THE PEOPLE & THE COAST

FEASIBILITY OF ALTERNATIVE, SUSTAINABLE COASTAL RESOURCE-BASED ENHANCED LIVELIHOOD STRATEGIES








Presented by

SUSTAINABLE ECONOMIC DEVELOPMENT UNIT (SEDU)
University of the West Indies
St Augustine Campus
Trinidad and Tobago

FEASIBILITY OF ALTERNATIVE, SUSTAINABLE COASTAL RESOURCE-BASED ENHANCED LIVELIHOOD STRATEGIES

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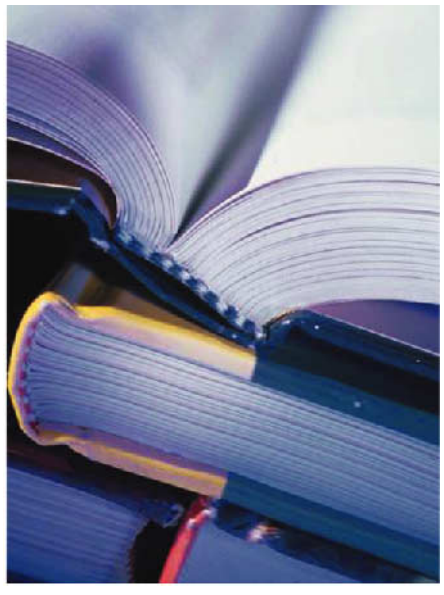

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INTRODUCTION

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"Following emancipation and the collapse of the sugar industry in the 19th century, regional economies diversified by shifting to other agricultural exports-cocoa, coffee, citrus and, later, bananas. The 20th century saw the growth of mineral export dependence-bauxite (in Jamaica, Guyana, Suriname); oil and more recently natural gas (in Trinidad and Tobago). Moreover, with tourism important everywhere in the Caribbean, regional economies remain largely dependent on natural resources for their economic survival."

INTRODUCTION
Sustainable Development and Sustainable Livelihoods

1.1: Introduction

This Report details the study commissioned from the Sustainable Economic Development Unit (SEDU), Economics Department, University of the West Indies, St Augustine, Trinidad and Tobago, by the United Kingdom's Department for International Development (DFID) on the theme, "The feasibility of alternative sustainable coastal resource-based enhanced livelihood strategies."

Chapter 1 addresses the goals, objectives and approach to the Study together with a summary review of the literature on sustainable development and sustainable livelihoods, as a necessary contextual background. This introductory chapter concludes with summary profiles of natural resources and poverty trends in the Caribbean as a whole, together with the two case-study countries.

Chapter 2 provides a review of macro-economic and linked livelihoods trends in the Caribbean and the case-study countries and communities. Chapters 3-5 conclude the main report with the main findings of the study. Chapter 3 provides these main findings for St Lucia and Chapter 4 repeats this same process for Belize. Chapter 5 addresses the generic findings and implications for new knowledge.

1.2: Goal, Objectives and Approach to the Study

1.2.1 Goal and Objectives

The goal of this study is to contribute to improved resource-use strategies in coastal zone production systems in the land-water interface in the Caribbean with particular reference to the livelihoods of the poor.

The specific objectives, outputs and activities are detailed in the log-frame, which is attached as Appendix 1.

1.2.2: Approach to the Study

The study began with the identification of criteria for the selection of two case-study countries and then, subsequently, for the choice of the two case-study communities in each of the two selected countries. The second component of the research approach involved a literature search and review on the two countries and communities. The third step entailed field visits to both countries and communities. In each country, researchers interviewed key informants in target institutions at national and community level. The interviews were complemented by focus-group

meetings in the four case-study communities. In June-July 2003, the research team returned to the case-study communities—St Lucia between June 30 and July 2; and Belize, between July 22 and 26, 2003—to report findings and to facilitate uptake by the target institutions. Further details are provided in Appendix 2 on the criteria for country and community selection.

1.2.2.1: Criteria for selection of case-study countries

The study began with the formulation of criteria for selecting two Caribbean countries which would be as representative of the range of natural resources which exist in the Caribbean and, as well, simultaneously, to reflect the use of such natural resources by the poor in the region. The map below shows the range of country choices from which the two countries were selected.

Five factors were identified:

1. Range of geographic situations—small island states, archipelagic states, and continental states;
2. Range of eco-systems—target habitats, coral reefs, lagoons, mangroves and sea grass beds;
3. Range of socio-economic conditions—the existence of target beneficiaries—women, indigenous people, landless people;
4. Range of resource ownership/control;
5. Range of governance situations—evaluation of local level institutions, NGOs etc.

An analytical matrix then listed the 17 Commonwealth Caribbean countries into four groups according to factor 1 above, to facilitate selection of one country from each class. The categories used were: Continental States, Archipelagic States, Island States and Dependent Territories (very small territories).

Four issues also were identified in relation to factors 4 and 5:

(a) Ownership/control of coastal land;
(b) Right of access to the coastline;
(c) Regulation of NR use—specifically the target habitats;
(d) Governance.

The following countries were short-listed:

- Continental State – Belize;
- Archipelagic State – Antigua and Barbuda or Trinidad and Tobago;
- Island State—Barbados, St Lucia or Dominica;
- Small Island Territory—Anguilla, Cayman Islands or Tobago.

Published data on poverty profiles were only available for Belize, Jamaica, Trinidad and Tobago, Guyana, St Vincent and the Grenadines, St Kitts-Nevis, and the Turks and Caicos Islands.

Based on the available poverty data, the countries of interest identified on the basis of poverty trends were:

- Continental State – Belize
- Archipelagic State – St Vincent and the Grenadines
- Island State – St Lucia
- Small Island Territory – Turks and Caicos Islands.

Consideration was then given to the situation of indigenous people. Such populations exist only in Belize (two types), Guyana and Dominica.

St Vincent and the Grenadines also have a small population of Black Caribs. Belize is of more interest than Guyana, for the status of the Maya and Garifuna peoples and their resource rights are less studied.

In the analysis of landlessness in the region, consideration was given to the prevalence of squatting and land tenancy and the existence of security of tenure legislation. Based on the available information the following countries appeared to be of interest:

- Continental State – Belize;
- Archipelagic State – Antigua and Barbuda;
- Island State – St Lucia;
- Very Small Territory – Turks and Caicos Islands.

Belize and St Lucia were then selected as the two case-study countries. Appendix Table 2 details the matrix of Caribbean countries, criteria and ranking for country selection.

1.2.2.2: Criteria for Selection of Case-Study Communities

It was decided to use available data and key informants to identify the two case-study communities in each case-study country based on the following criteria:

- Representative of the natural resource profile identified for the overall project;
- Representative of a significant poverty presence and natural resource dependence;
- Relatively under-studied.

The two communities selected in St Lucia were Praslin (population: 497) on the east coast and Anse La Raye on the west coast (population: 1,877). In Belize, the choices were Sarteneja in the north (population: 1,650) and Hopkins in the south (population: 1,003). The following two maps of St Lucia and Belize show the location of the selected case study communities.

1.3: Sustainable Development and Sustainable Livelihoods

This study addresses the issue of alternative, sustainable natural resource-based livelihood practices in the Caribbean land/water interface, with particular reference to poor people. It seeks, in summary, to evaluate the sustainability of existing livelihood practices and to identify alternative, sustainable NR-based livelihoods, especially for poor people. To conduct this study,

researchers ensured familiarity with the key analytical constructs that inform the livelihoods perspective. In this Section, therefore, the livelihoods issue is located within the larger framework of the literature on Sustainable Development (SD).

In the discourse on SD are three main components. First are definitions issues. Second are the indicators for measuring and monitoring the extent to which SD, as defined, is being realised in a particular place. Third are the strategies, policies, programmes and projects capable of shifting a society positively along a sustainable development path.

1.3.1: SD Definitions and Context

Sustainable Development is concerned with fairness or equity both within and between generations. The term became popularised in the aftermath of the 1987 Bruntland Report and the 1992 United Nations Conference on Environment and Development. Ten years later, the World Summit on Sustainable Development in South Africa captured the shift from a focus on environment and development to overall sustainable development.

1.3.1.1: SD Measurement Indicators

The economic literature identifies the overall SD goal as that of sustaining a positive level of aggregate capital accumulation (K). However, as opposed to conventional economics, four components of K are identified[1]:
K= Km, Kn, Kh, Ks.

Where:

Km = Man-made capital;
Kn = Natural capital or assets provided by nature;
Kh = Human Capital;
Ks = Social Capital.

Km is well-known and is the form of capital accumulation to which conventional economics pays most attention.

Kn has begun to be recognised in some countries with the addition of so-called satellite accounts to the national income accounts which seek to measure changes in natural capital. A distinction needs to be made between non-renewable K which is, by definition, depleted in use (oil, natural gas, bauxite, copper, etc) and renewable K which, if harvested optimally, can maintain its stock (fisheries, forestry, etc).

To capture the impact of depletion, some writers have developed the concept of "genuine savings", which elaborates on the satellite national accounts. Empirical research based on the "genuine savings" indicator has estimated, for example, that some countries, which are highly dependent on non-renewable natural resources, have been experiencing negative rates of "genuine savings"[2]. Such a trend also is applicable if countries exploit renewable resources in a non-sustainable manner.

1 (See Pearce et al, 1998, for elaboration on the measurement of SD)

2 (See Hamilton, 1999, for a discussion on "genuine savings".)

Kh stresses that since human knowledge determines the level of development, measurable changes in the human capital stock are a proxy indicator for the desired augmentation of human knowledge.

Ks is the most recently recognised component of aggregate national capital accumulation. Social capital comprises the network of voluntary organisations that hold a society together. The implication is that the thinner the density of social capital the more fragile and hence less sustainable it would be.

1.3.1.2: Strategies for SD

Strategies for SD should therefore seek to maintain aggregate real K or, if there are SD deficits, to realise a positive rate of capital accumulation. Since the non-renewable component of Kn will have a negative impact on aggregate K, there is need for a counterpart investment of the economic rents generated from their exploitation. The same holds for renewable resources in that their exploitation also generates economic rents[3] which should be utilised to maintain and/or enhance the stock itself, while also contributing to man-made, human and social capital.

SD strategies should result in the adaptation of macro policies—economic, social, cultural, political—to this larger SD framework, as informed by trends in the indicators of SD. Such macro policies must then be supported by sectoral strategies, policies, programmes and projects. It is therefore obvious that SD strategies need to take into account the country, countries or regions which can be regarded as similar in terms of the relevant issues. For a review of the literature in SD on small-island developing states, particularly in the Caribbean, see, for example, Pantin, 1994.

1.3.2: Sustainable Livelihoods (SL)

One critique of the SD literature is that it operates at too macro a level. An amendment has been to add "human" to the nomenclature—SHD. Another line of critique disputes need for a more disaggregated analysis to bring into sharp relief the human impacts. In this context, the term Sustainable Livelihoods can be considered a micro-level synonym for sustainable development.

A "livelihood" has been defined as that combination of assets, activities and entitlements which enable people to make a living. (Singh and Lawrence, 1997)

Some writers on SL view the concept as a tool or checklist of issues and a way of structuring analysis. Others consider SL an operational objective with the mission of improving the sustainability of livelihoods. A third perspective considers SL to be a set of principles applicable to any situation (projects or programmes).

The SL concept has a particular focus on poverty. Ashley and Carney note that "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-centred, responsive and multi-level approaches to development." (Ashley and Carney, 1999)

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3 (Dixon et al, (1999), for example provide an analysis of the importance of capture of rents from the Caribbean tourism industry)

Sustainable livelihoods involve a set of complex and diverse economic, social and physical strategies. These strategies are activities by which people make a living.

The SL approach shifts focus from aggregate economic output to people.

"Livelihood" can therefore be described as the engagement in a number of activities, which at times neither require a formal agreement nor are limited to a particular trade. This differs from a "job" since it may not involve money, is self-directing and not based on income derived from jobs.

Activities: A key feature of the SL approach is recognising that the root of all human development and economic growth is livelihoods—not just jobs, but the wide and diverse range of activities people pursue to make their living, in the formal or the informal sector.

Assets: Assets are the resources upon which people base their livelihood, including:

- Natural/biological (land, water, common property resources, flora, fauna)
- Social and political (community, family, social networks)
- Human (knowledge, skills)
- Physical (roads, markets, clinics, schools, bridges).

Entitlements: The human, social and economic rights of an individual. Sen has identified:

- Trade-based entitlements;
- Production-based entitlements;
- Own-labour entitlements;
- Inheritance and transfer entitlements.

Sustainable livelihood deals with:

i. Income generation;
ii. Natural resource management;
iii. People's empowerment;
iv. Use of appropriate technology;
v. Financial services;
vi. Good governance.

Some of the identified benefits of sustainable livelihood include:

- Promotion of inter-generational and intra-generational equity for all races, genders, and ethnic groups;
- Equal wealth distribution;
- Stimulation of community investment;
- Connectedness in the local communities;
- Use of appropriate technology;
- Conservation of the environment;
- Social and economic returns.

1.3.2.1: The socio-cultural, political and economic priorities of sustainable livelihood are:
POLITICAL PRIORITIES

- Public participation and involvement in policy making at all levels to maintain government and political accountability;
- Political reform ensuring transparency of corporate lobbies and campaign contributions;
- Multilateral trade agreements and treaties etc should not violate the principles of social sovereignty;
- Government should support livelihood practices at the local level.

ECONOMIC PRIORITIES

1. Power must be rooted in localised economies;
2. Economic policy based on full-cost accounting;
3. Ranking of local needs over export marketing;
4. Support of renewable resource technologies and sustainable consumption and production.

SOCIO-CULTURAL ASPECTS

5. Education, health, arts and media should be based on cultural diversity;
6. Encouragement of indigenous and modern knowledge, wisdom and skills;
7. Transforming social and economic structures that perpetuate injustice, intolerance and inequity.

Four common elements can therefore be identified from these differing approaches to sustainable livelihoods:

- Analysis of the livelihoods of the poor;
- Explicit links between development activities and impact on people's lives;
- Inter-sectoral linkages identified;
- Macro-micro relationships detailed.

DFID has identified the following six core principles of the sustainable livelihoods concept:

- People-centred
- Responsive and participatory
- Multi-level
- Conducted in partnership
- Sustainable
- Dynamic

1.3.2.2: Realising Sustainable Livelihoods

SL helps to identify the limitations of focusing on physical outputs or sectoral objectives at the expense of human livelihood and poverty reduction. SL is useful in the identification of development priorities and in the review of current activities; it is appropriate at both field and policy levels. This people-centred perspective on policies and institutions is vital when planning pro-poor policy change and structural reform.

The different stages of SL include:

- Programme identification and design;
- Planning new projects;
- Reviewing existing activities;
- Monitoring and evaluation.

Sustainable livelihood has been used in identifying, designing and assessing new initiatives (projects and programmes) and also in re-assessing existing activities, informing strategic thinking and research.

Tables 1.1 and **1.2**, which follow, summarise the uses, advantages, challenges, strengths and weaknesses of SL in planning.

TABLE 1.1
USES, ADVANTAGES AND CHALLENGES OF SL IN PROGRAMME DESIGN

Ways of using SL	Advantages	Challenges
Identify explicit links between programme activities and livelihood priorities of the poor. Adapt the former to the latter and ensure coherence.	More effective contribution to lives of target groups	Takes resources to do the analysis. Not all partners have equal commitment to poverty elimination.
Identify and discuss policy constraints to livelihood enhancement.	Promotes systematic exploration of the main ways in which policies affect livelihoods.	Requires in-depth analysis of policies and institutions, using tools other than the SL framework.
Conduct broad-brush livelihoods analysis to feed into reform of sector policy	Encourage people- orientation and better cross-sectoral links	Proponents of sector approaches and SL may start from different perspectives- need to explore the overlap.
Build on SL analysis to identify new partnership opportunities	SL approaches can facilitate dialogue, provide a common 'language'.	Partners may be sceptical at first. May require significant capacity building.
Use SL framework to help identify high-payoff, priority entry points.	Helps ensure open-minded analysis of options and appropriate sequencing.	Other tools required for prioritisation. Sequencing issues often poorly understood.

Source: Livelihood Connect

TABLE 1.2
STRENGTHS AND WEAKNESSES OF SL IN PLANNING NEW PROJECTS

Use of SL to…	Advantages	Disadvantages
Understand the priorities of poor	Helps 'fit' project activities to priorities of the poor.	May reduce fit with donor's intended activity. Requires donor to be flexible
Identify links • Across sectors • Between field and policy level • Between urban and rural	Avoids isolationist mentality Helps ensure links are addressed elsewhere, if not by project	Cannot feasibly address all issues Have to prioritise
Generate a range of entry points	Questions traditional assumptions	Need to prioritise
Design project activities that: • Are appropriately sequence • Accommodate inter-community relations • And potentially conflicting interests	Provides analytical framework and structure	Not necessarily useful for detailed planning. Still may need other tools

Source: Livelihood Connect

1.3.2.3: Common Tools already used in SL analysis:

- Environmental checklists—an effort to understand the relationship between the poor and their environment. Some areas covered can include health empowerment, security and livelihood opportunity;
- Gender analysis—to uncover the dynamics of gender differences such as social relationships, needs, access and control activities;
- Governance assessment;
- Institutional appraisal;
- Macro-economic analysis—fiscal, monetary, trade and exchange rate policies;
- Market analysis—analysis of the private sector;
- Participatory poverty assessment techniques—research to understand poverty from the perspectives of various stakeholders;
- Risk assessment;
- Social analysis;
- Stakeholder analysis;
- Strategy conflict assessment (SCA)—to understand conflict caused by new technologies, new government policies, growing consumerism, and commercialisation of common resources within a country or region;
- Strategic environmental assessment (SEA)—focusing on policy and planning, it provides for alternative strategic options;
- Secondary data including key informants;
- Individual and household case studies;
- Participatory methods—for investigative purposes and also for involving people in the processes that may affect their lives;
- Sample analysis—complementary to participatory methods, must entail initial qualitative overview of the community.

Methods of research, planning, implementation and evaluation appropriate to success of SL:

1. Methodologies for situation analysis:
These include:

- Participatory approaches: encouraging community participation and improving local governance; fostering priority in project proposals and developments of cultural, environmental and gender issues. Some disadvantages here include poverty and low levels of social capital.
- Stakeholder analysis: participatory and transparent, allowing people of different educational backgrounds to participate; small meetings, stakeholder workshops, individual interviews, in-depth discussions and focus groups help identify and explain stakeholder interest.
- Poverty and dynamics: participatory poverty assessment (PPA) is helpful here.
- Sampling and focus: focus groups, questionnaires, interviews etc.
- Sustainability: cost-benefit analysis, contingent valuation useful.
- Food security: household surveys to find proportion of consumption supplied through home agriculture.
- Policy and institutions: geographical information systems often used here to input information researched.

2. Policy formulation and action planning
Strategic Investment Planning, often in these stages: awareness raising and lobbying; diagnosis and stakeholder commitment; strategy formulation and action planning; implementation; follow-up and consolidation.

3. Technical tools
Structured planning, which provides a broad range for local decision-making and involves public participation, is the most appropriate tool for SL.

4. Participatory technology development
An unavoidable decision on the use of appropriate technology likely involves choosing between rural and urban technology.

5. Monitoring and evaluation
Many different methods are available to monitor and evaluate the SL and participatory methods implemented. For SL in urban and periurban agriculture in Dar Es Salaam, Tanzania, evaluation used the ward profile. Socio-economic impacts and contingency valuation are also helpful.

1.3.2.4: SL Policy Practice
SL has evolved from three decades of research, approaches and theories on poverty reduction. Previous research has linked poverty to environmental degradation. Identified as the solution, SL involves participatory management by all members of a community or a region. Organisations associated with SL research range from non-governmental organisations to national and multilateral organisations such as DFID, UNDP and research institutes.

1.3.2.5: Conclusion on SLs

A note of caution: a focus on SL is useful as an approach to analysis but is certainly not a panacea. Nor should it be seen as something new to replace previous approaches and methodologies, such as stakeholder analyses. Rather, it should build on them.

SL can help focus on key poverty issues from a community viewpoint, and give policy issues a clear micro-level perspective. Emerging use of SLA (Farrington, 1999 et al) indicates a need for adapting language and concepts to local experiences and methods. Considerable effort and time are needed to engage local stakeholders in developing important joint understanding of analysis and approach, rather than imposing them as the latest development fad. This research project can only begin such a process locally. Though taking on important elements of the SLA, the project still faces a considerable challenge in turning analysis into practicable solutions.

MACRO-ECONOMIC AND LIVELIHOODS

TRENDS IN THE CARIBBEAN

"Caribbean economies have always been dependent on their natural resources. Over time, an observable shift occurred from total dependence on arable soils for production of agricultural exports, to reliance on mineral exports and, increasingly over the last 25 years, on tourism in most countries."

MACRO-ECONOMIC AND LIVELIHOOD TRENDS

In the Caribbean

2.1: Introduction

Chapter One detailed the goals, objectives and approach of the study, and reviewed the literature on sustainable development and sustainable livelihoods. Chapter Two, a Caribbean-specific analysis, begins with an overview of macro-economic trends in the region, and then highlights the livelihood practices that reflect the macro-economy.

This is followed by a summary of trends in environmental conditions in the region and a review of natural resource trends. In its third main section, this chapter stresses the human dimension, highlighting some key poverty trends in the region. The final sections review the issues earlier covered at the regional level but with specific reference to St Lucia and Belize.

2.2: Macro-Economic Overview

The Caribbean is made up of the island economies within the Caribbean Sea—the "insular Caribbean"—and the bordering mainland countries of Belize, Guyana, French Guiana and Suriname. Of the 28 distinct political entities, most are islands; 12 are dependent territories. The region's total population is 37 million[4].

Caribbean economies range in size from Cuba, with some 11 million people, and the Dominican Republic with 8.2 million, to 6,000 of Montserrat. The most populous and largest (in terms of area) Caribbean economies are in the northern Caribbean—Cuba, Hispaniola (Dominica Republic and Haiti), Puerto Rico and Jamaica—and in the southern Caribbean (Guyana with 215,000 odd square kilometers, but 780,000 population) and the 1.2 million in Trinidad and Tobago. The size of Caribbean economies (in population and area) decreases as one moves south of Hispaniola or north of Guyana and Trinidad and Tobago.

The many aspects of commonality among these individual economies derive from their post-Columbian history of colonisation by one or other European power for the initial, primary purpose of producing cane sugar for export. The first common point of Caribbean history is that of plantation slavery, together with the indentureship that followed the end of the slave trade and the subsequent abolition of slavery itself. Abolition occurred by 1838 in the English-speaking Caribbean, following which indentured labourers were introduced from India, principally to Trinidad, Guyana and Suriname. The result has been the creation of multi-racial, multicultural and multi-religious plural societies, the legacies of which are evident today in the social, political, and economic systems in these countries.

4 *(Appendix 3 provides some relevant economic and demographic data on these individual political entities.)*

The second main commonality and legacy shared by Caribbean economies is dependence on natural resources for the generation of export earnings. For their internal production, employment, income and consumption, these small, open economies were totally dependent on sugar exports. As cane producers shifted to newer territories and virgin soils, it was soil fertility that determined their fortunes.

Following emancipation and the collapse of the sugar industry in the 19th century, regional economies diversified by shifting to other agricultural exports—cocoa, coffee, citrus and, later, bananas. The 20th century saw the growth of mineral export dependence—bauxite (in Jamaica, Guyana, Suriname); oil and more recently natural gas (in Trinidad and Tobago). Moreover, with tourism important everywhere in the Caribbean, regional economies remain largely dependent on natural resources for their economic survival.

2.2.1: Current Economic Structure and Economic Performance

Caribbean economies continue to be dominated by their export sectors that, in turn, tend to be concentrated on one to three products based on the region's natural resource endowment. Regional economies vary in respect of the significance of non-export producing sectors. Domestic food production is the most common area of non-export production. Particularly in the more arid or limestone islands such as Aruba, Curacao and Barbados, however, little domestic agricultural production occurs. Manufacturing in some economies tends to be significantly dependent on imported inputs. Tourism has been the most dynamic and fastest growing industry in most economies, and is already the dominant industry in some.

2.2.2: Current and Projected Economic Challenges

Caribbean economies face a number of challenges. The first flows from the unravelling of preferential arrangements for traditional exports, a development linked to economic liberalisation. A second challenge is poverty and high unemployment, particularly among youth, and concomitant growing social deviance including violence, crime and drugs. A third major challenge flows from the fact that the Caribbean is marked by a relatively high degree of vulnerability to natural disasters (exacerbated by climate change). The region is also economically vulnerable, as shown by the negative fall-out from 9/11 on as important an economic sector as tourism. A fourth challenge inheres in the high levels of foreign indebtedness in some countries.

Finally, all challenges are leading to a discounting of the future, and hence of sustainability concerns. The result is that economic policy tends to focus only on Km (man-made capital). Economic policy disregards the importance of social capital. Further, it ignores the need to maintain renewable natural resources, capture the rents they generate—including rents from non-renewable resources—and invest these to ensure intra-generational and inter-generational equity.

2.2.2.1: Preferential Arrangements

Despite substantial economic diversification in the Caribbean, traditional agricultural exports still loom large. Cuba, Jamaica, St Kitts, Trinidad and Tobago and Guyana continue to operate cane sugar industries that are particularly significant for employment. Some other Caribbean economies, particularly in the Windward Islands, are similarly dependent on banana exports.

These exports still depend on long-established preferential agreements with the European Union under the Lome Agreement, which is a co-operation agreement between the EU and 71 African, Caribbean and Pacific (ACP) countries. Under the Lome Agreement some ACP products enter EU markets duty-free.

These preferential agreements are now under threat, bananas being the most imperilled. World Trade Organisation rulings have determined the preferential banana regime of the European Union for ACP countries to be in breach of this global trade agreement[5].

Already, the Caribbean banana industry has experienced significant decline. This is particularly evident among the four banana-producing countries of the Windward Islands of the English-speaking Caribbean. Between 1992 and 1998, Dominica experienced a 46 per cent decline in the number of active farmers. The comparable decline in St Lucia was 36 per cent, in St Vincent and the Grenadines 12 per cent, and in Grenada, 80 per cent. This dramatic decline in active farmers poses several risks to these island micro-states. First, it has led to growing unemployment and increasing social tension. Second, it poses the risk of leading to the kind of negative social behaviour adversely affecting other still-competitive sectors, such as tourism. Third, it has led to a shift in livelihood activities to other available natural resources, such as fishing, thereby endangering the long-term sustainability of the related natural resources.

The second most vulnerable sector is that of the sugar cane industry. With the exception of Cuba, Caribbean cane sugar producers benefit from the Sugar Protocol with the European Union. This protocol is considered to be independent of the Lome Agreement between the EU and the African, Caribbean and Pacific (ACP) countries. In addition, the Lome Agreement has been effectively extended for much of the coming decade under the Cotonou Agreement. It is difficult to assume, however, that both this Lome Agreement and the related Sugar and Rum Protocols will not soon come under the same pressure, as did the EU's banana regime. A likely consequence is a repetition of the experience of the banana industry, with a dramatic drop in the number of active farmers and their related employment creation.

2.2.2.2: Adjusting to Liberalisation/Globalisation

The threat faced from a near-term collapse of preferential arrangements is exacerbated by the larger likely impact on small Caribbean economies of globalisation and its institutional expression in economic liberalisation. Globalisation may be defined, generally, as the increasing integration of the world economy. Liberalisation involves the negotiation by nations of binding contracts to remove barriers to the opening of their economies. The World Trade Organisation is the forum for these negotiations, many of which are reinforced by loan agreements between individual countries and the World Bank or International Monetary Fund.

One key issue in such negotiations is the time individual countries will be allowed to adjust to the demands of liberalisation. Countries such as the USA have been able to negotiate a decade-long transitional period to liberalise their markets for textiles and garments. The Caribbean, to date, has not had the negotiating clout to achieve similar results for some of its traditional export industries such as bananas.

5 *(See Pantin, Sandiford, Henry and Preville (2004) for an analysis of the implications for the Caribbean of the collapse of the Banana Regime.)*

Discussions are underway toward the formation of a Free Trade Agreement of the Americas (FTAA). In FTAA discussions the notion that small economies require special and differential treatment, including longer transitional terms, does not appear to have found favour, particularly with the dominant player, the United States[6].

The implications of globalisation/liberalisation include the impact of differential treatment for nationally-owned firms in the tourism, financial, agricultural and manufacturing sectors. According to some interpretations of the WTO rules, Caribbean economies may not be able to persist with requirements of significant or total local ownership of small hotels, tour operators, and the like. If this proves to be correct, then the share of national ownership in many Caribbean industries may come under threat. Though increased competition from foreign firms is not without benefits, a sudden and large-scale denationalisation of industry is likely to have substantial negative fall-out. A likely result is resentment of foreign ownership of major industries, especially those that were nationally owned. The commitment of such foreign firms to national developmental objectives is also likely to be weaker.

2.2.2.3: Unemployment, Underemployment, Crime, Drugs

The Caribbean context of the collapse of preferential arrangements and the rise of globalisation/liberalisation is the experience of substantial unemployment, underemployment and poverty throughout the region, particularly in the more populous economies. The data reveal a concentration of unemployment among the youth. It is not difficult to suggest a linkage between the frustration of unemployed youth and growing crime, notably drug-related. Trade and investment patterns are sensitive to national stability which, in small economies, can be disrupted by factors such as youth-based crime and general deviance.

2.2.2.4: The Debt Burden

Some Caribbean economies, especially those with the most significant socio-economic problems, face a constraint that stems from substantial foreign, and sometimes domestic, debt burdens that consume a large share of fiscal revenue. This is particularly true of Jamaica and Guyana and, to a lesser extent, the Dominican Republic and Trinidad and Tobago. In fiscal 2003, for example, Jamaica was committed to expending 62 per cent of its budget on debt service.

Facing the challenges noted above will require substantial fiscal allocations to fund programmes, including retraining of workers displaced in the process of globalisation/liberalisation, and upgrade of infrastructure (telecommunication) for new investment. Countries with significant debt burdens, however, are constrained to service prior liabilities before addressing future needs.

2.2.2.5: Risks Facing Non-preferential Export Sectors

The non-preferential and globally competitive export industries of the Caribbean will not remain unaffected by global trends. The larger question facing tourism, the most dynamic sector in the Caribbean, is that of its sustainability. By expansion of tourism beyond its eco-cultural carrying capacity, the Caribbean faces the danger of killing the goose that lays the golden egg. The challenge is to develop sustainable tourism that is simultaneously within carrying capacity limits

6 (A small-economies group, which has been set up in the FTAA negotiations, appears to be playing a role that is mostly cosmetic and symbolic.)

(whether socio-cultural, economic or ecological) while maximising the economic rents accruing from the sector.[7]

The offshore financial sector also faces the risk of decline in the face of changing metropolitan tax laws addressed to the alleged use of offshore centres for money laundering and tax evasion. In a recent OECD Report on "Harmful Tax Competition", 15 Caribbean countries are listed among the 47 with offshore financial services and nominal corporation taxes, said to be causing injury to OECD tax regimes. Offshore investment trusts, foreign sales corporations and offshore insurance companies have been identified in this report as instruments of such OECD tax losses, and are liable to be targeted by punitive changes in tax laws.
The information-processing sector is dominated by low-end data entry activities subject to competitive erosion by the increasing automation that is facilitating use of non-English-speaking services in lower-labour-cost regions of the world, especially Asia.

2.2.2.6: Vulnerability to Natural Disasters/Climate Change
Table 2.1 and **Figure 2.1** show that between 1899 and 1999, Jamaica experienced the most natural disasters in the Caribbean—22 in all. St Vincent and the Grenadines experienced approximately 14 natural events with Antigua and Barbuda, Dominica and St Lucia about 11 disasters each over the 100 years.

The scenario changed over the period 1992-2002, when Antigua experienced six hurricanes, tropical storms, or extreme events. Over the same 10 years, the experience of the rest of the Organisation of the Eastern Caribbean States was just over one event per country.

One hurricane event sometimes affects several Caribbean countries simultaneously. This is an indication that addressing anticipatory adaptation to climate change, threatening to several economies, may best be done as a regional (or sub-regional) effort.

The islands of the eastern Caribbean, including, St Lucia, Anguilla, Antigua and Barbuda, Dominica and St Kitts/Nevis, have borne the brunt of these hurricanes between 1992 and 1999. **Tables 2.2 –2.3** detail some of the economic impacts of these events.

Gray (1993) has projected that the sea-surface temperature in the Caribbean Sea could increase in the order of 1.5 degrees Celsius, leading to a greater number of hurricane activities.

Another aspect of climate change which poses a threat to Caribbean countries is flooding and inundation caused by rising sea levels. It is predicted that global warming could result in a greater heating of water via thermal expansion. This thermal expansion, coupled with melting glaciers and ice sheets, could cause sea levels to rise. But the rise will not be uniform; it will be influenced by other factors such as currents, winds and tides.

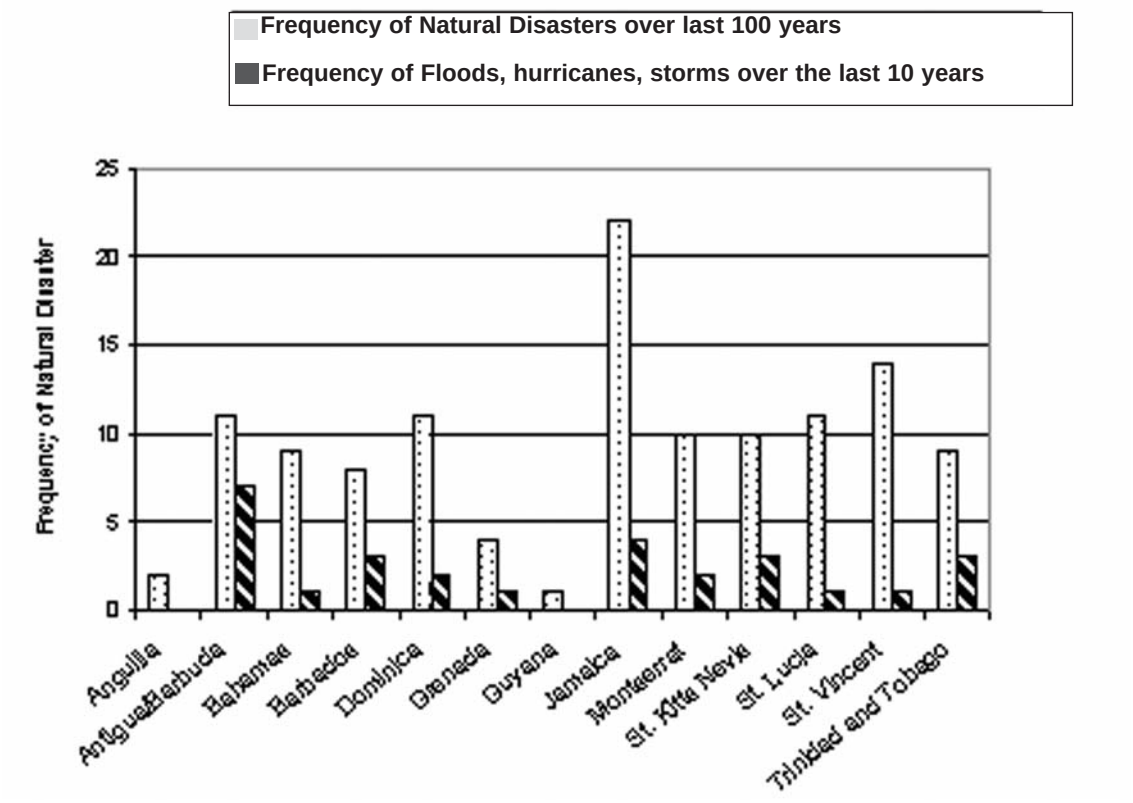
[7] *(See Patullo, 1996, for a critical review of the state of Caribbean tourism; Pantin, 1999, for further elaboration of the sustainable tourism challenge.)*

TABLE 2.1
FREQUENCY OF MAJOR NATURAL EVENTS IN THE CARIBBEAN, BY COUNTRY – 1899-1999

Country	Frequency of Natural Disasters over last 100 years (1889-1999)	Frequency of Floods, Hurricanes, Storms over last 10 years(1992-2002)
Anguilla	2	0
Antigua and Barbuda	11	6
Bahamas	9	1
Barbados	8	3
Dominica	11	2
Grenada	4	1
Guyana	1	0
Jamaica	22	4
Montserrat	10	2
St. Kitts/Nevis	10	3
St. Lucia	11	1
St. Vincent	14	1
Trinidad and Tobago	9	3

Source: http://www.oas.org/en/cdmp/document/insuranc.htm#A

FIGURE 2.1
FREQUENCY OF MAJOR NATURAL DISASTERS IN THE CARIBBEAN, BY COUNTRY: 1899 – 1999



Source: http://www.oas.org/en/cdmp/document/insuranc.htm#A

TABLE 2.2
COST OF DAMAGE TO THE FIVE COUNTRIES MOST SERIOUSLY AFFECTED BY HURRICANES LUIS AND MARILYN IN 1995, IN RELATION TO GDP (MILLIONS OF EC DOLLARS)

Country	Storm Damages (EC$ Mn)	GDP for preceding year (EC$ Mn)	Damage/ GDP
Anguilla	245	166.4	147.0%
Antigua/Barbuda	810	1,143.9	71.0%
Montserrat	8.0	147.3	5.4%
Dominica	262	494.1	53.0%
St. Kitts/Nevis	532	505.6	105.2%
St. Martin	1,764		NA

Sources: CDERA: Report on the Economic Impact of the Recent Disasters in the Eastern Caribbean, 1998. ECLAC/CDCC: Selected Statistical Indicators of Caribbean Countries Doc. LC/CAR/G.535 Vol. X, 1997.

TABLE 2.3
SOCIO-ECONOMIC IMPACT OF SELECTED NATURAL DISASTERS IN THE CARIBBEAN 1979-2001

Year	Country	No. Persons Affected	Damage (US 000s)[8]
1979	Dominica	72,100	44,650
1980	St. Lucia	80,000	87,990
1988	Dominican Republic	1,191,150	n.a.
1988	Haiti	870,000	91,286
1988	Jamaica	810,000	1,000,000
1989	Montserrat	12,040	240,000
1989	Antigua, St. Kitts/Nevis, Tortolla, Montserrat	33,790	3,579,000
1991	Jamaica	551,340	30,000
1992	Bahamas	1,700	250,000
1993	Cuba	149,775	1,000,000
1994	Haiti	1,587,000	
1995	St. Kitts/Nevis	1,800	197,000
1995	US Virgin Islands	10,000	1,500,000
1998	Dominican Republic	975,595	2,193,400
2000	Antigua and Barbuda, Dominica, Grenada, St Lucia		268,000
2001	Cuba	5,900,012	87,000

Source: CGCED Natural Hazard Risk Management in the Caribbean: Revisiting the Challenge, 2002, p. 2

8 Valued at year of event

One IPCC projection suggests that sea level could rise by an average of five millimeters per annum.

Klein and Nicholls (1999) have suggested ways that sea level rise could affect natural coastal systems:

- Increasing the frequency of floods.
- Erosion of beaches.
- Inundation of coastal areas.
- Rising water tables.
- Intrusion of salt water into groundwater sources.
- Biological effects—changes to ecological flora and fauna.

Additionally, Klein and Nicholls noted that, given the likely range of negative effects of higher sea levels, vulnerability studies to assess the socio-economic impacts should take cognisance of:

- Direct loss of economic, ecological, cultural and subsistence values through loss of land, infrastructure and coastal habitats;
- Increased flood risk of people, land and infrastructure; and
- Other impacts related to changes in water management, salinity and biological activity.

2.3: Sustainable Development and Sustainable Livelihoods in the Caribbean

Caribbean economies, as noted earlier, have always been dependent on their natural resources. Over time, an observable shift occurred from total dependence on arable soils for production of agricultural exports, to reliance on mineral exports and, increasingly over the last 25 years, on tourism in most countries. The natural resource-based export sectors generate the foreign exchange on which these highly import-dependent economies survive.

Varying proportions of the population and labour force, however, exist outside the formal sector based on the export industries, the public sector and the commercial enterprises. These comprise the marginalised and poor groups which vary from significant minorities to majorities across the region. Many of the poor live on the coast and/or engage in activities which either depend on the coastal natural resources, or impact on them, largely in a negative manner. These include deforestation by "slash and burn" untenured farmers, and disposal of untreated household sewage in rivers and streams, which quickly finds its way into the marine environment.

2.3.1: The Special and Contradictory Role of Tourism

The tourism sector deserves special attention since it is common to and the fastest growing industry in most Caribbean economies; it is already the dominant industry in several. Tourism depends largely on the environment[9] and there are increasing conflicts, as the two country case studies will reveal, between traditional natural resources users.

[9] *(See SEDU Report to the IDB for further details on environmental management issue in tourism. See Pantin et al, 2001)*

The growth of the tourism industry has increased the competition for coastal space and hence natural resource access and quality. The 2001 Travel and Tourism Satellite Accounts (TSA) developed by the World Travel and Tourism Council[10] estimate that by 2001 the economic impact of tourism in the Caribbean was greater than in any other region in the world. Tourism accounts for roughly 17 per cent of total Caribbean GDP, in contrast to 12 per cent for North America, Europe and Oceania. Second, tourism accounts for over 21 per cent of all Caribbean capital formation. Comparable figures for Oceania (13 per cent) and North America/Europe (10 per cent) are significantly lower. Third, Caribbean tourism accounts for nearly 20 per cent of total regional exports, in contrast to 15 per cent for Oceania and seven to eight per cent for North America and Europe. In 2001, tourism was estimated to absorb 2.5 million jobs in the region, or roughly 16 per cent of the total, compared to 12 per cent for Oceania, Europe and North America. In addition, the WTTC forecast was that the Caribbean would continue to lead the world in tourism economic impact over the next decade.

The Tourism Penetration Index (TPI) seeks to highlight the impact of tourism based on an unweighted three-variable index (See McElroy and de Albuquerque, 1998). This index conflates all major impact dimensions: economic in terms of per capita visitor spending; socio-demographic in terms of daily visitor density per 1,000 resident population; and environmental in terms of hotel rooms per square kilometer.

To gauge the impact of tourism in the Caribbean, McElroy has prepared an international sample of 47 small islands representing the Caribbean (21), Pacific (15), Indian (5), Mediterranean (3), and Atlantic (3). The results indicate that the most penetrated group is populated by highly developed Caribbean, Mediterranean and Northern Pacific destinations, with average per capita visitor spending over $8,000, and densities around 200 per 1,000 population. Tourists thus represent the equivalent of a 20 per cent increase in the daily island population year-round. These destinations are the most affluent, mature and promoted, as well as the most crowded with the largest-scale facilities, and the most ecosystem damage. They also exhibit the least seasonality—an indicator of their maturity and aggressive marketing—the shortest average length of visitor stay, and declining visitor satisfaction. Such characteristics collectively describe the Bahamas' high-density tourist concentration in the Freeport-Nassau complex. The Bahamas' overall intermediate score is largely due, however, to the archipelago's extensive land mass.

Intermediate destinations, the most dynamic and heterogeneous group, are normally typified by very rapid visitor growth and hotel/infrastructure construction. Many are experiencing planning pressures from resource-use conflicts as labour and capital migrate from traditional pursuits (farming and fishing) to higher-income opportunities in tourism. These 21 islands fall roughly into three subgroups. The top cluster contains a handful of highly developed Lesser Antilles destinations projected to advance to most-penetrated status in the next decade. These include the Bahamas and Barbados, another mature destination. The middle intermediate subgroup includes several relatively developed Pacific and Indian Ocean islands plus another handful of Eastern Caribbean destinations including St Lucia, which has experienced rapid transformation and population growth over the past two decades.

10 *(The WTTC is based in London, and the study was conducted in conjunction with a group of experts under the auspices of the World Tourism Organisation—WTTC, 2001)*
11 *(T&T Newsday, 25 July 2003: 10)Tourism Organisation—WTTC, 2001)*

2.4: Overview of Environmental Conditions in the Caribbean

The Caribbean inclusive of Latin America contains 40 per cent of the biodiversity on the planet "and is considered to have the highest diversity in the world" (UNEP, 2000:9). Today, however, the total region ranks second in the world in threatened bird, reptile and amphibian species, and third in endangered mammals and marine species (WCMC/IUCN, 1998). Environmental degradation has a long history in the region and is not limited to the impacts of tourism. Upland deforestation, and habitat destruction after decades of sugar and banana culture, plus the construction of large-scale condominium clusters on steep hillsides, have damaged watersheds, caused erosion and silted over permanent streams. Since 1980, arable and cropland in the Caribbean has risen 20 per cent, the annual loss of forest cover has averaged 1.7 per cent, and the freshwater fish catch has declined 12 per cent (UNEP, 2000: 116-117). Since 1980, urban growth, 50 per cent greater than population growth, has resulted in discharge of improperly treated waste. Only 39 per cent of the 140 small Caribbean industries surveyed in 1995 used some type of wastewater treatment (UNEP, 1999a). In 1991, only 10 per cent of the Caribbean population were served by a central sewerage system, and nearly 60 per cent of treatment plants in the Eastern Caribbean were operating inefficiently (Vlugman, 1992). Very little has changed since then.

Marine resources have also been altered by inland activity, coastal construction and over-fishing. Over 80 per cent of improperly treated municipal waste is discharged directly into the sea (UNEP, 2000). More than 10 million tons of eroded sediment is deposited every year in coastal waters of the wider Caribbean because of deforestation and poor agricultural land practices (UNEP, 2000: 44). As a result, Caribbean reefs, which represent 12 per cent of the world total, are in decline. A group from the Tyndall Centre for Climate Change Research at the University of East Anglia, UK, recently analysed data from 263 separate coral reefs sites in the Caribbean and concluded that hard coral cover on these reefs has declined from some 50 per cent to 10 per cent over the last three decades.[11]

Today, 29 per cent of these reef areas are at significant risk from runoff and sedimentation, nutrients coming from hotel and vessel sewage, and construction projects and sand mining (Bryant and others, 1998). In addition, because of inadequate port reception facilities, a large number of pleasure yachts and cruise ships directly inject waste into Eastern Caribbean waters, that is, in the vicinity of those island destinations most aggressively promoting and dependent upon mass tourism.

In Barbados, Jamaica and Haiti, protective reef systems have become degraded by eutrophication caused by faecal material from both land and sea-based waste (PNUMA, 1999). In combination, all these man-made environmental changes have been exacerbated by frequent, diverse, and increasingly destructive natural disasters. The Caribbean's colonial history of environmental neglect and present institutional weaknesses "suggest that the current trends of declining biological diversity will continue unabated over the next decade" (UNEO, 2000: 35), unless there is a major policy reversal.

11 *(T&T Newsday, 25 July 2003: 10)Tourism Organisation—WTTC, 2001)*

2.4.1: Natural Resource and Environmental Impacts of Tourism in the Caribbean

Mass-tourism growth has altered insular ecosystems in the Caribbean and has directly or indirectly caused deforestation and erosion of upland forests for condominium developments and road works. Other consequences have been beach loss, lagoon pollution and reef damage from sand mining, dredging and cruise ship anchoring (McElroy and de Albuquerque, 1998).

In the United Nations Environment Program's most recent outlook for the future of the Caribbean environment, a 30-year forecast suggests some alarming trends and provides further justification for stronger policy (UNEP, 2002). Among those trends:

- Increased globalisation and trade will put further pressure on terrestrial and marine resources.
- Without significant policy reform, market forces will weaken long-run management practice for short-term commercial gain, and continued deforestation and erosion are projected.
- Marine resource degradation will continue as a result of the increased human settlement of coastal areas, the proliferation of tourist resorts, the discharge of wastes and lack of strong fisheries regulation and enforcement.
- Many endangered species will disappear. In particular, "the quality and quantity of water, and the disposal of solid waste, are particularly worrying in the small island countries and territories of the Caribbean." (UNEP, 2002).

According to this outlook, these trends can be mitigated or reversed through:

- improved management and monitoring of critical environments;
- a lower level of economic growth (or greener growth);
- improved ecosystem knowledge; and
- a conservation ethic born of an appreciation for environmental values—to be used for quality tourism as well as enhanced biodiversity for pharmaceutical uses.

Condominium clusters and road works on steep hillsides have damaged forests and watersheds causing erosion, silting over streams and wetlands, and polluting lagoons (McElroy and de Albuquerque, 1998). Mangrove forests and salt ponds also have been destroyed through the construction of large-scale resorts, marinas and infrastructure along shorelines, depleting endemic species, archaeological artefacts and reef systems already weakened by sand mining, yacht anchoring and sewage dumping (Wilkinson, 1989).

According to UNEP (1999:11), the most intrusive impacts of tourism development involve the construction phase and solid waste disposal and treatment. To this must be added, particularly for small islands, tourism's demand for scarce water and power supplies. Recent research suggests these impacts are substantial.[12]

The estimated water demand of tourism grew from 1,926 to 3,915 million gallons between 1990 and 1999. UNEP has pointed out that, as a result of tourism, the Caribbean has one of the highest per capita water withdrawal rates in the world, although its per capita water resource base is significantly lower than insular regions in the Pacific and Indian oceans (UNEP, 1999a).

12 *(See SEDU study on "Greening of Tourism and Adaptation to Climate Change", 2001, Pantin et al.)*

Total energy consumption by the tourism sector is also estimated to have increased from 232 million KWh to 471 million KWh. Total solid waste generated is estimated to have doubled over the period from 32,104 tonnes to 65,252 tonnes. Such estimates suggest that the doubling of tourist activity during the decade of the 1990s also doubled the demand for water and power, and the supply of solid waste.

In Antigua and Barbuda, growth in tourist arrivals doubled twice between the late 1970s and 1980s. To accommodate these massive annual visitor flows, Coram (1993: 168) estimates that during the 1980s more mangrove swamps, salt ponds, and offshore reefs were damaged or killed than in all of Antigua's previous history. The result has been massive fish kills in the late 1980s at McKinnon's Salt Pond, and declines in reef life, fish and sea grass beds in adjacent marine waters. In the sister island of Barbuda, during the 1980s and early 1990s, barges of sand mined from Palmetto Point left almost daily. As a result, beaches were severely eroded and the fresh-water aquifer damaged (McElroy and de Albuquerque, 1997).

In addition, in the early 1990s, the general solid waste dump, Flashes, located at the western end of the island heavily colonised with hotel rooms, had become so littered with domestic garbage and cruise ship waste that the area was plagued with flies. The plague caused wholesale hotel cancellations (Pattullo, 1996:109).

Infrastructure and hotel construction have negatively affected beach areas. In Tobago, the extension of the airport and the deep-water harbour at Scarborough in the 1980s was accomplished through sand mining. One of the affected beaches was severely altered. "Goldsborough beach…has already shown the effect of mining: the sand is black, the beach has narrowed and it is littered with dead and rotting plants and trees. No one, tourist or local, goes there anymore," reported a local newspaper. (Pattullo, 1996:109).

On the heavily built-up west coast of Barbados, hotel construction has involved the clearing of natural beach vegetation (which holds sand in place) to improve sea views and access for hotel guests. This has caused beach erosion and prompted the construction of groynes and jetties to staunch erosion. Sadly, these inappropriate structures further disrupt natural wave action and only accelerate beach erosion. As a result, some west coast beaches are reported to be receding at 1.5 meters per decade (Hamilton, 1992).

All across the region, reefs and reef life are being damaged by tourism and overfishing. Examples include snorkellers trampling reefs in Tobago; divers dragging anchors over coral in the US Virgin Islands; sailors dumping waste in the Grenadines; souvenir vendors ripping out shells, coral and sea horses in the Bahamas, and selling rare black coral jewelry in Grenada (Pattullo, 1996: 109-110).

One of the most egregious examples of marine destruction is the Bimini Bay development in the Bahamas. This involves the wholesale destruction by an American investor of a delicate mangrove fisheries nursery, to gain cheap construction fill. The dredging has severely damaged nutrient recycling in the adjacent lagoon and curtailed fish and shark production in what had formerly been a government-declared Marine Protected Area supplying large areas of the Great

Bahamas Bank with fish. Fishermen who used to fish and gather conch in North Bimini Bay now must voyage much farther for their catch (Duncombe, 2001).

2.5: Study-specific Summary Natural Resources Profile of the Caribbean

For the purposes of this study, the natural resources discussion is confined to coral reefs, sea grasses, mangroves and the proximal coastal and marine areas at the study sites, in each case country (as per Appendix 1).

The coastal zone is defined by Brown et al (2002) as the set of landward systems, tending to be within the jurisdiction of one country, whose functioning and use directly affect the marine environment and the set of marine systems that exist in proximity to land. In Caribbean small islands, this land/water interface, where aquatic and terrestrial resources systems co-exist, may in effect define an entire island as the coastal zone. Caribbean coastal zones possess a number of natural resources which provide a wide range of goods and services, fuelling economic growth and development. Often, this zone is where the majority of economic activity takes place—extraction of oil and gas, fisheries, marine transport, and tourism.

Because of high population densities, poverty, and absence of sanitary facilities, the human impacts on these Caribbean environments are significant. For example, common agricultural practice (particularly shifting agriculture) is the major cause of deforestation, with directly negative effects on watersheds, rivers, mangroves and other coastal resources. Artisanal fishing methods damage Caribbean coastal and marine fishing grounds, while over-harvesting has led to the decline of wild stocks of some species in islands—*Tripneustes ventricosus* (white sea urchin) in St Lucia and *Megaptera novaeangliae* (humpback whales) in the Lesser Antillean waters.

Beach sand mining is the major human-induced cause of coastal erosion in the eastern Caribbean. Sand is regarded by people as a free natural resource. This has also led to loss of beaches, dunes and other coastal habitats.

Pollution and contamination in Caribbean coastal and marine environments is common to most of the islands: from agriculture (fertilisers and pesticides); domestic/municipal areas (sewage, solid and liquid waste); tourism industry hotels/marinas (sewage, solid and liquid waste); shipping and marine transport (oil, solid and liquid wastes); and, in Trinidad, heavy industry (oil, liquid wastes and heavy metals).

These natural resources including inter-tidal ecosystems, beaches and sand-dune systems are inextricably linked and synergistic relationships sustain the functioning of these systems. For example, there are many direct links between the extent and health of these habitats and the productivity of the inshore fisheries, which support human populations. The economic, ecological and social importance of these systems stems primarily from their goods, services and attributes.

In this respect, coral reefs rank amongst the most biologically productive and diverse of all natural ecosystems supporting as many as 3,000 species (Salm et al 2000) of organisms. In the Caribbean, they provide such goods as fish (food and ornamental); shellfish (lobsters, crabs, conchs); pharmaceuticals (from sea fans and sponges); black corals (for jewelry); and skeletal materials (used in ornaments and jewelry). Coral reefs are the basis of many coastal fisheries: they provide food and shelter for fish and shellfish. They also function as breakwaters which protect harbours, bays, lagoons and they limit the effects of erosion. Their attributes include a tourist attraction—an associated million-dollar industry. Most of the benthic (bottom-dwelling) fish species in the shallow nearshore waters of the Caribbean are associated with coral reefs as adults. Of the more than 300 species, an estimated 180 are landed for human consumption (Towle and Towle, 1991). Coral reefs are very important for subsistence and security to Caribbean coastal communities.

In the Caribbean, mangrove swamps and coastal lagoons provide goods such as construction materials; fuel—firewood, charcoal; tannins; fishery resources—finfish, shellfish and crabs; and wildlife resources—birds, caimans etc. They also provide a flood/flow control of fresh waters; storm protection and windbreaks; act as shoreline stabilisers, allow for nutrition retention, assist in water quality maintenance; and provide recreational/educational opportunities, including tourism.

The attributes of mangroves include increasing the biodiversity of the coastal waters; scenic landscapes, their uniqueness and aesthetic value. Many reef fish as well as conch and lobsters, use mangrove swamps and/or sea grass beds as nursery habitats in their juvenile stages.

Sea grass beds of *Thalassia testudinum* or turtle grass, *Halodule wrightii* and *Syringodium filaform*e occur throughout the Caribbean and increase the biodiversity of coastal waters. They provide grazing and foraging meadows for a variety of fauna which include turtles (*Chelonia mydas*), manatees (*Tricheus manatus*), parrotfish (*Scaridae*), snappers (*Lutjanidae*), grunts (*Scaridae*), and commercially important species of queen conchs (*Strombus gigas*), lobsters (*Panulirus argus*) and the edible sea urchin (*Tripneustes esculentus*). Sea grass beds trap and stabilise sediments along the coast, often preventing abrasion and burial of reefs during storm conditions. They also afford coastal protection by reducing wave action along the coast.

Degradation and contamination in the coastal zone

As noted earlier, degradation and contamination are common to most of the Caribbean territories, from industrial, urban and agricultural activities. Rawlins et al (1998) describe the practice of shifting agriculture as the major cause of deforestation, while fertilisers and pesticides are a major source of pollution. Fertiliser consumption in the Caribbean is extremely high (in St Lucia and in Martinique 14.0 metric tonnes per year). The tourism industry—hotels/marinas (sewage, solid and liquid waste); shipping and marine transport (oil, solid and liquid wastes); heavy industry (oil, liquid wastes and heavy metals); and domestic/municipal areas (sewage, solid and liquid waste); are the main sources of pollution reaching the coastal zone.

Pollution and degradation have direct negative effects (causing death and stress) on mangroves, coral reefs, sea grass beds and lagoons. This degradation and destruction are global

(IUCN/UNEP 1991, Wilkinson 1992/1998), with severe effects on the economies that depend on them (Salm et al 2000). It is common knowledge that a large proportion of the region's mangroves have been lost already to coastal development with many further areas "threatened" or "under stress" (Bacon 1990).

2.5.1: Fisheries

Capture fisheries in the Caribbean include subsistence fisheries (consumed by the local community), artisanal (small commercial operations) and industrial (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. 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 etc. This compounds the situation and leads to over-exploitation of the fish stock.

Many fishing vessels utilise destructive methods.

- Trawling—"bulldozing" or "dragging" the ocean floor; taking everything (all sizes)—destroys coral and rocky reefs, sponges, sea turtles etc. Turtle Exclusion Devices (TEDS) have still not been legislated for in many Caribbean countries.
- Long-lining boats that spool out miles of baited hooks in a single set, wipe out 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 "displace the fish" from their cover destroying coral reefs, rocks and other organisms.
- 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.

According to UNEP, the marine fish catch in the region is down 50 per cent in gross tonnage since 1984 (UNEP, 2000: 122).

2.5.2: Non-extractive uses of the Caribbean marine environment

Recreational activities (diving, swimming, boating etc) affect the state of these ecosystems. Coral reefs have been damaged by boat anchors and by tourists stepping on them. Other uses—for research and education, marine park developments, and as natural boat harbours—also have negative impacts on these systems.

Development in coastal areas has coincided with the influx of tourism. In Caribbean countries, this is a big threat to coral reef ecosystems, mangroves and sea grasses. In addition, the associated sewage and solid waste products generated by the tourism industry pose a serious threat.

The coastal zone is very fragile: it is here that a series of dynamic processes occur, and these are highly susceptible to anthropogenic activities. The coastal zone is a sink for receiving a myriad of effluents from land-based activities, which contribute to coastal degradation, pollution, eutrophication, and sediment and water quality decline (as identified above). It is very difficult to isolate a specific effect on the environment or resource, since it is often a result of a combination of few or many of these external factors. In addition, the inherent inter-linkages between the ecosystems increase the fragility of a particular resource. For example, deleterious impacts on a mangrove will affect adjacent coral reefs and sea grass beds, since they are often found in close association. The human impacts on these environments in the Caribbean are significant, because of high population densities, poverty and the absence of adequate sanitary facilities.

Coral reefs are very vulnerable to temperature changes since they live near the upper limit of their tolerance; small increases stress them and cause them to expel their symbiotic algae which provide their colour and nourishment. Global warming and associated climate change have already impacted on the status of coral reefs worldwide, and in the Caribbean. Natural damage and hurricanes have also injured coral reef ecosystems, and prolonged algal blooms (ref. CARICOMP…) caused extensive mortalities of reef organisms eg. *Diadema antillarum*. The massive climate-related coral bleaching event of 1998 (major el Nino 1997-1998) was the largest single cause of deterioration of coral reefs (Wilkinson 2000). On the Belize barrier reef, sea surface temperature, which rarely exceeds 29 degrees Celsius, reached 31.5 degrees and caused extensive bleaching.

2.5.3: Threats to target resources for this study

The following are threats that are common to the target resources:

2.5.3.1: Coral reefs

a. Over-fishing by commercial and subsistence fishers;
b. Uncontrolled anchoring of boats and ships, shrimp trawling, tourist activities;
c. Dredging, inland agricultural activities, coastal, residential and tourist developments;
d. Natural phenomena/global warming;
e. Pollution—oil (bilge/ships/boats)—agriculture, aquaculture, sewage.

2.5.3.2: Mangroves and coastal lagoons

a. Residential and hotel resort developments;
b. Dredging;
c. Natural disasters/hurricanes.

2.5.3.3: Sea grass beds

a. Shrimp trawling, dredging;
b. Removal for tourism activities;
c. Natural disasters.

2.6: Poverty Profile of Caribbean

During the past decade, official poverty studies have been conducted in nine English-speaking countries—Jamaica, Trinidad and Tobago, Guyana, Belize, Turks and Caicos Islands, St Vincent and the Grenadines, St Lucia, St Kitts/Nevis, and Grenada. In the larger islands, the studies were conducted under the aegis of the World Bank; in the others, under the auspices of the Caribbean Development Bank. **Table 2.4** provides a snapshot of poverty estimates for six Caribbean countries between 1992 and 1995.

TABLE 2.4
POVERTY ESTIMATES OF SELECTED CARIBBEAN COUNTRIES

Country	Poverty Indicator			
	Extreme Poverty	Head Count Index (P0)	Poverty Gap Index(P1)	Poverty Severity (P2)
Belize	7.0	34.6	12.5	6.4
Guyana	29.0	43.2	16.2	8.2
Jamaica	n.a.	34.2	10.6	4.4
St Lucia	5.3	25.1	6.5	3.5
St Vincent & the Grenadines	20.4	37.5	12.6	6.9
Trinidad & Tobago	11.0	21.2	7.3	3.7

Source: **Belize Survey of Living Conditions, 1995.**
Guyana HEIS/LSMS Survey, 1993.
Jamaica Survey of Living Conditions, 1993.
St Lucia Survey of Living Conditions, 1995.
St Vincent and the Grenadines Household Budgetary Survey/Survey of Living Conditions, 1995.
Trinidad and Tobago Survey of Living Conditions, 1992.
n.a.: Not available

2.7: St Lucia-specific Case Study

2.7.1: Economic Profile

St Lucia has been traditionally dependent on banana production and export. Over the last decade and a half, however, tourism has been growing at a rapid rate.

2.7.2: The Banana Industry

The banana industry, for decades the mainstay of the St Lucian economy, has seen since the early 1990s a rapid decline in activity and output. This was brought about by the cash crop's vulnerability to drought and tropical storms and by extensive competition for the European Union markets which from 1993 triggered new limitations on the preferential access of bananas from ACP countries.

As shown in **Table 2.5** below, over the nineties both production and exports of bananas declined at an annual average rate of minus 4.4 per cent. The levels achieved in 2000 were just about half of that recorded in 1990. The industry's contribution to Gross Domestic Product (factor costs) dropped steadily from 10.3 per cent in 1990 to 3.6 per cent in 2000. Banana export earnings also declined to just $EC82.5 million in 2000 from $EC186.9 million in 1990. The weakening euro, as well as continuing problems of fruit quality, have contributed to this decline.

According to a Government of St Lucia study, "Country Strategy paper for the Banana Industry, Agricultural Diversification and the Social recovery of Rural Communities", this fall-off in activity and output has resulted in depressed farmers' disposable income, massive farmer migration out of the industry and reduced levels of on-farm investments. The paper cited an estimate that some 49 per cent of farmers had left the industry between 1992 and 1997. The gravity of the social impact of such declines is apparent, given that the industry is estimated to have employed some 30,000 persons directly and indirectly—more than half of the employed labour force in St Lucia.

TABLE 2.5
ST LUCIA: KEY INDICATORS OF THE BANANA INDUSTRY, 1990 – 2000

PERIOD	Banana Production (Tonnes)	Banana Exports To UK (Tonnes)	Banana Revenue From UK ($ECm)	Contribution to GDP (Factor Costs)	
				$ECm	Percentage
1990	135,367	133,777	186.9	97.7	10.3
1991	100,877	100,595	146.4	81.5	8.0
1992	135,291	132,854	184.8	102.5	9.1
1993	122,927	120,129	137.9	72.4	6.4
1994	90,909	90,119	115.7	58.4	4.9
1995	105,658	103,668	128.1	69.2	5.4
1996	105,547	104,805	125.8	55.9	4.3
1997	71,395	71,395	85.9	30.3	2.4
1998	73,219	73,039	91.7	34.1p	2.4p
1999	65,231	65,231	87.0	57.6p	3.8p
2000	70,281	70,281	82.3	55.6p	3.6p
Jan-March 2000	17,970	17,970	n.a	n.a	n.a
Jan-March 2001	12,383	12,383	n.a	n.a	n.a

Source: 1. Windward Islands Banana Development and Exporting Company
2. Government Statistical Office

2.7.3: Fisheries

Fishing is the other area of economic activity which grew significantly over the period. Fish landings increased at an average annual rate of 15 per cent over the decade. **Table 2.6** details. This represents a major turnaround from the five per cent rate of decline recorded over the preceding decade.

TABLE 2.6
ST LUCIA: ESTIMATED FISH LANDINGS (TONNES)

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Rate of Growth
573	1039	959	1114	883	983	1316	1312	1462	1718	1795	15%

Source: Ministry of Agriculture, Lands, Fisheries and Forestry

The sub-sector's contribution to gross domestic product, though small, increased from less than one per cent in 1990 to 1.6 per cent in 2000. Employment doubled between 1997 and 2000.

2.7.4: Tourism

Spurred on by Government policy thrusts as articulated in the Medium–Term Economic Strategy 1996-1998, tourism has been rapidly replacing banana as the main industry in St Lucia. As shown in **Table 2.7,** activity in the tourism sector has been steadily increasing over the period since 1990. Visitor arrivals (stay-over) grew at an average annual rate of 6.8 per cent between 1990 and 2000, while cruise ship passengers increased 15 per cent per annum since 1997. The contribution of "Hotels and Restaurants" to GDP also increased steadily, reaching a high of 14 per cent in 2000. Employment in this sub-sector increased by 26 per cent between 1997 and 2000.

As a further indication of the increasing importance of tourism to the economy of St Lucia, the number of available rooms increased by 95 per cent (to 3,986) between 1988 and 1996. Total visitor expenditure also doubled from $US134 million in 1988 to $US268 million in 1996.

TABLE 2.7
ST LUCIA: TRENDS IN TOURISM ACTIVITY

	Visitor Arrivals		Hotels and Restaurants		
	Stay Over	Cruise	Contribution to GDP		Employment
			$ECm	% of Total	
1990	148,714		91.3	9.6	
1991	165,987		105.0	10.3	
1992	183,937		123.9	11.0	
1993	200,886		114.5	10.1	
1994	223,872		139.9	11.7	
1995	236,883		149.7	11.7	
1996	241,232		193.9	12.6	
1997	253,369	319,256	181.2	13.6	5220
1998	257,530	381,020	190.7	13.6	5260
1999	270,836	394,148	205.5	13.5	5710
2000	285,422	487,550	219.4	14.1	6585
Growth Rate	6.8%	15%			8.2%

Source: Government Statistical Office

2.7.5: Natural Resource Profile: St Lucia

2.7.5.1: Climatic Conditions

The island of St Lucia is an archipelagic state in the Caribbean, lying at 140 N latitude and 610 W longitude. St Lucia experiences a typical tropical climate with the main seasonal variation of rainfall occurring between the wet (late May to mid-December) and dry (late December to early May) seasons; with minimal precipitation during the dry. There are significant differences spatially in the annual rainfall amounts, highest in the mountainous south-central part of the country but relatively dry in the coastal plains and valleys (Caribbean Conservation Association, 1991). Overall for St Lucia, as for most of the other islands, there are only small seasonal variations in temperature, and significant spatial variation limited to a very small and localised basis. The near constant temperature is between 23 degrees Celsius and 28 degrees Celsius. The prevailing wind system is the Northeast Trades with a dominant direction from the northeast in the dry season and from the east in the wet.

2.7.5.2: Coastal resources

St Lucia's coastal attributes are typical of the Caribbean—beaches, rocky shorelines, coral reefs, mangroves and sea grass beds. St Lucia's 18 mangrove sites cover a total of 179.30 hectares[13]. Most of the mangroves have been declared marine reserves, of which the Mankote mangrove is the largest.

Sea grass beds, common along the coastline, are more extensive on the east coast than on the west. The two most common species are Thalassia testudinum (turtle grass) and Syringodium filiforme (manatee grass). Halodule wrightii (shoal grass) are less abundant. Sea grass beds increase the productivity and the biodiversity of the island in general, but especially foster a rich marine and coastal fishery.

Not much information is available about marine and coastal biological resources specific to the coasts of St Lucia. The Biodiversity Country Report for St Lucia (1998) presents the various species lists (fish, corals and reefs), but notes "it is difficult to currently determine threat categories for marine and coastal species in St Lucia since few relevant studies have been carried out and very little monitoring of marine/coastal areas takes place".

Coral reefs are present along both the west and east coasts, but are more extensive along the east. The healthiest (most diverse) reefs are along the central west coast, off Soufriere. The Biodiversity Report (1998) lists 29 species of corals, 333 (ray finned) species of landed fish, which includes reef fish.

The species and species diversities of marine invertebrates—crustaceans, lobsters, crabs, echinoderms, sponges—have not been well studied for St Lucia, although they have been included in some Caribbean-wide surveys (various OECS documents, CCA Environmental Profile 1991; Biodiversity Report, St Lucia 1998).

The most common turtle is the green turtle (Chelonia mydas), while the leatherback (Dermochelys imbricata) is the least common. After increased restrictions on the traditional use

13 UN Statistical Yearbook 42nd issue 1997; Bacon 1993.

of turtle resources, a moratorium on turtles was finally declared in 1996. To protect turtle nesting sites and fish nursery grounds, the Government of St Lucia declared a number of marine reserves in 1986 and in 1990. The Fisheries Act (1984) and Regulations (1994) forbid extractive activities in these marine reserves.

The commercial fishery of St Lucia is artisanal with a wide variety of species being exploited. The fishery includes: shallow shelf and reef fish, deep-slope, large pelagics, coastal pelagics, lobster, sea urchins, sea moss, flying fish and turtles. The sea moss (marine algae) species harvested in St Lucia are Euchema sp. and Gracilaria sp. The nearshore environment functions as a nursery for juveniles of many species, the adults of which are exploited collectively. The major fishing ports/landing areas in St Lucia are Vieux Fort, Castries, Soufriere, Gros Islet and Dennery.

2.7.5.3: External and internal threats to the target resources

The activities affecting St Lucian coastal resources are typical of most of the Caribbean islands. They include over-fishing and illegal fishing, tourism/infrastructural development, improper waste disposal, excessive recreational use, farming, poor agricultural practices, deforestation, and sand mining. Illegal (sub-legal meshes, trammels, in marine reserves) and destructive methods by foreign and local vessels continue to plague the fish resources.

Tourism infrastructural development, which tends to be close to beaches, is growing. In addition to the generated waste products (sewage and solid), which enter coastal areas, destructive practices, such as clearing of mangroves, are often associated with tourism. Sewage pollution is a problem in St Lucia where many homes are non-sewered, and many sewage treatment plants not functioning. The UNEP (1995) report suggests that 46 per cent of sewage treatment facilities were in "good" condition while 54 per cent were in "poor" condition.

Fertiliser consumption figures for St Lucia were 7,000 metric tons for 1994/1995 (UN Statistical Yearbook, 42nd Issue, 1997). Water quality is poor in many coastal areas (CEHI 1996). The increased recreational use of coastal resources, driven by expanding tourism, has contributed to habitat degradation (and loss of biodiversity), and also perpetuated some social conflicts.

2.7.5.4: Impact on Coastal and Marine Resources of Tourism and Fisheries

The major implication of this spurt of growth in tourism and fisheries has been the impact on the country's coastal and marine resources. The Biodiversity Country Study Report argued that "the high demand for fish products and the rapidly growing tourism industry have resulted in a decline in the quality of coastal and marine resources"[14]. Continued "poor agricultural practices" inland have also been identified as contributing to this decline. The report cited "destruction of and encroachment onto coastal habitats and heavy exploitation of natural resources" among the foremost root causes of biodiversity loss in the fisheries/marine sector.

In 1995, Lorah et al, recognising the coastal resource degradation brought about by the "stresses associated with development and poorly managed growth", summarised the causes and effects of the major threats to St Lucia's coastal environment, as presented in **Table 2.8**.

14 *(Supra, Note 2)*

With respect to the mangrove areas, "uncontrolled use", mainly as a source of charcoal, and "indiscriminate dumping", have brought about degradation. So much so that, of the 14 mangrove areas covering some 200 hectares of St Lucia coastal land, only "two or three remain relatively intact" today. Sand mining has been identified as responsible for extensive damage.[15]

TABLE 2.8
CAUSES AND EFFECTS OF DIRECT THREATS TO ST. LUCIA'S COASTAL ENVIRONMENT

THREATS	CAUSES	EFFECTS
1. Resort Development	Growth of beach-oriented, high-density, high impact tourism sector.	Crowding, habitat destruction.
2. Destruction of Wetlands/Mangroves	Sites for landfills/dumps, charcoal.	Habitat destruction, degradation of resource base, aesthetic disaster.
3. Destruction of Sea grass Beds	Sedimentation, biocides, recreational boating.	Habitat destruction, declining numbers of fish, black sea urchins and turtles
4. Degradation of Coral Reefs	Over fishing, sport diving, pesticides, eutrophication, coral collection.	Habitat destruction, loss of fisheries and sport diving revenues.
5. Sand Mining	Sand used as an aggregate in the production of cement and masonry.	Beach loss, Increasing vulnerability to natural hazards, declining property values.
6. Depletion of Fisheries	Over fishing, poor management.	Average marine catch declined 1.3% per year in St. Lucia during the 1980s (World Bank 1993).
7. Municipal and Industrial Pollution	Discharge of municipal sewage, waste, operational and accidental releases of oil, dredging.	Increasing water-borne disease (typhoid, gastro-enteritis. World Bank, 1993), damage to marine communities.
8. Agricultural Run-off	Misuse and over application of highly subsidized pesticides and fertilizers.	Pollutes ground water and sea water. Harmful to human health and marine life.
9. Deforestation in Watersheds	Conversion of forest to agricultural uses; inadequate property rights/ tenure insecurity farmers; unsuitable logging practices.	Flooding of coastal lowlands, siltation, Increase in suspended sediments that limit photosynthesis of coral reefs.

Source: Lorah et al, 1995, Supra Note 2

15 (See Lorah, Paul, Dennis Conway and Ed Jackiewicz, December 1995)

2.8: Belize Country Case Study

Belize is located in Central America, bounded by Mexico in the north, Honduras and Guatemala on the western Caribbean coast. Belize's Barrier Reef is the largest coral reef in the Caribbean and the second longest in the world. (It extends 220 kilometers along the coast, and covers 22,800 square kilometers.) This diverse and well-developed reef ecosystem represents the last extensive and flourishing reef environment in the Caribbean (Wildes, 1992).

There are three atolls (ring-shaped volcanic reefs—Lighthouse, Glovers and Turneffe) outside the reef and over 1,060 cays (islands formed from coral/sand debris) between the reef and the mainland. The Belize Barrier Reef contributes to tourism (18 per cent the GDP) and fisheries (4.5 per cent of the GDP). Of Belize's 2.4 million hectares of territorial marine area, 6.9 per cent has protection status. Of this, less than 10 per cent is excluded from any extractive use (Programme for Belize, 2001).

2.8.1: Coastal Resources

The Belize Barrier Reef Reserve System (BBRS) is of great economic, ecological and social importance to Belize and was declared a World Heritage Site in 1996 with seven designated marine protected areas (MPAs).

The coast of Belize, with its numerous fringing reefs, patch reefs and the Belize Barrier Reef Reserve System form a range of habitats that support a high diversity of marine and coastal fauna and flora. The BBRS is rich in biodiversity—corals, fish, lobsters, conchs, known spawning banks, rich sea grass beds and nesting sites. They include over 600 species of reef fish, 247 kinds of reef flora (including sponges and sea grasses) and several species of reptiles (crocodiles, leatherback turtles, green loggerhead and hawksbill turtles). The BBR World Heritage Site is also home to 350 species of birds, 22 species of amphibians and 40 species of mammals including the endangered Jaguar (*Panthere onca*) and the West Indian manatee (*Trichetus manatus manatus)* (Programme for Belize doc. 2001). **Table 2.9** details further.

TABLE 2.9
BIOLOGICAL DIVERSITY IN COASTAL AND MARINE AREAS IN BELIZE (JACOBS 1998)

	Coastal		Marine	
Taxon	**Genera**	**Species**	**Genera**	**Species**
Fish	37	173	229	472
Invertebrates	29	45	296	456
Reptiles	17	124	5	7
Amphibians	6	22	-	-
Insects	152	240	-	-
Birds	128	177	34	47
Mammals	37	40	4	5
Plants	188	235	66	315
Totals	**594**			

Source: Belize National Biodiversity Strategy, 1998

Jacobs (1998a) suggests that, from qualitative data, it can be inferred that over 600 species of fish and 500 species of invertebrates may occur in marine systems of Belize. Only a relatively small number of these, however, have been positively identified. More than 317 reef species exist, with higher fish density on shallow reefs. The Coastal Zone Management Project (CZMAI Report 2000) says 65 coral species have been identified for Belize. *Montastrea annularis and Siderastrea radians* are common along the coasts. Dominant species at South Water Caye Reserve were *M. cavernosa, M. annularis, Agaricia grahamae, Diploria strigosa,* while at Glovers Reef it was *Montastrea, Diploria, Siderastrea* and *Porites, Agaricia sp.* and *Acropora cervicornis.*

Several studies are being carried out in Southern Belize involving fisheries and invertebrate surveys by the Smithsonian Institution and under the Caribbean Coral Reef Ecosystem Program—CORE. There have also been a number of independent studies by scientists and also from researchers of the University of South Carolina (on the mutton snapper at Gladden Spit).

Southern Belize's riverine and lagoon habitats are critical for the manatees *Trichechus manatus manatus*, while many of the cayes—Laughing Bird Caye, Southwater Caye, Coco Raye Silk Caye—are nesting sites for the turtles—*Chelonia mydas* (green), *Caretta caretta* (loggerhead), *Eretmochelys imbricata* (hawksbill).

2.8.2: External and internal threats to the target resources

Recently, the reefs of the Mesoamerican region have been subjected to natural and anthropogenic disturbances which have resulted in degradation. These include recent global occurrences (elevations in temperature), which caused the extensive, well-developed reefs on the Atlantic coast to experience massive coral bleaching and mortality (in 1995 and 1998), and increased frequency of hurricanes. Hurricane Mitch (1998) caused widespread destruction (State of the Coast Report 2000) and in 2000, Hurricane Keith (a high-category hurricane—135 mph winds) caused significant damage to land and coastal ecosystems. According to the State of the Coast Report (2000), "along the northern Cayes there was 40-48 per cent mangrove leaf loss and numerous uprooted trees". The increased siltation caused extreme stress to the corals by smothering them and reducing photosynthetic light; in addition, there was mechanical damage (abrasions and tissue damage) to the corals. Hurricane Mitch (1998) caused massive destruction by eroding sediment along the windward sides of Ambergris Caye, Caye Caulker, Tobacco and South Water Cayes, and destroyed portions of the Barrier Reef Reserve System (CZMAI Report 2000).

These events heavily impacted reefs from the Mexican Yucatan to Honduras with losses in coral cover of 15-20 per cent across the region, and as high as 75 per cent in parts of Belize. Combined with other pressures (over-fishing, increased coastal developments, agricultural and industrial run-off, deforestation, land-use and sewage pollution), the effect was to leave the coral reefs and associated ecosystems in a very vulnerable state.

2.8.3: Marine Protected Areas

In Belize, competitive use for resources has become very intense, because of rapid population growth, high unemployment and poverty. This has led to resource-use conflicts in many coastal

areas. Belize has attempted to manage the use of their threatened coastal and marine resources by the designation of marine protected areas (MPAs). Although Belize is a small, developing country, it is engaged in some major conservation attempts in the form of protected areas with various active organisations. Presently, there are 12 MPAs: the Corozal Bay Wildlife Sanctuary, Bacalar Chico Marine Reserve and National Park, Blue Hole Natural Monument, Glovers Reef Marine Reserve, Laughing Bird Caye National Park, South Water Caye Marine Reserve, Sapodilla Caye Marine Reserve, Port Honduras Marine Reserve, Gladden Spit Marine Reserve, Half Moon Caye Natural Monument, and Hol Chan Marine Reserve.

Half Moon Caye Natural Monument was established in 1982 (the first reserve to be created under the National Parks System Act (1981). Half Moon Caye is located at the southeast corner of Lighthouse Reef (most easterly of the atolls). It is famous for its Red-footed Booby (*Sula sula*) colony which has an unusual pre-dominance (almost 98 per cent of its total adult population) of a white colour phase. There are around 98 other bird species (frigate birds, ospreys, mangrove warblers and white-crowned pigeons). There are iguanas, lizards, and the beaches are known nesting sites for loggerhead *(Caretta caretta)* and hawksbill turtles (*Chelonia sp.*).

Hol Chan Marine Reserve was established in May 1987. It is in the northern section of the BBRS and is a "channel" or break in the reef which is about 15-30 feet deep. Hol Chan is rich in corals—*Siderastrea, Diploria, Acropora sp.*, various fish species and green moray eels. Within the Hol Chan Marine Reserve are three clearly defined zones:

1. The reef; no fishing/collecting; buoy moorings for use, entrance;
2. The sea grass beds; no spearing or netting of fish in the Boca Siega blue hole; fishing only under a special licence; and
3 The mangroves; plants and wildlife here cannot be collected or disturbed; fishing only under a special licence.

This MPA has effectively protected fish over the last 13 years, and there now appear to be more species, in greater abundance, and larger sizes of commercial species than in non-protected areas (Hol Chan Marine Reserve Brochure 2002).

2.8.4: External and internal threats to the target resources

The Belize Barrier Reef System is a fragile ecosystem because of the inter-connected ecosystems of the coastal area. As fishing and tourism industries in Belize expand, it faces a number of threats.

For the BBRS and coastal Belize, like the rest of the Caribbean, the natural threats are coral diseases, storms, hurricanes and global climate variations. Coastal developments for tourism—hotel construction, sewage and wastewater facilities, solid wastes, water sports/tourism activities, snorkelling and diving—also pose threats.

As do port and shipping activities—oil spills, pollution from hazardous cargo, collisions with manatees etc.

Other threats arise from the absence of land use plans, soil erosion from poor and unmanaged agricultural practices, inadequate waste disposal, industrial wastes entering the rivers, mangrove

clearance, oil spills, unsustainable fishing practices, indiscriminate killings and hunting, poaching, tourism and residential development.

Increased coastal development over recent years in Belize is not limited to residential but includes industrial (tourism) and agricultural (aquaculture industry—primarily shrimp farms) development. Tourism in Belize is the major industry, outstripping fisheries, forestry and agriculture combined. Associated with tourism are increased hotel/rooms, residential homes, visitors to protected areas, coastal development activities—dredging, pier construction, water transport traffic, generation of solid and liquid wastes including sewage. Natural disasters such as Hurricane Mitch caused thousands of fish and lobster traps to be lost. The fisheries sector estimated a loss of over Belizean $1.2 million (Santos 1999). Weyman and Graham (2000) reporting on the fisheries of Southern Belize state that:

- The global and local fisheries resources are in a state of decline;
- Fishermen are working harder and landing less fish;
- Marine environments are being degraded by upland pollution, destructive fishing gears, anchor impact and increasing coastal development;
- Prices of gasoline, boats and fishing gear are increasing.

In Belize there are five types of sea grasses: turtle grass (*Thalassia testudinum*) which is most dominant; the manatee grass (*Syringodium filiforme*); shoal grass (*Halodule wrightii*); midrib sea grass (*Halophila baillonis* and *Halophila beaudettei*) and two Caribbean species. In the Caribbean, Belize has the largest population of the Antillean manatee, which is a subspecies of the West Indian manatee (*Tricheus manatus manatus*). The manatees live in salt and fresh waters in sea grass areas. The manatee population is small, less than 900 (CZMAI 2001) and considered threatened although they are protected (the Wildlife Protection Act No 4 1981). The manatee monitoring programme affords the CZMAI a database from which they are able to assess population changes after natural or anthropogenic disasters.

2.9: Incidence and Characteristics of Poverty in Belize

The Belize Country Poverty Assessment of 1996, using a per capita measure of poverty, reports that 33 per cent of the population and 25.3 per cent of the households were below the poverty line. The monthly poverty line was estimated at $105.82. This estimate places Belize's levels of poverty second only to Guyana's in the CARICOM region.

The incidence of poverty was assessed for each of Belize's six administrative districts. It varied from Toledo and Cayo, the poorest with 57.6 and 41 per cent of the population poor, to Belize and Stan Creek, with 18.6 and 16.1 per cent of the population poor. The lowest degree of inequality exists in Stan Creek with a poverty gap of 4.9, and the highest in Toledo with 21.8. Poverty is greatest in the southern part of the country.

The youthfulness of the poor, noted for St Lucia, is even more pronounced in Belize. Here, some 53.5 per cent of the poor are below the age of 14. In part, this high incidence of youth among the poor is a feature of the population structure itself. In Belize, 46 per cent of the population is

below the age of 14. Nonetheless, it is higher-than-average levels of fertility among the poor that have produced this preponderance of youth in a state of deprivation. Only 41 per cent of the non-poor population fall below the age of 14 years. Women constitute 49.5 per cent of the poor.

The association between unemployment and poverty is definite in Belize. Here, 27.7 per cent of the poor are unemployed, as opposed to 15.5 per cent of the non-poor. Unemployment among the poor was much higher in the urban than in the rural areas. The unemployment rate of the urban poor was 41 per cent, whereas it was 21 per cent among the rural poor. This compares with the urban non-poor who had an unemployment rate of 22 per cent and the rural non-poor with a rate of 15 per cent. The urban poor are mostly involved in the construction, wholesale/retail, and manufacturing industries. The rural poor earn their livelihoods through farming and fishing.

2.9.1: Gender and Poverty in Belize

The Gender-related Development Index (GDI) and the Gender Empowerment Measure for Belize are 0.755 and 0.496 respectively. The former measure is based on life expectancy, literacy and average income. It places Belize in position 59 in a ranking of 146 countries, and seems to suggest that, in global terms, a fair measure of discrimination against women exists in Belize.

Further, recent gender-sensitive research is said to have pointed to the existence of "inequities" related to "socio-political traditions" and the functioning of institutions that disenfranchise women in a systemic way.[16]

In the labour market, women are confined to a limited range of occupations and they find it more difficult to obtain employment than men; uncertified women are likely to have a particularly difficult time obtaining employment.[17]

Married women must have the sanction of their husbands to obtain loans from financial institutions; women are required have a man in the community as guarantor for any loan they might obtain.[18]

If women are owners of land, this provides them with some measure of autonomy. But they are less likely to inherit land than men, and experience greater difficulties than do men in obtaining land from government.

By social convention and cultural tradition, women are discouraged from going to sea to fish or dive for seafood. As one fisherman put it, "The woman's place is to be in charge of the domestic."

Although GDP in Belize has grown impressively in recent years, the poverty assessment exercise revealed levels of poverty that are high by Caribbean standards. If Belize's problem of inequitable distribution is to be addressed by providing better pay and employment practices, that is not necessarily helpful to women. For women are less likely than men to get jobs, tend to get the less well-paid jobs, and to be paid less than men for the same work.

16 *National Gender Policy: Belize, July 2000*
17 *Carolyn Reynolds, Women's Issues Network of Belize.*
18 *ibid*

MAIN FINDINGS

ST. LUCIA

MAIN FINDINGS

St Lucia

3.1: Introduction

This chapter begins summing up the main findings of the study in the two case-study communities in St Lucia and Belize with those specific to St Lucia. Chapter 4 does the same for Belize. Finally, Chapter 5 addresses the generic lessons and new knowledge products from all four communities in both countries.

St Lucia-specific Case Study

3.2: Summary Population Profile—Praslin and Anse La Raye

Praslin has a population of some 500, while Anse La Raye, the larger of the two selected case-study areas, has a population (2001 census) of 1,877. Some 54 per cent of the population are under 25 years old, but the corresponding ratio for the official labour force is about 27 per cent. This suggests either relatively high youth unemployment and non-participation in the labour force, or engagement of young people in their own unofficial livelihood activities. Only 19 per cent of the population has attained education above the primary level.

3.3: Natural Resource Profile of the two St Lucian Case-Study Communities: Praslin and Anse La Raye

Praslin is one of the most productive bays in St Lucia (Fisheries Dept 1997) because of the interactions of three ecosystems—mangroves, sea grasses and the coral reef.

3.3.1: Praslin Coral Reefs

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 source 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.

3.3.2: Sea grass Beds

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.

Praslin shares its coastal resources with other communities: Dennery for reef fish, pelagics, lobsters, sea urchins etc. Praslin fishers use the Dennery Bay landing site and storage/marketing facilities.

3.3.3: Praslin Mangrove

Praslin has a beach length of 243 metres, with the extent of sandy area, approximately 650 square metres, on the fringe of the Praslin mangrove which covers about 17.35 hectares—hardly any change between 1985 and 1997 (OECS/NRMU, 1999). The red mangrove (*Rhizophora mangle*) is dominant. Bordering vegetation consists of manchineel, shrub, grass, buttonwood (*Conocarpus erecta*) and some white (*Laguncularia racemosa*) and black mangrove (*Avicennia germinans*) (OECS/NRMU, 1999). The beach is used for recreation by the community, for pot and spear gun fishing and as a small fish landing site. Pirogues are moored here, and the beach is also used by the sea moss farmers during cultivation.

Praslin Mangrove is a declared marine reserve under 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 (Marine Reserve 1986), the Praslin mangrove areas continue to be encroached upon by banana growers (Biodiversity Report 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.

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.

3.3.4: Marine algae

Sea moss or marine algae species—*Eucheuma sp.* and *Gracilaria sp.* are being farmed in Praslin Bay. Approximately 25 sea moss farmers engage in this activity.

3.3.5: Water quality

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 (SLNT Census Results 1994). Much solid waste is also running off into the waters here.

3.3.6: Anse La Raye: Beach Front

The village of Anse La Raye is on the central west coast of St Lucia. The Anse La Raye beach is 418 metres long, with approximately 8,045 square meters of sandy area. The beach is used for recreation and landing fish, with the bay being used mainly for net and pot fishing (OECS/NRMU 1999). The beach is a known nesting site for turtles and there are reef patches in the bay (Biodiversity Country Report for St Lucia 1998).

3.3.7: Anse La Raye coral reef, coastal and marine area, sea grass beds

The Anse La Raye coastal and marine area forms part of the Canaries-Anse La Raye Marine Management Area (CAMMA), which is a rich coastal area due to the interconnected ecosystems of coral reef with patches of sea grass beds. There are no mangroves proximal to the area. The area supports, among others, groupers, wrasses, snappers, grunts, squirrelfish, goatfish, boxfish and surgeonfish. Lobsters and conchs are also abundant in the area as are other coastal pelagic fish species (small jacks, ballyhoo and sardines) and migratory pelagics (wahoo, dolphinfish, king mackerel and swordfish).

Anse La Raye is a known turtle nesting site for the more abundant species *Chelonia mydas mydas* (the green turtle).

3.3.8: Anse La Raye water quality

Coastal water quality is generally poor in Anse La Raye; raw sewage has been observed entering the area. No recent surveys have taken place, but CEHI (1994, 1995) reported on high levels of faecal coliform in the area. The latter is due to the waste disposal practices: raw sewage (night soil) is disposed of directly into the bay and into the Anse La Raye river. The Anse La Raye area is drained by the Grande Riviere de Anse La Raye (8.9 square km) and the Petite Riviere de Anse La Raye (5.7 square km) catchment areas. The former is potentially at risk from agricultural practices—pollution, extraction of water, sedimentation. (See Categories of Pollution in Stream Biota in St Lucia Biodiversity Country Report 1998:p.317).

3.4: Poverty profile in the case-study communities

As a result of the preponderance of (unemployed) youth in their population, the circumstances of the two case-study communities resonate with the national profile of poverty in St Lucia.

Praslin is the more agricultural. Anse La Raye is more spatially compact and closer to the urban capital, Castries. Census data for 2001 indicate that some 50 per cent of the houses in Anse La Raye depend on a public standpipe for domestic water. In Praslin, the respective proportion is five per cent. As much as one third of the houses in Praslin are of concrete as opposed 12 per cent in Anse La Raye.

Both communities display signs of the downturn in the wider macro-economy. The downturn in export agriculture has obviously had a negative impact on Praslin, but affected Anse La Raye less since it is less agriculturally oriented. As long ago as 1981, for example, Carnegie described Anse La Raye as relying heavily on non-agricultural income sources. She cites remittances as a major source of income for this district.[19]

3.4.1: Anse La Raye

Anse La Raye had a population of 1,476 (711 males and 765 females), according to the census of 1991. The population was spread across 462 households. In 2001, the population of the village had grown to 1,877 persons. This amounts to an annual growth rate of 2.4 per cent.

The population below 25 years old constitutes 52 per cent of the total. As much as 43 per cent of the total population of the village is either below 15 or over 65. This results in a high dependency ratio of 75 per cent.

High levels of fertility in this population are attested to by the relative size of the age groups 0-4 and 5-9 which are, respectively, the first and second largest age cohorts in the population. In low-fertility populations these two age groups would be smaller than the others.

According to the 2001 census, 72 per cent of the labour force had attended primary school only. More tellingly for socioeconomic status, 85 per cent of the heads of household had not gone beyond primary school in their formal education. Some 21 per cent of the labour force was unemployed. An equally important indicator of economic distress is the proportion of the working-age population outside the labour force. Among the young and able-bodied this is often an indication of frustration and discouragement.

According to the Poverty Map constructed using 1991 census data, the districts of which both communities are a part are the poorest in St Lucia. Both districts are ranked as “extremely poor”. Within the district, both communities rank “bad” on a socioeconomic scale that ranges from “very good”, through “good”, “fair”, “bad” and “very bad”. The scale represents an index based on the possession of social infrastructure and other indicators of living conditions

3.5: Main Livelihood Practices in Praslin and Anse La Raye

The two communities share, at one level, the livelihood practices of farming, fishing and incipient tourist industries. There are some differences: sea moss is a relatively significant activity in Praslin; Anse La Raye has developed a dynamic Friday fish-night, which often attracts more people than are resident in the community. Further details are now provided below.

[19] *Carnegie, C, September 1981*

Both communities report declines in the stock of fisheries due to pollution of the immediate coastal waters, but Anse La Raye, with its greater traditional dependence on fishing and seemingly higher levels of marine pollution, appears to have suffered more in this regard. The CEHI report of 1996 tells of high levels of faecal coliform in the coastal waters due to waste disposal practices in the community. In Praslin, better waste disposal systems exist and mangroves act as natural protection against pollution.

Both communities have also been affected by downturns in the tourism industry associated with global political and economic changes.

Praslin, with its stronger tradition of farming, more clearly demonstrates the practice of occupational multiplicity than does Anse La Raye.[20]

3.5.1: Anse La Raye

Historically, the coastal environment has played an integral role in the livelihood strategies of the people of Anse La Raye. Fishing has always been important in the life of the community. More recent evidence suggests that, at least from the early part of the 20th century, the members of this community relied heavily on fishing as a source of livelihood.[21]

Currently, the economy of Anse La Raye is based on farming, fishing and cultural tourism. Of these, the last two involve direct use of the coastal and marine environment. Farming, on the other hand, is related to the coastal environment in a less immediate way. Given the small size of the island, inland agriculture affects the coastal environment through the run-off into the sea of chemicals and topsoil. The best known expression of cultural tourism is a Friday evening fish-fry attended by people mainly from outside the community, who buy the fish meals prepared by local vendors.

Accounts differ of the number of community people who earn their living from fishing. Official records indicate some 100 licensed fishers in the community. A veteran fisherman, however, reports that 300 persons go to sea on a regular basis. The discrepancy probably arises because many of those who go to sea do so as a part of an occupational multiplicity strategy, and therefore are not officially recognised as fishers. Numbers fluctuate, depending on the state of the wider economy. In effect, the natural resource-based livelihoods act as a kind of “shock absorber” for the formal economy.

3.5.2: Praslin

Farming exists but banana production has virtually disappeared.

3.5.2.1: Fishing

At Praslin, there are 21 registered fishing vessels—14 pirogues, six canoes and one transom (Fisheries Dept 2000). There are 52 full-time and 20 part-time fishermen registered for Praslin.

20 See interviews with Praslin residents in Annex Chapter 6.
21 See excerpt from interview with Mrs James in Annex Chapter 7)

3.5.2.2: Agro-industry

One significant agro-processor in Praslin buys product from area farmers, providing a good example of linkages.

3.5.2.3: Eco-tourism

A trained tour guide serves as an agent for the St Lucia Heritage Tourism Authority and some residents are used as tour guides on nature trails.

3.5.2.4: Sea moss cultivation in Praslin: Case study

Sea moss represents an interesting new product developed within the community in recent years. 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".[22]

The traditional activities were cited as sources of increasing threat to aquatic and terrestrial bio-diversity. Emerging alternatives, however, have remained marginal to date, and are in dire need of both technical and financial support, if they are to provide the economic incentive to effect a shift of the many producers away from traditional livelihoods.

Tenure, rights of access and security were also identified as key issues to be addressed if successful promotion of the alternative strategies is to be achieved.

Sea moss cultivation in Praslin started about three years ago with the support of CANARI, utilising a plant species imported from Belize. Praslin's sea moss cultivation is generally recognised as more advanced and better organised than a similar project in Point Sable which has been in existence for some 20 years. The activities in Praslin present a greater potential for progressing into an economically viable alternative livelihood strategy that can be the mobilisation point of related activities on the island.

In Praslin, the cultivation, processing and marketing of sea-moss are promoted and managed by a co-operative—the "Praslin Seamoss Farmers' Association". The co-operative is made up of some 20 members registered as sea moss farmers, ranging in age from 25 to 50. Eight of the registered farmers are women with an additional three women operating farms for which their husbands are the recorded members.

The co-operative approach appears to be pursued only with respect to the processing and marketing activities. "Gel", an intermediary product of the processing activity is sold in bulk to the St Lucia Distillers and the co-operative markets a variety of flavoured, sea moss-based bottled drinks.

Institutional problems clearly affect the farming and harvesting levels. First, not all existing farmers are members of the association and those who are not experience difficulty in marketing their product. At the focus group session one farmer indicated that he had nine bags of harvested sea moss sitting at home unsold for as long as 18 months.

22 *"Nature Conservancy", April 29, 2002.*

Moreover, the view was expressed that the association was not really a co-operative since it is made up of individual and independent farmers. This suggests that even among members of the association, the co-operative approach is not pursued at the cultivation levels. The focus group was generally of the opinion that the association had become stagnant upon achieving some success with its venture into processing.

Farming and Harvesting

A detailed look at the economics of the vertically integrated operations of the co-operative suggests that the farmers who are members of the Association are quite prepared to return zero profits on the farming and harvesting end, in direct subsidy to processing, from which they each can eventually earn a share of the profits.

An average farm consists of 17 growing lines each 21 feet long capable of producing 77 kilograms of sea moss (4.5kilogram/line) in one harvest. With 20 farmers this suggests a total production per harvest of 1,542 kilograms.

Cost of production is estimated at $7.26 per kilogram—$1.36 (19 per cent) of which is accounted for by the purchase of planting material. Infrastructure and operational costs are therefore relatively high—some 81 per cent of total. The harvested sea-moss however, is sold to the processing plant at the same $7.26 per kilogram—suggesting zero returns to the farming end of operations. Only one farmer operates a farm large enough to enjoy economies of scale and return a cost of production of approximately $5.90 a kilogram.

The implication here is that potential exists for reducing production costs through collective or co-operative purchasing of both planting and infrastructure materials, as well as the sharing of other overheads that can bring about greater scale benefits to all the member farmers. This potential, and its implications for the institutional shortcomings cited above, need to be explored further with a view to uptake promotion.

Processing

The processing plant engages in three activities: drying, boiling and extracting, and blending and bottling of sea moss-based drinks.

(1) Drying

The co-operative recognises that current open-air drying is less than efficient and a source of major problems particularly during the wet season. Plans are in train and funding being sought for the construction of a “housed” drying plant utilising more modern techniques. Land, available at a rental of about $200 a year has already been identified. Technical assistance would be required with respect to the design of the plant as well as selection and acquisition of equipment.

(2) Extraction

Extraction effected through boiling converts the raw sea-moss into a gel that is produced at varying levels of viscosity. At an average level of viscosity (8.06 gallons of gel to one kilogram of sea moss), one gallon of finished gel weighs about 4.3 kilograms.

The cost of production of gel (assumed to be inclusive of the cost of purchase of sea-moss from the farmers) is estimated at $13-14 per gallon or $3.02-$3.26 kilogram. All the gel is sold to St Lucia Distillers (SLD) at $4 per kilogram, as quoted by SLD, generating a profit to the extraction process of at least $0.74 per kilogram of gel. (The Praslin Farmers' Association quoted the price at which the gel is sold to SLD at approximately $15 per gallon i.e. $3.49 per kilogram – suggesting levels of profit as low as $0.23 per kilogram).

SLD, which utilises the gel to produce "Z-moss" an alcoholic drink based on sea moss flavoured with coconut, argues that the price paid for gel is high, constituting some 50 per cent of their production costs. Moreover, while no specific information was forthcoming, the company claimed that quotations received indicated that gel can be obtained from Dominica, St Vincent and even Indonesia at cheaper prices. This clearly suggests the need for detailed expert examination of the potential for more cost effective operations at both the farming and processing levels at Praslin.

Currently, the St Lucia Distillers purchases 920 kilograms of gel from the Praslin Plant every six weeks from which 1,600 cases of Z-moss (7,948 litres) are produced. This is equivalent to 1,067 cases (5,299 litres) a month, the bulk of which, 1,000 cases (4,968 litres) is exported monthly to Barbados.

SLD claims that the potential exists for expansion of exports of Z-moss to Canadian and English markets, generating as much as three times the current levels. A potential of 3,000 cases (14,900 litres) of Z-moss suggests a requirement of 1,725 kilograms of gel on a monthly basis. With a storage capacity at the Praslin Processing Plant of 1,600 gallons (approximately 6,880 kilograms), the managers believe they can effectively supply all the future requirements of the St Lucia Distillers.

It should be noted here that the Nature Conservancy recommended that the Praslin Processing Plant can be the nucleus of a central facility that sources raw sea moss from other areas of the country in particular Point Sable. The need for an additional boiler has also been identified.

Sea moss-Based Drinks

The Praslin Processing Plant produces and markets a variety of sea moss-based bottled drinks. Bottles are sourced from Miami and labels from Trinidad and Tobago. No details of cost of production or potential returns have been forthcoming in this regard. Both the managers of the Plant and the St Lucia Distillers, however, argued that significant potential exists for expansion into a number of sea moss-based products, including ice creams, desserts, fudges, jams and jellies.

St Lucia Distillers identified the St Lucia Livestock Development Company facilities, in existence for over 25 years, as capable, with little modification, of processing (including pasteurisation) and packaging of sea moss-based drinks. Carton-type packaging can be used. This potential needs to be technically explored further with all stakeholders, including the Ministry of Agriculture.

Funding
To date, the Praslin Farmers' Association has benefited from limited funding sourced from the St Lucia Rural Enterprise Project (SLREP) which financed the acquisition of labels for the bottled drinks. The Poverty Reduction Fund participated in financing the construction of the building that houses the processing plant.

Significant levels of funding are required for:

- Establishment (including equipment) of the proposed "housed" drying plant;
- Acquisition of an additional boiler;
- Acquisition of the equipment and facilities for producing and marketing the proposed new sea moss-based products.

Equally important, however, is the need for expert technical assistance at all levels of the operations being promoted by the Praslin Co-operative as a viable alternative livelihood strategy. Such assistance is needed to address questions of the rights of access and formal leasing of farmed areas, as well as security and protection from natural events such as rough seas, fresh water incursions and sea-weed spores. Technical assistance for institutional capacity building is also crucial.

St Lucia Distillers argues that the need for a national vision on the development of sea moss-based economic activity, and greater institutional proactivity particularly on the part of the Ministry of Agriculture.

3.6: Main Livelihood and Related Issues in Both Communities

3.6.1 Anse La Raye

Anse La Raye, the larger community, is closer to the capital and employment opportunities. As a result, not all of the residents of this community depend on the natural resources of the area for their livelihood. Many commute to work daily in the capital region. The main livelihood practices in this area are also farming and fishing together, with the famous Friday night fish fry. There also is an incipient handicraft industry.

3.6.1.1: Fishing

There are contradictory perspectives on the reality of fishing in the village. The fish fry vendors claim that they cannot obtain fish from the resident fishers as a result of a virtual abandonment of the trade, while fishers present at the focus group meetings deny this. The fishers also report on a conflict with tourist divers who sometimes release the fish in their pots. Need was also expressed for a functional jetty.

3.6.1.2: Fish Fry

This, as noted earlier, is a major recent livelihood practice which draws significant clientele on Friday nights. Among issues to be addressed to sustain this livelihood practice are the need for water, toilet and parking facilities. Incipient conflict has developed with parallel activities on Friday nights, involving young people from the community.

3.6.1.3: Infrastructure

This is a significant problem in the community, to the extent that a relocation plan has been drawn up but is reported to be mired in controversy over the distribution and cost of upland sites. Sewage and solid waste disposal are yet another problem.

3.6.1.4: Pollution

Pollution comes both from upstream sources (agriculture, deforestation, waste disposal) and from in-situ waste disposal.

3.6.1.5: Financing

There was a clearly expressed need for financing of fishing including cold storage facilities and facilities and also for training in offshore fishing techniques.

3.6.2: Praslin: Main Issues

3.6.2.1: Fishing

Another need identified is for storage facilities for catch, for addressing pollution in the coastal waters and for combating vandalism of gear and fishpots.

3.6.2.2: Sea moss cultivation

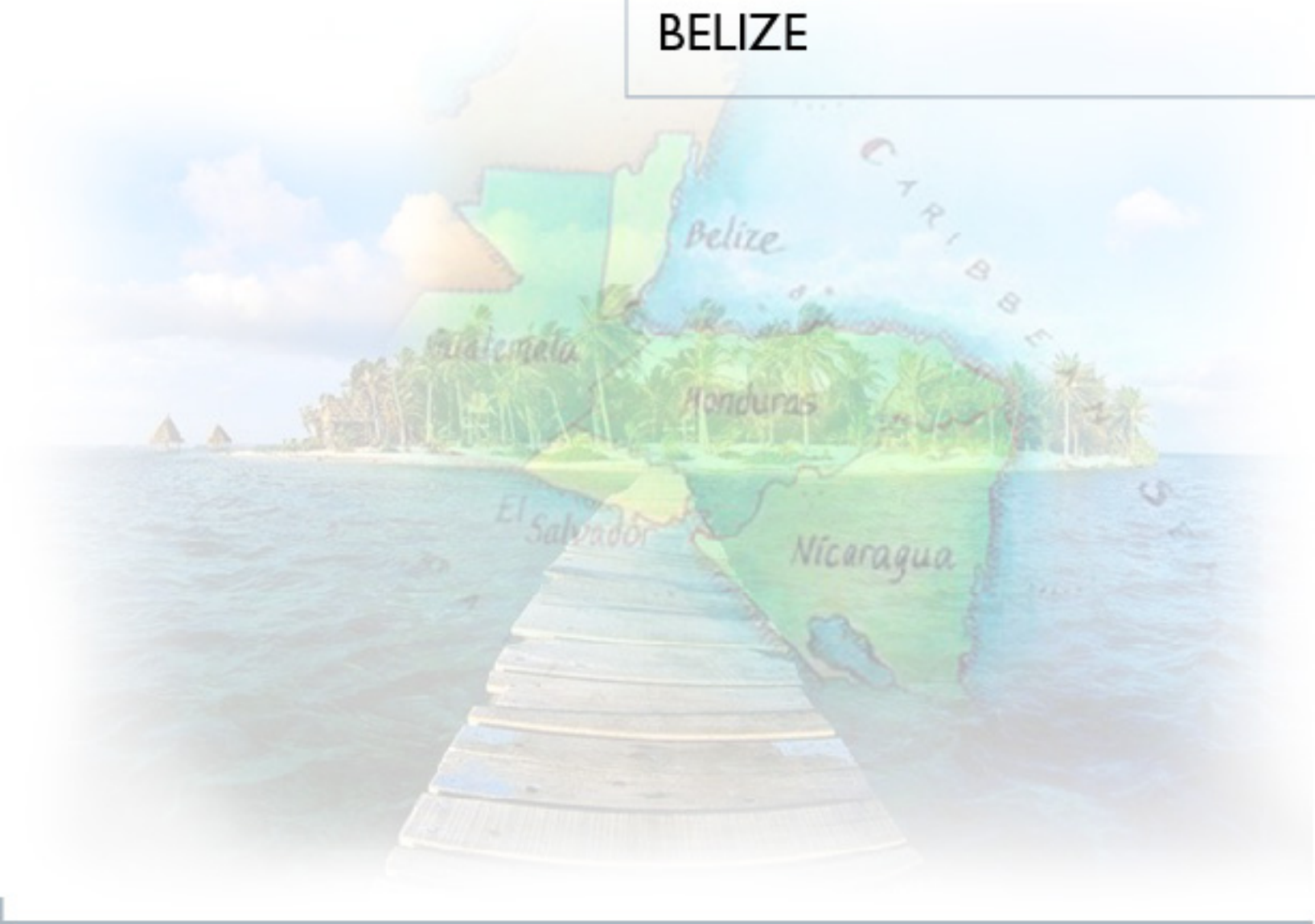
Marketing, provision of inputs, technical assistance for quality control are other concerns. Sea-moss producers complained about problems of marketing their product including availability of bottles and labels.

3.6.2.3: Credit Access

Concerns about credit access were linked to the problems of land ownership.

MAIN FINDINGS

BELIZE



MAIN FINDINGS

Belize

4.1: Summary Population Profile of the two Case-Study Communities in Belize: Sarteneja and Hopkins

As in the case of St Lucia, the two selected communities were of relatively different population sizes. Sarteneja in the north has a population of some 1,700, and Hopkins 1,003.

4.2: Natural Resources in communities

4.2.1: Sarteneja and Hopkins Coral Reef, Coastal and Marine areas

The coastal villages of Hopkins and Sarteneja use various areas of the productive ecosystems of Barrier Reef for their livelihoods. They fish in a variety of habitats—in the sea grass beds for conchs, on the reefs and elsewhere for lobsters, and along the marine and coastal areas for finfish—barracuda, bonefish, groupers, jacks etc. Livelihood practices are very different, however, for the two communities. There are no detailed scientific data on resource assessment in terms of declining stocks, but some coastal and marine species—conchs, groupers and manatees—have been listed as "threatened" (CSO 1999, Table 32A). The coral reef monitoring programme affords the CZMAI a database from which to assess changes to the coral reef after natural or anthropogenic disasters.

4.2.2: Sarteneja and Hopkins Water Quality

The water quality monitoring programme was established in 1992 by the CZMAI. This affords a database from which the CZMAI can now make assessments of changes to coastal water quality after natural or anthropogenic disasters. Little information has been published on water quality for Sarteneja and Hopkins. However, observations suggest that land run-off (eg. sewer outfalls) may be contributing to contamination of the coastal waters at both villages.

4.3: The Case-Study Communities: disparate traditions

In terms of historical political economy, Belize can be roughly divided into a northern region stretching from the Mexican border to what is now Belize City, and a southern region from that point to the border with Guatemala. Relative to the north, the southern part of the country has suffered neglect, especially in the areas of economy and social infrastructure. Thus, although both case-study areas are poor, remote rural communities, there are significant differences in terms of the regional political economy of which they are a part.

From the early historical period up to the first half of the 20th century, the main forms of economic activity were concentrated in the northern part of the country. A plantation-type economic organisation facilitated the exploitation of sugar and mahogany from this region. The forms of economic activity, social and infrastructural development and of integration into the wider global economy associated with this type of economic development were therefore a feature of the development of the northern section of the country.

These included the development of roads, schools and hospitals and the incorporation of the workforce into hierarchically structured wage relationships. The southern section of the country, on the other hand, experienced far less of this type of development. This type of polarised economic development is not peculiar to Belize. Langdon, describes a similar pattern in parts of Africa.[23]

Belize is a multi-ethnic country. Sarteneja on the northern coast and Hopkins in the southern coastal region are representative of two of the main historical-cultural traditions of the northern and southern regions of the country—the Mestizo and the Garifuna. These two ethnic groupings have played a prominent role in fishing in the country. Their distinctive values and cultures have been associated with patterns of involvement with the marine environment that are quite distinctive.

Garifuna refugees fleeing political turmoil in Central America established Hopkins in 1940. The historical tradition of the Garifuna, in Belize, though, predates this by at least a century. The Garifuna, or Black Caribs, are originally from the Caribbean island of St Vincent. They are the descendants of Carib and Arawak Indians and runaway West African slaves. In keeping with the political economy of the southern region and their own cultural traditions, they developed a subsistence-type economy and social organisation based on the resources of the land and sea.

This approach to the exploitation of the natural resources has shaped to a large extent the ways in which this community has undertaken fishing as an economic activity. Fishing for these people has been, first and foremost, an integral part of their survival strategy, and quite independent of the need for economic gain. Historically, it has represented the reaping of the providence of nature to satisfy basic nutritional needs.

Of course, with the modernisation of the society and the increasing monetisation of the economy, income earning becomes an imperative. Even so, the Garifuna who now engage in fishing seem to do so in a less commercial manner. Fishermen in this community are reported, for example, to go to sea only when they are “out of cash”, but not on a regular and systematic basis.

Sarteneja belongs to a markedly different cultural, historical economic tradition. This community was established in 1854 by Mexican Mayan peoples fleeing persecution by the Spaniards in Mexico. Culturally, it is in many ways closer to Mexico than Belize. Nonetheless, the people are Belizean in their national orientation.

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23 *Langdon, 1999.*

Their interface with the commercial activity in the north of the country was associated with the development of a monetised economy quite early in their history. They moved from the sale of natural and agricultural produce to the development of fishing as their main commercial activity, in a way the Garifuna in the south never did.

Their fishing activity is not conducted in the immediate waters of the village. Rather, they utilise the marine resources stretching along the entire coastline of the country. Taken together therefore, the two disparate cultural traditions that we have described comprise much of the sociocultural traditions of the Belizean fishing industry.

4.4: Sarteneja

Sarteneja has the higher fertility rate of the two communities. In Sarteneja the total fertility rate is 5.3. In the case of Hopkins the rate is 3.8.

The disproportionate share of the population total held by the age groups up to age 14, in Sarteneja, is an indication of high fertility levels and the heavy dependency burden borne by the population of working age. Higher fertility rates in Sarteneja are related to the earlier age of marriage in this community.

Population growth in Belize is an interesting issue since the country is obviously underpopulated in terms of the existing overall land resources. However, much of this land resource is unavailable to the local Belizean population. This means that, relative to available land resources, the country is overpopulated.

4.4.1: Labour Market Characteristics

Census data indicate that the adult members of the community are not well equipped to function in the labour market. Some 94 per cent of the population had only gone as far as primary school. Of these, only 18 per cent had managed to attain a school-leaving certificate. It points to the economic vulnerability of the community, the constraints that face them in their search for alternative livelihoods. This factor explains the heavy reliance on natural resources in their livelihood strategies. Often, persons outside the labour force are really discouraged workers, a high proportion of whom are women. (See **Table 4.1** for further details)

TABLE 4.1
LABOUR MARKET FEATURES OF SARTENEJA

	Sarteneja
% of Labour force with up to primary level education	94% (18% with Primary School certificate
Unemployment rate	14%
% of persons outside of the labour force who are female	82%
% of population less than who are less than 15 years of age	43%
% of population that is of working age	52%

Source: Belize Population Census, 2000/2001

4.4.2: Fishing and Livelihoods in Sarteneja

Fishing is the major economic activity for the people of Sarteneja. "Sarteneja is fishing and fishing is Sarteneja. Without fishing there is no Sarteneja," they say. The community originally made its living from the land through the sale of fuel wood and agricultural produce transported by boat to Belize City. About a generation ago, that activity declined and was replaced by fishing. At first, in the mid 1950s, this took the form of trap setting and line fishing, which was replaced by diving for conchs and lobsters.

In the early days livelihoods were made through a combination of fishing and farming. Today, one fisherman estimates, only 25 per cent of the fishermen of Sarteneja are also involved in farming. In the past, sail boats were used exclusively for sea transport. Today, these have been supplanted to some extent by "skiffs", or fibre glass motor boats. There are some 150-200 boats in the village and these are each manned by an average of five persons. Estimates of the number of fishermen in Belize range from 3,000 to 3,500. Fishermen from Sarteneja make up as much as one third of this number.

The sea as a source of subsistence

Fishing as a means of subsistence has declined significantly over the years, replaced by fishing as a commercial activity. Nonetheless, seafood is an important source of protein for some families. Community members estimate that it costs about $30 per day to provide basic nutrition for a family of six. Knowledgeable observers living in the community estimate that a small number of families, who are not able to obtain a daily source of animal protein such as fish or chicken, eat instead, corn tortilla or some such starchy staple. These persons, they suggest, only get this kind of food on the weekends. Increases in the cost of living make it impossible for them to afford basic foodstuff.

Some families consistently do not pay the school and exam fees of $3.50 per term. Four per cent of the children five to 14 suffer from extreme hunger. The major cost of living expense is said to be food.

4.4.3: Pattern of use by the poor of the marine environment

Environmental and socioeconomic structural constraints have brought about a heavy dependence on the sea for livelihood in this village. Geographical remoteness, the absence of any other major commercial activity to provide employment, and a broader macroeconomy dominated by primary economic activity, go a long way in explaining the villagers' dependence on the sea. In addition, limited education, limited access to credit, and a system of land tenure that alienates 80 per cent of private land into the hands of foreigners[24] are the other factors in this outcome.

Lack of access to financial capital prevents the fishermen from investing in fishing, and limits their ability to develop new economic activities. Compounding the factor of low education levels is the fact that the traditional language of the village is Spanish as opposed to the more commonly spoken English in the rest of the Belizean society. The result is to limit the range of labour-market options and the ability to interact with and make demands upon government institutions that regulate the marine environment.

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24 SPEAR, 2000

4.4.4: Estimates of the 'catch'

Fishing is thus the main labour-market activity for the village. Young men enter into it enthusiastically as a means of immediate income. They do so, in the main, via their family network. Each catch has to be divided between the boat, the captain and the men on the boat. Fishermen are at sea for nine months of the year. One fisher reports that he fishes for "fin fish" six months, and conch and lobster during the other three. Another, of 20 years experience, says he is at sea eight days out of every 14.

According to this fisherman, in the first two trips of the season, each fisherman will catch about 80 pounds of lobster after eight days. The boat will therefore have 400 pounds, if there are five crew members. Subsequently, the size of the catch declines to about 20 pounds per fisherman per trip. Yet another reports 600-700 pounds of fish caught each week. One fisher reports that when he goes with the sailboat he goes off in his dorrie and dives from 8 am to 3 pm. each day for 12 days. Each day they pay the boat one pound of lobster. They catch about five pounds of lobster each day. Hurricanes, he suggests, do most of the damage to the fishing activity. Since Hurricane Mitch in 1997, he reckons that there has been a fall in seafood stock due to the destruction of the lobsters' habitat.

One fisherman of 26 years' experience reports that the lobster catch has declined during his time. He attributes this to the presence now of more fishermen. He also notes that the weather has become more volatile during this time, and that that has also had a negative effect on the size of the catch. Four years ago, at the opening of the lobster season, he used to catch 175 pounds of lobster. This has declined steadily: in the last two years, he has caught only 64-65 pounds at the opening of the season. At the October 2003 beginning of the season, he reports fishermen catching only 10-14 pounds of conch.

Discussions and interviews with those involved in the exploitation of the marine resources in this village yield the following:

- The people of this village rely heavily on the sea as a source of income and sustenance. The main drivers in this regard are increasing population size and lack of comparative non-marine earning activities.
- Overuse of the environment and restrictions on the scope of fishing activities have been associated with a decline in the per capita intake from the sea. Although this represents a threat to the villagers' current standard of living, it has not yet translated into significant declines in their material circumstances. Nutrition and health have not yet been adversely affected.
- Natural disasters in the form of hurricanes also seem to have had a devastating effect on the seafood stock.

4.5: Case Study 2. Hopkins

As in Sarteneja, the youngest age groups make up a disproportionate share of the population total. Again, this is an indication of high fertility levels and the heavy dependency burden borne by the population of working age. The lower total fertility rate in Hopkins is probably related to mating patterns and the higher levels of education in comparison to Sarteneja. **Table 4.2** provides further details below.

TABLE 4.2
LABOUR MARKET FEATURES OF HOPKINS

	Hopkins
% of Labour force with up to primary level education	92% (46% with Primary School certificate
Unemployment rate	18%
% of persons outside of the labour force who are female	72%
% of population less than who are less than 15 years of age	45%
% of population that is of working age	58%

This table highlights the unfavourable labour market situation and economic vulnerability of the members of the community. It points to the constraints that face them in their search for alternative livelihoods, and provides some understanding of the reason for the heavy reliance on natural resources in their livelihood strategies. Persons outside the labour force are often in fact discouraged workers, a high proportion of whom are women.

4.5.1: Fishing in Hopkins

Fishing in Hopkins has been a part of the subsistence tradition of the people. This means that, in the main, it is artisan in character, pursued on a small-scale basis to meet daily needs rather than as a major business activity with the objective of wealth accumulation. One source estimates that for every 10 fishermen in Hopkins two are commercial and eight subsistence.[25]

Unlike in the northern part of the country the social structure of coastal communities such as Hopkins has not been traditionally shaped by commercialism and the unequal distribution of land associated with plantation agriculture. The result has been a flat social structure, with relatively low levels of monetisation, modified with the establishment of citrus and banana plantations in the areas immediately beyond the community, external migration, and the coming of foreign tourism investors.

Because of remittances from the Garifuna community in Chicago, USA, the community relies less on fishing. Since the early 1990s, the community has been modernised by the introduction of telephones, electricity, water and cable television, and road connection to the rest of the country. Tourism is now established— small guesthouses owned by the locals and larger facilities built by foreign capital—leading to less reliance on fishing. Many locals find employment in

[25] *Gaspar Martinez, former Hopkins resident and SPEAR, Community Empowerment Co-ordinator*

these foreign concerns. The young men work as maintenance workers, drivers, tour guides and the young women as domestics in the hotels.

4.6: Main Issues in both Belizean communities

The main common concern in both communities related to fishing, which had both a national and trans-border dimension. Concern was expressed that the declaration of Marine Protected Areas had been undertaken without the communities' full participation and involvement. Moreover, they were not involved in any co-management of these MPAs. A second significant concern was the impact of non-Belizean fishers on the stock of fish, including during the declared closed seasons for conch and lobster.

4.6.1: Hopkins-specific

A particular concern was with land availability for residents including that resulting from population growth. Residents also disputed some of the national data on the community, including the extent of available sewage facilities. A similar sentiment was expressed about the estimation of fish stock.

4.6.2: Sarteneja-specific

The participants in focus group and individual meetings seemed to recognise the need for alternative livelihoods but felt that they faced several constraints on this score. One was that Spanish was the common language, while training in tour guiding, for example, required a good grasp of English. The language problem also tended to be correlated with the educational levels.

MAIN GENERIC FINDINGS

AND IMPLICATIONS FOR NEW KNOWLEDGE

MAIN GENERIC FINDINGS

And Implications for New Knowledge

Introduction

Background

Considerable research and development has taken place in the Caribbean around specific environmental issues, among others, coastal pollution, the economics of the tourism industry, technical aspects surrounding production technologies, and even resource management practices. Several country-level poverty study reports also exist. Unfortunately, such research and development work tends often to stay "boxed"—sectorally or at the analytical stage.

The challenge in a situation of rapid global changes—climatic or trade-related—and more ingrained poverty issues is to identify the bigger picture, covering the policy and institutional environment, and understanding points of integration and opportunities in related or impinging sectors.

Suggested solutions and options arising, then, need to be brought to and thought through with stakeholders: resources users, practitioners like NGOs, and policy makers. This, which amounts to putting research effectively into action, needs to start with identifying the feasibility of priority options and the right tools to take forward complex multi-disciplinary and practical solutions.

Aims of study

With respect to alternative and enhanced coastal livelihoods, this study has set out to address the challenge of identifying main issues and options, and of putting the results into practice. Study R8135, looking at the feasibility of alternative coastal livelihoods, has sought to draw out information and knowledge directly relevant to understanding the constraints and the opportunities applicable to feasible alternatives.

The study was designed to explore this through the following outputs:

1. Assessing the demands for new strategies on alternative coastal livelihoods—what and where are the needs of the poor, and the sustainability of present coastal resource uses.
2. Understanding the strategic constraints to natural resource livelihoods: what are the limitations through use rights for example.
3. Understanding opportunities for enhancing livelihoods, including alternatives.
4. Identifying strategies to enhance the capacity of the poor to implement proposed alternatives.

5. Identifying indicators by which change agents may assess progress toward enhancing coastal livelihoods.
6. Distilling key messages and identifying pathways for bringing the messages to the change agents so that they provide real influence.

With the last two outputs in mind, this chapter has set out to summarise key messages, indicators and pathways to uptake. These will be further elaborated with local partner institutions through a follow-on project (R8325) starting in 2004.

In this chapter, the generic findings of the specific community and country case studies are distilled, together with their implications for new knowledge.

Site selection and methods of the study

The study took place through work in four sites in Belize and in St Lucia, carefully selected to provide a wider relevance in terms of geographic situation, ecosystems, socioeconomic conditions (especially of those living in poverty), resource ownership and governance.

The analysis of constraints and of opportunities to enhance coastal livelihoods in the study areas was done using a sustainable livelihoods approach (SLA). Participatory discussions, inherent to this approach, assisted in ensuring that analysis of issues reflected, as closely as possible, the multifaceted perspectives of resource users themselves, including issues of access, assets and the decisions the poor can make. In addition, working with key partner institutions—CZMA/I in Belize and the National Trust and Heritage Tourism Division in St Lucia—the study was able to examine broader policy and institutional constraints, and potential channels for overcoming them.

Stakeholder feedback workshops at the end of the study, where the overall results were presented, helped validate the analysis, priorities, policy relevance, and the feasibility of putting some of the findings into practice. These validations have been incorporated in the summary below.

Persons living in poverty and their needs

The study confirmed the range of issues of poverty in the coastal areas in the Caribbean: often a dependency on multiple incomes, the increasing limitations on direct resource use such as fishing, and lack of control over decisions by users. In addition, the most vulnerable tended to be the indigenous people, women, youth and those living on the margins, poorly served by decision-making processes, and services such infrastructure and credit. The findings pointed to improvements in the existing initiatives: in resource management and alternatives, such as resource conservation and tourism—rather than starting initiatives from scratch.

Main findings in terms of constraints, opportunities and strategies

Because of the strong linkages among constraints, opportunities and potential strategies under certain themes, for example, tourism, the following section identifies eight main generic findings.

1. Need for improved information on credit access and use, and on new and innovative credit mechanisms

The poor are acutely aware of the threats to their existing natural resource-based livelihoods. The more enterprising poor are searching for alternative ways of maintaining the same livelihood practices, or of shifting to alternatives—natural resource-based and other.

Two linked generic findings of the study relate to the role of credit in this process. On the one hand, the poor are not always aware of existing credit sources, or whether and how they can access them. Communication products are accordingly needed to ensure effective transfer of information on credit opportunities.

On the other hand, the very specific realities of the poor require innovative credit mechanisms. The issue of commonly owned land, for example, illustrates the difficulty in accessing credit found by many people who lack individual title to land. Creative and practicable alternative options—group-based micro-credit collateral systems— must be found for using land as collateral, drawing on lessons from across the region and from Asia and Africa.

2. Access to new knowledge of production techniques

Livelihood practices of the poor are many times constrained by limited knowledge of the most efficient and effective methods of production. In St Lucia this was observed in sea-moss cultivation, harvesting and processing. Efforts to obtain new knowledge on processing techniques were stymied by the cost of obtaining such new knowledge. More generally, such knowledge limitations were identified across the board—in fishing, farming and agro-processing techniques.

3. Marketing Limitations

Even when the poor have surmounted the production requirements, they suffer from limited knowledge about getting their output to market. In the feedback from the communities, access to information at different institutional levels was cited as important. Information needs to be met range from technical information on aquaculture opportunities to prospects for capacity and skills development to enter the tourism industry. Marketing tools such as e-commerce, for tourism, were not on their horizon.

4. Infrastructural Limitations

Almost by definition, the poor face challenges in terms of the availability of adequate infrastructure to reduce the transaction costs of their individual or group efforts at maintaining or enhancing their livelihoods. In Anse La Raye, St Lucia, groups, mostly women, have developed a successful Friday night fish-fry operation. However, the infrastructural base of the community—sewerage facilities and a propensity to flooding—is weak. Inadequacies of road and transport access to Hopkins and Sarteneja in Belize also are evident alongside similar problems of sewage and solid waste disposal.

5. Policy framework specifically for small-scale, pro-poor tourism

Tourism is the most evident alternative, which is widely identified by the poor as the one which they wish to explore. Nevertheless, stakeholders often perceived limitations to their entry: land ownership, skills/capacity, etc. Also, the type of tourism (community tourism) that is more inclusive in terms of respecting local needs, as well as creating the right type of opportunities, requires considerable attention to define strategies, resources and specific information. Even with all the existing initiatives in St Lucia, potential tourist attractions remain to be promoted.

National tourism policies reflect this in only a limited way; the case-study countries are focused on the formal and familiar tourism sector. The Heritage Tourism project in St Lucia is, however, a model to be emulated. To support their effective participation in tourism, the specific needs of the poor, need to be recognised and accommodated in public policy. The needs include training, credit, marketing and promotional support, and equity participation.

Access to land as an asset emerged as important, to gain a foothold in building alternative options not only as collateral for loans (Point 1 above) but also as a base for tourism establishments.

The findings on tourism as a central source of opportunities for alternative and supplementary incomes tally with its overall importance in the Caribbean. The findings also indicate the challenges of tourism as an effective opportunity for the poor and marginalised NR users. Local skills and resources must be enhanced but, on a wider policy level, planning and regulation must also be adapted to the needs of poor people, implying longer-term work on influencing change (see Ashley, 2000, Box 5.1).

BOX 5.1

POLICY CONCLUSIONS ON PRO-POOR TOURISM

- Tourism development has not, to date, incorporated poverty elimination objectives. It remains driven by economic, environmental and/or cultural perspectives at national and international levels.
- Given the massive impact of tourism on many of the world's poor, how and how far pro-poor tourism can be promoted needs to become a central issue.
- Tourism makes a wide range of impacts on livelihoods of the poor—not just jobs or incomes—with differential costs and benefits.
- Participation by the poor in tourism, and the benefits they gain, depend on a range of critical factors including the type of tourism, planning regulations, land tenure, market context, and access to capital and training. Many of these can be influenced by changes in policy or external support.
- Plenty of unexploited scope exists for adapting tourism interventions to enhance livelihood benefits to the poor from tourism.
- Pro-poor tourism strategies must be commercially realistic. Although the private sector cannot be expected to prioritise poverty objectives, it must be included in the process of developing pro-poor tourism.

Source: Ashley 2000, "Pro-Poor Tourism: Putting Poverty at the Heart of the Tourism Agenda."

6. Governance in poor communities

The efforts of the poor require supportive systems including those of their own making, such as co-operatives. Yet the case studies revealed significant weaknesses in these voluntary governance systems and, as well, in more formal systems such as local government.

A good example is the continued destructive trawling in Belize, despite repeated requests for bans. Such fishing still allows room for some local livelihoods. Change from such NR use is thus a slow process which must go hand-in-hand with practicable and visibly feasible alternative livelihood options. In Anse La Raye, St Lucia, on the other hand, there is an incipient conflict between the fishers, the Fish Fry vendors and the youth in the community who host parties on the very night. No forum exists in which they can all work through their mutual interests and come to mutually agreeable arrangements, which provide all with some rewards. In Sarteneja, inter-party and inter-religious differences also impact on the capacity for community solidarity.

Options must therefore be examined in a quest for stronger decision-making frameworks through conflict-resolution processes and instruments for building local democracy.

7. Legislative framework

Each of the six generic issues noted above tends to have a legal dimension. Many specific laws governing natural resource use constrain common-policy frameworks. Land law lags behind the realities on the ground and also impacts on the credit system and law. Legal frameworks for tourism rarely address the specific need to ensure active, positive participation of the poor. Stronger pressures for decentralisation and devolution initiatives across the region also carry relevant implications.

A further need is to address the issue of wider land allocation policy and its implementation in the transparency in land registration procedures.

8. Policy makers must integrate poverty analysis with sustainability and natural resource issues.

Each of these tends to fall under the remit of distinct public agencies, and also to coincide with differing disciplinary structures. The frequent result is limited contact with, or communication among, those responsible for pulling together the total package of policies which impact simultaneously on the poor and on sustainable use of natural resources. Many important concerns—particularly those of poor people—fall between the policy cracks. Belize has taken the very positive step of introducing Marine Protected Areas (MPAs). However, some local fishers have complained, perhaps incorrectly, that they have not been adequately consulted and are being unnecessarily deprived of access to a livelihood.

Policy makers must derive enhanced capacity for economic valuation of natural resources and for identification of policy instruments to ensure these values are reflected in policy decisions on user fees, fish permits etc.

Participants in feedback sessions raised important points about the influence of research which may have lost some credibility among resource users. (One example was the use of research as the basis for the unpopular ban on Nassau Grouper fishing.) A second consideration was the capacity of research to influence politicians to change policies and their implementation in a positive direction.

Participants argued research processes should contain room for flexibility, allowing follow-up actions to address community needs for information in, among other areas, disaster preparedness, or specific technology.

Overall, the community feedback highlighted the need for access to assets, information, and influence. The call is for research guided by a more concerted, but perhaps delicate, approach to examining not only political/power issues in natural resources management, but also in wider decision-making on local development. In all cases, the imperative is putting community groups at centre stage, to shape the type of information to be generated and the instruments which ensure communities obtain and use information effectively. This may mean strengthening the capacity of organisations to voice their needs and demands, and shaping strategies and research agendas around those demands.

Relevance of findings and emerging strategies

The feedback sessions, involving the poor and partner institutions, and the wider feedback to the Caribbean research and policy community, indicate that the findings have a wider relevance to the regional situation. The sampling process in the selection of study sites and the background literature further support this conclusion.

The present findings on the ground recall similar trends found under R7797 in Tobago and Jamaica on coastal NR dependents, their relationships to their local institutions and services, and their opportunities for alternative livelihoods. Further parallels are in the constraining factors: a multiplicity of policies and national programmes—extending beyond the fisheries sector, or environmental protection per se, such as land tenure and planning—affect the opportunities available for alternative livelihoods.

The findings here resonate strongly across the Caribbean (R7797), but also with wider issues on coastal livelihoods when examined under the SL approach. A study on coastal livelihoods in India, Bangladesh and Sri Lanka (IMM, 2002) brings up similar issues. This raises the possibility of more generically applicable findings and lessons about realistic opportunities for enhancing outcomes of coastal livelihoods. Strategic issues faced by coastal communities and support agencies when addressing realistic opportunities and strategies include:

- Alternative livelihoods are often proposed but few are suitable or viable. Supplementary incomes of various kinds may well be as important as alternatives.

- Sustainable approaches (SLA) are useful for understanding the diversity of poor people's needs, both group and individual needs. In these approaches, a locally developed and relevant terminology should probably be adopted.

- SLA also helps in starting to examine options for more profound policy change. One such change is to identify poverty concerns for indicators within ICAM policies and related legislation. This is a process that these findings can contribute to.

- The actual policy development processes are important: where and how, and through which representatives, communities can engage in policy processes that affect them, considering the multiplicity of ways and, often, the obscurity in which policies are implemented. Baumann and Sinha (2001) emphasise that the political engagement of communities (building their "political capital") should be further developed to take the important analysis of SLA to practicable action. This is particularly so since programmes for the poor tend to be captured by local or national elites.

- The IMM findings also point to further coastal parallels in respect of the need for disaster preparedness systems and the high-priority access and sharing information by communities and practitioners.

Implications for knowledge and change

After identifying eight key generic findings from the study, questions naturally arise about

a) the new knowledge necessary to address these findings and,
b) to whom this should be targeted.

Concerns relate to target audiences, types of messages and products.

Outlines of a communication programme

Some areas for consideration in the actual process of communicating, negotiating and delivering change in policy or in practice are:

- General ones pertaining to how policies are developed and with what information, how they are monitored and analysed.

- Resource management, particularly measures clearly linked to the needs of the poor which are often considered externalities, such as watershed management, and credit, which is frequently considered outside the sector.

- Alternative extractive (sea-moss) and non-extractive (tourism) coastal resources uses which can provide real opportunities, when they come together with appropriate capacity-building and supportive policies.

- Alternative uses on land (farming) add another dimension in terms of policy issues that need to be addressed under the rubric of land tenure.

All of these point to creative use and development of a knowledge management framework. Some of the areas to be addressed have to do with translating and sharing existing knowledge among users, in such a way as to be supportive to the poorest. Here, creative and peer-to-peer sharing systems are critical.

On another level, the challenge is to engage stakeholders in a real debate about the value of information and facts which lead to strong and pro-poor policy. Facts need to be credible to users; facts should not easily misused or ignored by policy formulators and politicians.

A communication programme should set out how the project's aims will be achieved using a range of targeted communication strategies to reach well-defined audiences. To ensure that the strategies are accepted and owned by policy makers and those in a position to influence the livelihood strategies of the poor in the coastal zone, the activities should aim to target relevant government and statutory agencies. In addition, local and regional NGOs and, in some areas, the local business sector should be targeted. The communities in which the research was carried out are also a target for relevant communication strategies.

To ensure ease of uptake by the poor in the coastal zone, the intention is actively to engage the identified target peoples and institutions in the promotion and implementation of the new strategies.

The communication programme and product and communication matrix developed (see below) capture the key information themes for taking forward such new strategies, and their applicability to different local stakeholders.

In this context, five types of new knowledge are identified; the first four are deemed particularly relevant to the project.

1. Knowledge which already exists in the case-study communities but which is not known to all those for whom it would be useful (production methods).

2. Knowledge which exists in the case-study country but not in the communities themselves (credit facilities).

3. Knowledge which exists in the Caribbean region but not in the case-study country (heritage tourism support).

4. Knowledge available in the rest of the world but not in the Caribbean (e-commerce promotion for the poor).

5. Knowledge on the latest innovations relevant to the livelihood practices of the poor.

Products for multi-level audiences; multi-level messages

The findings of this study are both specific to the communities studied and, by extrapolation, generic to the experience of poor coastal dwellers making their living from the environment. Some of these findings will require improvements in techniques or approaches at the community levels. They also require changes in the policy environment, including provision of new or altered facilities so as to enhance the quality of the livelihoods under study.

Given that audiences include both policy makers and the poor users of marine resources, it is vital to plan communication strategies which can address the multiple perspectives of the same issue—for instance, the provision, as well as the effective use, of credit.

This study has found, for example, that the provision of innovative and appropriate credit mechanisms was a vital means of enhancing the natural resource-based livelihoods of the poor in coastal areas. Encouraging policymakers and the private sector to take appropriate actions to provide these mechanisms is therefore one important activity. However, it is also important to communicate, to the poor, the benefits (as well as the risks) of using credit to improve levels of operation. The poor should also be advised on the most effective means of utilising credit mechanisms.

A generic finding—the need to enhance production and marketing knowledge, towards improved product quality and a better livelihood—is rooted in a range of specific findings. The latter concern standards of hygiene within communities offering bed and breakfast and food services to visitors; production techniques in food services; and sea moss harvesting. Some of these findings can be addressed by direct interventions at the community level, and can be incorporated into products with application in other similar communities elsewhere. Related aspects involve interventions with policymakers and technocrats so as to ensure an encouraging policy environment and necessary infrastructural, fiscal and other provisions. For instance, training at the community level may enhance the offering of local tourism services. But infrastructure—roads, signage, sewerage, garbage collection and disposal—as well as promotion at the national level are also important in attracting visitors to what the community is offering.

The key, then, will be to choose those strategies that have greatest impact in changing the approach of policymakers, in changing the negative and in enhancing the positive elements of natural resource-based livelihoods of the poor. Given that it will not be possible to reach all potential audiences directly, it will also be important to incorporate strategies with the potential for a wider, long-term reach. Among these is the use of audio-visual material in training sessions, and as providing information to and through the mass media. Issues of cost-effectiveness within the established time-frames will clearly determine the ultimate spread of activities undertaken.

Practically, such issues as literacy levels, habitual language (Spanish or French Creole rather than English in some target communities), as well as attention span and access to electricity and other services, are important factors in assessing the effectiveness of communication products. It is thus important to factor in costs of producing Spanish and French Creole as well as English language versions of a proposed video aimed at enhancing product quality and marketing effec-

tiveness. An assessment of what communication products already exist will also be necessary to avoid reinventing the wheel.

Target audiences
Three main target audiences are thus identified with some key means of communication:

First, **policy makers** at the national, regional and international levels, all of whose decisions impact, directly and indirectly on the livelihoods of the poor. (IMF, World Bank policies or DFID support systems, etc). Knowledge products useful to policy makers and communicating with are:

- Policy briefs and analyses
- Study findings in digestible formats
- Policy models, regional templates
- Workshops and seminars
- Innovative, rapid and easy-to-use analytical frameworks and methods

Second, **policy actors in both the public, business and other civil society institutions** (NGOs) whose direct action impacts on the livelihoods of the poor (tourism investors, environmental NGOs).

- Suggested guidelines and procedures for implementing policies and policy implications
- Skills and tools for communicating and negotiating with public
- Knowledge and information on systems for communication: electronic, direct, popular media
- Tools for training, teaching, distance learning
- Technical material for new livelihoods skills, techniques

Third, the **poor themselves** who are seeking, in their individual and co-operative capacities, to maintain and enhance their livelihoods.

- Leaflets, booklets videos to learn new techniques
- Community tele-centres for accessing information, as are being tested in South Asia
- Information flyers for understanding legislation
- Popular media tools for understanding and analysing political processes around them
- Skills and ideas for negotiation and communicating with policy makers,
- Networking and alliance building, organisational development to reduce transaction costs of accessing information

Maximising effects of communication
To maximise resources under short time-frames and to create an impact with target groups, an intensive approach would be appropriate. A format for this could be the research/communication team spending up to one week in a target country and with target institutions, delivering the main findings as well as validating messages to be incorporated in more long-term outputs. Clearly, preparation on the ground will be vital to the success of such an approach.

Local NGOs assisting in the workshops and participating in the discussions would also benefit from their integral involvement in the process.

It is also anticipated that the discussion generated during the meetings and workshops will help the research/communication teams to test and to validate findings drawn during the course of this study; and thereby to enhance the relevance and utility of the communications products proposed.

The product and communication matrix presented below summarises the new knowledge, target audiences and appropriate media of communication for both the generic and the specific products identified for the case study countries and sites.

DFID R8135 - PRODUCT AND COMMUNICATION MATRIX

Livelihood Practice	Sustainability Evaluation of Livelihood Practices	Drivers (Causal and and Impact Factors)	New Knowledge to Maintain and/or Convert Practices re Sustainability and/or Alternatives	Relevant Decision Makers to Receive New Knowledge	Appropriate media of Communication of New Knowledge
GENERAL					
General to all livelihood practices	Integrated NR and poverty analysis	Limited appreciation of poverty, its causes and of policies to address same alongside NR management	New knowledge on the methods of poverty analysis and its integration with NR management	Policymakers at the Government; Statutory and NGO levels	R8135 Report, Briefs, Workshops
FISHING					
Fishing	No	1. Pollution in coastal waters: (sewage disposal; deforestation; agro- chemical run-off)	- Eco-system and human health system impacts.	Policy makers	R8135 Report, Policy Briefs, Workshops
			- Community based reforestation	Policy makers and community	
		2. Inappropriate fishing techniques by Nationals (gill net and harvesting of immature fish) and Transnationals (too small trawler fishing nets)	- Education in alternatives to chemical use	Community;	
			- Training in offshore fishing techniques and provision of credit to poor to facilitate	Policy makers	R8135 Report, Policy Briefs, Workshops
		3. Natural disasters	- Devising effective strategy to ensure enforcement of laws in regard to trawling;	Policy makers	
			Natural disaster preparedness incl. insurance	Policy makers	

SEA MOSS (PRASLIN, ST LUCIA)

Livelihood Practice	Sustainability Evaluation of Livelihood Practices	Drivers (Causal and and Impact Factors)	New Knowledge to Maintain and/or Convert Practices re Sustainability and/or Alternatives	Relevant Decision Makers to Receive New Knowledge	Appropriate media of Communication of New Knowledge
Cultivation/ Harvesting	Sustainable	1.Institutional facilitation; 2. Appropriate specie availability 3. Institutional structure (Co-op) 4. Market; 5. Security; 6. Access to Credit; 7. National Policy.	- Capacity building strategies at community (co-op) level. - Improved techniques - Potential for economies of scale in production - Effective Legislation/Improved Policing - New credit facilities available (public and private) - Vision and institutional pro-activity	Community Development Officers; Department of Co-ops; NGOs. Farmers; Co-opFarmers; Co-op Policy Makers; Authorities Farmers; Co-op Policy Makers	R8135Report; Policy Brief; Workshops, popular culture
Sea Moss Processing	Sustainable	1.Institutional facilitation; 2.Institutional structure (Co-op) 3.Market; 4.Access to Credit; 5.National Policy.	- Available land for 'housed' drying facility - Price competitiveness of 'gel' product. - Potential for increased 'gel' market. - Use of facilities of the Livestock Development Company (LDC) for processing (incl. pasteurization) and packaging of drinks. - New credit facilities available (public and private) - Information on marketing product standards (content and labelling). - Vision and institutional pro-activity	Policy makers Farmers; Co-op Farmers; Co-op Farmers; Co-op; Ministry of Agriculture; LDC Farmers; Co-op Farmers; Co-op Policy Makers	R8135 Report; Policy Brief; Workshops

TOURISM

Livelihood Practice	Sustainability Evaluation of Livelihood Practices	Drivers (Causal and and Impact Factors)	New Knowledge to Maintain and/or Convert Practices re Sustainability and/or Alternatives	Relevant Decision Makers to Receive New Knowledge	Appropriate media of Communication of New Knowledge
General	Sustainable	International & regional demand	- Sustainable Tourism policy including: a .policies to address competition from big capital; b .Education on ESOPs; c. Waste disposal	National policy-makers; NGOs; CBOs; Entrepreneurs; Community organisations (including youth)	R8135Report; Policy Brief; Workshops; Popular Culture media
Tour- Guiding: (Land and Marine)	Sustainable	International & regional demand	-Tour Guide Training; Credit access	Policy-makers;NGOs;CBOs	R8135Report;Workshops (incl use of pop culture media)
Bed & Breakfast/ Guest Houses	Sustainable	International & regional demand	- Hospitality Management; - Micro/Small Bus. credit access; - E-Commerce promotional support	Policy-makers; Credit Institutions; IT policy system	R8135Report; Policy Brief; Workshops; Mass media
Fish Fry (Anse La Raye, St Lucia)	Sustainable	International & regional demand; Govt. initial support; Predominantly female-based entrepreneurial spirit	- Managing business expansion; - Community conflict resolution; - Waste disposal systems	Policy-makers:-re business man training; Conflict resolution techniques; Waste Management Entrepreneurs	R8135Report; Policy Brief; Workshops; Mass Media

FARMING					
Livelihood Practice	**Sustainability Evaluation of Livelihood Practices**	**Drivers (Causal and and Impact Factors)**	**New Knowledge to Maintain and/or Convert Practices re Sustainability and/or Alternatives**	**Relevant Decision Makers to Receive New Knowledge**	**Appropriate media of Communication of New Knowledge**
Bananas (Traditional)	Not Sustainable	WTO-ruling on EU banana regime; Over-use of chemicals	- Shift to organic banana production Techniques; - Alternative livelihood opportunities	Policy makers (incl.diversification planning); Farmers (Incl.Associations)	Report; Policy Briefs; Workshops; Training modules in multi-media formats
Bananas (Organic)	Sustainable	Market demand	- Organic production techniques; - Market opportunities	Farmers; Public Policy makers especially re market promotion	Report; Policy Briefs; Workshops; Training modules in multi-media formats
Food Crops	Sustainable	Decline in banana production; Market and subsistence levels of demand	- Extension services; - Market promotion training - Access to land	Min. of Agriculture Market promotion agencies Min. of Agriculture	Report; Policy Briefs; Workshops;Training modules in multi-media formats
Agro-Industry	Sustainable	Decline in banana production & fishing; Market potential	- Extension services; - Market promotion training - Access to land	Ministry of Agriculture Market promotion agencies Ministry of Agriculture	Report; Policy Briefs; Workshops; Training modules in multi-media formats

Indicators that may be monitored to determine success in Uptake and Sustainability of Changes in Livelihood Strategies

After outlining the constraints, opportunities and desirable strategies, and recommending an outline communication programme, milestones and indicators must be proposed for the assessment of progress in the change process.

The starting point here was to define the broad framework within which to develop indicators for measuring and monitoring the success of uptake and sustainability of proposed changes in livelihood strategies. The indicators had to be relevant to the Caribbean reality and, more specifically, applicable to the case-study sites, but with potential for scaling up.

Since the body of indicators is required to span from uptake to sustainability, the following three broad rubrics were proposed:[26]

A. Success of Uptake;
B. Implementation;
C. Sustainability.

Success of Uptake

Indicators to be developed here will address the issues of participation in the uptake mechanisms by the target communities; their requests for follow-up information and activities; and policy incorporation by relevant target institutions. These indicators are essentially "internal" in the sense that they are developed and tested "through participatory work with the local stakeholders". In terms of data collection, the indicators also seek to reflect social differentiations within target communities—gender, age and natural resource bases[27].

The following areas are identified for coverage by the indicators:

- Participation in uptake sessions (Numbers by gender, age and NR base)
- Involvement in Field Testing (Numbers by gender, age and NR base)
- Participation in Training Programmes (Numbers by gender, age and NR base)
- Request for follow-up information, workshops etc. (Numbers by gender, age and NR base)
- Policy incorporation activities (Relevant target institutions)

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[26] *The framework developed drew from available literature on the measuring and monitoring success/failure of livelihood strategies of the poor. It drew particularly upon the DFID-supported research project on "The Effects of Policy on Natural Resource Management and Investment by Farmers and Rural Households in East and Southern Africa" (Project No. R7076CA). The focus was on two Working Papers from this project:*
• Working Paper No. 1 (Rigby et al, February 2000) Rigby, Dan; Howlett, David; and Woodhouse, Phil, A Review of Indicators of Agricultural and Rural Livelihood Sustainability, Sustainability Indicators for Natural Resource Management and Policy, Working Paper No 1, Institute for Development Policy and Management, University of Manchester, UK, February 2000; and
• Working Paper No. 8 (Bahiigwa et al, March 2001) Bahiigwa, Godfrey; Shinyekwa, Isaac; Rigby, Dan; Woodhouse, Phil; and Wowlett, David, Sustainability Indicators for Farming-Based Livelihoods in Uganda, Sustainability Indicators for Natural resource Management and Policy, Working Paper No 8, Institute for Development Policy and Management, University of Manchester, UK, March 2001

[27] *Issue highlighted in the Research Brief by Dr Virginia Nazarea, "Looking at the Landscape Through Local Lenses: Integrating Community Values and Variation in Indicators of Sustainability", Sustainable Agriculture and Natural Resource management Collaborative Support Programme (SANREM CRSP), No. 6, 2001.*

Implementation

The major areas of concern with respect to implementation are the institutional changes made to accommodate the new knowledge; and the access to the resources to effect the changes. The areas to be covered by these indicators are:

- Institutional changes made: for example, adoption of new polices related to pro-poor tourism, schemes for support coastal communities;
- Access to and allocation of resources (financial and other): ultimately new policies and institutions for credit, land allocation mechanisms, decision-making around MPAs, etc;
- Transition process: changes in the attitude and responses of decision-makers; improvement in satisfaction ratings in communities with regard to demand for changes in services etc.

Sustainability

Ultimately, the changes should be reflected in changes in the lives of the people living in poverty and in their direct livelihoods. The literature suggests that indicators of assets (wealth) are superior to those of income generation with respect to the measurement of vulnerability and poverty. On this premise, the indicators identified here seek to address the full range of capital assets—financial, physical, natural, human and social. The following relevant indicators can, therefore, be selected to effect coverage of the following areas of capital-asset accessibility:

- Financial: especially savings, and credit opportunities;
- Terms and conditions of credit access, especially for women and youth, and indigenous people;
- Market availability and access—new and strengthened channels for sea-moss products, fish products in new overseas markets, tourism market, etc;
- (In the longer term in sampled communities) physical assets; quality of life (housing quality and household assets); land ownership rights;
- Rights of access to natural resources: increased number of favourable access to resources; reduced conflict around NR; rights that are embedded in strong institutional structures;
- (Also in longer term): human: education, health, food security etc.
- Social; respect for gender and indigenous concerns, for example;
- Supportive community and local institutional structures, strengthened community organisations and networks, that are more active and have significant achievements in reaching out or demanding changes.

This template of indicators, however, requires further review in terms of their application to the Caribbean, in general, and to the case-study countries and communities, in particular. The process of establishing relevant indicators will be further elaborated.

Conclusions

In summary, the findings of the study R8135 on opportunities and constraints to enhancing coastal livelihoods of the people living in poverty in the Caribbean have provided a basis for identification and validation of the new knowledge required, together with the sketching of a change strategy for translating the new knowledge into action.

The findings confirm the existence of severe constraints to enhancing some existing use, such as fishing. The findings also suggest opportunities for making sectors such as tourism work in a way that is more pro-poor. Significantly, strong indications point to not radical overhauls or innovations, but rather to the building on existing alternatives— sea moss culture and community.

What these communities do need is considerable support for their efforts, in terms of the right policies, access to information and infrastructure, and appropriate credit. They also need the tools and skills, either technical or organisational, to demand those changes concertedly and with confidence.

The study therefore recommends a programme of communication, and a refinement of an existing outline of knowledge products and processes. This is to take research results, not only of this study but also from other relevant regional and global experiences, into the domain of policy making and policy practitioners and the coastal communities.

FURTHER READING

This volume synthesises individual contributions by the following researchers whose work is contained in a second volume comprising detailed topical analyses as follows:

Natural Resources Profile – **Judith Gobin**
Poverty and Sustainable Livelihoods in the Caribbean – **Dennis A Brown**
Strategic Constraints to Natural Resource-based Livelihoods – **Christine Toppin-Allahar**
Land Use, The Poor and Sustainable Livelihoods – **Michelle Mycoo.**

This second volume is available from

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APPENDIX 1

ID- R8135 - Log Frame (Restructured)

Outputs	Objectively Verifiable Indicators (OVIs)	Activity/Milestones
1. Improved understanding of demand for alternative sustainable NR-based livelihood strategies to enhance livelihood outcomes for poor people (particularly women, the landless, indigenous people and other vulnerable groups) in coastal zone in the Caribbean	By 30 June 2002 case studies selected, target beneficiaries and participatory mechanisms identified and demand for alternative strategies for enhanced livelihood outcomes determined	**1.1 Assessment of Fragility of NR** a) Relevant reports previously completed reviewed. b) Criteria for case study selection chosen c) Case studies selected d) Fragility and Vulnerability of production systems for NR based livelihoods evaluated.
		1.2 Assessment of Sustainability of traditional NR-based Livelihood strategies a) Target beneficiaries and participatory mechanisms identified. b) Existing quality of life, demographic trends and expectations of target beneficiaries documented. c) Carrying capacity of NR to accommodate increase in traditional NR-based livelihood strategies assessed. d) Demand for alternative strategies for enhanced livelihood outcomes identified by participatory process.
2. Improved understanding of strategic constraints to NR-based livelihood strategies, including poor people's rights of access to NR in the coastal zone and policy/ institutional environment	By 31 August 2002 strategic constraints on access of poor to NR output evaluated	**2.1 Evaluation of Security of Ownership/User Rights of poor people** a) Comparative analysis of types and security of land tenure and legislation governing land use made b) Comparative analysis of legislation governing ownership and use of marine resources carried out c) Comparative analysis of emergent competing commercial interests performed d) Impacts of (a), (b) and (c) on access of poor to NR evaluated **2.2 Evaluation of Policy/Institutional Environment for NR Management and support of Livelihood Strategies** a) Regulatory framework for NR management identified. b) Gov't policies regarding formal and informal utilisation of NR by poor identified. c) Impacts of (a) and (b) on livelihood strategies identified.
3. Improved understanding of opportunities for enhanced livelihood outcomes for the poor in the coastal zone, including alternative sustainable NR-based livelihood strategies	By December 31 2002 feasible alternative strategies for enhanced livelihood outcomes identified and cost/benefit analysis performed	**3.1 Exploration of Alternative Livelihood Opportunities for Enhanced Livelihood Outcomes** a) Alternative opportunities for enhanced livelihood outcomes that benefit the poor identified. b) Demand for alternative strategies for enhanced livelihood outcomes that can be satisfied by non-NR based opportunities considered. c) Demand for enhanced livelihood outcomes dependent on NR based livelihood strategies identified.

Outputs	Objectively Verifiable Indicators (OVIs)	Activity/Milestones
		3.2 Exploration of Sustainable Consumptive Uses a) Alternative sustainable techniques for pursuing traditional consumptive NR-use livelihood strategies identified. b) Mechanisms for implementing change strategy for adoption of (a) developed.
		3.3 Exploration of Sustainable Non-consumptive Uses a) Alternative, sustainable techniques for pursuing non-consumptive NR use livelihood strategies identified b) Mechanisms for implementing change strategy for adoption of (a) developed.
4. Strategies for enhancing capacity of the poor to utilize multiple alternative sustainable NR- based livelihood options identified	By 28 February 2003 poverty assessment and needs analysis completed and change strategy identified	**4.1 Identification of Needs of the Poor** a) Incidence of poverty, particularly amongst women, the landless, indigenous peoples and other vulnerable groups identified. b) Structural and behavioural factors affecting livelihood choices identified and assessed. c) Needs arising from (a) and (b) identified.
		4.2 Evaluation of target Beneficiaries to Respond to Change a) Social capital evaluated b) Internal and external factors influencing vulnerability identified
		4.3 Participatory Development of Mechanisms for Change a) Capacity building mechanisms identified b) Uptake pathways identified and communication strategies developed
5. Indicators that may be monitored to determine success in uptake and sustainability of changes in livelihood strategies developed	By 31 March 2003 indicators that may be monitored to determine success in uptake and sustainability of changes proposed	**5.1 Identification of Indicators for Monitoring Uptake Success** a) Literature on indicators critically reviewed b) Appropriate indicators in the Caribbean context proposed
		5.2 Identification of Indicators for Monitoring Sustainability of Livelihood Changes • Literature on indicators critically reviewed • Appropriate indicators in the Caribbean context proposed
6. Strategies to ensure development impact in comparable environments and sustained uptake by target beneficiaries and institutions identified and promoted with key TIs	By 30 June 2003 strategies formulated, means of dissemination of results identified and measures for sustainability of impacts identified	**6.1 Identification and Extraction of Generic Principles** a) Generic principles distilled from case studies b) Recommendations for utilisation of principles formulated c) Means of disseminating knowledge identified in collaboration with TIs
		6.2 Identification of TIs and Uptake Pathways a) Consenting TIs identified at an early stage of the Project b) Uptake pathways identified, developed and market tested with TIs

APPENDIX 2

APPLICATION OF CRITERIA FOR SELECTION OF CASE STUDY COUNTRIES TO CARIBBEAN

Country	Target Habitats	Regulation of NR use — specifically target habitats	Poverty	Ownership/ control of coastal land	Right of access to coastline	Landless-ness	Indigenous people	Governance
Anguilla (DT)	Reefs Lagoons Sea grass Beds Mangrove	Beach Protection Act; Marine Parks Act; Wild Birds Protection Act; Land Development Control Act	No Poverty data		Beach Control Act; Access to Beaches Act	No	None	
Antigua/ Barbuda (AS)	Reefs Sea grass Beds Mangroves Lagoons	Beach Protection; Maritime Areas Act; Marine Areas (Preservation and Enhancement) Act; Turtle Act; Fisheries Act; Forestry Act; Wild Birds Protection Act; National Parks Act; Land Development & Control Act	No Poverty data	Island of Barbuda is State/ Communal Land	Beach Control Act	Yes Land Tenancy; Squatting	None	Barbuda Council
Bahamas (AS)		Fisheries Resources Jurisdiction & Conservation Act; Continental Shelf Act; Wild Animals Protection Act; Wild Birds Protection Act; Coastal Protection Act; Reclamation & Drainage Act; Town Planning Act	No Poverty data			Land Tenancy	None	National Trust Act
Barbados (IS)	Reefs Sea grass Beds Virtually no mangrove & lagoon areas	Beach Protection Act; Marine Boundaries & Jurisdiction Act; Territorial Waters Act; Marine Areas Preservation & Enhancement Act; Fisheries Regulation Act; Coastal Zone Management Act; National Conservation Commission Act; Town & Country Planning Act	No Poverty data			Security of Tenure & Freehold Purchase Laws	None	National Trust Act

Country	Target Habitats	Regulation of NR use — specifically target habitats	Poverty	Ownership/ control of coastal land	Right of access to coastline	Landless-ness	Indigenous people	Governance
Belize (CS)	Excellent example of all 4 habitats	Forests Act; Private Forests Conservation Act; Forest Fire Protection Act; Protection of Mangrove Regulations; Fisheries Act; Coastal Zone Management Act; Wildlife Protection Act; National Parks System Act; Environmental Act; Land Utilisation Act; Housing & Town Planning Act; Ancient Monuments & Antiquities Act	Poverty data			Land Tenancy; Squatting; Refugees; Maya Land issue	2 groups - Maya & Garifuna	Belize City Council; 8 Town Councils & 180 Village Councils Village Councils Act 2000 Protected Areas Conservation Trust Act Umbrella NGOs BACONGO Land
BVI (DT)	All 4	Beach Protection Act; Marine Parks & Protected Areas Act; Fisheries Act; Turtles Act; Wild Birds Protection Act; Protection of Endangered Animals, Plants and Articles Act; Protection of Trees & Conservation of Soil & Water Act; National Parks Act; Land Development Control Act	No Poverty data			No	None	
Cayman Islands (DT)	Reefs; Seagrass; Mangrove	Whaling Industry Regulations Act; Marine Conservation Act; Continental Shelf Act; Fisheries Zone Proclamation; Endangered Species Protection & Propogation Act; Development & Planning Act; Mosquito Research & Control Act	No Poverty data			No	None	National Trust Act
Dominica (IS)	4	Fisheries Act; Forestry & Wildlife Act; National Parks & Protected Areas Act; Town & Country Planning Act	No Poverty data		Beach Control Act 3 Chains Reserve	Squatting	Caribs	Carib Reserve Act Village Councils

Country	Target Habitats	Regulation of NR use — specifically target habitats	Poverty	Ownership/ control of coastal land	Right of access to coastline	Landless-ness	Indigenous people	Governance
Grenada	3	Beach Protection Act; Marien Boundaries Act; Fisheries Act; Birds & Other Wildlife Protection Act; Forest, Soil & Water Conservation Act; National Parks and Protected Areas Act; National Heritage Protection Act; Land Development Control Act	No Poverty data			Some urban squatting	None	National Trust Act
Guyana (CS)	1	Forests Act; Maritime Boundaries Act; Fisheries Act; Aquatic Wildlife Control Regulations; Sea Defences Act; Wild Birds Protection Act; Environmental Protection Act; Town & Country Planning Act	Poverty data			Land Tenancy; Urban squatting; Land Tenure Regularisation Programme	Amerindians (several tribes)	10 Regional & 5 Municipal Councils Amerindian Lands Act; Amerindians Act; National Trusts Act
Jamaica (IS)	4	Fishing Industry Act; Morant & Pedro Cays Act; Black Coral Order; Black River Upper Morass Reclamation Act; Forest Act; Wildlife Protection Act; Watersheds Protection Act; Natural Resources Conservation Authority Act; Jamaica National Heritage Trust Act	Poverty data			Extreme Landlessness	None	Parish Councils Act 1973; 14 Parish Councils; Urban Corporations NEST
Montserrat (DT)	—	Beach Protection Act; Turtle Act; National Parks & Protected Areas; Forestry and Wildlife Act; Endangered Animals & Plants Act; Town & Country Planning Act	No Poverty data				None	National Trust Act
St. Kitts/ Nevis (AS)	2	National Conservation and Environmental Protection Act; Fisheries Act & Regulations; Development Control & Planning Act	Poverty data			Village Freehold Purchase Act (St. Kitts)	None	Nevis Island Administration

Country	Target Habitats	Regulation of NR use — specifically target habitats	Poverty	Ownership/ control of coastal land	Right of access to coastline	Landless-ness	Indigenous people	Governance
St. Lucia (IS)	3	Beach Protection Act; Maritime Areas Act; Fisheries Act; Forest, Soil & Water Conservation Act; Wildlife Protection Act; Parks & Beaches Commission Act; Physical Planning & Development Act	Poverty data	*Cinquante pas de la reine* = State Land		Squatting; PROUD Programme	None	National Trust Act
St. Vincent & the Grenadines (AS)	Reefs Sea grass Beds	Beach Protection Act; Fisheries Act & Regulations; Forests & Forest Resource Conservation Acts; Wildlife Protection Act; Town & Country Planning Act; Town & Country Act; Ancient Monuments & Antiquities Act	Poverty data		3 Chains Act	Severe squatting	A few "Black Caribs"	National Trust Act
Trinidad & Tobago (AS)	All 4	Archipelagic Waters and Exclusive Economic Zone Act; Territorial Sea Act; Continental Shelf Act; Marine Areas (Preservation and Enhancement) Act; Fisheries Act; Turtle & Turtle Eggs Regulations; Malaria Abatement Act; Forests Act; Conservation of Wildlife Act; Environmental Management Act; Town & Country Planning Act	Poverty data		3 Chains (Tobago) Act	Severe squatting	A small "Carib" community	Municipal & Regional Corporations; Tobago House of Assembly National Trust Act COPE
Turks & Caicos Islands (DT	2	Coastal Protection Act; Fisheries Protection Act; Wild Birds Protection Act; National Parks Act; Food & Environmental Protection Act; Physical Planning Act	Poverty data			Haitian Refugees	None	National Trust Act

APPENDIX 3

General Population Statistics on the Caribbean

COUNTRIES	POPULATION	AREAL SIZE KM²	LANGUAGE	POLITICAL STATUS
Anguilla	10000	96	English	UK Territory
Antigua & Barbuda	69000	440	English	Independent
Aruba	67000	194	Dutch	Netherlands Territory
Bahamas	293000	13878	English	Independent
Barbados	263000	430	English	Independent
Belize	230000	22700		
British Virgin Islands	19000	153	English	UK Territory
Cuba	11115000	114524	Spanish	Independent
Cayman Islands	35000	250	English	UK Territory
Dominica	75000	790	English	Independent
Dominican Republic	8232000	48400	Spanish	Independent
Grenada	85000 (1991)	344	English	
Guadeloupe	444000	1780	French	French Territory
Guyana	857000	214970	English	Independent
Haiti	7533000	27750	French	Independent
Jamaica	2539000	10990	English	Independent
Martinique	392000	1100	French	French Territory
Montserrat	6000	102	English	UK Territory
Netherlands Antilles	198000	800	Dutch	Netherlands Territory
Puerto Rico	3806000	9104	Spanish	US Territory
St Lucia	136000 (1991)	620	English	Independent
St Kitts/Nevis	41000 (1991)	269.2	English	Independent
St Vincent & the Grenadines	106000 (1991)	388	English	Independent
Suriname	443000	163820	Dutch	Independent
Trinidad & Tobago	1318000	5130	English	Independent
Turks & Caicos	15000	430	English	UK Territory
US Virgin Islands	102000 (1990)	342	English	US Territory

APPENDIX 4

VISITOR EXPENDITURE AS A PERCENTAGE OF GROSS DOMESTIC PRODUCT

Destination	1991	1992	1993	1994	1995	1996	1997	1998	1999
Anguilla	65.53	68.88	77.74	82.66	79.38	73.73	79.55	74.77	65.49
Antigua and Barbuda	87.47	67.36	71.47	69.25	59.47	57.08	55.28	49.13	52.43
Aruba	41.66	43.11	n.a	n.a	35.93	39.42	40.58	42.38	42.71
Bahamas	38.59	40.65	42.54	44.04	39.36	40.11	36.03	32.87	n.a.
Barbados	31.78	34.22	37.83	40.92	39.01	37.42	36.80	35.82	32.20
Belize	26.05	15.67	13.20	12.93	13.14	14.68	14.30	17.21	16.19
Bermuda	33.61	33.59	32.27	32.72	27.60	25.26	25.51	24.11	22.96
British Virgin Islands	76.61	n.a	78.59	74.21	76.76	n.a	n.a	n.a	46.61
Dominica	18.62	16.36	17.10	17.16	18.04	18.18	19.15	17.24	21.91
Dominican Republic	n.a	13.17	12.63	11.78	n.a	n.a	39.43	37.68	40.13
Grenada	22.74	22.82	26.27	31.34	29.90	29.66	28.41	27.62	27.45
Guyana	10.08	9.65	11.38	18.61	15.13	11.91	9.51	10.97	12.70
Jamaica	36.57	25.98	31.36	24.84	24.88	22.38	19.12	19.97	21.40
Martinique	6.88	n.a	n.a	n.a	8.51	n.a	n.a	n.a	n.a
Montserrat	21.24	27.85	32.82	43.22	38.57	23.15	16.92	25.24	31.20
St Kitts/Nevis	47.77	43.71	41.75	41.06	33.49	32.44	30.30	31.24	27.85
St Lucia	45.92	49.81	52.71	51.08	57.14	56.31	57.08	54.89	56.13
St Vincent and Grenadines	30.01	20.65	21.70	21.49	18.38	27.08	28.63	27.70	28.56
Suriname	0.56	0.72	7.14	4.36	6.98	5.68	9.35	6.72	n.a
Trinidad and Tobago	1.97	2.08	1.86	1.93	1.47	2.14	3.55	3.39	3.10

Source: Central Statistical Offices, IBRD and CDB Reports