveness of regional intergovernmental and non-governmental organizations in support of sustainable development goals for SIDS.

Analysing Domestic Capacity for Sustainable Development

Sustainable development capacity at domestic level depends on a number of factors, each of which must be investigated carefully and with appropriate methods of empirical research as the SEASCAPE project proceeds.

One factor is the relative strength and resources of proponents of sustainable development, in all three sectors: public (state), voluntary ('Third Sector') and private, as well as the obstacles (structural and interest-based). Here, the quality of leadership will also be important, as will the capacity for strategic management for sustainable development.

Second, the degree and modes of policy integration within the legal and institutional arrangements for pursuing sustainable development in each country is a variable. Here, assessment extends to National Environmental Action Plans, for example, to the size, remit and location of the Environment Ministries/Departments, and to any constitutional commitment to sustainable development. It also addresses the existence and performance of National Commissions or Committees for Sustainable Development and their equivalents.

Third, in SIDS, as increasingly in the 'North', the increasing interdependence of public agencies and environmental NGOs is a factor, especially when the NGOs bring major funding via international NGO collaboration. This influence of the civil society sector makes itself felt in the context of public awareness of environmental issues in each country (see below).

Fourth, the capacity for policy-relevant knowledge production affects the pursuit of sustainable development goals. UNDP and UNEP programmes help offset the impacts on capacity of brain-drain (or, brain drift) and lack of trained personnel in the Caribbean, although National Capacity Self-Assessments are frequently conducted by short-term 'external' consultants, indicating a lack of established domestic research capacity (though these external consultants may be expatriate nationals.)

Fifth, the level of environmental awareness is important, but so too is its substantive focus, which may be much more concerned with 'endogenous' local and personal issues of environmental health, shelter and sustenance than with 'exogenous' issues framed in the language of multilateral environmental agreements, such as biodiversity conservation and climate change. The role of participatory processes in supporting community ownership of, and commitment to, environmental sustainability, is key to the analysis of the conditions for enhancing public environmental awareness.

Added to this is the issue of the political and cultural context of public environmental awareness. For example, in the Caribbean, this could raise questions about the impact of consciousness of colonial history on citizens' responses to requests from the North that they now protect the rainforest their ancestors were transported to strip for sugar or tobacco plantations. Also, the perception that the countries of the North have failed to keep their promises at Rio and afterwards of resource and technology transfer may undermine efforts to promote awareness and concern.

Sixth, opportunity structures are relevant to capacity. These include political, economic and behavioral variables. One question about political opportunity structures, for example, is the extent to which the policy process is open to sustainable development proponents, the level in the political system that ultimate, visible responsibility resides (ideally, with the Cabinet Office or Head of State). Economic or market opportunity structures will affect the prospects for sustainable production and consumption, corporate social responsibility, and for green consumerism and investment. 'Behaviour opportunity structures' refers to the provision of appropriate infrastructure to support

environmentally benign behaviours, like low-energy light bulbs, recycling facilities, zero-waste strategies, or low-energy solutions for architecture and public transport.

Foreign Policy Capacity for Sustainable Development Goals

The foreign policy context for sustainable development in the Caribbean is complex and changing. There is movement, for example, towards a Free Trade Area of the Americas concurrent with reductions in assistance from Europe. At the same time and more positively for sustainable development, the Organization of Eastern Caribbean States (OECS), in its Environmental Management Development Unit, now works to harmonize environmental policy systems and approaches across the OECS member states.

As in the case of domestic capacity, several basic variables are at work and require detailed analysis.

One factor involves changes in the dynamics of the UN system. Examples include the incumbency [70] of the chairmanship of the Commission on Sustainable Development; the relative strength of SIDS and AOSIS within the G77/China group; the enhanced access of Major Groups to the UN process, and the increasing emphasis on Type 2 partnerships in countries lacking strong domestic partners.

Second, human resources and knowledge networks are also relevant variables, affecting the degree of mobility of environment experts across domestic agencies and ministries and within the international system.[71]

There are also, thirdly, different dimensions of environmental foreign policy capacity that need to be distinguished. Bargaining power can affect interest aggregation and mediation at regional level, within the SIDS network, AOSIS, and CARICOM, as well as possibilities for trading in the Clean Development Mechanism (CDM). Another dimension of capacity is policy integration, the extent to which effort is coordinated across government agencies, across policy sectors and across the public, private and voluntary sectors.[72]

A fourth key aspect is the ability of the Ministry with lead responsibility for environmental diplomacy to conduct research and manage environmental data. Improvement, here, is a major emphasis of the SEASCAPE project and extends to the evaluation of research capacity in foreign ministries, environment departments/ministries, academic research institutes, and NGOs.

Fifth, fundraising ability is a factor in environmental foreign policy capacity, because some of it takes place in the context of UN programmes, especially GEF programmes, such as the GEF/UNDP Small Grants Programme and the Protected Areas and Associated Livelihoods project for the OECS (Antigua and Barbuda, the Commonwealth of Dominica, Grenada, St Kitts and Nevis, St Lucia and St Vincent and the Grenadines).

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[70] The assumption by John Ashe of Antigua of the Chair for the CSD-14 session was in marked contrast to the later incumbencies of Qatar and now, Zimbabwe.

[71] Epistemic communities and foreign policy networks will also be important, and particular attention will need to be paid to the relative balance of power in such networks between development partners, both governmental and non-governmental. These networks will include the overlapping regional networks such as the Association of Caribbean States (now arguably less relevant to Commonwealth Caribbean SIDS since the Chair has moved to a hispanic state) CARICOM, The Latin American Economic System (SELA), The Permanent Secretariat of the General Agreement on Central American Economic Integration (SIECA), the CAN, OECS and the Caribbean Regional Negotiating Machinery (RNM). The NGO networks will be similarly reviewed - both the regional networks (CCA, the Caribbean Policy Development Centre (CPDC), Island Resources Foundation) as well as the international NGO networks (the CSD NGO Steering Group, the Sustainable Development Issues Network and Stakeholder Forum, as well as the IUCN, WWF, Greenpeace etc.)

[72] The White Water to Blue Water Partnership (WW2BW) in the Caribbean will produce evidence for the participating countries of their capacity for policy integration in the implementation of international agreements (the Barbados Programmeme of Action, the, Montreal Declaration of the Global Programmeme of Action for the Protection of the Marine Environment from Land-based Activities, the Jakarta Mandate of the CBD, UNCLOS, the Cartagena Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region The Protocol Concerning Co-operation and Development in Combating Oil Spills in the Wider Caribbean Region (the Oil Spills Protocol) The Protocol Concerning Specially Protected Areas and Wildlife (the SPAW Protocol) and the Protocol Concerning Pollution from Land-Based Sources and Activities (LBS Protocol), the International Coral Reef Initiative. the St George's Declaration of Principles, the FAO Compliance Agreement, the 1995 FAO Code of Conduct for Responsible Fisheries and the 1995 UN Fish Stocks Agreement, and the 2000 Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Region.

A sixth relevant consideration deals with core functions. External core functions include the necessary human resources and analytical capacity to develop policy positions and negotiate across environmental regimes, as well as the ability to secure an appropriate share of the government budget. Internally, policy integration is a core function involving such things as constructive relations across departments and the effective running of national Commissions on Sustainable Development or their equivalents.

Seventh, the assessment of environmental foreign policy capacity in the Caribbean implicates generic variables that distinguish the global South from the global North. The South faces important structural constraints, especially poverty and economic dependence on the primary (agriculture and fisheries) and tertiary (tourism) sectors of the economy. The South faces generally high transaction costs in pursuing policy integration because of distances and poor communications infrastructure. There are also substantive issue differences between North and South, with the latter generally giving more priority to 'grey' issues, like waste treatment, than to green issues like biodiversity conservation.

A Training Agenda

The training component should be designed as a series of short courses that take key staff out of the office for a minimum period, supported by longer-term courses of traditional design, but virtual delivery. In this way, the short courses could carry transferable credits that could count towards a postgraduate certificate, diploma or an international Masters in Sustainable Development. Such training offers an opportunity for partnerships between higher education institutions (including UCSIS), NGOs and international agencies. Further, innovative modes of delivery should be explored, including mobile (e.g. on board ship), or to accompany international meetings.

The modules are also available as Continuing Professional Development short courses and can be converted into module credits after completion of a related assessment exercise. Most modules already exist at one or more of the partner higher education institutions, including London Metropolitan University, the Free University Berlin, the University of Twente and the University of the West Indies (Cave Hill). Caribbean students will likely take advantage of this training through a split-site, mixed-mode Masters degree, relying in part on distance learning and in part on intensive face-to-face short courses.

The core of the training programme develops skills in policy development, policy analysis and strategic management for sustainable development. This is in keeping with the current CSD emphasis on policy review and implementation and responds directly to the relative lack of such training in Caribbean SIDS, where the science of environmental management is developed to an advanced level and already delivered in the region. There are also 'transferable skills' modules on the development of documentation and information management capacities for environmental policy, which are important for communication across the proposed SIDS network, or cadre, of sustainable development professionals.

Training Modules

Training modules might include as cores: **National Environmental Governance** (with special emphasis on implementation, monitoring and evaluation); **International Relations and Global Environmental Change** (including negotiating international treaties); **Managing Community and Voluntary Sector Organizations** (with emphasis on environmental NGOs and CSOs, including good governance); and substantive modules such as **Integrated Coastal Zone Management; Sustainable Tourism; Water and Sanitation; Energy and Environment** (with special emphasis on renewable energy sources and energy conservation); **Terrestrial Ecology and the Coastal Impact of Pollution from Land-Based Sources; Marine Environmental Management; Environmental Impact Assessment/Local Impact Assessment; and transferable skills such as Still and Video Documentary Making** (to enable participants to document 'before and after' conditions and to communicate across the group of students) and **Geographic Information Systems in Participatory (GIS-P) Coastal Zone Management.**

Students in the Masters training programme will also complete a three-module dissertation in their own local environments, or, in the case of participating students from the North, in a small island state of choice. Students

from SIDS can, thus, remain for the most part in the local environment and continue employment while they complete training requirements.

The mixture of teaching and research in the SEASCAPE project, in addition to developing a regional cadre of environmental experts across a range of SIDS, also has the potential to train a new generation of effective participants in ongoing negotiations about environmental and sustainable development policies.

The Small Island Developing States face major resource constraints when sending government delegations to international meetings. As a result, representation from the environment ministry may even be limited to the Permanent Secretary alone. As well as constraining the potential of the delegation, this means that SIDS are not afforded the opportunity of exposing more junior staff to the learning experience afforded by attendance at such meetings.

How such a programme might look

This proposal is for a programme to bring a cadre of junior ministry officials from SIDS to the regional preparatory meetings for CSD or international meetings of the Multilateral Environment Agreements. Such a programme would involve:

- funding travel and subsistence for a group of, say, 20 delegates, from SIDS least able to support extra delegates
- a two-day induction into the process of decision-making and implementation in international environmental policy, and the substantive theme of the meeting, supported by prior dissemination of materials
- attendance by members of the group at different sessions of the Meeting, reporting back daily at an evening one-hour meeting followed by a half-hour debriefing session by a senior delegate to the Meeting (Permanent Secretary or Ambassador from a SIDS)
- a one-day review seminar following the Meeting.

The programme would be supported by provision of the opportunity after the Meeting to write an assessed report reflecting on the process and outcomes, so that the whole would constitute an accredited Short Course, or Masters-level Module, which could then count towards a Postgraduate Diploma or Masters in International Sustainable Development (see above).

Funding would also be required for preparation of the training programme and for travel and subsistence for three staff members from the partner institutions preparing the training.

Delegates should be recruited from among middle-level or junior staff in environment ministries or equivalent who are interested in further (postgraduate level) training in this area. This would ensure that participants have already demonstrated a commitment to a career in-country so that the training would be likely to remain of benefit to the sending country, but avoid simply sending already fully established and trained staff.

The Coastal Zone Challenge

The challenge of integrated coastal zone management rests in achieving inclusion of all stakeholders, developing an interdisciplinary approach, integrating or setting priorities among the competing needs of traditional communities, the tourist industry, commercial fisheries, resource conservation and urban sanitation. One example is the Soufriere Marine Management Area in St. Lucia, as described by (Sandersen & Koester, 2000): ‘Co-management is a user-group-centered approach, but without neglecting or compromising the state's role in resource management. It is considered particularly suitable for situations characterized by common pool resources and large monitoring and enforcement costs, which applies to most tropical, small-scale fisheries.’ Soufriere is an important example of co-management, but recent changes illustrate further problems. Two years ago, Soufriere lost 70 per cent of its coral as a result of global warming, reducing the potential income from charges on divers that pay for management of the area. Last year (2006), government recognition of the effectiveness of the management of the SMMA led to requests for the SMMA also to offer security to boat owners, i.e. to protect them from robbery.

However, the co-management principle is one that should underpin ICZM in Caribbean SIDS, and existing examples deserve in-depth analysis to identify what works, and what may be transferable.

It is now further acknowledged, on the basis of successful regime changes in coastal fisheries in the Pacific, that fisheries interests can be combined fruitfully with traditional fisher communities' needs, as well as high-value tourism in the form of diving. Such regime change has included the introduction of marine reserves. Fishers who fish just outside the reserves catch larger fish, and divers pay to see the fish in the reserve. The challenge here is to find policy instruments that work. In New Zealand, the privatization of fishery rights with major participation by Maori stakeholders has served to render fish stocks sustainable and accessible to traditional fisher communities.

Illegal, unregulated and unreported (IUU) fishing is another challenge, less acute in the Caribbean than, say, off the coast of Africa, but still needing regulation and enforcement. Also, bottom-trawling, legal or not, may still pose major threats to the long-term viability of SIDS fisheries and reef systems in the form of marine desertification. To combat this, SIDS need to organize on a regional basis for negotiations with large fisher interests (the EU, Japan and China in particular). The example of the Pacific, which has such an organization, is so far not encouraging, as the EU has not agreed to negotiate with the regional organization, but prefers to 'pick off' individual states in bilateral agreements, which offer short-term high cash yields, but destroy the resource in the medium-term.

As well as management and conservation instruments, ICZM needs to address the wider challenges of WW2BW. This includes an issue of particular importance for Caribbean SIDS, whose high-end tourism is largely dependent on marine biodiversity and coral reefs, namely sanitation and sewerage. Belize presents a clear example of this. The world's second largest coral reef lies just offshore from Belize City, with continued runoff of raw sewage onto the reef. This means that the environmental impacts of the urban environment on beaches, reefs and the marine environment have to be monitored and evaluated. This implies that UN Habitat needs to add the list of international agencies involved, and that the World Urban Forum could become a forum for debate of these issues, for example WUF4 in China (2008). Coastal cities could usefully form a key comparison, building on the existing expertise on harbor cleanups in the Caribbean (including Kingston and Havana).

Tourism development in the coastal zone requires the application of by now traditional environmental policy measures such as environmental impact assessment (though research on Puerto Rico points up the risks of relying on these), as well as the newer forms of participatory decision-making pioneered by CANARI, but also supported by new methodologies such as Geographic Information Systems for Participation (GIS-P). GIS-P is a multimedia method for identifying and addressing concerns and preferences of communities facing development choices, or trying to protect their environment. It works by engaging citizens in a mapping exercise, whereby their concerns are written in comments on a map, and flash video, talk or still images can be added to the file as overlays. The whole is then transferred to an electronic map, as a basis for further analysis and negotiation. The method has the dual advantage that individuals can find their comments and documents on the e-map later, so know their inputs have been recorded and are likely to be taken seriously, and also, because issues are targeted at the map, conflict situations tend to be largely avoided.

The coastal zone also depends on land uses inland, in forestry and agriculture as well as urban waste water issues, so that ICZM will also need to work with the relevant authorities. Unfortunately, these substantive issues are not usually organized in one ministry or department of environment, which creates further transaction costs in working across departmental silos, and raises the familiar issues of bureaucratic politics.

Mobilizing knowledge

The range of issues addressed above means that each state in the region needs its own source of research and capacity development for monitoring and evaluating the impacts of policy choices on known local coastal communities and

environments. But each state will also need to be able to draw on a regional bank of data and expertise. In short, the issue requires relevant generalist training for professionals at the national level, and specialist training at the regional level, with specialists available for deployment across the region. This division of labor - or, of training - should also serve to present improved career opportunities in the region for the very able national experts who too often lack such opportunities and migrate to international organizations in New York, Geneva or Nairobi. It might also serve to attract some of those migrants back to the region.

In the context of knowledge production and mobilization, the project could also consider supporting the 'University in the Community' initiative, a project to identify ways in which universities and their outreach institutes interact with local communities to promote their sustainable development. This would serve a dual purpose, first, of producing knowledge and skills needed for local sustainable development and, second, of opening up a debate on the role and organization of higher education in sustainable development. How should the academy define its role, and should this differ across states and communities at different levels of development and facing different problems. In other words, how far should the academy be contextualized in the modern world?

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A Feasibility Study on the Use of Structural Mitigation to Reduce the Economic Vulnerability of Caribbean Small Island Developing States (SIDs) to Natural Disasters.

Jason M. A. Alexander

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Introduction

The period 1990 to 2000 was officially declared as the 'Decade of Disaster Risk Reduction' by the United Nations. One of the primary approaches identified as a solution for reducing disaster risk during this decade and onward was Mitigation. Mitigation constitutes one of the major components identified in the pre-disaster phase of disaster risk management. It involves complementary structural and non-structural measures used to reduce a country's vulnerability to natural disasters. (Freeman et al. 2003)

1.1 Rationale

A major reason for undertaking this research has to do with the 'natural disaster syndrome' that exists in the Caribbean region and the increasing resource gaps that these economies are susceptible to when disasters strike. The *natural disaster syndrome* refers to the mindset of a population which has limited interest in protection prior to a disaster or risk mitigation. (Kunreuther 1996) A resource gap indicates the inability of a country to finance its reconstruction obligations after a disaster. (Freeman et al. 2003) Small resource gaps are ideal but hardly ever a reality.

One approach to the successful reduction of resource gaps caused by natural disasters involves the use of structural mitigation. In fact, one author concluded that the resource gap of Grenada could have been reduced in the aftermath of Hurricane Ivan had investments been made in structural mitigation in the pre-disaster phase. (Alexander 2007)

Another *'raison d'être'* for this research agenda stems from the need to reduce the rising costs and total number of persons affected by natural disasters in the Caribbean.

A cursory review of the literature on the economic vulnerability of countries to natural disasters reveals a grave disparity between the experiences of Caribbean Small Island Developing States (SIDS) and those of more developed countries. Caribbean SIDS are particularly more vulnerable to natural disasters than many other countries in the world. (Pantin unpublished paper; Rasmussen 2004)

The implications of the above reveal that any sustainable development strategy for Caribbean SIDS must include a reduction in their economic vulnerability to natural disasters. (Attzs 2006)

Consequently this research seeks to highlight the feasibility of structural mitigation as a major tool or component for reducing the economic vulnerability of Caribbean SIDS to natural disasters. In addition, it also advocates a more proactive role for governments of Caribbean SIDS to provide appropriate incentives to encourage economic actors to engage in structural mitigation measures. Four major objectives of this research paper are outlined below.

1.2 Objectives

Four main objectives of this research paper are:

1. to examine and highlight the devastating economic impacts of natural disasters on Caribbean SIDS. This is achieved by reviewing secondary data on the type, incidence, total damage, total number of deaths and total number of people affected by disasters in fifteen Caribbean countries within the last seventeen years;

2. to conduct a review of the literature on the feasibility of using structural mitigation to reduce the economic vulnerability of Caribbean SIDS to natural disasters. This is done by reviewing the literature on economic vulnerability and structural mitigation;

3. to reiterate the importance of structural mitigation as a solution to drastically reduce the economic vulnerability of Caribbean SIDS to natural disasters. In other words, to promote a culture of structural mitigation among governments, firms and households in Caribbean SIDS. This is achieved by an economic appraisal of both the costs (nominal and opportunity) and benefits of structural mitigation and by examining six regional and international case studies on structural mitigation;

4. to inform policy makers and governments about the need for appropriate incentives and institutional capacity to induce households and firms to engage in structural mitigation;

1.3 Structure

Given the above objectives, this paper has been arranged into five sections. A Section 1 contains an overview of the research agenda inclusive of the rationale, objectives and structure of this paper. Section 2 provides an overview of the impact of natural disasters on fifteen Caribbean SIDS. Section 3 broadly reviews the literature on disaster mitigation and vulnerability and more specifically, reviews the literature on structural mitigation and economic vulnerability. This section also outlines the evolution and elements of disaster risk management over the past four decades. Section 4 examines six regional and international feasibility studies that explore the use of structural mitigation as a tool for economic vulnerability reduction in different sectors. Finally, the fifth section of this paper contains recommendations and policy conclusions for reducing the economic vulnerability of Caribbean SIDS to natural disasters via structural mitigation.

2.0 PROFILE OF NATURAL DISASTERS IN CARIBBEAN SIDS

Table 2.1 provides an overview of the impact of natural disasters on fifteen Caribbean countries. According to this table, 123 disasters affected the lives of over 4 million people, resulted in the deaths of another 7,548 and cost about 7 billion dollars in damage during the period 1990 to 2007.

A review of a Table 2.1 shows that:

(1) the islands of Haiti and Jamaica experienced the most disasters for this period, 41 and 16 respectively. Haiti was impacted by twice as many disasters as Jamaica. Conversely, Anguilla and Suriname experienced the least amount of disasters in the region;

(2) the most number of deaths caused by natural disasters occurred in Haiti, Jamaica and Belize. A proportionally higher number of lives, 7,000 more, were lost in Haiti when compared to all the other countries. In contrast, less than 10 deaths occurred in nine countries and no lives were lost in Anguilla, for this period;

(3) in the region the most number of people affected by disasters were in Haiti, Jamaica and Guyana. On the other hand, Anguilla had the least number of people affected by disasters. According to the EM-DAT, the number of people affected by a disaster refers to people who have been injured, affected or left homeless;

(4) Bahamas, Jamaica and Grenada experienced the most damage from natural disasters. However, Suriname, Anguilla and Barbados suffered the least damage.

TABLE 2.1:
DATA ON THE IMPACT OF NATURAL DISASTERS ON 15 CARIBBEAN SIDS DURING THE PERIOD 1990 -2007

COUNTRY	TOTAL NUMBER OF DISASTERS[73]	TOTAL NUMBER OF DEATHS	TOTAL NUMBER OF PEOPLE AFFECTED	TOTAL DAMAGE IN US$ '000
Anguilla	1	0	150	50
Antigua and Barbuda	5	6	76,684	500,000
Bahamas	10	10	19,200	2,000,400
Barbados	5	1	4,881	5,000
Belize	9	56	165,170	545,057
Dominica	6	7	13,421	215,000
Grenada	4	40	62,860	894,500
Guyana	4	44	347,774	634,100
Haiti	41	7,288	2,466,829	303,620
Jamaica	16	70	981,922	1,349,987
St. Kitts and Nevis	4	5	12,980	638,400
St. Lucia	5	5	950	40,500
St. Vincent and the Grenadines	5	7	1,834	16,000
Suriname	1	3	25,000	0
Trinidad and Tobago	7	6	1,787	26,127
TOTAL	**123**	**7,548**	**4,181,442**	**7,168,741**

Source: EM-DAT: The OFDA/CRED International Disaster Database www.em-dat.net - Université Catholique de Louvain - Brussels – Belgium

The data above excludes the impact of natural disasters on environmental assets and the goods and services that they provide to Caribbean countries.

The data in Table 2.2 shows the ten most costly disasters in the Caribbean SIDS during the period 1900-2007. These costs exclude the damage to immeasurable and priceless environmental assets.

TABLE 2.2: THE TEN MOST COSTLY NATURAL DISASTERS IN THE CARIBBEAN FOR THE PERIOD 1900 TO 2007

YEAR	COUNTRY AND TYPE OF EVENT	TOTAL DAMAGE IN US$ '000
October 1963	Haiti, Hurricane	1,587,000
September 2004	Bahamas, Hurricane	1,000,000
January 1988	Jamaica, Hurricane	1,000,000
September 1988	Jamaica, St. Lucia	1,000,000
September 2004	Grenada, Hurricane	889,000
September 2004	Jamaica, Hurricane	595,000
January 2005	Guyana, Flood	465,100
September 1999	Bahamas, Hurricane	450,000
September 1995	Antigua and Barbuda, Hurricane	400,000
September 1998	St. Kitts and Nevis,	400,000

Source: EM-DAT: The OFDA/CRED International Disaster Database www.em-dat.net – Université Catholique de Louvain - Brussels – Belgium.

[73] Natural Disasters include earthquake, flood and wind storms.

The data in Table 2.3 shows the top ten disasters that resulted in the most number of deaths during the period 1900-2007.

TABLE 2.3: THE TOP TEN NATURAL DISASTERS THAT RESULTED IN THE MOST NUMBER OF DEATHS IN THE CARIBBEAN FOR THE PERIOD 1900 TO 2007

YEAR	COUNTRY AND TYPE OF EVENT	TOTAL NUMBER OF DEATHS
October 1963	Haiti, Hurricane	5,000
September 2004	Haiti, Hurricane	2,754
May 2004	Haiti, Flood	2,665
October 1935	Haiti, Hurricane	2,150
September 1930	Dominica, Hurricane	2,000
August 1915	Haiti, Hurricane	1,600
September 1961	Belize, Hurricane	1,500
January 1907	Jamaica, Earthquake	1,200
November 1994	Haiti, Hurricane	1,122
November 1963	Haiti, Flood	500

Source: EM-DAT: The OFDA/CRED International Disaster Database www.em-dat.net – Université Catholique de Louvain - Brussels – Belgium.

The data in Table 2.4 shows the top ten disasters that resulted in the most number of people affected. The total number of people affected by a disaster refers to the number of people that were injured, affected and made homeless as a result of its occurrence.

TABLE 2.4: THE TOP TEN NATURAL DISASTERS THAT RESULTED IN THE MOST NUMBER OF PEOPLE AFFECTED IN THE CARIBBEAN FOR THE PERIOD 1900 TO 2007

DATE	COUNTRY AND TYPE OF EVENT	TOTAL NUMBER OF PERSONS AFFECTED
November 1994	Haiti, Hurricane	1,587,000
September 1988	Haiti, Hurricane	870,000
August 1980	Haiti, Hurricane	330,000
September 2004	Haiti, Hurricane	315,594
January 2005	Guyana, Flood	274,774
October 1954	Haiti, Hurricane	250,000
December 2003	Haiti, Flood	150,000
September 1988	Jamaica, Hurricane	81,000
July 1980	St. Lucia, Hurricane	80,000
August 1979	Dominica, Hurricane	72,100

Source: EM-DAT: The OFDA/CRED International Disaster Database www.em-dat.net – Université Catholique de Louvain - Brussels – Belgium.

The aforementioned reality of Caribbean countries cannot be disregarded, minimized or ignored because of the high opportunity costs involved and the unsustainable nature of this situation. Therefore, the increasing costs of disasters must be reduced or managed and the total number of people affected by these disasters must be curtailed.

3.0 Literature Review

This section reviews the literature on disaster risk management, mitigation, structural mitigation, vulnerability and economic vulnerability.

3.1 An Evolution and Overview of Disaster Risk Management

The literature on the evolution of disaster risk management indicates that prior to the 1970s, the overriding concern of disaster risk management was responding to damage that were already caused and seeking to rehabilitate the shock caused to an economy. In the 1970s, physical and structural measures were used to curb post disaster losses. This represented an improvement in dealing with the onset of natural disasters. In the 1980s and 1990s further strides were made to deal with the havoc caused by natural disasters. During both decades, the link between development and disasters became clearer and the benefits of mitigation continued to gain relevance in the disaster discourse. In addition, social and economic vulnerability reduction was considered very important given the varying degrees of both for different countries and social groups in society. More recently, in the 21st century, disaster risk management has now encompassed the benefits of the earlier periods as well as the lessons learned from country-specific examples. It now includes six steps, namely, risk identification, risk mitigation, risk transfer, preparedness, emergency response and reconstruction and rehabilitation. (UNDP 2004)

Therefore an important part of any development policy in Caribbean SIDS would include the six elements of disaster risk management since as noted above, it is recognized that disasters affect economic development.

The United Nations International Strategy for Disaster Reduction, UNISDR defines Disaster Risk Management as:

'The systematic process of using administrative decisions, organizations, operational skills and capacities to implement policies, strategies and coping capacities of the society and communities to lessen the impacts of natural hazards and related environmental and technological disasters.'

Disaster Risk Management also involves a series of four pre- and two post-disasters steps that can be used by countries to reduce their vulnerability to natural disasters. (Freeman et al. 2003)

Table 3.1 summarizes the phases and elements of DRM. Disaster Risk Management as it is known today represents a paradigm shift in the approach to dealing with disasters. This shift involves a movement away from reactive to proactive disaster risk management.

Table 3.1: Phases and Elements of Disaster Risk Management

PRE-DISASTER PHASE	POST-DISASTER PHASE
Risk Identification	Emergency Response
Risk Mitigation	Reconstruction and Rehabilitation
Risk Transfer	
Preparedness	

Source: Freeman et al, 2003.

3.2 Disaster Mitigation

This section broadly defines disaster mitigation and examines the literature on the linkages between disaster mitigation and economic vulnerability. It also outlines different expert perspectives on disaster mitigation.

Disaster mitigation refers to actions taken to reduce or eliminate the long-term risks to people and property from natural disasters. (USFEMA 1996) Other authors have defined risk (disaster) mitigation as the structural and nonstructural activities, done prior to a disaster, to reduce the devastating impacts caused to human life and infrastructure. (Freeman et al. 2003) According to Van Howell (2006) disaster mitigation involves 'spending a little now to save a lot later.'

The underlying principle of the above definitions is the importance of investment or forgoing current consumption in order to reduce vulnerability to natural disasters. Freeman et al. (2002) acknowledges that disaster mitigation requires current expenditure in order to reduce future risks.

Regarding the linkage between economic vulnerability Van Howell (2006) stated that:
'...increased economic vulnerability requires that natural disaster mitigation strategies be at the heart of planning/development of new and existing construction.' Similarly, Rose (2004) acknowledged that mitigation can reduce vulnerability to natural disasters.

In fact, this interconnected relationship can be seen since failure to engage in disaster mitigation can exacerbate economic vulnerability just as inherent economic vulnerability can inhibit the availability of funds for disaster mitigation. The latter is especially the case when examining the sacrifices that are required by the economically vulnerable (poor, women, children and sick) to make investments in disaster mitigation.

The literature identifies three types of approaches to disaster mitigation: Formal, Informal and Community-based. Schilderman (2004)

Formal disaster mitigation refers to official disaster programmes that are directed by governmental authorities with the support of donors, professionals and the private sector. Examples of the above include the Maharastra, India earthquake (1993), Alto Mayo, Peru earthquake (1990), Chosica, Peru flood (1987) and the Callao, Peru flood (1994).

Despite the application of formal disaster mitigation in earlier periods, this approach is flawed. Some disadvantages of this approach include:

1. it is a *costly solution* for the poor and marginalized in society. Since there tends to be a direct duplication of a foreign disaster mitigation strategy into a local economy;
2. it often results in an *inappropriate solution* to the problem because this approach does not involve people and their organizations in the disaster mitigation process;
3. there is the possibility of *a greater degree of manipulation, political interference and corruption;*
4. there is an inherent tendency for a *lack of integration* between the disparate sectors and institutions involved in the initiative. (Schilderman 2004)

On the other hand, informal disaster mitigation involves the integration of the poor in disaster mitigation initiative. Specifically, it is smaller in scale and centered around individuals or communities and their organizations. This approach uses the skills of artisans and sometimes Non-Governmental Organizations (NGOs) to support disaster mitigation efforts. Some examples of its application include the use of timber beams in masonry in Turkey to provide seismic resistance in buildings and the use of nets weighed down with stones on thatched roofs in India for protection against strong winds from tropical storms.

However, some disadvantages of this approach include:

1. lack of local knowledge on how to cope with severe and intense disasters. In addition, even if this knowledge does exist the infrequency of disaster occurrence in a particular area may result in memory lapses in individuals;
2. economic decline or other factors may cause local knowledge to be ignored;
3. changes in consumer taste i.e. fashionable construction can result in inferior structures in the end. (Schilderman 2004)

Finally, the community-based approach for disaster mitigation includes building on the strengths of the informal approach and addressing its major drawback, lack of training. The main actor involved in this approach tends to be development agencies and NGOs. Some examples of development agencies that have used the community-based approach to disaster mitigation include the Intermediate Technology Development Group (ITDG), its NGO partners and the Building Advisory Service and Information Network (BASIN). The Intermediate Technology Development Group (ITDG) for example, worked with a community in Alta Mayo, Peru to develop more earthquake resistant houses for the population. This process involved working along with artisans and residents, using local raw materials and marketing new housing solutions, using local media to disseminate structural mitigation practices.

The advantages of the community-based approach to disaster mitigation include:

1. lessons are drawn from past disaster events to ascertain the appropriate local technologies that can be used in the mitigation process.
2. NGOs tend to be more successful in developing relationships with communities than public sector or international agencies.
3. related to the above, is the fact that communities possess the requisite knowledge and memory of past disaster effects. They also know more about their own needs and are able to have a more far-reaching effect than other external agencies.
4. this approach gives development agencies the opportunity to tap into the knowledge of local builders within communities. This can result in enhancing the skills of artisans and local builders.
5. this approach also involves the documentation and dissemination of lessons learned with the poor using appropriate oral and visual communication like radio, posters and video where possible. (Schilderman 2004)

Two other authors have distinguished between self-insurance and self-protection as two different forms of mitigation. (Ehrlich and Becker 1972) According to them, the former refers to mitigation investment that reduces the damage from a disaster whereas the latter reduces the probability that a disaster will occur. In other words, self-insurance or loss-reducing mitigation reduces the size of a loss from a disaster. An example of this includes building a structurally sound home to withstand a given hurricane. In contrast, self-protection or probability-reducing mitigation reduces the probability of a loss from a disaster. So, for example a prospective homeowner engages in self-protection mitigation when he or she purchases a more expensive home in a less hurricane-prone area.

Ehrlich and Becker (1972) concluded that market insurance and self-insurance are substitutable and therefore subject to the problem of moral hazard. This implies that individuals are reluctant to purchase market insurance, even at an affordable price, when they have engaged in self-insurance activities. The above was reinforced in a study done by Fronstin and Holtmann (1994).

Another deduction made by Ehrlich and Becker (1972) is that market insurance and self-protection are complements as long as market insurance is affordable and factors in the reduced vulnerability as a result of the homeowner probability-reducing mitigation activities. This implies that individuals are more likely to purchase market insurance when they have engaged in self-protection initiatives.

A major implication of the above is that the willingness of an individual to purchase market insurance is determined by their choice to engage in self-insurance or self-protection and the affordability of the insurance premium. Related to the above, two authors stated that structural mitigation activities by homeowners reduce the exposure of insurance companies and hence should be accompanied by lower premiums. (Kleindorfer and Kunreuther 1999)

Also, it can be deduced above that self-insurance is synonymous to structural mitigation and self-protection is analogous to non-structural mitigation. As such a comprehensive approach that includes both aspects of disaster mitigation will yield the best results i.e. economic vulnerability reduction. Regarding the feasibility of the above, this paper only explores the use of structural mitigation (self-insurance) as a tool for deducing economic vulnerability to natural disasters.

Alternatively, Marshall et al. (2004) identifies a three-step protocol risk mitigation plan for the protection of facilities against man-made and natural disasters. The elements of this plan are contained in Table 3.2.

TABLE 3.2: THE ELEMENTS OF THE THREE-STEP PROTOCOL RISK MITIGATION PLAN

ELEMNENTS OF THE THREE-STEP PROTOCOL MITIGATION PLAN	EXPLANATION
1. Risk Assessment	Assess the risk of uncertain costly, man-made and natural disasters (e.g. terrorism, floods, fire and earthquake).
2. Mitigation Strategies	Identify the alternative risk strategies that can be used singly or in combination that can be used in reducing the expected value of damage. Three alternative strategies identified include engineering alternatives, management practices and financial mechanisms.
3. Economic Analysis	Select the optimum package of risk mitigation by using economic analysis, tools and software.

Source: Marshall et al. 2004.

Regarding the engineering alternatives available for Mitigation Strategies the authors make reference to increased facility protection derived from using structural or material changes, barriers and mechanical system changes. These changes are elaborated on in the next section.

3.3 Structural Mitigation

To reiterate, structural mitigation involves structural activities, done prior to a disaster, to reduce the devastating impacts caused to human life and infrastructure. (Freeman et al. 2003) According to Godschalk et al. (1999) structural mitigation includes the strengthening of buildings and infrastructure exposed to hazards by a variety of means including building codes, engineering design and construction practices.

Table 3.3 outlines some specific examples of structural mitigation identified in the literature on earthquakes, floods and hurricanes.

TABLE 3.3: STRUCTURAL MITIGATION METHODS CONTAINED IN THE LITERATURE ON EARTHQUAKES, FLOODS AND WIND STORMS

STRUCTURAL MITIGATION METHODS IN THE LITERATURE ON EARTHQUAKES	STRUCTURAL MITIGATION METHODS IN THE LITERATURE ON FLOODS	STRUCTURAL MITIGATION METHODS IN THE LITERATURE ON WIND STORMS
construction of stronger and larger bridge piers	construction of levees	Underground telecommunication
Strengthen and hardened bridge	construction of dams	Underground electrical transmission lines
Timber beams in masonry	Channel diversions	Fisherman nets weighed down with stones over thatched roofs
Retrofitting	Dry bypass channel	Wide roof eaves
	regular drain upkeep	Reinforced gables
	Channelization	Storm blinds or shutters
	Kiln fired materials in construction. e.g. brick, clay tiles, building lime and lime-based concrete.	Storm panels
	Alternative kiln fired materials. e.g. limestone, silica sand, ceramic clay.	Rafter bracing

Source: Freeman et al. 2003; Marshall et al. 2004; Schilderman 2004; Simmons et al. 2002; Burrus et al. 2002; Mclean and Moore 2005; Bechtol and Laurian 2005

Interestingly, the literature reveals that the use of some structural mitigation measures for flooding have failed in the United States of America. These measures include building floodwalls, levees and the modification of river channels. Mileti (1999) indicates that these structural mitigation measures have failed to reduce flooding and resulted in rising costs. Furthermore, Burby et al. (1988) revealed that the above approaches can result in severe environmental

degradation, the loss of wetlands and animal habitats. Flood mitigation can be successfully accomplished by using complimentary non structural mitigation methods such as open space conservation, river restoration and floodplain management. (Bechtol and Laurian 2005)

3.4 Vulnerability

A definitional review of the literature indicates that there exists some ambiguity in defining the term vulnerability (to natural disasters). According to one author the meanings of vulnerability are still fuzzy. This same author reinforces the aforementioned by his inclusion of twenty-four selected definitions of vulnerability by notable authors in this field. (Weichselgartner 2001)

Reiterating the above, McEntire (2005) identified fifteen distinct disciplinary perspectives on vulnerability to natural disasters. Essentially, each discipline (e.g. Economics or Sociology or Environmental Sciences) has different views on the determinants of vulnerability and the requisite approaches for vulnerability reduction. For instance, economists may define vulnerability in relation to the poor and their inability to prevent, prepare and recover from a disaster whereas environmental scientists may be concerned with the degree of environmental degradation which may occur as a result of a disaster. As such, the recommendations for vulnerability reduction in both professions might include improving the distribution of income and protecting environmental assets, respectively.

Given the broad and varying definitions of vulnerability an attempt is made next to define economic vulnerability to natural disasters below.

3.5 Economic Vulnerability

The term economic vulnerability of SIDS was defined by Briguglio (2002). He stated that the economic vulnerability of a country is a function of its inherent and permanent economic features. Some of these economic features include:

1. Economic openness or a high degree of openness. (This can be measured by expressing exports as a percentage of GDP or expressing imports as a percentage of GDP.)
2. Export concentration or a dependence on a narrow range of exports. (This can be measured by the UNCTAD's Export Concentration Index)
3. Import dependence or dependence on a few strategic imports. (This can be measured by the average imports of commercial energy as a percentage of domestic energy production.)
4. Peripherality or the insularity and remoteness of a country which leads to higher transportation costs and marginalization. (This can be measured using the ratio of transport and freight costs to imports.)

McEntire (2001) also identifies some factors that may increase the economic and related social vulnerability of a country to natural disasters. These include:

1. A growing divergence in the distribution of wealth;
2. The pursuit of profit without concern for any consequences.
3. Failure to purchase Insurance;
4. Limited resources for disaster prevention, planning and management.
5. Inadequate routine and emergency health care;
6. Marginalization of specific groups and individuals;
7. Limited education; and
8. Massive and unplanned mitigation to urban areas.

Economic vulnerability has also been defined as fiscal vulnerability. According to Hemming and Petrie (2000) fiscal vulnerability involves much more than a government pursuing inappropriate fiscal policies or lacking the ability to implement better policies. It also involves the inability of a government to achieve any of the three main macro-fiscal objectives of fiscal policy at the aggregate, sectoral and programme levels in the economy.

The macro-fiscal objectives of fiscal policy include:
1. avoiding excessive fiscal deficits and debt;
2. retaining sufficient flexibility to respond in a timely and appropriate manner to domestic and external macroeconomic balances; and
3. maintaining a reasonable and stable tax rate.

The operational applications of fiscal policy are outlined below:
1. at the aggregate level, the main concern is with total expenditure and total taxation or revenue in the economy;
2. at the sectoral level, the major concern is about spending across major programmes and revenue collection from major tax bases; and
3. the programme level is primarily concerned with spending and tax programmes for individuals.

This section reviewed the literature on Disaster Risk Management, Disaster Mitigation and Vulnerability. More specifically, it summarized the literature on structural mitigation and economic vulnerability.

4.0 FEASIBILITY STUDIES ON STRUCTURAL MITIGATION

Sections 2 and 3, present a case for exploring the feasibility of disaster mitigation in Caribbean SIDS given their disaster profile and inherent economic vulnerability. As such, this section highlights six examples of structural mitigation used throughout the world.

Van Howell (2006) identified some benefits and costs of disaster mitigation. Table 4.1 outlines some of the benefits and costs of disaster mitigation outlined by Van Howell and other authors.

TABLE 4.1: BENEFITS AND COSTS OF MITIGATION STRATEGIES

BENEFITS OF MITIGATION	COSTS OF MITIGATION
1. Minimal property damage	1. Complete destruction
2. Minimal inventory damage	2. Complete loss
3. Minimal loss of working days/productive time	3. Extended Shutdown
4. Low emergency response costs	4. High emergency response costs
5. Reduced loss of life	5. Initial construction cost
6. Reduction in the incidences of injuries	6. Maintenance cost (net present value of)
7. Reduced potential of low employee morale	7. Environmental Damage (in the case of flood mitigation that involves floodwalls, levees and modifying river channels.)
8. Increased sense of company strength	8. Loss of wetlands (in the case of flood mitigation that involves floodwalls, levees and modifying river channels.)
9. Increased property value	9. Loss of animal habitat (in the case of flood mitigation that involves floodwalls, levees and modifying river channels.)
10. Lower insurance premiums (if deductibles are increased)	
11. Reduced potential of low employee morale	

Source: Van Howell 2006; Simmons et al. 2002; Burrus et al. 2002; Bechtol and Laurian 2005 Marshall et al. 2004

4.1 Feasibility Study 1: Grenada and Hurricane Ivan 2004

According to the United States Federal Emergency and Management Agency (FEMA), every one dollar spent on mitigation saves two dollars in disaster recovery and response. (World Bank 2000/2001) This estimate implies that $1m spent on mitigation works in the pre-disaster period can save $2m in the post-disaster period.

The above rule can be applied to Grenada and Hurricane Ivan in 2004. Assuming that expenditure on structural mitigation in Grenada was US$1m[74] annually, starting 1990[75]. This means that by 2003, the year before Hurricane Ivan, total accumulated expenditure on mitigation could have been US$13m. The resulting savings from structural mitigation would then be US$26m[76]. This US$26m saving would have resulted in a new and lower resource gap of about US$859m[77] instead of US$885m.

This scenario seeks to corroborate that investment in structural mitigation would have reduced the economic vulnerability of Grenada and hence its resource gap in the post-disaster phase of Hurricane Ivan. (Alexander 2007)

4.2 Feasibility Study 2: St. Marks Secondary School of Grenada and Hurricane Ivan 2004

According to OAS (2005) prior to Hurricane Ivan, the World Bank approved a disaster management project to retrofit schools to make them resistant to a Category 3 Hurricane. One of the schools to be retrofitted was the St. Marks Secondary School in Grenada. The estimated cost of retrofitting the school was EC$377,160.00. However, the project was never started and the school was damaged by Hurricane Ivan. The result was a huge rebuilding cost of about EC$3.6m or almost 10 times the cost of retrofitting. The above might have been avoided if structural mitigation measure were implemented in the pre-disaster period.

4.3 Feasibility Study 3: OAS-USAID Caribbean Disaster Mitigation Project (CDMP)

One of the major lessons learned from the OAS-USAID Caribbean Disaster Mitigation Project is that significant savings accrue to property owners when mitigation measures are implemented at the time of original construction. (OAS 2005)

The three Caribbean case studies outlined in Table 4.2 reinforce the point made above. In the case of Dominica's Deepwater Port, structural mitigation of 10-15% of the initial construction cost would have resulted in savings of 26-31% after Hurricane David in 1979. Similarly, if 1.9% of the original construction cost of the Manley Library in Jamaica was spent on disaster mitigation measures the resulting savings would have been about 55% of the reconstruction costs. Regarding the Grand Palazzo Hotel, 0.1% investment in disaster mitigation initiatives would have saved the Hotel 99% of the reconstruction costs resulting from Hurricane Marilyn in 1992.

4.4 Feasibility Study 4: Storm Blinds and the Resale Value of Houses in the US

Simmons et al. (2002) attempted to model the relationship between the resale value of a home and the use of structural mitigation measures in an unnamed hurricane-prone neighborhood in the US. The results of their model indicated that mitigation investment, specifically the use of storm blinds, increased the resale value of houses. The authors indicated that the resale value of homes increased by more than 5% when storm blinds were used.

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74 According to World Development Indicators the Population statistics in 1990 and 2003 were 93,600 and 104,614, respectively. This implies that each person would contribute US$10.68/year and US$9.56/year, respectively.

75 1990 was chosen as the year of reference because in that year the United Nations officially declared the "Decade of Disaster Risk Reduction."

76 US$13m × 2 = US$26m, based on the 1:2 rule of mitigation.

77 US$885m - US$26m = US$859m

TABLE 4.2: THREE CASE STUDIES FROM THE OAS-USAID CARIBBEAN DISASTER MITIGATION PROJECT

CASE STUDY/ LOCATION/ CONSTRUCTION DATE	EVENT	ORIGINAL COST OF INFRASTRUCTURE (1975 US$ UNLESS OTHER WISE STATED)	COST OF MITIGATION	COST OF RECONSTRUCTION
Dominica Deepwater Port, Dominica. 1974-1978	Hurricane David (1979)	$5,676,000	$567,600 - $851,400	$2,310,000
The Manley Library, Jamaica. 1975	Hurricane Gilbert (1988)	$685,000	$13,000	$28,800
Grand Palazzo Hotel, St. Thomas. 1992	Hurricane Marilyn	$28,000,000 (US$ 1992)	Less than $28,000	$5,300,000 (US$ 1992)

Source: OAS 2005

In their model, the cost of an average-sized home was US$80,000 and the cost of installing storm blinds in a home was US$4200. Therefore, the cost of structural mitigation can be offset by the future resale value of a home.

4.5 Feasibility Study 5: Des Moines Water Works, Iowa

Des Moines Water Works (DWW) is a water utility company operating in Iowa. DWW plant operations were halted in 1993 when it was flooded by the Mississippi River. Some implications of the above were no potable water for eleven days, a loss of fire protection and a loss of US$200m to US$500m in business for local businessmen. The total cost borne by the utility was US$16m. Later DWW invested $2m to repair and raise the existing levees surrounding their facility. The latter (structural mitigation investment) would have potentially saved the company about US$14m if the procedure was carried out prior to the flood of 1993. (Van Howell 2006)

4.6 Feasibility Study 6: Ocean View Medical Centre, Los Angeles, California

The Ocean View Medical Centre (OVMC) is a hospital located in the earthquake-prone California State of the USA. It was built in 1970, destroyed by the San Fernando Earthquake in 1971, abandoned for about 17 years and rebuilt in 1988. The initial building in 1970 was designed using 1965 building codes in from Los Angeles.

The reconstruction cost of the hospital in 1988 was US $48m. OVMC was reconstructed using the earthquake mitigation available at the time. Six years later, the Northridge Earthquake damaged the reconstructed Centre. The result of this second earthquake was a month-long interruption of OVMC normal operations. However, the total repair costs were US$6.6m or 11% of the replacement cost. Conversely, if the 1988 version of OVMC was not built using structural earthquake mitigation measures then the owners of the Hospital would have had a huge debt. (Van Howell 2006)

5.0 Conclusion

As outlined in section three, an initial sacrifice is mandatory for structural mitigation investments to be made in a country. This final section contains four policy conclusions, three recommendations and a suggestion for the way forward that can be used by Caribbean SIDS to reduce their economic vulnerability to natural disasters.

5.1 Policy Conclusions

Four policy conclusions that have been drawn from the case of Grenada and Hurricane Ivan are:

(1) structural mitigation must be incorporated into the Disaster Risk Management policies of all Caribbean countries. The empirical evidence in Table 2.1 indicates that billions of dollars have been lost in the last two decades alone and a huge amount of human lives have been injured, killed or made homeless by hurricanes, floods and earthquakes in Caribbean SIDS. The opportunity cost of not engaging in structural mitigation investments is too high;

(2) investment in Structural Mitigation could be very appropriate for disaster risk reduction in Caribbean SIDS. An attempt was made to highlight the potential positive impacts of structural mitigation measures, in Section 4, using the six feasibility studies related to households, utilities, health centres and schools in the region and abroad. The disaster syndrome ought to be removed from the minds of all citizens in the Caribbean because it inhibits effective Disaster Risk Management in the pre-disaster phase. Structural mitigation initiatives yield the highest return on investment when households, firms and governments prepare for disasters, beforehand;

(3) in this connection, Caribbean governments have a responsibility to educate all their citizens (firms and households) about the importance of structural mitigation in their businesses and homes. Government education can be coupled with fiscal incentives such as tax breaks, tax incentives, tax holidays and subsidies to signal to all their commitment to using structural mitigation measures to reduce the damage and costs caused by natural disasters;

(4) international and Regional Financial Institutions, Donor Agencies and Development Organizations have to unequivocally indicate to Caribbean economies that they are primarily committed to supporting structural mitigation initiatives. Grants and loans to Caribbean SIDS from these organizations should only be accessible if countries are willing to use the majority of funds for structural mitigation initiatives. This does not preclude aid, relief and loans in the post disaster period but it signals a commitment to more prudent resource allocation that reduces future economic vulnerability to natural disasters.

5.2 Recommendations

Given the above policy conclusions, some recommendations are:

(1) all Caribbean SIDS need to review their disaster risk management strategies and promote the use of structural mitigation as a tool for Sustainable Development. Failure to do the aforementioned can have implications for intergenerational equity and even intragenerational equity;

(2) Caribbean governments should encourage structural mitigation by starting with their own buildings and other public infrastructure. Fiscal incentives (such as those highlighted earlier) can induce public and private sector stakeholders to participate in proactive structural mitigation activities. For example, an initiative geared towards the structural mitigation of middle-income households can be achieved by providing tax breaks for mitigation works. With respect to businesses, Caribbean SIDS can provide tax holidays or reduce corporation taxes so that firms will implement structural mitigation measures in order to prepare for natural disasters;

(3) the clear and recurring lesson learnt from the six feasibility studies outlined in section four, is that investment in structural mitigation can and should be used by Caribbean governments to reduce, among other things, the loss of property, loss of productivity and most importantly the loss of lives caused by natural disasters.

5.3 The Way Forward

In terms of the way forward, the author suggests the comprehensive design, administration and analysis of a survey titled Structural Mitigation in Caribbean Small Island of Developing States. This survey can be used to measure the natural disaster syndrome in Caribbean SIDS and to inform policy makers about proactive strategies to educate and promote structural mitigation initiatives in the region. This survey should target a wide cross-section of individuals and businesses throughout the Caribbean. A survey of this nature and scope can be used to investigate:

1. the knowledge and awareness of individuals and firms about existing and possible structural mitigation practices that can and are being used in Caribbean SIDS;
2. the perceptions of structural mitigation held by individuals of different sexes, ages and income levels in Caribbean SIDS. As well as, the perceptions of structural mitigation held by firms of different sizes in Caribbean SIDS;
3. the knowledge and awareness of individuals and firms in Caribbean SIDS about the cost of structural mitigation measures for their homes and properties;
4. the knowledge and awareness of individuals and firms in Caribbean SIDS about the benefits of structural mitigation measures for their homes and properties;
5. the willingness of individuals and firms in Caribbean SIDS to engage in existing and new structural mitigation practices with and without fiscal incentives;
6. the availability of local and cheap raw materials for the implementation of structural mitigation practices in Caribbean SIDS;
7. the availability of skilled workers and labour to implement structural mitigation strategies in both existing and new buildings and properties in Caribbean SIDS.

This survey can be administered in three phases: Phase 1 - Identification of Structural Mitigation measures (i.e. raw materials and labour) in Caribbean SIDS; Phase 2 - Cost and Benefit Estimates of structural mitigation measures in Caribbean SIDS; and Phase 3 - An Analysis of the attitudes of Individuals and Firms to structural mitigation measures in Caribbean SIDS.

LIST OF ABBREVIATIONS

CRED	Centre for Research on the Epidemiology of Disasters
EC	Eastern Caribbean
EM-DAT	Emergency Events Database
GDP	Gross Domestic Product
NGO	Non Governmental Organizations
OAS	Organization of American States
OFDA	Office of Foreign Disaster Assistance
ST	Saint
SIDS	Small Island Developing States
UNISDR	United Nations International Strategy for Disaster Reduction
US	United States
USA	United States of America
USAID	United States Agency for International Aid
USFEMA	United States Federal Emergency Management Agency
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programmeme

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An Examination of the Contribution of Community-Based Organizations (CBOs) in Poverty Reduction Efforts and Environmental Management in Soufriere, St. Lucia.

Donna Devika Ramjattan

An Examination of the Contribution of Community-Based Organizations (CBOs) in Poverty Reduction Efforts and Environmental Management in Soufriere, St. Lucia.

Donna Devika Ramjattan[78]

Aim

The aim of this study is to investigate the contribution that community-based organizations are making to poverty reduction and environmental management in the small coastal community of Soufriere, St. Lucia. This investigation will help in identifying whether these community-based organizations create a sense of self-sufficiency and thus promote sustainable livelihoods as expressed in terms of poverty reduction and environmental management. In essence the aim of the study is to measure the contribution and progress of community-based organizations in the sustainable development process.

Objectives

- To identify the contribution of civil society in the form of community-based organizations to Sustainable management of natural resources with particular respect to the role and effectiveness of community-based organizations
- To identify the level of environmental dependency and practices. That is to identify the linkages between human activity and the environment (whether the poor depend on the environment as a source of income be it in terms of agriculture, fishing or tourism); to identify how community- based organizations facilitate this relationship
- To suggest ways to bridge the gap between local and national policy making through the utilization of a possible bottom up approach whereby community-based organizations provide possible solutions to national problems (in terms of poverty reduction and environmental management)

Justification

In St. Lucia, the data indicates that the level of poverty is of concern in the small coastal communities. Table 1 shows that in the small coastal communities the poverty gap ranges from 5.8 in Gros Islet to 17.7 in Anse La Raye/Canaries. In the case study community of Soufriere the poverty gap is 12.4. The percentages of those poor ranges from 23.1 to 44.9, with the case study community having 42.5% of its population being poor.

Table 1: Headcount, Poverty Gap, Poverty Severity by District 2005

	Population	Per cent Indigent	Per cent Poor	Poverty Gap	Poverty Severity
Anse la Raye/ Canaries	10,287	5.3	44.9	17.7	9.6
Soufriere	9,329	0.4	42.5	12.4	4.8
Choiseul	5,401		38.4	9.7	3.8
Laborie	7,190		42.1	10.6	3.5
Vieux- Fort	14,096	4.8	23.1	10.2	5.9
Micoud	18,071	4.0	43.6	14.1	6.8
Dennery	11,986		34.2	11.4	5.2
Gros-Islet	20,787	0.4	24.4	5.8	2.2

Source: Adapted from Kairi Consultants Limited. (2006), The Assessment of Poverty in St. Lucia.

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In terms of the environment, the data suggest that environmental degradation is also an area of major concern. This is especially so due to the fact that human activity has had significant effects on watersheds in St. Lucia. Table 2 below shows that damage in the watersheds range from damaging to extreme.

Table 2: Categories of Pollution in St. Lucia.

		Occurrence in catchment		
Category	**Principal Source/Causes**	**Lower (<200 ft)**	**Middle (200-600ft)**	**Upper (>600 ft)**
Organics	Domestic Sewage	Significant	Significant	-
Nitrogen and Phosphorous	Domestic sewage and agricultural fertilisers	Significant	Significant	-
Pesticides	Farm Land	Damaging	Significant	-
Herbicides	Farm Land	Damaging	Significant	-
Heavy Metals	Industrial effluents	-	-	-
Oil	Transport	Significant	Significant	-
pH	Industry	-	-	-
Pathogens	Human Sewage and Farm Waste	Damaging	Significant	-
Physical Solids	Farm Land and deforested soils	Extreme	Severe	Damaging

Source: Compendium of Environmental Statistics, 2001, adapted from the Biodiversity Report, 1998, Table from the Statistics Department

Further, the data suggest that environmental degradation offshore is also a major concern. Table 3 below, shows that threats to reef areas vary and include coastal development, sediment and pollution from inland sources, marine-based sources of pollution and fishing pressure. Fishing pressure presents the greatest threat with a figure of 98% with coastal development second with a figure of 67%.

Table 3: Reefs Threatened by Human Activity in St. Lucia.

						Individual Threats											
Reef Area (km^2)	**Reef Area as a % of total in Region**	**Reefs at Risk Threat Index (%)**				**Coastal Development (%)**			**Sediment and Pollution from Inland Sources (%)**			**Marine Based Sources of Pollution (%)**			**Fishing Pressure (%)**		
		Low	Medium	High	Very High	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
90	<1	0	0	39	61	1	32	67	0	51	49	60	29	11	0	2	98

Source: Burke, L., Maidens, J. and others. 2004. Reefs at Risk in the Caribbean. World Resources Institute, Washington D.C.

Further justification is gathered from the Report on Regional Dialogue on Civil Society Participation for Sustainable Development (OECS, 2004) where specific recommendations were made for the involvement of CBO's. These recommendations include:

1. *'environmental management programmemes, and development programmemes as a whole, should be implemented with the community and not for the community;*
2. *consideration should be given to providing funds to CBO's and NGOs for the administrative services that they are required to provide in implementation of small projects;*
3. *development should be seen as a community-driven process.'*

As such, it is important that local organizations play a role in educating and helping communities utilize sustainable management practices. To the extent that this is currently being undertaken the effectiveness of such efforts need to be quantified in order to further an Integrated National Policy for Poverty Reduction and Environmental Management.

Methodology:

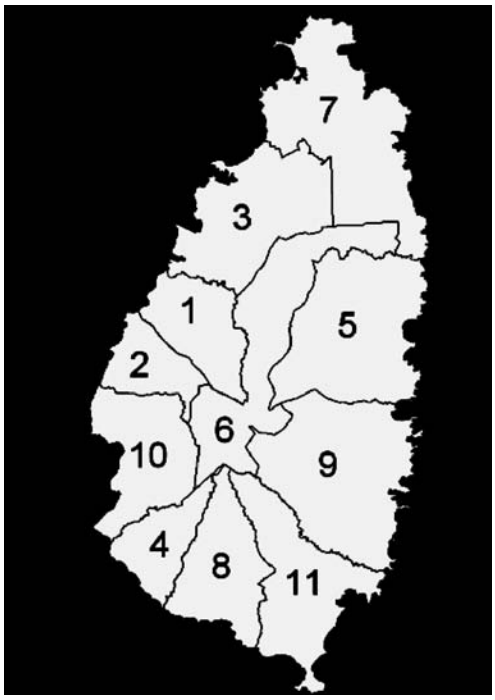
This study will entail reviewing the literature on civil society and community-based organizations and the institutional framework within the context of poverty reduction and environmental conservation in the small coastal community of Soufriere.

Further data will be collected to quantify the effectiveness of the institutional framework in St. Lucia (public education activities, research activities, provision of training for sustainable practices, provision of funds for sustainable practices amongst others). This study will utilize both primary and secondary data. Primary data will be gathered through interviews with key stakeholders to assess role and effectiveness of both civil society and local institutions. Secondary data will be gathered through published papers, projects and local studies.

Profile of St. Lucia

St. Lucia is an island in the Eastern Caribbean Sea on the boundary with the Atlantic Ocean. It is part of the Lesser Antilles and is located north of the islands of Saint Vincent and the Grenadines, north west of Barbados and south of Martinique. The following diagram illustrates the eleven (11) districts in St. Lucia.

Figure 1: Map of St. Lucia and its Districts



Source: Wikipedia Online Encyclopedia,
http://en.wikipedia.org/wiki/Saint_Lucia.
(Accessed 2007-05-14)

The island of St. Lucia is divided into eleven (11) quarters namely:

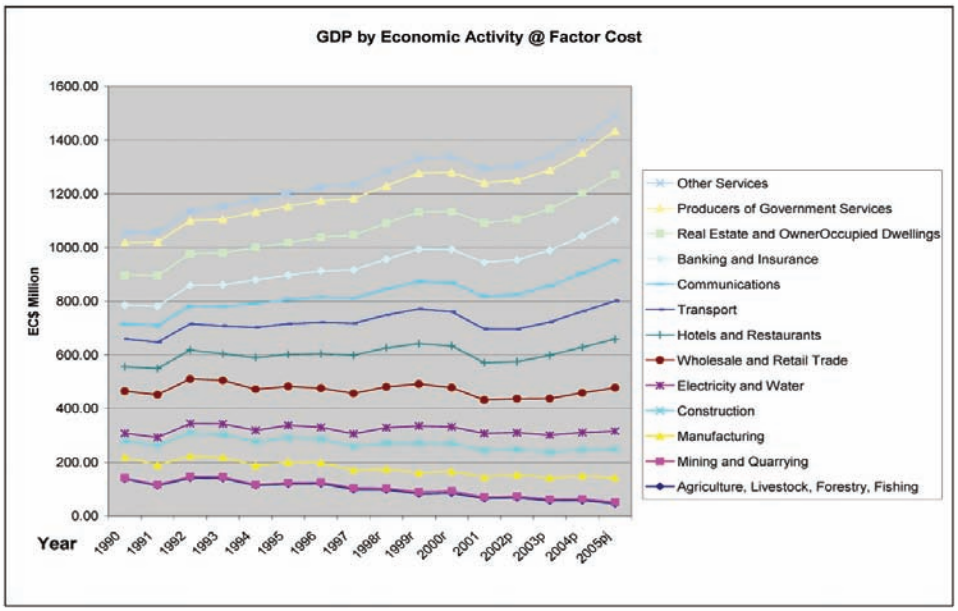
1.	Anse la Raye	4.	Choiseul	7.	Gros Islet	10.	Soufriere
2.	Canaries	5.	Dennery	8.	Laborie	11.	Vieux Fort
3.	Castries	6.	Forest	9.	Micoud		

Economic Profile of St. Lucia:

Gross Domestic Product:

According to the Economic and Social Review 2006 for St. Lucia, the preliminary data indicate that the real output in the economy grew by approximately 5.4% in 2006. This was primarily a result of the strong activity in the construction sector. In 2006, St. Lucia recorded its fifth consecutive year of real growth due to construction, road transport, electricity and banking sectors. It can be seen that sectors such as Agriculture, Livestock, Forestry and Fishing have been on the decline while real estate and owner-occupied dwellings and transport have been on the rise. The GDP trend is highlighted in the following diagram.

Figure 2: Gross Domestic Product by Activity at Factor Cost for St. Lucia (const prices = 1990)



Source: Central Statistical Office for St. Lucia
http://www.stats.gov.lc/na-main/na_mainpage.htm

Tourism:

The tourism industry has been increasing steadily during the period 1990 to 2000. However, this was interrupted due to the 9/11 terrorist attacks on the United States in 2001 which resulted in a decline in tourist arrivals as can be seen in Figure 3 overleaf. However, full recovery in the following years resulted up to 2004 but the industry experienced contraction from 2004 with an estimated contraction of 2.7% in 2006.[79] This contraction in the tourism industry has been attributed to more aggressive marketing by competing destinations, the recovery of the Asian market and the FIFA World Cup held in Germany.

However, it must be noted that the tourism sector continues to be a principal source of growth and foreign exchange in St. Lucia.

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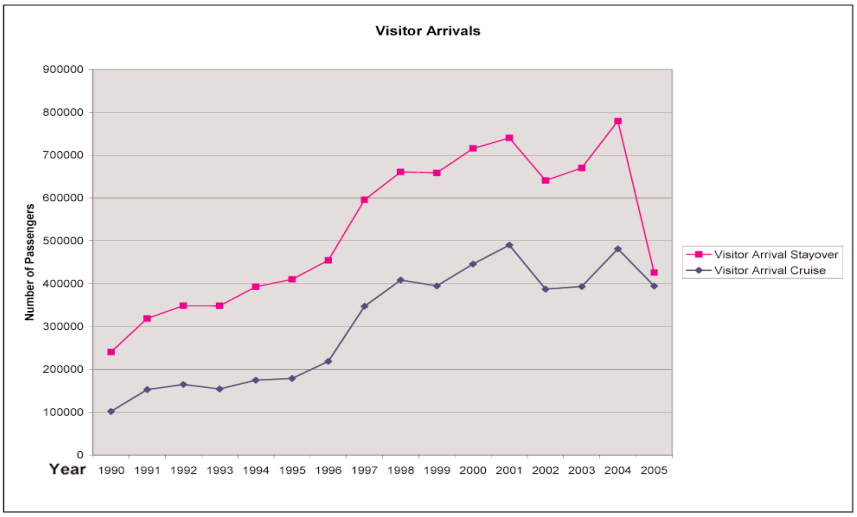
79 Economic and Social Review 2006

Figure 3: Visitor Arrivals to St. Lucia for the Period 1990 to 2005

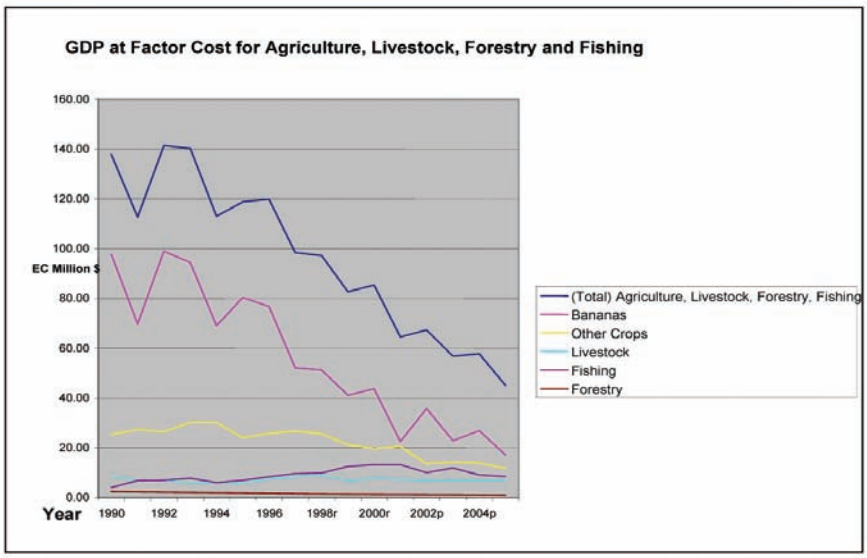


Source: Central Statistical Office for St. Lucia,
http://www.stats.gov.lc/na-main/na_mainpage.htm (accessed 2007/09/06)

Agriculture

The agricultural sector has been on the decline for the period 1990 to 2005 due to the adverse trading conditions and rulings of the World Trade Organization. The following diagram shows the decline in the agricultural sector with the banana industry experiencing the most significant decrease for the period 1990 to 2004.

Figure 4: GDP at Factor Cost for Agriculture, Livestock, Forestry and Fishing



Source: Central Statistical Office for St. Lucia
http://www.stats.gov.lc/na-main/na_mainpage.htm (accessed 2007/09/06)

However, in 2006 the trend was reversed whereby the banana exports increased by 13.3% as compared to the 29.1 % decline in 2005.[80]

[80] Economic and Social Review 2006

Poverty Profile:

The main exports of St. Lucia are banana, light manufactures and tourism. However, two of these three export areas have weakened due to international events such as reduced preferential access for bananas. Also, the formation of the North American Free Trade Area (NAFTA) and the drive of a number of Central American countries and the Dominican Republic to take advantage of the Caribbean Basin Initiative caused the labour intensive manufacturing sector in St. Lucia to become uncompetitive. [81]

The major findings of the 2006 Assessment of Poverty in St. Lucia[82] are summarized in Table 4 below which shows the change in indigence and poverty for the period 1995 and 2005/2006:

Table 4: Indigence and Poverty 1995 and 2005/06 (percent)

	1995	2005/05
Poor Households	18.7	21.4
Poor Population	25.1	28.8
Indigent Households	5.3	1.2
Indigent Population	7.1	1.6
Gini Coefficient	0.5	0.42

Source: Kairi Consultants Limited. (2006), The Assessment of Poverty in St. Lucia, http://www.stlucia.gov.lc/docs/AssessmentOfPovertyInStLucia/Assessment_of_Poverty_in_St_Lucia_Volume_1_Draft_Main_Report.pdf

From this data it can be gathered that there is an increase in the level of poverty from 25.1% to 28.8 %. However, it can also be seen that the level of indigence fell significantly from 7.1% to 1.6% indicating that although the percentage of the poor increased, the percentage of the extremely poor fell. The Gini coefficient, which represents the level of inequality in society also fell which indicates that as the incomes in society grew, the poor were able to acquire a larger percentage of the improved income.

Poverty and Gender

From the St. Lucia Poverty Assessment Report, it can be gathered that the head of households tend to be male dominated. The gender disparity in terms of head of households is significantly greater in the richest quintile as compared to the poorest quintile. From the data below it can be seen that the richest quintile has 62% of households being male dominated and 38.0% female as compared to 57.5% male and 42.5% female in the poorest quintile.

Table 5: Quintile Estimates 2005 (percent)

Per Capita Consumption Quintiles						
	Poorest	II	III	IV	Richest	All St. Lucia
Sex of Head of Household	%					
Male	57.5	56.6	50.3	53.3	62.0	56.4
Female	42.5	43.4	49.7	46.7	38.0	43.6
Both Sexes	100.0	100.0	100.0	100.0	100.0	100.0
Mean						
Household size	4.7	4.3	3.9	3.3	2.6	3.6
Children per household	1.9	1.5	1.2	0.9	0.5	1.1

Source: Kairi Consultants Limited. (2006), The Assessment of Poverty in St. Lucia, http://www.stlucia.gov.lc/docs/AssessmentOfPovertyInStLucia/Assessment_of_Poverty_in_St_Lucia_Volume_3_Quantitative_Assessment_of_Poverty.pdf

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[81] Poverty Assessment Report, St. Lucia. A Summary Document (2006)

[82] The Draft Report was prepared in 2006 by Kairi Consultants Limited and is the latest information available for St. Lucia in the context of poverty.

Rural Versus Urban Poverty

The data on poverty for St. Lucia also indicates that poverty is a rural phenomenon in St. Lucia. For example, the rural community of Soufriere has a population of 9,329 and of this population, 0.4% are indigent and 42.5% are poor. This is significant in the fact that almost half of the population in this rural community is poor. The poverty gap is 12.4 and the severity of poverty is 9.6. This is in contrast to Castries City which has a population of 16,594 and 1.7% indigent and 13.1 % poor. Again, the poverty gap is lower than in the rural community identified earlier at a figure of 3.4 with the poverty severity at 1.8. The data in Table 6 shows that in small coastal communities such as Soufriere (42.4%), Choiseul (38.4%), Laborie (42.1%), Vieux-Fort (23.1%) Micoud (43.6%) the per cent poor is high. Although, the figure for Vieux-Fort is lower the per cent indigent is quite high at 4.8%.

Table 6: Headcount, Poverty Gap, Poverty Severity by District 2005

	Population	Per cent Indigent	Per cent Poor	Poverty Gap	Poverty Severity
St. Lucia 2005/2006	164,842	1.6	28.8	9.0	4.1
Castries City	16,594	1.7	13.1	3.4	1.8
Castries Sub Urban	51,100	0.6	22.2	6.7	2.9
Anse la Raye/ Canaries	10,287	5.3	44.9	17.7	9.6
Soufriere	9,329	0.4	42.5	12.4	4.8
Choiseul	5,401		38.4	9.7	3.8
Laborie	7,190		42.1	10.6	3.5
Vieux- Fort	14,096	4.8	23.1	10.2	5.9
Micoud	18,071	4.0	43.6	14.1	6.8
Dennery	11,986		34.2	11.4	5.2
Gros-Islet	20,787	0.4	24.4	5.8	2.2

Source: Kairi Consultants Limited. (2006), The Assessment of Poverty in St. Lucia, http://www.stlucia.gov.lc/docs/AssessmentOfPovertyInStLucia/Assessment_of_Poverty_in_St_Lucia_Volume_3_Quantitative_Assessment_of_Poverty.pdf

Environmental Profile of St. Lucia:

Status of Coastal and Marine Ecosystems[83]:

Beaches

- There are 60 beaches on the west coast and 42 on the east coast. The total beach cover is 16.78% of the shoreline. Six point five per cent (6.5 %) of west coast beaches are illegally sand mined while on the east coast the figure is 14.3 %. The beach length being mined in 1990 was recorded at 43%. However, in 1996/1997 this figure was reduced to 12.5%.

Mangrove, Wetland

- Mangrove wetlands occupy a total of 0.29% of the island's landmass. These mangrove systems have not been mapped and as a result the true coverage is unknown. However there are five species of mangrove found on the island.

83 Poverty Assessment Report, St. Lucia. A Summary Document (2006)

Coral Reefs

- The area of coral reefs on the island is recorded at 160km2 and the level of macro algae covering the reefs continues to increase, thus indicating that the waters are high-nutrient.
- However, the coral cover is declining due to high sediment loading and smothering by macro algae.
- There has also been an increase in coral disease and the bleaching of corals is low but has increased over the years.

Sea Grass Beds

- The sea grass beds have not been mapped and as such true coverage is unknown.
- There are 3 species of sea grass found on the island and the health of the sea grass has been observed to be on the decline.

Forest Systems[84]

Forest Reserves:

- There are 56% of natural forests in forest reserves while 43% are found on private lands. Scrub forests and mangroves tend to be found on private lands. The forest reserve consists of 14 units covering 7,500 hectares of land and this is located in the central ridge of the island.
- Of this 88.1% is natural forest, 6% plantation forest (exotic species), 1.6% scrub forest and 4.3% is absorbed by the John Compton Dam Reservoir (16.2 hectares) and squatters (342 hectares).

Plantation Forests

- Two hundred and fifty six (256) hectares of plantation forest are within the forest reserve and comprise of 3 main species; Blue Mahoe, Honduras Mahogany and Caribbean Pine. There is a standing volume of 27 960m^3 of wood.
- There are two additional species of Christmas Trees; the Cypress and the Araucaria.

Fresh Water Systems[85]

Watersheds

- There are 37 watersheds on the island with 7 being significant contributors to the island's freshwater supply.
- The following table identifies the main watersheds and the main rivers:

Rivers

- All water for domestic and agricultural use is sourced from rivers. The Roseau River provides the most significant abstraction point supplying the north of the island where approximately 65% of the population resides.

Rainfall

- The water supply is replenished by rainfall. The rainy season in St. Lucia occurs during the period June to November and more than 60% of the annual precipitation occurs between June and November.
- The rainy season coincides with the hurricane season and as such the island is susceptible to tropical cyclones.

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84 State of the Environment Report (2007)

85 State of the Environment Report (2007)

Land Use[86]

- Ten per cent (10%) of St. Lucia's 616 square kilometers has slopes less than 5 degrees and is located primarily long the coast and valley areas. This spatial and topographical constraint has prescribed the availability of lands to the demands of the growing population.
- The pattern of land use and land management has developed without the framework of a land use strategy or policy. However, the direction of land use and management has been governed by national property laws, registration practices, legislation and institutional capacities.

Waste Management[87]

Waste management according to the State of the Environment Report (2007) is defined as the administration of reduction, collection, separation, storage, transportation, transfer, processing, treatment and disposal of wastes.

Solid Waste Management

- Collection: Solid waste is collected and transported to landfill/disposal sites. Since 1999, the collection of residential and institutional waste has been the responsibility of the St. Lucia Solid Waste Management Authority (SLSWMA) through private waste collection contractors. A monthly bulky waste collection service is also provided to 100% of the households and the SLSWMA provides either a curbside or a communal collection service. The collection of commercial waste is not a legal mandate of the SLSWMA. Commercial entities utilize a licensed waster hauler or a part of their own operations to collect and transport their commercial waste.

Hazardous Waste Management

- Due to the absence of adequate disposal facilities, the SLSWMA is unable to manage all hazardous waste streams.
- Biomedical Waste Management - This form of waste is collected and treated by steam sterilization using an autoclave system, before final disposal to the Deglos Site.
- Used Lead Acid Battery Management - There are three private companies that collect used lead acid batteries and ship them to Venezuela. This is as a result of the fact that there are no plants in St. Lucia undertaking the recycling of used lead batteries

Chemical Use[88]

- The Pesticides and Toxic Chemicals Control Board (PCB) regulates the management and administration of pesticides. This Board reviews applications for registration of pesticide products and allocates import licenses for pesticides with approved uses in Saint Lucia.

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86 State of the Environment Report (2007)
87 State of the Environment Report (2007)
88 State of the Environment Report (2007)

Dependency on the Environment

- **Fishing**

In terms of income and opportunity, the population of St. Lucia is heavily indebted to the environment as a source of livelihood and this is especially so in the poorer communities. For example, one can examine the number of registered fishermen in St. Lucia by districts to ascertain whether fishing in St. Lucia is for subsistence or for commercial usage. Table 7 below shows the number of registered fisherman in St. Lucia in 2001.

Table 7: Number of Registered Fishermen in St. Lucia, 2001

Site	Part Time	Full Time	Non Fishers	Total
Anse La Raye	46	54	2	102
Canaries	35	50	1	86
Castries	105	135	1	241
Banannes	38	35	2	75
Choiseul	36	99	4	139
Dennery	90	133	12	235
Gros Islet	77	103	0	180
Laborie	43	78	3	124
Marisule	12	8	0	20
Micoud	105	95	0	200
Monchy	8	6	0	14
Praslin	31	20	0	51
River Doree	8	16	0	24
Roseau	1	1	0	2
Savannes Bay	7	33	2	42
Soufriere	62	92	1	155
Vieux Fort	106	208	12	326
Total	810	1166	40	2016

Source: Compendium of Environmental Statistics, 2001. A Collaborative Effort of the Government Statistics Department and the Sustainable Development & Environment Department of the Ministry of Physical Development, Environment and Housing.

From the table above it can be seen that the highest number of fishermen are registered in Vieux Fort, a poor coastal community in St. Lucia. This suggests that this may be the main source of livelihood for members of this community may be fishing. It can also be seen that the poorer coastal communities have a higher number of fishermen registered suggesting that fishing may be a main source of livelihood, for example, Vieux Fort (326), Dennery (235), and Micoud (200). However, it should be noted that a large number of fishermen are also registered in the capital of St. Lucia, Castries (241).

- **Agriculture**

In terms of tenure and main land use, it can be seen that the percentage of agriculture as a main occupation has decreased slightly for the 10-year period 1986 and 1996. From Table 8 below, it can be noted that in terms of dependency on agriculture in 1996, approximately 61% of the male holders and 52% of female holders were receiving their main source of income from agriculture. This is in contrast to 1986 with approximately 66% of male holders and 59% of female holders receiving their main source of income from agriculture. In both cases there was a decline in agriculture as a main source of income from 1986 to 1996.

Table 8: Main Characteristics of Individual Holders by Sex

Individual Holdings	1986		1996	
	Male Holders	Female Holders	Male Holders	Female Holders
Total Number	8672	2832	9620	3439
Percentage	75.4	24.6	73.7	26.3
Area of holdings (acres)	-	-	37265.3	12375.6
Average Size of household (persons)	-	-	3.75	1.89
Median Age	42.8	46.6	44.4	47.9
Number with Agriculture as main occupation	5750	1659	5837	1788
Percentage with Agriculture as main occupation	66.3	58.5	60.7	52.0
Number receiving more than 50% of their households income from agriculture	4503	1218	4563	1333
Percentage receiving more than 50% of their households income from agriculture	51.9	43	47.4	38.8

Source: Agricultural Census 1996, Planning and Statistical Unit, Ministry Of Agriculture, Lands, Fisheries and Forestry, St. Lucia. August 1996

From this data it can be concluded that the population of St. Lucia is still heavily dependent on agriculture as a source of livelihood although it must be noted that there is a declining trend for this dependency.

In terms of income from agriculture by district, it can be seen from the Table 10, that small coastal communities have a significant number of household members involved in the fishing industry. For example, Table 10 shows that in the districts of Anse La Raye 549 household members, Soufriere, 375 household members and Vieux Fort 789 household members were involved in fishing.

Table 9: Number of Individual Holdings by Administrative Districts and by Type and Number of Agricultural Workers

Type and No. of Agricultural Worker	St. Lucia	Castries Urban	Castries Rural	Anse La Raye	Canaries	Soufriere	Choiseul	Laborie	Vieux Fort	Micoud	Dennery	Gros Islet
Household Members	13059	214	2807	696	138	753	911	875	1385	2410	1382	1488
0 persons	5349	163	1214	147	71	378	507	364	596	801	292	816
1 person	5388	40	1148	338	47	293	328	369	619	1085	669	452
2 persons	1924	10	375	168	17	70	69	117	139	425	338	196
3 persons	259	1	47	25	-	9	6	15	22	63	59	12
4 and more persons	139	-	23	18	3	3	1	10	9	36	24	12
Non Household Members	13059	214	2807	696	138	753	911	875	1385	2410	1382	1488
Without workers	10209	170	2107	504	127	659	865	755	1165	1968	620	1271
1 person	1046	25	299	57	7	25	14	54	92	160	204	109
2 persons	821	7	180	65	3	23	13	28	77	153	221	51
3 persons	385	4	86	31	1	11	5	18	26	58	121	24
4 and more persons	598	8	135	39	-	35	14	20	27	71	216	33

Source: Agricultural Census 1996, Planning and Statistical Unit, Ministry Of Agriculture, Lands, Fisheries and Forestry, St. Lucia. August 1996

Environmental Degradation in St. Lucia:

1. Deforestation

a. Human Settlements

In the first instance the increase in population size and density has contributed to the deforestation activities where land has been cleared for human settlements. Table 10 below shows the increase in population size per district which warrants an increase in housing facilities.

Table 10: Population by District 1970-2001

District	1970	1980	1991	2001	% change from 1970-2001
Gros Islet	6,113	10,164	13,505	19,816	224.16
Castries	40,450	42,964	51,994	61,341	51.65
Dennery	8,851	9,652	11,168	12,773	44.31
Micoud	10,145	11,934	15,088	17,153	69.08
Vieux Fort	8,108	10,957	13,140	16,329	101.39
Laborie	6,023	6,885	7,491	7,978	32.46
Choiseul	6,167	6,498	6,405	6,372	3.32
Soufriere	7,250	7,295	7,683	7,328	1.08
Anse –La-Raye	4,769	4,971	5,035	6,495	36.19
Canaries	1,939	2,085	1,799	1,906	-1.70
Total	99,815	113,405	133,308	157,490	57.78

Source: Adapted from Compendium of Environmental Statistics, 2001. A Collaborative Effort of the Government Statistics Department and the Sustainable Development & Environment Department of the Ministry of Physical Development, Environment and Housing.

From the above table it can be seen that the greatest increase in population size occurred in the district of Gros Islet (224%) with Vieux Fort (101.39%) second in percentage change since 1970. Small coastal communities also experienced positive population changes, for example, Anse La Raye experienced 36 % change and Micoud 69% change in population. The case study district experienced an insignificant change in population of 1%.

b. Agriculture

Another factor that contributes to deforestation and the clearing of lands is that of agriculture. The figures from the Government of St. Lucia Statistics Department[89], state that only approximately 19.60% of St. Lucia's land is covered by natural tropical vegetation while 26.37% is used for intensive farming and 23.58% is used for mixed farming. The pattern of land use for St. Lucia is illustrated in Table 11 below.

Table 11: Types of Land Use and Coverage

Type of Land Use	% of Total Land Area
Natural tropical forest	19.60
Mangrove	0.30
Plantation Forest	0.67
Scrub Forest	12.45
Grasslands and open woodlands	2.04
Mixed farming	23.58
Intensive farming	26.37
Other farming	4.68
Rural settlements	3.86
Urban settlements	5.28
Rocks and exposed soils	0.70
Water	0.08
Total	100.00

Source: The Government of St. Lucia Statistics Department, 1996.

89 As cited in The State of the Environment Report, 2007

Land use changes have indicated that forest cover has decreased by over 25% and agricultural use has increased by over 62%.[90] The changes in land use can be illustrated in the Table 12 as follows.

Table 12: Lsnd Use Changes, 1977 and 1989

Type of Land Use	Area in Hectares 1977	Area in Hectares 1989	Difference (%)
Forest	16,737	12,572	-24.88
Scrub Forest	12,677	7,515	-40.72
Grassland and Open Woodland	1,302	2,666	+104.76
Sub-total	30,716	22,753	-25.92
Intensive Agriculture	14,498	17,576	+21.23
Mixed Agriculture	6,306	16,205	+157.69
Sub-total	20,804	33,781	+62.38

Source: Saint Lucia National Land Policy, Green Paper. (2003). Ministry of Physical Development, Environment and Housing on behalf of the National Land Policy Committee

The result is that watershed degradation reduces the rainwater system and natural runoff systems, and causes inefficiencies in the freshwater systems such as shortages in supply for the population of St. Lucia.

In the small coastal communities the total area of holdings has been fluctuating. For example, in Anse La Raye, the percentage change has decreased from 8.1% in 1973/1974 to 7.7% in 1986 and 7.2% in 1996 while in Canaries the percentage change was neutral and in Soufriere the percentage change increased from 9.7% in 1973/1974 to 10.3% in 1986 and then decreased to 7.4% in 1996. These figures are shown in Table 13 below.

Table 13: Total Area of Holdings

Administrative District	1973/74		1986		1996	
	Total Area on holdings (acres)	%	Total Area on holdings (acres)	%	Total Area on holdings (acres)	%
St. Lucia	72001	100.0	58016.5	100.0	51323.1	100.0
Castries	10659	14.8	7553.9	12.9	11416.2	22.2
Anse La Raye	5796	8.1	4454.0	7.7	3674.5	7.2
Canaries	2248	3.1	1630.4	3.1	1590.1	3.1
Soufriere	6953	9.7	5988.2	10.3	3784.3	7.4
Choiseul	2016	2.8	1941.3	3.4	1553.1	3.0
Laborie	5832	8.1	3588.0	6.2	3089.3	6.0
Vieux Fort	4692	6.5	5251.8	9.0	4033.7	7.9
Micoud	11301	15.7	12416.4	21.4	10810.7	21.1
Dennery	10552	14.7	8037.9	14.7	5688.4	11.1
Gros Islet	11952	16.1	7154.5	12.3	5682.8	11.0

Source: Agricultural Census 1996, Planning and Statistical Unit, Ministry Of Agriculture, Lands, Fisheries and Forestry, St. Lucia. August 1996

The fall in total area of land holdings (acres) between the periods 1986 to 1996 may be as a result of the trade environment. In the past, the production of bananas was largely pursued due to the benefits from preferential marketing arrangements, the ease of cultivation and the social advantage with respect to other agricultural crops.[91]

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[90] National Land Policy (2003)

[91] St. Lucia Banana Industry Strategy Task Force, Final Report. (2001). Volume 1, Main Report.

During the period 1985 to 1992, the high prices paid to producers encouraged growth in production. However, in the last five (5) years the average price paid to growers has fluctuated from a high average price of 61.87 cents/lb to a low of 49.8 cents/lb in 2000.[92] This represented a drop of 19.5%.

The significant developments that took place within recent years include (1) Changes in European Marketing Regime, (2) Privatization of the St. Lucia Banana Growers Association, (3) Intensification of Banana Sector Policy Dialogue and the Implementation of the Production Recovery Plan.[93] The result is that there has been a 75% decrease in the number of farmers in the industry since 1993, and this is based on grower registration data over the different years.[94]

Due to data limitations, the data used to analyse the agricultural effect of deforestation is limited in use as within the period 1996-2006, many changes may have occurred to land holdings (some being converted to subsistence farming, some being abandoned altogether).

c. Deforestation for Charcoal

In the years preceding World War II, charcoal was an important export of St. Lucia. However, in the early 1980s concern about the contribution of charcoal production to deforestation resulted in several small-scale projects to improve fuel-wood productivity. There have been several studies to provide supply/demand projections but problems in standardization of what has been surveyed, measured, and reported generated several inconsistencies and confusion over policy implications.

The State of the Environment Report, 2007, suggests that St. Lucia is capable of meeting domestic fuel wood requirements from scrublands. However, fuel wood harvesting still contributes to deforestation due to weak public management.

2. Pollution (Banana Industry)

Table 14: Categories of Pollution

		Occurrence in catchment		
Category	**Principal Source/Causes**	**Lower (<200 ft)**	**Middle (200-600ft)**	**Upper (>600 ft)**
Organics	Domestic Sewage	Significant	Significant	-
Nitrogen and Phosphorous	Domestic sewage and agricultural fertilisers	Significant	Significant	-
Pesticides	Farm Land	Damaging	Significant	-
Herbicides	Farm Land	Damaging	Significant	-
Heavy Metals	Industrial effluents	-	-	-
Oil	Transport	Significant	Significant	-
pH	Industry	-	-	-
Pathogens	Human Sewage and Farm Waste	Damaging	Significant	-
Physical Solids	Farm Land and deforested soils	Extreme	Severe	Damaging

Source: Compendium of Environmental Statistics, 2001, adapted from the Biodiversity Report, 1998, Table from the Statistics Department.

From Table 14 above it can be seen that significant damage is done to the environment through human activity. This is especially the case for agriculture and farm lands where the pollution has even reached extreme pollution in the lower catchment.

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92 See footnote 91
93 See footnote 91
94 See footnote 91

In St. Lucia, the banana industry provides a source of livelihood for a large proportion of the population. However, banana cultivation in St. Lucia requires the use of high levels of pesticides. Nematicides that are applied to banana growing areas have been identified as potential water pollutants.

This is as a result of the water solubility of their active ingredients. In studies conducted, more than 75% of water samples had pesticide residues higher than the European Community general guideline for individual pesticides in drinking water (0.1?g/l)[95] . The rivers where the samples were taken were identified as drinking sources.

The agricultural industry has also contributed to coastal problems in the form of its contribution to solid waste problems through pesticide containers and the blue diothene plastic bags used in the banana industry.

3. Destruction of Coral Reefs

The table below shows the impact humans have on the coral reefs in St. Lucia. In terms of the overall impact 61% of the reefs are at a very high threat while the remaining 39% are at a high threat. These figures are alarming in the sense that human activities have contributed if not caused the reefs to be in this state.

Fishing Pressure has been identified by Burke et al, (2004) as the most omnipresent threat to reefs within the Eastern Caribbean. This is evidenced by the absence of larger fish catch and scarcity of some of the larger species. Fishing in St. Lucia is mainly artisanal or small scale commercial but represents an important activity on this island. The main reason for these over fishing activities are easy access to reef resources, high population densities and scarcity of other employment activities.[96]

The second activity contributing to coral reef destruction is coastal development. The development of infrastructure to support high population densities and tourism growth has resulted in increased siltation from land reclamation, dredging and construction, and pollution from sewage outfalls.

Another activity that contributes to coral reefs destruction is that of agricultural activities. St. Lucia's banana industry as well as subsistence farming with poor land use practices have led to increased sedimentation and pollution in coastal regions. See Table 15 below for figures.

Table 15: Reefs Threatened by Human Activity in St. Lucia

						Individual Threats											
Reef Area (km^2)	Reef Area as a % of total in Region	Reefs at Risk Threat Index (%)				Coastal Development (%)			Sediment and Pollution from Inland Sources (%)			Marine Based Sources of Pollution (%)			Fishing Pressure (%)		
		Low	Medium	High	Very High	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
90	<1	0	0	39	61	1	32	67	0	51	49	60	29	11	0	2	98

Source: Burke, L., Maidens, J. and others. 2004. Reefs at Risk in the Caribbean. World Resources Institute, Washington D.C.

[95] St. Lucia Banana Industry Strategy Task Force, Final Report. (2001). Volume 1, Main Report
[96] Burke, L., Maidens, J. and others (2004)

4. Coral Bleaching

Coral bleaching can be defined as the loss of a coral's natural colour caused by the expulsion of symbiotic algae, leaving the coral very pale to brilliant white in appearance.[97] There are many reasons to explain the bleaching process such as salinity changes, excessive light, toxins and microbial infection. However, the most common cause of bleaching is an increase in sea surface temperature (SST) over wide areas. In the Caribbean, coral bleaching is triggered by an increase of at least 1.0ºC in SST above the normal summertime maximums with a duration of at least 2 or 3 days.[98]

Table 16 below shows some data on bleaching in St. Lucia in areas of Le Sport, Turtle Reef, Anse Chastanet, Coral Gardens and Vieux Fort. From the data it can be seen that the figures are extremely high reaching up to 71% in Coral Gardens.

Table 16: Reef Bleaching in St. Lucia, August 2005

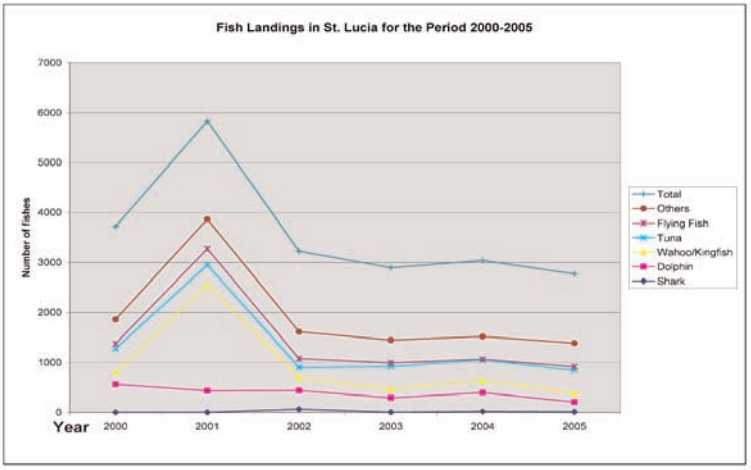
Reef Area	Le Sport	Turtle Reef	Anse Chastanet	Coral Gardens	Vieux Fort
Percent Bleached	49.18	53.98	52.01	71.23	>1

Source: The State of the Environment Report for St. Lucia, (2007). Sustainable Development and Environment Section of the Ministry of Physical Development, Environment and Housing in conjunction with Public and Private Sector Agencies, Non-Governmental Agencies (NGOs) and Community-Based Organizations (CBOs).

5. Overfishing

Where income is derived from fishing there is the threat of a reduction of species. This is exacerbated by the fact that in poorer communities the threat may be realized since fishing is a main source of livelihood for many in the community. The figure below shows that the fish landings have decreased for St. Lucia during the period 2000 to 2005 and thus threatening the source of livelihoods for the poorer communities. In terms of the total fish landings in St. Lucia it can be seen that in 2001 the fish landings were at a high of almost 6,000 fishes. But this was greatly reduced in 2005 to fewer than 3000. As identified earlier in the section of destruction to coral reefs the fishing pressure has resulted in scarcity of larger species and reduction in fish catch[99]. Figure 5, as follows, shows the trend in fish landings in St. Lucia for the period 2000 to 2005.

Figure 5: Fish Landings in St. Lucia for the period 2000-2005



Source: The State of the Environment Report for St. Lucia, (2007). Sustainable Development and Environment Section of the Ministry of Physical Development, Environment and Housing in conjunction with Public and Private Sector Agencies, Non-Governmental Agencies (NGOs) and Community-Based Organizations (CBOs).

97 Burke, Maidens and others, 2004
98 See footnote 95
99 See Burke, Maidens and others. (2004)

The Institutional Framework Governing Poverty and the Environment in St. Lucia

Poverty Reduction Framework

According to the Poverty Reduction Strategy and Action Plan for St. Lucia (2003), there is no integrated policy framework to administer activities to foster poverty reduction and social development. Further, according to this report the mechanism for the formulation of policies for this area also is not clear and the efforts for poverty reduction are not sustained and coordinated. In addition, there is no consensus as to the needs and priorities at the national level.

However, there exists an implicit overall national development policy but again it is not integrated into one document. Instead, this National Development Policy is contained in general policy statements such as Budgets Speeches, Medium Term Development Strategy Papers and in policies of key Social Sector Ministries such as Health, Education and Social Transformation. The documents that provide direction for the poverty reduction and social development efforts are as follows:

1. The St. Lucia Constitution Order 1978 and its commitment to the protection of fundamental rights and freedoms;
2. The Education Act No. 41 of 1999 and the Education Sector Development Plan;
3. The Health Sector Reform Proposals and Plans;
4. The Public Assistance Act of 1967.

Ministries Involved In the Poverty Reduction and Social Development Effort

The stakeholders that are directly involved in social development and poverty reduction are the Ministries responsible for Social Transformation, Health, Education and Gender Relations. These Ministries have policies, programmemes and service delivery programmemes that have a positive effect on the poor in St. Lucia.

The Ministry of Finance plays a role in poverty reduction and social development efforts through the preparation and management of the national budget. This is done mainly by defining the scope and direction of many public sector interventions in social development.

The Ministry of Physical Development has a role in terms of the formulation of land use policy and the coordination of programmemes in Housing, Human Settlements and Environment Management. The legal framework for development in the country is provided by the Attorney General's Chambers. A National Economic Council was recently established and has the purpose of guiding economic development policy.

In December 2001, the Ministry of Social Transformation was created. Under its auspices there are poverty reduction agencies such as the BELFUND, BNTF, NCA and PRF.

National and Non-Governmental Organizations

Generally the functioning of these organizations is weak in nature. According to the Poverty Reduction Strategy and Action Plan (2003) for St. Lucia, civil society in the country is poorly structured and many sectors are not organized and represented. There are also religious organizations that are important in the provision of moral and material support to the poor. Such efforts include that of the Centre for Adolescent Rehabilitation and Education (CARE) and a number of smaller informal projects.

The role of the private sector is not sufficient for poverty reduction and social development. Organizational capability at the community level is weak in nature and those institutions and programmemes involved in the poverty reduction effort remain largely focused on projects.

Community-Based Organizations

According to the Survey of NGOs/CBOs in the Caricom Region conducted by the Caribbean Sustainable Economic Development Network (CSEDNet), two types of CBOs can be identified in St. Lucia: (1) Youth and Sports Councils and (2) Mothers and Fathers Groups. The latter is a form of CBO that is unique to St. Lucia and is directly linked to the Catholic Church.

Poverty Reduction Agencies

The following table shows the Poverty Reduction Agencies that were established by the Government within recent time:

Table 17: Poverty Reduction Agencies Established by the Government

Programme within the governmental structure, but with autonomous board of governance	❖ Basic Needs Trust Fund
Establishment through an Act of Parliament	❖ National Community Foundation ❖ National Conservation Authority ❖ Poverty Reduction Fund
Registration as a government-owned company under the Companies Act	❖ BEL Fund ❖ National Skills Development Centre

Source: Poverty Reduction Strategy and Action Plan for St. Lucia (2003). Ministry of Social Transformation, Culture and Local Government, Castries, Saint Lucia

For a detailed description as to the key institutional actors involved in the Poverty Reduction effort in St. Lucia, as identified by the Poverty Reduction Strategy and Action Plan for St. Lucia (2003) see Appendix 1.

Institutional arrangements for Environmental Policies

1. Disaster Management Policy:

In St. Lucia, Disaster Management is carried out via a voluntary basis and when an event occurs, the National Emergency Management Organization (NEMO) is part of a larger network that comes into existence to respond to a disaster. There are eighteen (18) District Committees that are composed of representatives of various Ministries and Social Groups.

The Statutory Authority for NEMO[100] is as follows:

- Emergency Powers Act 5 of 1995

Provides the office with the ability to commandeer DURING A STATE OF EMERGENCY ONLY. Therefore NEMO/NEOC has access and control of the resources of the Nation when faced with a disaster.

- Disaster Preparedness and Response Act 13 of 2000

This consolidated and placed in law the actions of NEMO.

- Cabinet Conclusion 1149/96

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100 The NEMO Organization of St. Lucia.(2005) http://www.geocities.com/slunemo/about_us/This.is.NEMO.pdf (accessed 2007/07/17)

2. Draft Water Policy

The current situation regarding Water Resources Management in St. Lucia:[101]

- a chronic lack of coordination among public sector agencies charged with designing and implementing water resources policies and programmemes;
- a multiplicity of laws, each dealing separately with various aspects of resource management, thus encouraging a compartmentalized and isolated approach to environmental management;
- the absence of credible arrangements for involvement of civil society in sustainable development initiatives; and,
- the lack of understanding and awareness of the principles of sustainable development and the inseparable linkages between social and economic uses.

The Water and Sewerage Act (#13 of 1999) established the National Water and Sewerage Commission (NWSC) "*...to regulate the granting of licenses, the development and control of water supply and sewerage facilities and related matters". This Act recognises the NWSC as the body "responsible for the orderly and coordinated development and use of water resources and for the promotion of a national policy for water.*"[102] However, no such policy exists in St. Lucia and responsibilities have not been defined regarding policy formulation.[103] In addition, responsibilities for water resource management are not fully defined.

3. National Land Policy

In St. Lucia there is a National Land Policy (Green Paper) created in December 2003. This Green Paper attempts to review the issues of land development, use, management and administration in St. Lucia, to provide a broad policy framework and to identify preliminary policy directions and choices. This National Land Policy process began in February 2000 whereby the Ministry of Planning, Development, Environment and Housing convened a National Land Policy Symposium. This Symposium brought together representatives of all institutions, organizations and actors involved in land development and management. The Green Paper was commissioned by the Ministry of Physical Development, Environment and Housing for the National Land Policy Committee.

The policies that govern land use, management and development in St. Lucia are broad and complex in nature To implement these policies, there are a number of public sector agencies involved in various aspects of land management. However, there are gaps and overlaps in institutional policies and insufficient collaboration among public sector agencies. There is also the division of land management authority and roles among a range of agencies which include Ministries and Statutory Corporations.

It can be gathered from the Green Paper (2003) that there is very little public sector intervention in the management and operation of land markets. And more specifically, taxation is not being used to guide these land markets and land uses in any significant way. The Land and Property Taxes that were payable to Local Government only are now collected by the Inland Revenue Department and by the Village and Town Councils in accordance with the provisions of the Land and House Tax (Amendment) Act 2001. It is noted that the levels of taxation are determined by the land area and not by the value of the land which have increased significantly due to the introduction of the Act (from XCD 0.946 million in 1999/2000 to 4.673 million in 2001/2002), tax revenue from both land and house taxes still represents less than 1% of all tax revenue.[104]

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101 Draft, A National Water Policy for St. Lucia, sourced via Caribbean Environmental Health Institute
102 Draft, A National Water Policy for St. Lucia, sourced via CEHI
103 See footnote 101
104 Saint Lucia National Land Policy, Green Paper. (2003). Ministry of Physical Development, Environment and Housing on behalf of the National Land Policy Committee.

The Land Conservation and Improvement Act of 1992 have not yet been set in motion[105] but allows for the establishment of land development and management, including the issuance of protection orders, the establishment of conservation areas, the compulsory acquisition and vesting of lands, and the provision of advice to the Minister of Agriculture.

Generally, there is a lack of a National Development Plan and Strategy and a comprehensive physical development framework and strategy.

4. The National Environment Policy (NEP) And National Environmental Management Strategy (NEMS) For Saint Lucia

In St. Lucia there is a National Environmental Policy which is the formal statements by St. Lucia to address and reverse the trends of environmental degradation and to promote environmental awareness. The main roles for environmental management and the key institutions involved with the desired roles as articulated in the policy are as follows.

Table 18: The main Roles and Responsibilities in Environmental Management Among The Various Key Institutions

Main Roles in Environmental Management	Individual	Community	Civil society	Private sector	State
Current roles	Limited, and dependent on individual initiative	Limited, and dependent on initiative of community leaders and organisations	Limited Isolated but significant cases of civil society involvement	Limited and dependent on initiative of individual businesses Isolated but significant cases of good corporate behaviour	Leadership in policy and management Exclusive role in enforcement Primary and often exclusive role in all aspects of environmental management
Desirable roles	Self-regulation and appropriate behaviour Individual initiative	Self-regulation and appropriate behaviour Local initiative	Active involvement in management	High sense of corporate responsibility Investment in environmental management	Continued Leadership role Increased facilitating role Reduced enforcement
Changes needed to perform desirable roles	Increased awareness Empowerment Rewards for Positive behaviour Mechanisms for popular participation in policy formulation, monitoring and review	Strengthening of local government Mechanisms for popular participation in policy formulation, monitoring and review	Policy reform to facilitate community empowerment and devolution Increased capacity of civil society organisations	Incentives to corporate environmental responsibility Increased capacity in selected areas	Policy reform to facilitate devolution and partnerships Local Government Reform Increased capacity, particularly in facilitation, policy formulation and partnership development

Source: Government of Saint Lucia, Ministry of Physical Development, Environment and Housing. (2004) The Policy National Environment Policy (NEP) and National Environmental Management Strategy (NEMS) For Saint Lucia

[105] This is as a result of the Board not becoming operational and the provisions of the Act not being enforced, as cited in the Green Paper

LITERATURE REVIEW:

Sustainable Livelihoods:

The term Sustainable Livelihoods (SL) is a micro-level term derived from the broader term Sustainable Development. Sustainable Development according to the Report of the World Commission on Environment and Development (WCED), Our Common Future, (1987) can be defined as *"Development that meets the needs of the present without compromising the ability of future generations to meet their own needs."* Another definition of sustainable development states *"A participatory transformation of the political culture to enable a democratic process of allocating the use of resources for equitable economic and social development over a sustained period of time and within the constraints of the socio-cultural carrying capacity."*[106] In essence the concept of Sustainable Development encompasses the use of resources that enables both the current generation and the future generation to advance both economically as well as socially.

Consequently, a livelihood can be defined, according to Singh and Lawrence (1997)[107] as *'that combination of assets, activities and entitlements which enable people to make a living.'* A livelihood can also be described as *'comprising of people, their capabilities and their means of living, including food, income and assets.'* [108]

The term 'sustainable livelihood' was first articulated in the 1990s by Chambers and Conway (1991) as a development concept. They argued that a livelihood can be viewed as environmentally sustainable when it preserves and develops the local and global assets to which the livelihood is dependent on and is beneficial to other livelihoods. Also, a livelihood that is socially sustainable if the livelihood can endure and recuperate from stress and shocks and as a result provide for future generations.

In the literature the term sustainable livelihoods, on the one hand, can be seen as a checklist of issues and a means to the organization of analysis. On the other hand, it can be viewed as a working objective for improving the sustainability of livelihoods or the set of doctrines that are applicable to any situation (projects or programmemes).[109]

The linkages between poverty and the term sustainable livelihoods have been argued in the literature. For instance, Ashley and Carney (1999), argue that a *"sustainable livelihood is a way of thinking about the objectives, scope and priorities for development, in order to enhance progress in poverty elimination. SL approaches rest on core principles that stress people centered, responsive and multi-level approaches to development."* Thus, it can be seen that the sustainable livelihoods framework can be used as a tool in poverty reduction efforts since it places people at the forefront.

The linkages between poverty reduction and sustainable livelihoods can be further elaborated using the Core Sustainable Livelihoods Principles[110] as articulated by the Department for International Development (DFID). These Core Sustainable Principle states that poverty-focused development activity should focus on:

- *"people-centered: sustainable poverty elimination will be achieved only if external support focuses on what matters to people, understands the differences between groups of people and works with them in a way that is congruent with their current livelihood strategies, social environment and ability to adapt;"*

- *"responsive and participatory: poor people themselves must be key actors in identifying and addressing livelihood priorities. Outsiders need processes that enable them to listen and respond to the poor;"*

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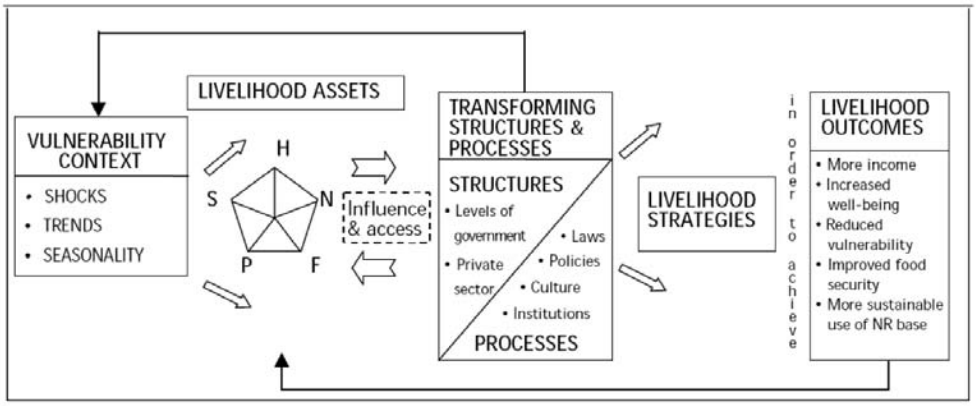
106 CANARI, 2005
107 As cited in SEDU (undated)
108 www.livelihoods.org/SLdefn.html
109 SEDU (undated), People and the Caribbean Coast, Feasibility of Alternative, Sustainable Coastal Resource-Based Enhanced Livelihood Strategies.
110 Ashley and Carney (1999)

- *"multi-level: poverty elimination is an enormous challenge that will only be overcome by working at multiple levels, ensuring that micro-level activity informs the development of policy and an effective enabling environment, and that macro-level structures and processes support people to build upon their own strengths;"*
- *"conducted in partnership: with both the public and the private sector;"*
- *"sustainable: there are four key dimensions to sustainability - economic, institutional, social and environmental sustainability. All are important - a balance must be found between them;"*
- *"dynamic: external support must recognize the dynamic nature of livelihood strategies, respond flexibly to changes in people's situation, and develop longer term commitments."*

The Sustainable Livelihoods framework can be illustrated in Figure 6 below. Within this framework are several key concepts.

Figure 6: The Sustainable Livelihoods Framework



Source: Department for International Development (DFID), (undated). Sustainable Livelihoods Guidance Sheets. www.livelihoods.org (accessed 2008/02/20)

Firstly, in terms of the livelihood assets, there are several forms of capital namely:

- human capital: this encompasses the skills and knowledge that enable people to pursue different livelihood strategies to achieve their livelihood objectives;
- natural capital: this corresponds to stocks of natural resources from which resource flows and services are derived;
- financial capital: this represents the financial resources that are used to realize livelihood objectives;
- Social capital: this reflects the social resources required in order to achieve livelihood objectives such as networks and relationships of trust, reciprocity and exchanges;
- physical capital: this consists of basic infrastructure (changes to physical environment) and producer goods (tools and equipment) to support livelihoods.

Secondly, there are structures which include the government and the private sector and processes which include, laws, policies and culture and institutions.

Thirdly, the livelihoods framework takes into consideration shocks to the system, seasonality and trends. These aspects of the framework allows for the development of livelihood strategies in order to achieve specific outcomes, for example, reduced vulnerability or increased well-being.

This figure identifies the components that make up sustainable livelihoods approaches and also make the linkages between the components. From this illustration, it can be seen that this SL approach is people centered and is dependent on the interaction between different factors that affect livelihoods such as processes, structures, strategies and vulnerability issues.

Differentiating between a Non-Governmental Organization (NGO and a Community-based Organization (CBO)

It is important to distinguish between a non-governmental organization and a community-based organization due to the differing frames of reference. The former can be defined as *"Private organizations that pursue activities to relieve suffering, promote the interests of the poor, protect the environment, provide basic social services or undertake community development. NGOs are typically non-profit, independent from government, value based and dependent in whole or in part on charitable donations and voluntary service."* [111]

Community-based organizations differ from such organizations in the sense that they tend to be community-based to the effect that their members live in, work in or are connected to the community. The focus of these organizations also differs from the NGOs in that the issues they tackle tend to be community-specific issues as compared to issue specific.

According to Chechetto-Salles and Geyer (2006), a community-based organization can be characterized as an organization that is non-profit and provides social services at the local level. They further argue that the specific characteristics of a community-based organization are that it relies on voluntary contributions, it acts at the local level and it is service oriented.

The Source Book for Poverty Reduction Strategies as prepared by the World Bank defines a community-based organization as *"Communities who have organized themselves to address collective and individual needs."* This source book further states that CBOs are *"typically membership organizations in a self-defined community consisting of a group of individuals with common interests."* However, it must be noted that CBOs can be groups of people with a common interest but who are not living in the same geographic community. Examples of the common interests that they may possess include production activities, consumption activities the use of a common pool of resources or the delivery of services. CBOs can also be linked to federations of groups at the regional, national, or international level.

Several components arise out of the term community-based organization. These include stakeholders, institutions, civil society, participation, governance, co-management, social capital and decentralization are but a few aspects that will be discussed in order to provide a better understanding of community-based organizations as defined above.

Stakeholders

According to McConney et al (2003), stakeholders can be defined as the *"people and groups whose interests, resources, power or authority result in them being likely to substantially impact, or to be impacted by, management or the lack of it."* Thus the essence of a CBO entails stakeholders with a common interest.

Institutions

The term institution can be defined as *'the formal and informal sets of rules and types of interactions that people develop in order to function effectively.'* [112] Institutions can also be defined as *'the structures and processes that individuals and groups use to negotiate the rules and norms that guide their own behavior or that of society.'* [113] As such institutions may be small or large, formal or informal, inclusive or exclusive and local, national or international. Community-based organizations effectively function as an institution be it formal or informal since they cooperate and interact with each other through a structured approach for a common goal.

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111 World Bank website "Non-governmental Organisations and Civil Society Overview" http://wbln0018.worldbank.org/essd/essd.nsf/NGOs/home as cited in Assessing Caribbean Civil Society Participation in Regional Sustainable Development Process (2006)
112 McConney, P. et al, 2003
113 CANARI, 2005

Civil Society

Civil society, according to CANARI (2005), is *"the set of organized non-state and non-commercial actors, including: conservation and development organizations, non-governmental networks and coalitions, natural resource user groups and community-based organizations."* CBOs consist of members of civil society who have a common interest and reside within the same community.

Participation

Participation, which forms the basis underlying community-based organizations, is defined as *"both a process and an outcome through which concerned stakeholders become actors in decision-making that affects their lives and their communities."* [114] As a result, community-based organizations rely on the process of participation among stakeholders to facilitate the efficient and effective functioning of the organization through the sharing of information and input into the decision-making process.

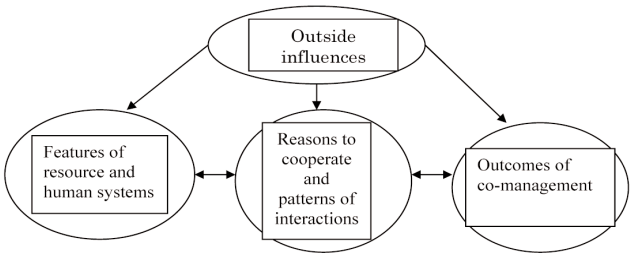
Governance

The term governance can be defined as the *"rules, processes and practices through which power and decision-making are shared within an institution and within society."* [115] From this definition one can gather that good governance refers to values that are considered important in an effective decision-making process such as participation, transparency and accountability. The World Bank also defines governance as: *"The traditions and institutions by which authority is exercised for the common good. This includes the processes by which those in authority are selected, monitored and replaced, the capacity of government to effectively manage its resources and implement sound policies, and the respect of citizens and the state for the institutions that govern economic and social interactions among them."*[116] This term is usually associated with community-based organizations in the sense that communities require good governance in the administration and functioning of its business. However good governance is dependent on the specific context on whether the state or the community has the power and authority to govern resources.

Co-management

Co-management can be defined as *"the sharing of responsibility and authority for the management of resources between government and stakeholders."*[117] This partnership arrangement facilitates interaction between the government, the community of local resource users, external agents such as non-governmental organizations, academic research institutions and other fisheries and coastal resource stakeholders to decentralize the responsibility and authority for decision making. This process of co-management emphasizes the importance of relationships and can be illustrated in the Figure 7 below:

Figure 7: The Importance of Relationships in co-management



Source: McConney, P. et al (2003). Guidelines for Coastal Resource Co-management in the Caribbean: Communicating the Concepts and Conditions the Favour Success. CCA in association with UWI CERMES and MRAG.

114 CANARI, 2005
115 CANARI, 2005
116 www.Worldbank.org/wbi/governance as cited in Mangones (2004)
117 McConney, P. et al (2003)

Social Capital

According to Banuri et al, (1994), the term social capital *"inheres in the structure of relations between and among actors."* Simply put, it can be defined as voluntary forms of social capital. It can also be seen that social capital represents networks and relationships that facilitate social cooperation and mutual trust and is built by developing strong bonds between all sectors be it government, business and the community. Community-based organizations, as a result, create social capital and facilitate the interaction between and among stakeholders.

Decentralization

The process of decentralization occurs when a central government transfers some of its powers or functions to a lower level of government or to a local leader or institution.[118] This ultimately results in the empowerment of local institutions who can better determine how to manage resources and deliver services to meet the needs of the local population.

Community-based Organizations and the Poor

Why is there the need to empower communities for development? This can be viewed in terms of why is there the need to decentralize decision-making from one central authority to different stakeholders. Some of the reasons as suggested by World Resources (2005): The Wealth of the Poor include:

- *"It promotes democracy due to the provision of better opportunities for local residents to participate.*
- *It increases efficiency in such areas of the delivery of public service. This is as a result of reduced bottlenecks and bureaucracy*
- *Poor households are given the chance to participate in local institutions and as a result given recognition for their concerns. This involves mobilizing regions and advocating public policies on behalf of marginal groups like women, ethnic minorities and poorer sections.*
- *Due to local accountability and sensitivity to local needs a higher quality of public services can be realized*
- *Social and economic development can be enhanced as a result of the reliance of local knowledge*
- *Transparency, accountability and the response-capacity of government institutions can be increased. This can be done through monitoring the state's activities, analyzing public policy and publicizing shortcomings*
- *Greater political representation for a diverse political , ethnic, religious and economic groups in decision making is possible*
- *Political stability and national unity is increased since citizens are allowed to better control public programmemes at the local level."*

However, as with the advantages to be gained from such a process of decentralization there are drawbacks to such a process. These disadvantages as articulated in World Resources (2005): The Wealth of the Poor includes:

- *"The undermining of democracy due to the empowering of local elites beyond the concern of central government*
- *Deterioration in the delivery of services as a result of the absence of effective controls*
- *Local institutions reflect the anti-poor predispositions present at the state level*
- *Due to the lack of local capacity and insufficient resources the quality of services declines*
- *Increased corruption and inequalities among regions counteract the gains from participation by the local governments*
- *The capacity of local governments become burdened and it promise too much*
- *New tensions are created and latent ethnic and religious rivalries are inflamed*
- *Weakens states because it can increase regional inequalities, lead to separatism or undermining national financial governance"*

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[118] World Resources, 2005

As such the argument for the role of community-base organizations in the form of decentralization is twofold in nature. Whether the benefits outweigh the costs is context specific and is dependent on the administrative infrastructure to substantiate transparency, accountability and good governance.

How the community-based Resource Management can Benefit the Poor

Community-based natural resource management is another form of decentralization but in this case it relates to the control of rural resources. This form of decentralization, if successful, can empower communities with authority over the use of natural resources. Other benefits that can be derived from such community-based natural resource management according to World Resources (2005): The Wealth of the Poor includes:

- *Improved Livelihoods in the form of job creation and substantial management rights and long term- revenue generation.*
- *Improved Resource condition as a result of the resources being managed by those in the community directly affected by those resources.*
- *Development of Village Infrastructure as a result of a portion of the revenues from community-based enterprises being reinvested in key infrastructure needs such as the construction of schools and libraries, development of drinking water irrigation systems and extension of electricity services. (Malla 2000:42)* [119]
- *Representation in decision-making roles can occur as the poorest members in societies can be empowered to play a role in the decision-making process.*

In some cases, community-based resource management may not be beneficial to the poor. According to World Resources (2005): The Wealth of the Poor, the disadvantages to the poor can be seen in cases where:

- Delegating decision-making power to the local level does not guarantee the poor a role in the process.
- Gaps in access to information about resource rights result in programmemes working against the people they should support.
- High transaction costs and complicated application and management requirements deter communities from participating in such community-based natural resource management programmemes.

Community-based Organizations and Trends Globally

There are two global trends that are occurring which have resulted in a greater role for community-based organizations. Firstly, globalization, which results in the economic integration of nations and societies, has had the effect of increasing the area of private property and private responsibility with the government playing a lesser role with regard to civil society and the private sector. This has implications in terms of the management of public lands and natural resources. The result of such implications is the transfer of more power over resources to corporate interests via privatization or the granting of resource concessions. [120]

Secondly, decentralization of natural resource management has been a trend in recent times. This has resulted in local and community-level institutions becoming more assertive in the management of local resources.

Community-based Organizations and Trends in the Caribbean

The trends in the Caribbean with respect to decentralization and the role of Community-based organizations differ from that of the global area. This can be seen in the CANARI Policy Brief No. 7 (2005) whereby the challenges in the insular Caribbean can be broken up into the following areas:

Political context:

- State withdrawing as welfare provider
- State reluctant to decentralize decision-making
- Citizens and organizations pressing for further democratization across the region

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119 See footnote 105

120 Johnson et al (2001) as cited in Holmes, K. and Cooper, E. World Resources (2005

Socio-economic context

- Globalization (trade liberalization) has resulted in the undermining of the ability of the Caribbean States to establish their own development paths. Factors that have created and aggravated inequitable relationships include increased foreign control of major economic sectors such as agriculture and tourism and exploitation of natural resources at unsustainable levels
- Exclusion of large sections of society from ownership and control of land and resources

Institutional context

- Areas for engagement between the state and civil society have developed but have remained one-off instances rather than the trend. E.g. National Sustainable Development Councils

Geographical context

- The Caribbean region has been characterized by efforts to build a sense of Caribbean unity (by both state and civil society)
- However, efforts inhibited by geopolitical reality of international influence (especially the US) that have limited both the extent and effectiveness of these actions

Community-based Organizations in St. Lucia

St. Lucia's history has a strong tradition of charitable societies and community-oriented organizations. These were originally called *"Friendly Societies"* whose object was to *"relieve members in sickness and to provide funeral expenses at death."* [121]

In more recent times, it can be noted from Caribbean Sustainable Economic Development Network (CSEDNet), (2003) that in St. Lucia there are a large number of community-based organizations as compared to the non-governmental organization as defined earlier. This was the conclusion of the CSEDNet regional pilot survey of NGOs and CBOs conducted in 2003 and the individual country reports also completed in 2003.

Using a broad definition of CBOs, a total of 499 organizations emerge from this study. This study also showed that there are two types of organizations that dominate the CBO environment in St. Lucia which are Youth and Sport councils and Mothers and Fathers Groups. The Mothers and Fathers Groups are unique to St. Lucia in that they stem from the Catholic Church. The characteristics of this group include the fact that they are able to attract a large membership, they are able to generate significant funds (through community efforts) and they have been able to construct their own meeting venues. This group is largely social in nature and their main activity is to provide solidarity to each other through participation in anniversary celebrations.[122] However, it should be noted that the potential of this group is largely under-utilized as they exist largely in their own realm and the interaction with other CBOs, NGOs and Government is limited.

This study conducted by CSEDNet (2003) also revealed that CBOs in St. Lucia are largely social in their focus and orientation with only a few having a development focus. Many of the CBOs also reflect weak structures and leadership and an absence of clear visions and programmemes.

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121 www.slucia.com/community.html (accessed 2008/01/29)

122 Rennie, W. on behalf of CSEDNet, (2003) A Survey of NGOS/CBOS in the CARICOM region

Examples of success stories linked to sustainable development efforts as reported in CSEDNet (2003) include:

- St. Lucia National Trust;
- Soufriere Marine Management Project;
- Propagation/Processing of seamoss - Praslin;
- Collaboration Protected Area Management in Praslin;
- Poverty Reduction Fund - Community Tourism Project;
- St. Lucia National Trust - Environmental Conservation;
- Folk Research Centre - Language Development;
- National Farmers Association Credit Union;
- Aupicon Charcoal Producers Group - Sustainable production of charcoal within a mangrove environment;
- St. Lucia National Trust - South East Coast Fishers;
- Tambou Mele and St. Lucia Rural Enterprises Project in South of St. Lucia;
- St. Lucia National Trust - Systems Plan for Protected Areas;
- Desbarras Turtle Watch Group;
- Fond Gens Libre Tour Guides Association.

Some of the functions of the CBOs in St. Lucia according to CSEDNet (2003) include community service, public awareness, education, training and capacity development, economic activity, representation, cultural promotion, natural resource management and advocacy amongst others.

However, these community-based organizations in St. Lucia face many challenges. Some of these challenges include lack of finance, commitment of members, community participation, human resources, meeting venues and a small asset base.[123]

Role for Community-based Organization as Identified in Regional Principles for St. Lucia

Organization of Eastern Caribbean States (OECS) Environmental Management Strategy

The vision statement that guides the implementation of the St. George's Declaration of Principles for Environmental Sustainability in the OECS is as follows: *"To protect, conserve and enhance or restore, where appropriate, the quality and value of the region's natural resources in order to sustain social and economic development for present and future generations."*

The relevant principles include:
Principle 1: To foster improvement in the quality of life. This would result in the sustainable use of resources to enhance the quality of life for all members in society.

Principle 2: To integrate environmental considerations into national social and economic development plans, policies and programmemes. This includes designing appropriate mechanisms for all stakeholders, including social entities, in preparing and implementing developing policies, plans and programmemes.[124]

Principle 3: To ensure meaningful participation by civil society in decision making. This includes:

- Review and amendment of existing legislation to ensure effective participation by civil society in decision making

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123 Rennie, W. on behalf of CSEDNet, (2003) A Survey of NGOS/CBOS in the CARICOM region

124 OECS Environmental Management Strategy. (2002). Document prepared by the OECS Natural Resources Management Unit (NRMU) for the OECS as the framework for which the St. George's Declaration of Principles for Environmental Sustainability in the OECS will be implemented

- Establishing mechanisms to ensure participation, including feedback and comments, from all levels of civil society stakeholders.[125]

St. Lucia has also signed the Charter for Civil Society for the Caribbean Community at the CARICOM level.[126] This charter is not legally binding but is a collective statement of intent in which the Heads of Government of CARICOM have pledged to uphold. This charter states that a healthy environment is considered a fundamental right of all persons and the shared responsibility of all. It also emphasizes greater citizen participation in environmental management.

Profile of Soufriere, St. Lucia

Soufriere is located on the central west coast of St. Lucia and is bordered by a narrow submarine shelf which supports the island's most diverse and productive reefs. The following figure shows the Soufriere Bay.

Figure 8: Location of Soufriere Bay, St. Lucia

Source: Soufriere Marine Management Area (SMMA). (undated) Research & Monitoring in the Soufriere Marine Management Area Research. http://www.nacri.org/downloads/SLUNutMonpresentation.pdf

Soufriere was the former capital of St. Lucia for the duration of French rule.[127] The main sources of income up to the late 1970s was agriculture in the form of large scale production of cocoa, citrus, bananas and ground provisions and fishing. However, the tourism sector has gained relevance and has been developing in recent times this is due to several attractions in this picturesque town such as a "drive-in" volcano,[128] the Diamond Botanical Gardens with waterfall and mineral baths. To the south of this town lie the Pitons comprising Gros Pitons and Petit Piton which further encourage the growth of the tourism.

The fishing industry is also an important source of income for the town of Soufriere. The community is heavily dependent on coastal resources. Soufriere is the furthest from the migration routes of valuable ocean species and as such relies heavily on transient schools of *coastal pelagic*.[129] During the periods December to July there is trawling for such pelagic species and the rest of the year with the use of bottom set gears reef fishing is done.

However, even with the growing tourism industry and the fishing industry providing sources of income for the community, the poverty level is significantly high. According to the KAIRI Poverty Assessment Report of 2006 the population of Soufriere is 9,329 and out of this population over 42% of its population are poor and 0.4% indigent.

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125 See footnote 123

126 Charter for Civil Society for the Caribbean Community (1997) as cited in the St. Lucia Country Programmeme Strategy 2007-2010. GEF (2007)

127 During the 18th and early 19th century, the control of St. Lucia fell alternately between Britain and France who sought control of St. Lucia for strategic purposes. http://www.workmall.com/wfb2001/saint_lucia/saint_lucia_history_index.html

128 In this volcano you can drive right into the crater and walk between the bubbling sulphur springs and pools of steam. The last minor eruption occurred in the late1700's but the St. Lucia volcano is dormant now. http://www.st-lucia-vacation-guide.com/st-lucia-volcano.html

129 Soufriere Marine Management Area (SMMA). (undated) Research & Monitoring in the Soufriere Marine Management Area Research. http://www.nacri.org/downloads/SLUNutMonpresentation.pdf (accessed 2008/01/29)

Also, environmental problems plague the area (as identified in the earlier section on environmental degradation in St. Lucia) such as fishing pressure, deforestation (for human settlement and agriculture) and destruction to coral reefs.

Comunity-based Organizations in Soufriere, St. Lucia

The relevant stakeholders in the Soufriere district in St. Lucia can be seen in Table 19 below as derived from the Soufriere Marine Management Area. By using this stakeholder identification framework the different classification of the stakeholders can be distinguished. That is, the broad resource, use or sector can be classified with the corresponding organizations with authority, organization representing users and communities and the users and non-organized stakeholders.

Table 19: Description of Stakeholder Group

Resource, use or sector	Organizations with management authority	Organizations representing users and communities	Users and non-organized stakeholders
Planning and development	Ministry of Planning	Soufriere Regional Development Foundation, Soufriere Town Council and St. Lucia National Trust	General public and all Soufriere residents
Living Marine Resources	Department of Fisheries	Soufriere Fishermen's Association, St. Lucia Dive Association and St. Lucia Whale and Dolphin Watching Association	Fishers, other harvesters of marine resources, recreational divers and dive operators
Transportation	St. Lucia Air and Sea Ports Authority and Customs and Excise Department	Soufriere Regional Development Foundation and Soufriere Water Taxi Association	Traders
Beaches	Parks and Beaches Commission (since replaced by the National Conservation Authority) and Soufriere Town Council		General Public and all Soufriere residents
Tourism	Ministry of Tourism and the St. Lucia Tourist Board	St. Lucia Hotel and Tourism Association, Soufriere Regional Development Foundation, St. Lucia Dive Association and St. Lucia Day Boat Charter Association	Hotels, yacht operators, dive operators, day-boat charters, taxi drivers, tourism workers, restaurateurs, visitors and Soufriere residents

Source: Renard, Y. (2001). Case of the Soufriere Marine Management Area (SMMA), St. Lucia. CANARI Technical Report N1285

Thus community-based organizations in this classification can be examined in detail to identify the specific roles, contributions and effectiveness in poverty reduction efforts and environmental management in Soufriere, St. Lucia.

Conclusion and the way Forward

The contribution of community-based organizations to the livelihoods of a society can be significant. Whether the impact is negative or positive is context specific and is dependent on the ability of the community to participate in the decision-making process and effect change.

The data shows that the problems of poverty and environmental degradation in St. Lucia is significant and to combat these problems different approaches should be considered such as the Community-based Management Approach which allows the community to be empowered to manage their resources effectively. Such an approach can complement existing policies and approaches already in existence and as such contribute to the sustainable development of St. Lucia.

This research paper has provided a literature review on the concept of community-based organizations. It has also provided an argument for the contribution that such CBOs can provide to the sustainable livelihoods of a society. However, the negative effects of such CBOs were also taken into consideration.

The next phase of this paper involves an examination of the specific CBOs in Soufriere. Such an examination will involve conducting fieldwork in Soufriere to conduct interviews with the relevant stakeholders. Such interviews will seek to provide answers to the following:

1. Review of CBOs in Soufriere to provide a history from conception to evolution as well as the number of functioning CBOs at present, a description of the purposes and aims of the CBO (especially in the sustainable development process). This review would also help ascertain the participatory process in CBOs i.e. what mechanisms do members participate in the decision-making process e.g. meetings, membership committees etc.
2. Contributions of CBOs in Soufriere to poverty reduction efforts and environmental management
    a. Determining how CBOs function in Soufriere (e.g. structure, membership, reach, target groups).
    b. It will also entail reviewing policies, processes and governance structures of these CBOs to determine whether intervention by or collaboration with other agencies are required or necessary for the success of such organizations. (e.g. private sector funding, government assistance etc.).
    c. Reviewing status before the CBO and after in terms of poverty levels and environmental degradation
    d. Examining CBOs and Gender to determine female participation rate and the empowerment of women in the decision- making process
    e. Examining CBOs and disaster risk management. How can CBOs contribute to disaster risk mitigation
    f. Determining whether the Soufriere community is empowered to participate in the decision making process at a national level or are they excluded (top down approach or bottom up approach) and relegated to only a community level.

ACRONYMS

CANARI - Caribbean Natural Resource Institute
CARE - Centre for Adolescent Rehabilitation and Education
CARICOM - Caribbean Community
CBO - Community-Based Organization
CSEDNet - Caribbean Sustainable Economic Development Network
GDP - Gross Domestic Product
DFID - Department for International Development
NAFTA - North America Free Trade Area
NEMO - National Emergency Management Organization
NGO - Non-Governmental Organization
OECS - Organization of Eastern Caribbean States
PCB - Pesticides and Toxic Chemicals Control Board
SLSWMA - St. Lucia Solid Waste Management Authority
WCED - World Commission on Environment and Development

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Appendix

APPENDIX 1 : ***The Key Institutional Actors Involved In the Poverty Reduction Effort in St. Lucia.***

Source: Poverty Reduction Strategy and Action Plan for St. Lucia (2003) Ministry of Social Transformation, Culture and Local Government, Castries, St. Lucia

State Institutions and Programmes:

Sector	Name of institution or programme	Mandate	Primary function(s)	Role(s) in poverty reduction	Current activities in poverty reduction	Resources and capacity	Discussion (impacts, issues)
Economic Development and Planning	Ministry of Finance, International Financial Services and Economic Affairs	St. Lucia Constitution Order 1978	Fiscal policy Economic development Policy Budgeting Inland Revenue and Customs Treasury Development cooperation International financial services	Economic development policies Allocation of financial resources for poverty reduction activities Relations with donors involved in poverty reduction	Allocation of Financial resources for poverty reduction and social development programmes and Activities Focal point for agreement between GOSL and CDB to govern BNTF Focal point for relationships with most external agencies	Strong role in policy formulation Qualified staff Projects Monitoring Committee (PMC) established to monitor project implementation Good linkages with donor agencies Generates resources for poverty reduction programme	The Programme Planning and Budgeting System has been instituted in an effort to assign resources in a more meaningful way. There is need to strengthen poverty agenda in budgeting process. There is need to integrate poverty indicators and data in research, Development and policy. Generally, data from Informal sector do not appear in macroeconomic analysis

Sector	Name of institution or programme	Mandate	Primary function(s)	Role(s) in poverty reduction	Current activities in poverty reduction	Resources and capacity	Discussion (impacts, issues)
	Ministry of Physical Development, Environment and Housing	St. Lucia Constitution Order 1978	Physical development Planning Land administration and management Housing	Land policies Titling of squatter settlements Low-income housing	Formulation of a land policy PROUD programme Shelter Development Programme (CDB loan), executed in Collaboration with the National Housing Corporation Housing Research and Analysis Project to determine demand and inform policy	Qualified staff Technical expertise in physical planning, architecture, project management, housing and environment	Housing issues associated with poverty remain significant, both in terms of the inadequacy of housing and in terms of the lack of control Insufficient staff to Undertake important housing functions Separation of physical and economic planning Functions
Social transformation and poverty reduction	Ministry of Social Transformation, Culture and Local Government	Saint Lucia Constitution Order 1978	Poverty reduction Social transformation and community development Local government	Social transformation and poverty reduction policies Community development Supervision of, and provision of policy direction to, BELFUND, BNTF, NCA and PRF	Leadership role in preparation of IPRSAP and Social Policy Co-ordination and facilitation of poverty reduction projects and programmes at local level All current activities fall within the work programmes of BELFUND, BNTF, NCA and PRF (see below)	Poverty reduction programmes (BELFUND, BNTF, NCA and PRF) fall under the Ministry's Authority Community Services Unit with Community Development Officers working at community level in each constituency	Lack of a clear Policy framework Lack of a coordinating mechanism among poverty reduction Initiatives Leadership role in current policy processes

Sector	Name of institution or programme	Mandate	Primary function(s)	Role(s) in poverty reduction	Current activities in poverty reduction	Resources and capacity	Discussion (impacts, issues)
	Basic Needs Trust Fund	Financing agreement between the Caribbean Development Bank and the Government of St. Lucia	Provision of funding and technical assistance in support of poverty reduction	Construction of social infrastructure Skills training	BNTF 5 about to start, with funding available for community projects and skills training programmes	BNTF 5 (2002-2007) budget of USD$4 million Staff of five Project Steering Committee	Focused and efficient Constraints of project cycle imposed by funding agency Need to introduce monitoring and evaluation systems
	Poverty Reduction Fund	Poverty Reduction Act, No. 7 of 1998	Provision of funding and technical assistance in support of poverty reduction	Construction of social and economic infrastructure Skills training Institutional development and strengthening Income generation	During its 2000-2001 fiscal year, PRF disbursed a total of XCD 2,620,977, on 41 projects PRF also involved in training, capacity building, and institutional development	Funding from EU and World Bank Staff of 18 Board of Directors	Involved in a wide range of initiatives *De facto* role in policy advice Danger of duplicating roles of existing agencies including ministries
	James Belgrave Micro Enterprise Development Limited (BELFUND)	Registration under the Companies Act in December 1999, launched in March 2000	Provision of credit to poor people for micro enterprise development	Job creation, income generation, and diversification of economic activity	Loans and counselling provided to >120 clients since launch Total loans disbursed: XCD 1,126,918.05	Financed by Government and EC grants, XCD 1,755,000 in budget 2002-2003 Board of Directors Total staff of eight	Focused Reaches people who would not have access to credit otherwise Needs more promotion

Sector	Name of institution or programme	Mandate	Primary function(s)	Role(s) in poverty reduction	Current activities in poverty reduction	Resources and capacity	Discussion (impacts, issues)
	National Conservation Authority	National Conservation Authority Act No. 16 of 1999	Conserving the country's natural scenery and managing beaches and protected areas	Employment of full-time and part-time workers for beautification and other projects	Employment of 300 workers, and up to 600 for exceptional periods (e.g. August 2002)	Annual budget of approximately XCD 2 million Staff Equipment and tools Board of Directors	Performs role not played by others, employing people who would not otherwise be working
Health and Welfare	Ministry of Health, Human Services and Family Affairs	St. Lucia Constitution Order 1978 Public Assistance Act of 1967	Provision of health care Management of health facilities Provision of social welfare	Provision of all health services Provision of public assistance funding to poor people Provision of funding to NGOs involved in the delivery of social services to the poor	Health sector reform MOU between Ministry and PRF Provision of services to vulnerable persons and households Provision of Public Assistance to vulnerable persons, for a total of over XCD 2.5 million in 2001-2002	Hospitals Health centres Qualified staff	Ministry plays critical role in all aspects of health care and in provision of social services Health sector reform proposals provide clear guidance on issues relevant to poverty reduction

Sector	Name of institution or programme	Mandate	Primary function(s)	Role(s) in poverty reduction	Current activities in poverty reduction	Resources and capacity	Discussion (impacts, issues)
Education, Youth and Sports	Ministry of Education, Youth and Sports	Saint Lucia Constitution Order 1978 Education Act No. 41 of 1999	Provision of education services Management of educational facilities Creation and management of sporting facilities, and sports development	Provision of universal access to education Development of skills and human resources Mitigation of the negative impact of poverty on educational opportunities	MOU between Ministry and PRF Skills development through the National Enrichment and Learning Programme Provision of policy guidance and supervision to the National Skills Development Centre Bursaries programme School feeding programme	Qualified staff at ministry and school levels External funding for skills development and education reform	Ministry plays critical role in all aspects of education and human resource development Poverty issues are taken into account in policies and programmes
	National Skills Development Centre	Registered as a Government-owned company under the Companies Act in February 2000	Development of a skilled and marketable labour force	Training, counselling and support to unemployed people	Training (production and business skills, information technology and computer skills, job searching skills) Counselling Information Placement of trainees and assistance with job searches Provision of child care to trainees Assessment of job market demands	Provision of Staff of approximately 30 Recurrent budget of XCD 90,000 Grant funding from EU	Has already trained several hundreds, but too early to evaluate impact on employment Collaborates with a wide range of agencies Need for more private sector involvement

Sector	Name of institution or programme	Mandate	Primary function(s)	Role(s) in poverty reduction	Current activities in poverty reduction	Resources and capacity	Discussion (impacts, issues)
Agriculture and rural development	Ministry of Agriculture, Forestry and Fisheries	St. Lucia Constitution Order 1978	Supporting agricultural and food production and rural development Crop development Livestock development Fisheries development Forest management and development Information management and dissemination	Agricultural and rural development policies Provision of extension services to farmers, including the poor Provision of facilitation and technical assistance services to producers' organisations	St. Lucia Rural Enterprise Project focuses on rural poverty in the south of the island The Mabouya Valley Development Project promotes Rural development and land reform The Banana Emergency Recovery Unit includes social programmes aimed at mitigating the social impacts of changes in the banana sector	Extension Division Special funding for BERU, SLREP and MVDP	Need for renewed initiatives in rural development, especially in response to banana crisis Need to strengthen linkages between agriculture and other economic sectors The new policy on agriculture does not make specific reference to poverty reduction objectives, but includes a number of policy directions that can have positive impacts
	Saint Lucia Rural Enterprise Development Project	Agreement between the International Fund for Agricultural Development the Caribbean Development Bank and the Government of Saint Lucia	Rural development and promotion of productive activities in southern region (from Praslin to Canaries)	Focus on resource poor rural households Diversification of production Micro-enterprise development Marketing Capacity-building and Institutional Development	Plant propagation Micro-irrigation Livestock development Community-based rural tourism Marketing Skills training	Project started in 1997, approximately XCD 10 million total funding, project into its final year (project to end by September 2003)	Project has had Significant impact on small farmers Project has recorded successes in marketing The issue of the continuity of project interventions needs to be addressed

Sector	Name of institution or programme	Mandate	Primary function(s)	Role(s) in poverty reduction	Current activities in poverty reduction	Resources and capacity	Discussion (impacts, issues)
Tourism	St. Lucia Heritage Tourism Programme Tourism and Community Development project, 2002 – 2005.	Financing Agreement between the European Union and the Government of Saint Lucia	Develop policies and institutional arrangements, build capacity and provide technical assistance in support of community based heritage tourism development	Maximize the positive impacts of tourism on poor people, by diversifying the tourism product, promoting a better geographic distribution of tourism activities, developing skills and supporting revenue generating activities	Support to Community based Initiatives such as festivals and cultural evenings Support to business development Skills training (e.g. in tour guiding) Policy development, e.g. with respect to access to common property resources, and incentives for micro businesses	EC funding, XCD 4.5 million over the next three years Policy and programme guidance provided by a Programme Management and Advisory Committee Staff of five persons	In its first phase (1998 – 2002), the Programme has demonstrated the potential linkages between poverty reduction and heritage tourism. In this second phase, it should aim at realizing that potential and providing systematic support to "propoor tourism" Need to monitor heritage sites, their sustainability and their impacts on communities

Sector	Name of institution or programme	Mandate	Primary function(s)	Role(s) in poverty reduction	Current activities in poverty reduction	Resources and capacity	Discussion (impacts, issues)
Commerce, industry and business	Small Enterprise Development Unit (SEDU)	Unit within the Ministry of Commerce, Industry and Consumer Affairs, created by Cabinet in 1994	Create and expand employment opportunities, develop entrepreneurial skills, enhance market opportunities and encourage export promotion and import substitution	Job creation Capacity-building Skills training	Courses One-on-one management training Counselling Marketing and promotion Business planning for microbusiness	Staff of 6 Funding from government and support from UNDP, ILO and OECS	SEDU has made significant investments in small business development, and has developed specialised expertise in training and technical assistance There is need to assess the impact of small business development programmes Need to address constraints to small business development, including crime
	National Development Corporation	Created in 1971 Administers government's incentives regime	Promotes investment Manages land and industrial estates	Job creation Land management	No specific activity	Not applicable	The issue of land management, including squatting, remains a source of concern, especially in and around Vieux Fort Need for closer linkage between NDC and local Communities

Sector	Name of institution or programme	Mandate	Primary function(s)	Role(s) in poverty reduction	Current activities in poverty reduction	Resources and capacity	Discussion (impacts, issues)
Infrastructure and public utilities	Ministry of Communications Works, Transport and Public Utilities	St. Lucia Constitution Order 1978	Policies and programmes with respect to public works, public infrastructure, public utilities and transportation Ownership and management of public buildings and facilities	Implementation of policy to provide universal access to public utilities, agriculture feeder roads, and disaster mitigation	MOU between Ministry and PRF Sub-contracting of Small entrepreneurs and contractors on infrastructural projects	Staff and equipment of the Ministry Road Development Programmes	Significant progress in providing universal access to public utilities Principle of universal access not applied to telecommunications
	Water and Sewerage Company	Registered under the Companies Act	Provision of water supply and sewerage services	Universal access to water supply Improvement of sanitation	Provision of Technical services to BNTF and PRF in design and implementation of water supply projects Free water supply connections to disadvantaged households (6,000 between June 2000 and September 2001) Rural water supply improvement programme	Staff and equipment of the Company CBF-financed Fifth Water Supply Project	Potential conflict between WASCO's role as contractor to poverty reduction programmes, commercial supplier of water, and provider of social water to the poor
Legal Affairs	Ministries of Legal Affairs and Justice	Constitution Order	Administration of justice Legislation and regulation		Verification of legality instruments of Basic Needs Trust Fund Introduction of legal aid system		

Private sector and civil society institutions and programmes

Sector	Name of institution or programme	Mandate	Primary function(s)	Role(s) in poverty reduction	Current activities in poverty reduction	Resources and capacity	Discussion (impacts, issues)
Financing	Banks and Credit Unions	Credit Unions are registered as cooperatives Commercial banks are registered as companies	Financing Credit Investment	Savings for social and financial protection Credit in support of income generating and employment creating activities	Same	Well-developed banking sector Several active credit unions with large membership and significant capital	Important role of Credit Unions Need and opportunity to promote equity financing to businesses of various sizes
Development agencies (national)	National Research and Development Foundation (NRDF)	Registered under the Companies Act as a not-for-profit company	Credit and counseling to small businesses Training in support of small enterprise and community development	Credit and counseling for micro business development	Provides credit to clients who considered as poor, and also to small contractors who implement projects funded by poverty reduction initiatives (e.g. BNTF) Provides training Refers to *BELFUND* applicants and potential clients who are likely to qualify for funding under *BELFUND*	Membership, including companies and individuals Staff Funding from funding agencies and financial institutions	NRDF occupies a clear institutional niche as the source of credit and counseling for small business Because of its lending policies, it does not reach the poorest

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	Chamber of Commerce and Industry		Representing the interests of the private sector	Private sector involvement in poverty reduction initiatives	Serves on the Board of the National Skills Development Centre and on the Project Steering Committee of BNTF Junior Achievers programme	One staff person dedicated to Junior Achievers programme	The Chamber could play a lead role in mobilizing private sector involvement in poverty reduction initiatives The Junior Achievers programme has great potential for expansion
	St. Lucia Hotel and Tourism Association	Legal status unclear	Representing the interests of the tourism sector, including hotels, restaurants and providers of ancillary services	No specific role	Serves on the Board of the National Skills Development Centre	Not applicable	The Association could play a lead role in mobilizing private tourism sector involvement in poverty reduction The Association Promotes innovative programmes that link tourism businesses, farmers and community initiatives

Sector	Name of institution or programme	Mandate	Primary function(s)	Role(s) in poverty reduction	Current activities in poverty reduction	Resources and capacity	Discussion (impacts, issues)
Social Development Agencies	St. Lucia Save the Children (LUSAVE)	Registration under the Companies Act as a not-for profit company	Support child development and advocate for the rights of children	Feeding, nutrition and medical assistance programmes for vulnerable children and households Advocacy Early childhood services	Sponsorship of children and families Counseling Feeding programme	Donations from corporate and private sponsors Buildings and facilities in Castries, Anse la Raye and Jacmel Volunteers, and 1 staff (cook)	LUSAVE does not have adequate funding, does not receive any subvention from government Need to focus role in light of growing number of organizations involved in social development LUSAVE wishes to restart its youth development programme Needs to strengthen linkages with other agencies Social development Agencies
	National Association for Early Childhood Education company	Registration under the Companies Act as a not-for profit	Subventions and honoraria to teachers, training of teachers, provision of supplies to school and advocacy to protect the rights of children	Enhancing and facilitating access to early childhood education	Scholarships to centres including meals	Annual budget of XCD 170,000 Staff of two	Does not receive any subvention from government Need to strengthen linkages with agencies involved in child development issues

Sector	Name of institution or programme	Mandate	Primary function(s)	Role(s) in poverty reduction	Current activities in poverty reduction	Resources and capacity	Discussion (impacts, issues)
	St. Lucia Crisis Centre	Registration under the Companies Act as a not-for profit company	Work towards zero tolerance of gender-based violence in society Provide support and counseling to victims of gender-based violence, in particular domestic violence Network with relevant agencies in seeking out opportunities for the psycho-social rehabilitation and economic empowerment of victims	Working towards the creation of "self managed" opportunities for the economic empowerment of persons in crisis Networking with agencies that support sustainable livelihoods	Assisting impoverished parents (particularly mothers) with the acquisition of educational supplies for their children Working with the PRF in the implementation of the Social Assistance Programme	Office, administrative staff, counselors, volunteers, resource persons Subvention from Government Contributions from sponsors and fund-raising ventures	Has been in existence for 14 years, providing support and counseling to thousands (over 6,000 visits) of clients, many from poor and vulnerable segments of society The Centre is currently seeking to reach communities outside of the Castries area, and to engage in direct poverty alleviation initiatives Needs to increase its activities at the micro level

Sector	Name of institution or programme	Mandate	Primary function(s)	Role(s) in poverty reduction	Current activities in poverty reduction	Resources and capacity	Discussion (impacts, issues)
	National Council for Persons with Disabilities	Umbrella grouping of Blind Welfare Association, Society for the Hearing Impaired, Society for the Psychiatrically Affected, homes for the elderly and specialized schools and education centers.	Advocacy and procurement of resources, on behalf of persons with disabilities, and in support of its members organizations	Advocacy Fundraising Education of persons with disabilities Income generating activities	Schools for people with disabilities Workshop and production of wheelchairs and other equipment needed by persons with disabilities School Books project funded by PRF and implemented by the Blind Welfare Association	The Council and several of its member organizations receive financial subventions from government	The Council is aware of the need to ensure its own financial sustainability and that of its member organizations All civil society organizations need to take into account the needs of persons with disabilities
	National Council of and for Older Persons	Registered as a charitable organization	Improve the quality of life and preserve the dignity of older persons in St. Lucia through advocacy, empowerment and income security	Advocacy and public awareness Co-ordination Job creation Physical and moral support to poor people Project design and implementation	Provision of support to Club 60s and their activities Celebration of 1 October as UN Day for Older Persons	Three staff members Network of Community based groups Membership in Help Age International	Receives a subvention from government Need for increased efforts towards training of caretakers, and training of trainers at local level

Sector	Name of institution or programme	Mandate	Primary function(s)	Role(s) in poverty reduction	Current activities in poverty reduction	Resources and capacity	Discussion (impacts, issues)
	National Youth Council	Formed in 1985 and formally created in 1997 by an Act of Parliament	Youth development and empowerment Advocacy on behalf of young persons	Capacity-building for youth organizations Skills training Small business and enterprise development	Training programmes Small business programmes	Staffed by volunteers Membership of 162 organizations Would need a budget of approximately $200,000 per year to manage its operations and implement its programme	Need financial resources to recruit staff and have appropriate office space Receives a subvention from government Plays critical role in advocacy and capacity building Very active at local level, but needs increased support

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Churches	All Churches, including Catholic Parish Councils, Holy Name Societies, Saint Vincent de Paul Societies, and local confraternities		Religious organizations	Provision of financial support to poor people Management of homes for the elderly Counseling and assistance to vulnerable persons and households	Provision of school books and uniforms Provision of financial help to needy persons The Centre for Adolescent Rehabilitation and Education (CARE) provides training and manages permanent training centers St. Joseph's Villa in Dennery, Marian Home run by the Carmelites Sisters and Children's Home managed by the Dominican Sisters Salvation Army provides meals to poor persons	Large numbers of volunteers and strong networks of support BNTF and PRF support to CARE	CARE reports a high rate of success with employment of trainees All churches are active at community level, and play a key role in community development

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Community organizations and groups	Soufriere Regional Development Foundation	Registered as a not-for-profit company under the Companies Act	Promote the integrated development of Soufriere (town and environs)	Development and management of sites, attractions and events Skills training Promotion of investment Community participation in development planning	Youth development programme Fisheries development Community-based tourism Cultural action	Membership limited to a small number of organizations, who form the Board of Directors Staff	SRDF has potential for greater involvement in poverty reduction and social development
	Laborie Development Foundation	Registered as a not-for-profit company under the Companies Act	Promote the integrated development of Laborie	Development and management of sites, attractions and events Skills training Promotion of investment Community participation in development planning	Recently created, no major activity yet	Membership to include all community organizations	This Foundation has potential to become involved in poverty reduction initiatives

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	Mothers and Fathers League and Groups	Registered with Ministry of Social Transformation	Community development and empowerment of members	Implementation of community projects	Provision of assistance to needy members	Large membership	The League and its member Groups have lost some of their momentum, and could be more involved in social development and poverty reduction Need for institutional support, capacity building and programming
	Development committees, youth and sports councils and clubs, management committees, environmental groups, disaster preparedness committees, etc.	Many are informal, others are registered with Ministry of Youth and Sports or Ministry of Social Transformation	A wide range of community development functions	Project implementation Provision of assistance to vulnerable persons and groups Organisation of social events	Design and construction of facilities Donations Assistance to poor persons	A large number of people are involved in these organizations on a voluntary basis Most organisations do not have access to funding, except in the case of BNTF or PRF sponsored projects	Large number of organizations, most of them informal Important social capital, huge potential for expansion and formalization

External Institutions

Name of Institution	Primary function(s)	Current Activities in Poverty reduction (in, directly relevant to, St. Lucia
World Bank	Development financing	Funding to PRF OECS emergency recovery and disaster management project
United Nations Development Programme (UNDP)	Development financing Research and analysis Policy formulation International co-operation	Funding for IPRSAP and Social Development Policy Pilot poverty reduction project in Soufriere Funding for small business development
UNICEF	Financing and technical assistance in support of children	Funding for IPRSAP and Social Development Policy Funding for early childhood policy development and implementation
European Commission (EC)	Development financing Trade	Grant funding through: • STABEX • Budget support • Special Framework of Assistance (SFA) • National Indicative Programme • Regional Indicative Programme Social recovery programme, including work on HIV/AIDS (SFA 2001) and support to CBOs and NGOs (SFA 2001) Vocational training and skills development through the NSDC (SFA 1999, 2000 and 2001) Support to the health sector development policy, including construction of new hospital Economic diversification (all programmes), housing (SFA 2001), data capture and management (SFA 2001), and funding to poverty reduction programmes, notably PRF (SFA 1999, 2000 and 2001) Agricultural diversification programme Saint Lucia Heritage Tourism Programme Water Resources Management Project, including Water Policy
UK Department for International Development (DFID)	Development co-operation and aid	OECS Waste Management Project

Name of Institution	Primary function(s)	Current Activities in Poverty reduction (in, directly relevant to, St. Lucia
Caribbean Development Bank	Regional development financing, technical assistance and training	Funding to BNTF Road Development Programmes SLREP (with IFAD) PROUD Response to Hurricane Lenny in Soufriere and Gros Islet Shelter development programme
Canadian International Development Agency	Development co-operation and aid	Currently negotiating the provision of complementary funding to BNTF 5 OECS Education Reform Project Sulphur Springs development, Soufriere