FIRST DRAFT

(A work in progress)

DISASTER RISK REDUCTION COUNTRY PROFILE

for

Saint Lucia

COUNTRY DOCUMENT

Prepared on behalf of
The Government of Saint Lucia
National Emergency Management Organisation

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GLOSSARY

More information: http://www.unisdr.org/files/7817_UNISDRTerminologyEnglish.pdf

Disaster Risk Reduction Terminology

The terminology used for the preparation of this document is UNISDR's terminology and definitions and/or terminology established in the national legal framework. The aim is to promote understanding and use of common DRR concepts, as well as support DRR efforts undertaken by the government, experts and the public.

A Disaster is:

A serious disruption of the functioning of a community or a society, causing widespread human, material, economic and environmental losses which exceed the ability of the affected community or society to cope using its own resources. Source: ISDR

Disaster = Hazard Exposure x Vulnerability

Disaster Risk Reduction = Reduced hazard exposure and lessened vulnerability

Anthropogenic hazards
Hazards created through the action of human activity (Baastel-ESL and Stakeholders)

Capacity
Physical social, economic and institutional means as well as skilled personal or collective attributes such as leadership and management (ISDR)

Capacity building
Efforts aimed to develop human skills or societal infrastructures within a community or organization needed to reduce the level of risk. Capacity building also includes development of institutional, financial, political and other resources, such as technology at different levels and sectors of the society. (ISDR)

CARICOM Framework
Ten year (2005-2015) Framework for disaster management in the Caribbean presented through CDERA at the World Conference on Disaster Reduction (WCDR), Kobe, Japan, 2005 as input to the Hyogo Framework for Action 2005-2015. (Baastel-ESL)

Comprehensive Disaster Management (CDM)
Comprehensive Disaster Management which includes attention to all phases of the Disaster Management Cycle – prevention, mitigation, preparedness and response, recovery and rehabilitation (CDERA). It includes emphasis on reducing risk. This nomenclature is the term that reflects the global trend in the discipline for increased focus on risk management and the intense desire among disaster management Stakeholders in the Caribbean to accelerate initiatives in promoting disaster loss reduction. DRM as defined by ISDR is explained below.

Community Resilience

The ability of a community to cope with the effects of a hazardous event through appropriate prevention, mitigation, preparedness, response and recovery mechanisms (adapted from WCDR)

Coping Capacity
The means by which people or organizations use available resources and abilities to face adverse consequences that could lead to a disaster. In general, this involves managing resources, both in normal times as well as during crises or adverse conditions. The strengthening of coping capacities usually builds resilience to withstand the effects of natural and human-induced hazards (ISDR)

Disaster Risk Management (DRM)
The systematic process of using administrative decisions, organization, operational skills and capacities to implement policies, strategies and coping capacities of the society and communities to lessen the impacts of natural hazards and related environmental and technological disasters. This comprises all forms of activities, including structural and nonstructural measures to avoid (prevention) or to limit (mitigation and preparedness) adverse effects of hazards. (ISDR)

Disaster Risk Reduction (DRR)
The conceptual framework of elements considered with the possibilities to minimize vulnerabilities and disaster risks throughout a society, to avoid (prevention) or to limit (mitigation and preparedness) the adverse impacts of hazards, within the broad context of sustainable development. DRR involves:

- Risk awareness and assessment including hazard analysis and vulnerability/capacity analysis;
- Knowledge development including education, training, research and information;
- Public commitment and institutional frameworks, including organizational, policy, legislation and community action;
- Application of measures including environmental management, land-use and urban planning, protection of critical facilities, application of science and technology, partnership and networking, and financial instruments;
- Early warning systems including forecasting, dissemination of warnings, preparedness measures and reaction capacities (ISDR)

Donor Harmonization
Collaboration among donors or development partners on programme initiatives so as to avoid duplication and to optimise resource allocation (Eastern Caribbean DonorGroup /Development Partners)

Early Warning
The provision of the means by which people or organizations, use available resources and abilities to face adverse consequences that could lead to a disaster. In general, this involves managing resources, both in normal times as well as during crises or adverse conditions. The strengthening of coping capacities usually builds resilience to withstand the effects of natural and human-induced hazards (ISDR)

Intermediate Results (IRs)
Interim Targets set to measure progress toward achievement of Strategic Objective (CDERA CDM Strategy)

Mainstreaming
Making Comprehensive Disaster management an integral dimension of the policies and programmes in all political, economic and societal spheres (BCPR)

Mitigation
Structural and non-structural measures undertaken to limit the adverse impact of natural hazards, environmental degradation and technological hazards (ISDR)

National Disaster Organization (NDO)
The NDO in this document refers to the national organizational structure of agencies linked for the purpose of attending to the legal, institutional and operational aspects of disaster prevention and mitigation, preparedness and response and recovery and rehabilitation. The NDO is generally headed by the Prime Minister or Head of government in the respective
country. (Baastel-ESL)

National Disaster Management Office (NDMO)
The NDMO is the government agency with focal responsibility for disaster management in the respective country. It is generally headed by the country's Disaster coordinator (Baastel-ESL)

Outcomes
Targets to be achieved in the Medium-term in the results-based framework. Outcomes result from an amalgam of short- term outputs (Baastel)

Outputs
Short-term Results from activities undertaken toward the medium-term outcome (Baastel)

Preparedness
Activities and measures taken in advance to ensure effective response to the impact of hazards, including the issuance of timely and effective early warnings and the temporary evacuation of people and property from threatened locations (ISDR)

Prevention
Activities to provide outright avoidance of the adverse impact of hazards and means to minimize related environmental, technological and biological disasters. Depending on social and technical feasibility and cost/benefit considerations, investing in preventive measures is justified in areas frequently affected by disasters. In the context of public awareness and education, related to disaster risk reduction changing attitudes and behaviour contribute to promoting a "culture of prevention". (ISDR)

Program Based Approach
A way of engaging in development cooperation based on the principle of coordinated support for a locally owned programme of development. The approach includes four key elements:
• Leadership by the host country or organization.
• A single programme and budget framework.
• Donor coordination and harmonization of procedures.
• Efforts to increase the use of local procedures over time with regard to programme design and implementation, financial management, and monitoring and evaluation." (Baastel)

Recovery
Decisions and actions taken after a disaster with a view to restoring or improving the predisaster living conditions of the stricken community, while encouraging and facilitating necessary adjustments to reduce disaster risk. Recovery (rehabilitation and reconstruction) affords an opportunity to develop and apply disaster risk reduction measures (ISDR)

Relief / response
The provision of assistance or intervention during or immediately after a disaster to meet the life preservation and basic subsistence needs of those people affected. It can be of an immediate, short-term, or protracted duration. (ISDR)

Resilience
The capacity of a system, community or society potentially exposed to hazards to adapt, by resisting or changing in order to reach and maintain an acceptable level of functioning and structure. This is determined by the degree to which the social system is capable of organizing itself to increase its capacity for learning from past disasters for better future protection and to improve risk reduction measures. (ISDR)

Results Based Management
"Rather than focusing programme/project management efforts on the monitoring of inputs, activities and processes, an RBM approach concentrates on 'results' and places emphasis on the following dimensions: **Defining realistic results** based on appropriate analysis and context;
Clearly identifying programme beneficiaries and designing programmes/projects that meet their needs and priorities; Using results information to **make effective management decisions**;
Monitoring the progress made towards expected results with the use of appropriate indicators (Baastel)

Risk

The probability of harmful consequences, or expected losses (deaths, injuries, property, livelihoods, economic activity disrupted or environment damaged) resulting from interactions between natural or human-induced hazards and vulnerable conditions.

Conventionally risk is expressed by the notation Risk = Hazards x Vulnerability. Some disciplines also include the concept of exposure to refer particularly to the physical aspects of vulnerability.

Beyond expressing a possibility of physical harm, it is crucial to recognize that risks are inherent or can be created or exist within social systems. It is important to consider the social contexts in which risks occur and that people therefore do not necessarily share the same perceptions of risk and their underlying causes. (ISDR)

Vulnerability

The conditions determined by physical, social, economic, and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards (ISDR)

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2. SUMMARY FOR POLICY MAKERS

The executive summary synthesizes the main points of the document, objectives, scope, conclusions and recommendations. It also describes the criteria considered, emphasizing the analysis of disaster risk in the country (hazards, vulnerabilities and capacities), priorities and strategic interventions for DRR. The information should be backed up with figures as much as possible to enhance its validity and credibility. It is recommended that this section not exceeds three pages.

Saint Lucia, like the other SIDS, is highly prone to devastating natural disasters. Its vulnerability can be attributed to (a) its small geographical area, which accounts for the fact that disasters take country-wide proportions; (b) its location in some of the highest risk areas of the planet, such as mid-ocean ridges with strong volcanic and seismic activity, tropical cyclone belts, and direct exposure to the forces of the oceans; and (c) the fact that it is dependent on few sources of income, in the agricultural sector or in tourism, for a substantial part of its gross national product (GNP). These sources of income have been severely reduced for months by a single catastrophic event.

The potentially deleterious effects of global climate change and natural catastrophes (earthquakes, tsunamis, hurricanes, and volcanic activity) on country's economic resources – including land resources are becoming increasingly difficult to anticipate. Increases in the frequency and intensity of extreme weather and climate events, such as heavy rainfall, strong winds, drought and high sea temperatures and levels, are already occurring. These and other events have claimed lives, caused severe damage to infrastructure and other economic assets and caused adverse effects on livelihoods. Importantly, these changes and their adverse consequences are projected to escalate in the near and longer terms. Hence, adaptive management must be considered an imperative to decrease the vulnerability of regions, communities and groups/individuals.

According to the United Nations' Economic Commission for Latin America and the Caribbean (ECLAC) Macro Socio-Economic Damage Assessment report (December 2010), the total impact from Hurricane Tomas represents 43.4% of Saint Lucia's GDP - nine times its agricultural GDP, three times its tourism GDP, 62% of exports

Another critical factor which highlights Saint Lucia's vulnerability is its limited capacity to reactivate the development process. The fragility of ecosystems, coupled with limited human resources, often preclude any possibility of developing and implementing meaningful disaster-mitigation programmes.

Environmental disasters such as that experienced in Soufriere during Hurricane Tomas, are hardest on the poor, who also face the highest income disparities.

DRR is attaining increased prominence and attention from a national to global scale, with such demonstrable impacts of multiple disasters and climate change on the social and economic fabric of communities. The Global Assessment Report (GAR), 2011, states that while great strides have been made in reducing loss of life, for at least weather related disasters, the reality remains that disaster-related socio-economic losses continue to rise. This is particularly so in developing countries where damage to housing and critical local infrastructure and public assets such bridges, schools and health facilities has risen sharply. For example, over the past three decades, the risk of economic loss as a result of floods rose by over 160 per cent, while economic loss incurred as a result of cyclones surged by 265 per cent in member countries of the Organisation for Economic Cooperation and Development (OECD)[1]. It is therefore apparent that the risk of losing wealth to natural disasters is beginning to outpace wealth creation, and as advocated, disaster risk reduction (DRR) must of need be incorporated in all sustainable development strategies[2].

Disaster Risk Reduction (DRR):
The conceptual framework of elements considered with the possibilities to minimize vulnerabilities and disaster risks throughout a society, to avoid (prevention) or to limit (mitigation and preparedness) the adverse impacts of hazards, within the broad context of sustainable development.
Source: ISDR

Recalling that during recent decades the country has been adversely affected by a succession of hurricanes, disastrous floods and landslides, and cognisant of the need to complement the initiatives of the global and regional level including Hyogo, St Marc. , UNISDR, SGD, (Pan Caribbean Disaster Preparedness and Prevention Project), CDM Strategies, etc., the GOSL through the NEMO is keen to enable an appropriate

[1] UN, 2011. 2011 Global Assessment Report (GAR) on Disaster risk reduction (DRR) – Revealing Risks, Redefining Development.

[2] Nassir Abdulaziz Al-Nasser, President of the General Assembly for RIO +20 Conference in thematic debate on disaster risk reduction: "addressing disaster risk reduction is therefore inseparable from the broader sustainable development agenda,"

mechanism involving all relevant national entities, to facilitate the implementation of a DRR approach and the coordination of DRR interventions in order to realise benefits such as[3]:

- Protected development gains and less diversion of development resources to disaster response and recovery
- active citizen participation and local democracy
- increased investment in buildings and property in anticipation of minimised disaster loss
- increased capital investment in infrastructure and critical buildings, including retrofitting, renovation and renewal
- increased business opportunities, economic growth and employment, due to attraction of investment in resilient economy
- balanced ecosystems, which foster provisioning and cultural ecosystem services such as fresh water and recreation
- overall better health and well being
- improved education in safer schools

As financial resources continue to decline, the GOSL, like all other governments, is being driven to increasingly give consideration to resilience building through disaster risk design and planning, particularly when undertaking public investments in infrastructure, health and education, etc, cognisant of the myriad of benefits.

It is against this background, that the country welcomed the privilege to participate as one of the pilot countries in the elaboration of a DRR country profile (DRR-CP). It is envisaged that the DRR-CP will provide a comprehensive overview of the status of DRR in the country, the progress made in reducing risk, the definition of priorities and strategies, the major challenges faced in reducing the loss of lives, as well as the economic, social and environmental impacts risks generate, in order to assist in disaster risk design, planning and investment.

(Objectives, Scope, Findings and Recommendations)

<u>Summary of Findings in Compilation:</u>

Analysis of Disaster Risk in Country

- <u>Hazards</u>

[3] UNISDR, 2011. The Making Cities Resilient Campaign. Urban risk reduction as an opportunity – what are the benefits?

Hazard analysis and experience have confirmed that Saint Lucia is prone to numerous hazards, both natural and manmade:

a) **Natural:** Fire, Seismic, Volcanic, Tsunami, Flooding, Landslide, Storm, Hurricane
b) **Manmade**: Dam Collapse, Explosion, Oil/Chemical Spill, Mass Casualty, Nuclear spill, Civil Unrest
c) **Slow Onset:** Drought, Famine, Plague

- Vulnerabilities

Current and emerging development challenges and the impact of various hazards on key sectors of the economy point to physical, social and economic vulnerability; and in turn the consequences of these impacts on sustainable national development.

Major drivers of disaster risk identified for Saint Lucia include:

- Unplanned development
- Concentration of economic assets – critical infrastructure, national assets, concentrated in coastal regions
- Increasing rural-urban migration and population density
- Weak local governance
- Conflicts regarding limited available land (allocation and use) resulting in poor land use (squatting, development in sensitive areas) and land degradation
- Lack of enforcement of building codes, etc.
- Ecosystem decline – exploitation and alteration of ecosystems result in loss of ecosystem services
-

Capacities

Capacities were examined at all three levels, systemic, institutional and individual and status determined as follows:

- Systemic
    - Well-developed organisational capacity for preparedness and response
    -
- Institutional
    - A developing local government structure
- Individual

Priorities for DRR

Need for comprehensive and innovative policies and interventions to deal with disaster risk.

Strategic Directions/Interventions for DRR

2. ACRONYMS

BCPR	Bureau for Crisis Prevention and Recovery
CARICOM	Caribbean Community
CDERA	Caribbean Disaster and Emergency Response Agency
CDM	Comprehensive Disaster Management
CPC	Caribbean Programme Co-ordination Office (PAHO) in Barbados
CSME	Caribbean Single Market and Economy
CU	Coordinating Unit
DANA	Damage Assessment and Needs Analysis
DRM	Disaster Risk Management
DRR	Disaster risk Reduction
DRRC	Disaster Risk Reduction Centre
IR	Intermediate Result
ISDR	International Strategy for Disaster Reduction
OECS	Organisation of Eastern Caribbean States
PBA	Program-Based Approach
PMP	Project Monitoring Program
RBM	Results-Based Management
SGD	St George's Declaration
SO	Strategic Objective
UWI	University of the West Indies
WCDR	World Conference on Disaster Reduction

3. INTRODUCTION

3.1 BACKGROUND

The preparation of **Saint Lucia's Disaster Risk Reduction (DRR) Country Document** was made possible through the financial support of the **UNISDR DIPECHO Project** (UNISDR) through the United Nations International Strategy for Disaster Risk Reduction Programme. The report compilation is recognized and appreciated as the result of the combined input and participation of a wide range of stakeholders across the various sectors of the Saint Lucian economy, including government agencies, statutory bodies, non-governmental organizations and civil society. The process, which commenced in March 2012, was executed under the oversight of the UNISDR Focal Points in Panama and Barbados, and coordinated through the National Counterpart, the National Emergency Management Organisation (NEMO).

Final approval was obtained through a national consultative process with the broad-based national workshops held with Community Disaster Management Committees on September 11, 2012, and the members of the National Emergency Management Advisory Committee (NEMAC) on September 12, 2012, with a cabinet conclusion sought from the Cabinet of Ministers on October …. 2012.

The main components of the DRR-Country Profile Document are:

- identification of national circumstances that impact DRR;
- compilation of disaster inventory;
- risk identification and analysis - integration of vulnerability and adaptation assessments;
- status of DRR interventions;
- priorities for DRR in country; and
- strategic directions for DRR .

In undertaking this compilation, the outputs of previous documents related to hazard risk management and resilience building such as National Emergency Management Plan and the myriad of associated hazard, sector, etc, plans, including the National Hazard and Mitigation Policy and Plan, Strategic Plan for Climate Resilience, Second National Communication to UNFCC, Mauritius Strategy (MSI), among others, were considered against the backdrop of current and emerging development challenges and the impact of various hazards on key sectors of the economy. In addition, the issue of physical, social and economic vulnerability and the consequences of these impacts on sustainable national development weighed heavily in the risk analysis including, determining the prioritisation of risk scenarios and areas for intervention, as well as recommendations for the strategic directions for DRR in the country. These analyses, along with the wider vulnerability of Small Island Developing States, generally led to the selection of –

vulnerable sectors – tourism, agriculture, coastal sector, critical infrastructure, financial services, forestry, marine biodiversity, health, and human settlements; at-risk populations with regard to vulnerable areas and vulnerable groups – women, children, elderly as the sectors of interest in this current profile. The wide range of sectors and services reflects both the growing importance of these sectors to the Saint Lucian economy and recent impacts on them by disaster events. It is envisaged that future updating of the Country Profile/document will serve to identify changes with regard to the vulnerability profile, in terms of at-risk populations, sectors, services, among others.

3.2 Purpose of the Country Document

A key objective of The Country Document's is to provide a comprehensive overview of the status of DRR in the country, the progress made in reducing risk, the definition of priorities and strategies, the major challenges faced in reducing the loss of lives, as well as the economic, social and environmental impacts risks generate. It is intended to harmonize and link existing DRR information in the country, both for the preparation and the updating of the Country Document, as well as to fill the need for documentation on the current state of DRR in the countries as an element of sustainable development.

The Country Document allows objective assessment of progress made and of the processes implemented for the reduction of vulnerability and the strengthening of resilience to risks caused by natural and other hazards. The assessment identifies at-risk populations and the public institutions that seek to protect them by strengthening the community-centred DRR platform and as a means to reach the most isolated vulnerable communities. It is also an important reference document for the design of policies and strategies, the planning and implementation of DRR activities, and decision making for action by representatives of national systems, organizations and institutions that work on DRR in the country and international cooperation agencies. It is expected that the Document will be used to influence authorities at various levels of national management, as well as to facilitate the establishment of channels for mutual help and cooperation.

Using the original information as a foundation, it is envisaged that the document will be continuously updated with value-added information. This instrument has therefore been designed to be flexible, and thus adaptable to changing circumstances and to the continuous inclusion of improvements and innovations. Thus it can become the institutional DRR memory of the country.

The Country Document is meant to be a joint guide, validated by authorities, scientific bodies, cooperation agencies and communities, which identifies the major hazards, vulnerabilities and capacities at national, sub-national and local levels, and guides the organization of coordinated and complementary action for DRR in priority intervention sectors.

It is expected that the Country Document will be useful to DRR national systems, HFA focal points, national and local authorities, agencies and actors linked to DRR as a national reference document to guide the formulation of actions and activities, to promote policies and decision making for DRR and to develop sustainably.

4. METHODOLOGY

4.1 Methodology of Process

Figure 1 outlines the methodology used in the process of preparing the Country Profile Document.

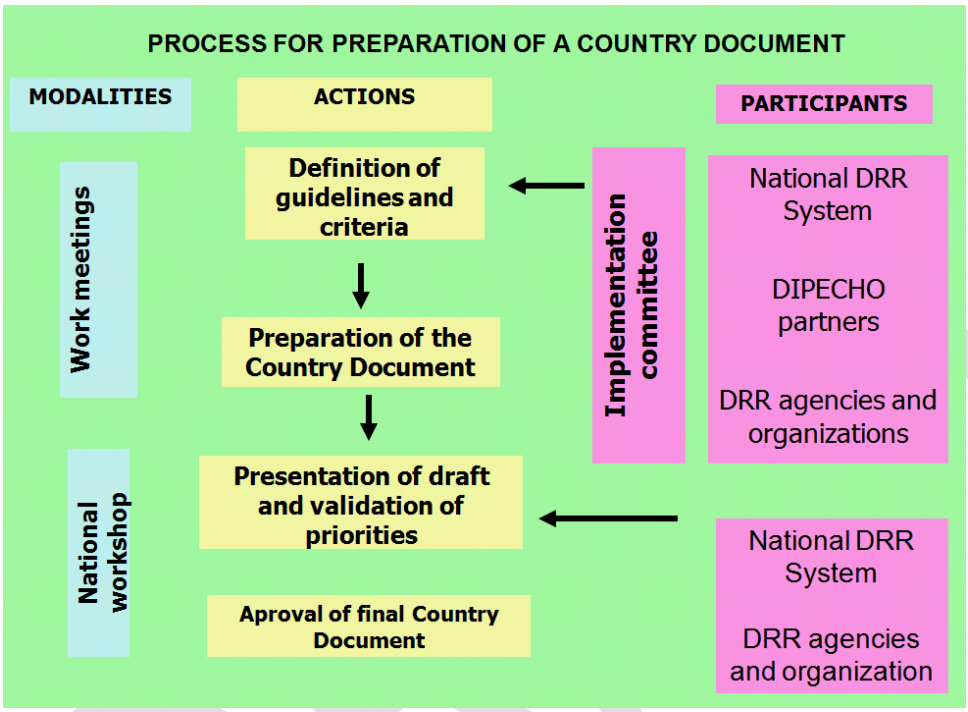


Figure 1. Process for Preparation of Country Document

Participants

The process of preparing the Country Document was inclusive and participatory, under the leadership of the entity with responsibility for coordinating the national disaster risk management (DRM) system, the NEMO. The process involved the collaboration of all the actors, including national authorities responsible for DRR implementation in the country, key stakeholders working on DRR in all relevant sectors (such as health, education, planning, housing and development, economic affairs and finance, etc.), technical and scientific institutions, the private sector, civil society, international cooperation agencies, DIPECHO partners, and members of existing DRR platforms, among others.

Modalities

The process of preparing the Country Document was facilitated mainly through meetings, focus group discussions, one-on-on interviews and national workshops involving the participation of all the actors identified above. Other modalities utilised during the process of development of the document included telephone discourses and the use of other e-media, such as e-mail and skype. Two national consultations/workshops were held, to obtain feedback at the policy, technical and community levels, to validate and finalise the draft Country Document. A workshop with the relevant national authority, National Emergency Management Advisory Committee (NEMAC), was scheduled, to obtain final approval for the Document as a nationally approved docment.

Information Needs

The Country Document responds to information requirements about the state of disaster risk and the management of risk reduction at the national level. The knowledge, experience, and perceptions of key stakeholders of the national system, platforms or committees participating in the process form the basis for the information's development.

The information compiled in this document was the most relevant and available at the time of the Document's preparation.

Phases of the process

Saint Lucia adopted the recommended three-stage process for elaboration of the document, which comprised:

1° Planning,

2° Joint development or updating of the Country Document, and

3° Consultation and approval.

Actions undertaken

The following were the actions undertaken in each phase:

First phase, planning:

- Definition of criteria and guidelines for the process,
- Identification and contact with participants and key stakeholders,
- Preparation of the work plan and schedule, and
- Definition of methodological aspects: items for analysis and the design of tools for compiling information.

Second phase, joint preparation or updating of the Country Document:

Gathering of information from direct and indirect sources,

- Organization of the information compiled,
- Analysis of the information, and
- Preparation or updating of the Country Document.

Third phase, consultation and approval:

- Presentation of the draft Country Document,
- Consultation to gather additional information and suggestions,
- National workshop to validate and gather final inputs, and
- Validation and approval of the Country Document.

5. INTERNATIONAL AND REGIONAL CONTEXT FOR DRR

5.1 International DRR Context

The Yokohama Strategy and Plan of Action for a Safer World was adopted at the World Conference on Natural Disasters in 1994. In an effort to ensure implementation of the Plan, the United Nations General Assembly Resolution A/RES/54/219 adopted the International Strategy for Disaster Reduction (ISDR) and created the secretariat of the ISDR (UNISDR) in 1999. The International Strategy for Disaster Reduction (ISDR) was adopted, as a follow-up of the International Decade on Natural Disaster Reduction (IDNDR) 1990-1999 by the Member States of the United Nations in 2000. This strategy aims to achieve substantive reduction of disaster losses and build resilient communities and nations, as an essential condition for sustainable development.

The worsening scenario with regard to disasters and economic loss, led countries to consider the usefulness of making commitments and developing international frameworks in various spheres for DRR and to increase the resilience of nations and communities. It likewise made evident the urgent need for a DRR tool that enabled a strategic and systematic approach for the reduction of vulnerability to hazards and the risks they generate.

In this context, a review of the Yokohama Strategy and Plan of Action for a Safer World by the UNISDR in 2003/2004, the outcomes were used to form the basis of the Hyogo Framework for Action which was submitted at the World Conference on Disaster Reduction in Kobe, Japan, in January 2005. One hundred and sixty-eight (168) Member States of the United Nations met at the World Conference on Disaster Reduction in Kobe, Hyogo, Japan, in January 2005 and adopted the *Hyogo Framework for Action (HFA) 2005–2015: Building the Resilience of Nations and Communities to Disasters*[4]. The goal of the HFA is to assists the efforts of nations and communities to become more resilient to, and cope better with the hazards that threaten their development gains; in terms of achieving "the substantial reduction of disaster losses by 2015, in lives as well as the social, economic and environmental assets of communities and countries" and is the reference framework for DRR public policy.

The adoption of the Hyogo Framework for Action 2005-2015 by the World Conference on Disaster Reduction in 2005 and its subsequent endorsement by the General Assembly of the United Nations (A/RES/60/195) were thus the culmination of the process which started in 1989/1990, with the declaration of the International Decade for Natural Disaster Reduction (A/RES/42/169). Governments around the world have committed to take action to reduce disaster risk, and have adopted a guideline to reduce vulnerabilities to natural hazards. The HFA is the key instrument for implementing disaster risk reduction, adopted by the Member States of the United Nations.

In this regard, many countries have made significant progress in understanding DRR through social research, the exchange of experiences and the participation of social and political sectors not previously included. During this time it has also become evident that there is a close link between development and disasters, and that development processes play a major role in the

[4] http://www.unisdr.org/hfa

configuration of socially constructed risk. For this reason it has been recognized that reducing disaster risk is necessary to achieve the Millennium Development Goals of the Millennium Declaration[5].

As a result, important efforts in the implementation of the HFA and toward the achievement of the Millennium Development Goals have been through the promotion of forums, platforms and mechanisms for coordination, collaboration and the exchange of knowledge and experiences in DRR. Such concrete actions are evidenced in the establishment of DRR platforms, promoted by UNISDR, which have the goal of raising the political profile of DRR in all sectors and to contribute to the achievement of the Millennium Development Goals, particularly those related to poverty reduction and environmental sustainability.

Some of the main agreements, strategies and international platforms for DRR are highlighted in Table 1.

Table 1. Main Agreements, Strategies and International Platforms for DRR

Year	Strategy, Agreement and Platform
1989	International Decade for Natural Disaster Reduction
1994	Yokohama Strategy and Plan of Action for A Safer World
2000	International Strategy for Disaster Reduction Millennium Declaration/Millennium Development Goals[6]
2002	Johannesburg Plan of Implementation/World Summit on Sustainable Development
2005	World Conference on Disaster Reduction/Hyogo Framework for Action (HFA)[7] 2005 -2015
2007	First Session of the Global Platform for Disaster Risk Reduction
2009	Second Session of the Global Platform for Disaster Risk Reduction First Meeting of the Regional Platform for DRR in the Americas
2011	Third Session of the Global Platform for Disaster Risk Reduction Second Meeting of the Regional Platform for DRR in the Americas

Source: UNISDR

[5] The United Nations Millennium Declaration, signed in September 2000, commits world leaders to combat poverty, hunger, sickness, illiteracy, environmental degradation and discrimination against women. The Millennium Development Goals, which stem from the Declaration, define objectives and specific indicators.
[6] UN Millennium Development Goals: http://www.un.org/millenniumgoals/
[7] UNISDR HFA: http://www.unisdr.org/hfa

In addition to the UN/ISDR secretariat, the Global Platform for Disaster Risk Reaction[8] is also an international element of the ISDR System.

The **Global Platform for Disaster Risk Reduction** is the main global forum for governments, United Nations agencies, international financial institutions, regional bodies, civil society, the private sector, the scientific, and academic communities. It is responsible for raising awareness and reiterates commitments, for sharing experience on implementation among stakeholders and Governments, addressing gaps, and for providing strategic guidance and coherence for implementing the Hyogo Framework. Thematic clusters, groups and platforms work on specific topics of the disaster risk reduction agenda, such as: climate change adaptation, education, urban risk, early warning, recovery and capacity development. The Global Platform appoints a committee to advise on programmatic priorities and direction to the Global Platform.

The DRR work undertaken by intergovernmental bodies is also noteworthy, such as that of the Organization of American States (OAS), the Community of Latin American and Caribbean States (CELAC), the Caribbean Disaster Emergency Management Agency (CDEMA), the Ibero-American General Secretariat (SEGIB), the Union of South American Nations (UNASUR), Andean Committee for Disaster Prevention and Response (CAPRADE), the Coordination Centre for the Prevention of Natural Disasters in Central America (CEPREDENAC), the Civil Defence, Civil Protection and Humanitarian Aid (REHU) and the Iberoamerican Association of Governmental Organizations of Civil Defence and Protection, among others. These bodies promote information exchange through, for example, the OAS Working Group CEPCIDI (Permanent Executive Committee of the Inter-American Council for Integral Development – CIDI-) to Strengthen (CIDI) (and the Inter American Network for Disaster Mitigation (INDM), the Inter-American Network on Disaster Mitigation (RIMD), the Meeting of Mechanisms for Emergencies from Natural Disasters led by SEGIB, the Forum for the Coordination and Cooperation of Sub-regional Mechanisms for Disaster Risk Management in the Americas, the Working Group on Risk, Emergencies and Disasters in Latin America and the Caribbean—REDLAC, Regional Meetings about International Humanitarian Mechanisms in Latin America and the Caribbean—MIAH, among others.

The HFA has been instrumental in assisting countries to embark on a path of change that is now irreversible. The HFA has thus contributed to increasing understanding, knowledge and developing approaches and priorities for reducing disaster risk and building resilience. This is being further supplemented by the momentum that DRR is also gaining in the international arena in the various discussions and planning around sustainable development, climate change adaptation, the Millennium Development Goals or more broadly public and private investment strategies.[9] For more information about the Hyogo Framework for Action and regional mechanisms, see "**Annex 1**, International and Regional Framework for Disaster Risk Reduction".

[8] The Global Platform for Disaster Risk Reduction is replacing the Inter-Agency Task Force with its same mandate and open-ended participation by Member States. www.preventionweb.net/globalplatform

[9] The HFA also contributed to the on-going debate leading up to the Rio+20, UN Conference on Sustainable Development in June 2012, with many disaster-prone countries making the point that disaster risk reduction offers an approach towards achieving sustainable development without increasing vulnerability and exposure to natural hazards.

Further, the HFA has assisted in making more explicit linkages between disaster risk reduction and managing climate-related risks and climate change adaptation. The Inter-governmental Panel on Climate Change Special Report on Managing the Risk of Extremes and Disasters (IPCC/SREX) (Summary released in November 2011) demonstrates that many measures to address natural hazard risk such as good land use planning, environmental protection and preparedness and early warning systems are also effective no-regret actions for adaptation to climate change. The HFA is also recognised as a pillar by parties to the UN Framework Convention on Climate Change with regard to efforts to adapt to climate change.

The issue of at-risk populations (vulnerable groups) is increasingly being articulated within the DRR agenda. The need to "raise awareness for a child-centred approach to DRR and stronger commitment from governments, donors and agencies to take appropriate steps to protect children and to utilise their energy and knowledge to engage in DRR and climate change adaptation" became enshrined in a "Children's Charter for Disaster Risk Reduction".[10] The Charter which has been developed from consultations with more than 600 children in 21 countries in Africa, Asia and Latin America, has seen initiatives advanced at the regional level in Latin America and the Caribbean. In this regard, and emanating from the Panama Declaration on Disaster Risk Reduction in the Education Sector in Latin America and the Caribbean[11], were commitments from governments of the region to establish a Regional Thematic Platform for disaster risk management in the education sector. The aim is to focus on educational infrastructure with a view to ensuring a right to education in emergency and disaster situations, through aspects of policy, information systems and strengthened coordination and cooperation links with regard to disaster risk management.

Trends in recent disaster events with regard to at-risk populations (vulnerable groups) also reveal a growing problem of the elderly/ older population and DRM. Recent events have shown that some characteristics of older adults put them at greater risk of illness and death during many types of emergencies. For example, older adults may have impaired mobility, diminished sensory awareness, multiple chronic health conditions, and social and economic limitations—all of which can impair their ability to prepare for, respond to, and adapt during emergencies.[12]

Recent World Disaster Risk Reduction Campaigns such as "Disaster risk reduction begins at school" 2006-2007, "Hospitals safe from disaster" 2008-2009, "Making Cities Resilient – My city is getting ready!" 2010-2015, which follow on the themes of the previous campaigns through the global advocacy initiative *called* "One Million Safe Schools and Hospitals", are also contributing to the dialogue on DRR.

[10] The Children's Charter for Disaster Risk Reduction was launched during the Global Platform for Disaster Risk Reduction held in May 2011 in Geneva. See: http://www.childreninachangingclimate.org/database/CCC/Publications/children_charter.pdf

[11] Declaration approved and signed in Panama City on Friday, 14 October 2011.

[12] Centers for Disease Control and Prevention. *Identifying Vulnerable Older Adults and Legal Options for Increasing Their Protection During All-Hazards Emergencies: A Cross-Sector Guide for States and Communities.* Atlanta: U.S. Department of Health and Human Services; 2012.

International support to the region must also be recognized. Experience to date indicates the need for greater effort to improve coordination between organizations and cooperation agencies to develop synergies and a more holistic understanding of risk, sustainable development, environmental management and their interaction.

5.2 Regional Context for DRR

A similar range of processes with regard to DRM and DRR, albeit not as extensive as at the global level, has been implemented at the initiative of regional agencies national governments, civil society organisations, donors and business. In the last two decades, the policy environment of SIDS has changed radically, from one where little attention was being paid to issues of disaster risk management and disaster risk reduction , to one where complex and sophisticated institutional arrangements have been put in place, where the linkages between disaster management and economic development, particularly in the context of natural resource management and environmental quality are far better understood, as the concern for sustainable development has begun to infiltrate all spheres of public policy (Brown et al. 2007).

The regional context for DRR in Saint Lucia is consequently, largely defined by the policy commitments contained in regional and global conventions and agreements such as the Johannesburg Declaration, the Mauritius Strategy for Implementation (MSI) of Agenda 21 and the Millennium Declaration and the Millennium Development Goals which are driving development aid and development agendas worldwide. Saint Lucia is also committed to the implementation of the Barbados Programme of Action (BPoA)[13]. The BPoA and the MSI underscore the particular vulnerability of SIDS in the face of climate change and outline specific response measures to be taken at national, regional and global levels.

The regional (CARICOM) development agenda has been hinged on the concept of sustainable development, which encompasses economic, social, environmental and governance dimensions, while the sub-regional agenda of the Organisation of Eastern Caribbean States (OECS) is anchored in the dimension of human development. As part of the OECS, Saint Lucia is signatory to the St George's Declaration of Principles of Environmental Sustainability in the OECS (SGD), 1979, which embodies the commitment of governments of the Eastern Caribbean to "environmentally sustainable development as essential for the creation of jobs, a stable society, and a healthy economy". The governments have adopted 21 principles for promoting environmental sustainability and expressed their commitment to provide the resources required for their implementation.

[13] The BPoA sets forth specific actions and measures to be taken at the national, regional and international levels to support the sustainable development of Small Island Developing States (SIDS).

St George's Declaration of Principles of Environmental Sustainability in the OECS

Principle # 9 speaks to *Integrated Disaster Management* whereby *"Governments will integrate disaster management initiatives with environmental priorities to help the peoples of the region in their preparation for and management of the impacts of natural and man-made disasters."*

Principle #8 embraces *"Preparation for Climate Change"* whereby *"Governments will enact laws, create organizations and institutions and provide money to assist people and communities to adapt to the impact of climate change."*

The revisions to the St. George's Declaration of Principles for Environmental Sustainability (SGD) in the Organisation of Eastern Caribbean States (OECS) in 2006 re-emphasise among other issues, the initiation of sustainable development strategies, with a strong focus on capacity building to guide and support processes in this regard. (Goal 1) and achieve long-term protection and sustained productivity of the region's natural resource base and the ecosystem services it provides (Goal 30. A stronger focus on disaster risk reduction is evident in the number of supportive actions that have been initiated towards this end to "reduce vulnerability to risks, stresses and shocks" in order to achieve the overall aim of fostering equitable and sustainable improvement in the quality of life in the OECS region.

Comprehensive Disaster Management [CDM] was conceptualized by the Caribbean Disaster Emergency Response Agency [CDERA] as a new direction for disaster management for the 21st century. The 2001 CDM Strategy and Framework (See **Annex xx**), was explicitly connected to the Bridgetown Programme of Action, and removed the focus away from the relief and response mode to disaster, to a more comprehensive approach which takes disaster risk and mitigation considerations into account during the planning and development stages. It also expands the partners to include economic, social, and environmental planners, architects, engineers, and health professionals, among others.

According to the review of the baseline study on the CDM[14] done in 2007, the CDM strategic framework between 2001 and 2006 recorded several successful initiatives in the institutional enhancement of the CDERA Coordinating Unit (CU) as the lead disaster management agency for the region; project support from development partners; donor collaboration; some resource pooling; project implementation; data acquisition and monitoring; sector programming dialogue; stakeholder consultations; and participatory discussions. Hazard identification and analysis, mitigation strategies and emergency response mechanisms have been particularly noteworthy.

The regional CDM Strategy for the CARICOM proposed to focus its programming around the critical actions needed to advance implementation of the five (5) Intermediate Results (IRs) of the 2001 CDM Strategy and Framework. Following review

[14] Le Groupe-conseil baastel ltée& Environmental Solutions Ltd. – March 2007

and participatory discussion the following thematic areas were selected for priority attention within CARICOM over the 2005-2015 period:

- Hazard mapping and vulnerability assessment
- Flood management
- Community disaster planning
- Early warning systems
- Climate change
- Knowledge enhancement

Building Resilience of nations and communities to hazard impacts was determined as the overall focus for the Caribbean region, and it was proposed that resources would be sought to expand and replicate several on-going best practices throughout the region.

Following the spate of disaster events in the year 2004[15] , which brought into sharp focus the impacts of worst-case scenarios, and revealed the limitations in the coping capacities of all affected territories, the ***Kingston Declaration of 2005,*** purposed to provide guidance for the Caribbean countries to improve their disaster risk management capabilities. As early as then, it was recognised that while great strides had been made in disaster preparedness and response coordination, disaster risk has not been significantly reduced in the Caribbean, but rather tends to increase and will increase even further during the coming years and decades; this being due to increasing social, environmental and institutional vulnerability.

The Saint Marc Plan of Action (2007), which is a sub-regional agreement of the Association of Caribbean States (ACS), gives cognizance to disaster reduction as an important element in the achievement of the Millennium Development Goals with respect to poverty reduction and environmental sustainability; as well as the Hyogo Framework of Action.

As part of the ISDR System, Regional Platforms for Disaster Risk Reaction are also promoted by the UN/ISDR secretariat and partners for information sharing and coordination among existing bodies. Regional platforms are multi-stakeholder forums that reflect the commitment of governments to improve coordination and implementation of disaster risk reduction activities while linking to international and national efforts.

Sectoral work is also noteworthy in the region, such as that of PAHO which has conducted an evaluation of the key aspects of disaster risk management, providing a comprehensive description of the state or level of the various aspects of mitigation and

[15] 2004 was a year for multi-event, multi-island impact of hurricanes and tropical systems in the Caribbean, which resulted in casualties of over 6000 and close to US$ 6 Billion in loss of assets in 8 CARICOM member states.

preparedness in the health sector; see the Health Sector Self Assessment Tool for Disaster Risk Reduction[16].

Best practice in some countries, in terms of resilience/capacity for coping and continuity of disaster management agencies, were most notable, as the contrast in the shortcomings in severely stricken countries (e.g. Grenada and Haiti) was highlighted. One important practice related to the location and design of shelters and Emergency Operations Centers with regard to exposure to unnecessary damages. Further the conduct of relief efforts in the context and application of existing disaster response plans, were notable best practices in some countries as opposed to the ad hoc fashion and ineffective efforts in other countries. In addition, the level of community empowerment and local participation during the emergency phase demonstrated the reach and effectiveness of national disaster management agencies.

5.3 National DRR Context

The national disaster management framework was as far back as the early 1980"s guided by a National Disaster Plan. The Plan later evolved into the Saint Lucia National Emergency Management Plan[17] (NEMP), which provided guidelines for national coordination of all resources involved in emergency management, and is the official reference in any emergency situation. The NEMP was first adopted by the Cabinet of Ministers in 1996, with subsequent revisions in 2007 and 2009 and further inclusions in subsequent years following annual reviews.

The most recent revision of the National Emergency Management Plan (2006) comprises six sets of documents namely:

1. General guidelines
2. Nine (9) Policy Documents
3. Seven (7) Guideline Documents
4. Four (4) Standard Operations Procedures [SOPs]
5. Twenty-six (26) National Emergency Plans
6. Seven (7) Sector Response Plans

The evolution of a national DRM framework was also guided by the elaboration of a national CDB strategy which rearticulated the 2001 Regional CDM Strategy utilizing more current terminology and approaches of the Results-based Methodology (RBM), and the Program-Based Approach (PBA). The Enhanced Framework towards Comprehensive Disaster Risk Management (CDRM) presented below reflects this change.

[16] http://new.paho.org/disasters/index.php?option=com_content&task=view&id=1443&Itemid=807

[17] *The Saint Lucia National Emergency Management Plan can be downloaded at* ***http://stlucia.gov.lc/nemp***

GOAL Regional Sustainable Development enhanced through Comprehensive Disaster Management			
PURPOSE *'To strengthen regional, national and community level capacity for mitigation, management, and coordinated response to natural and technological hazards, and the effects of climate change.*			
OUTCOME 1: Enhanced institutional support for CDM Program implementation at national and regional levels	OUTCOME 2: An effective mechanism and programme for management of comprehensive disaster	OUTCOME 3: Disaster Risk Management has been mainstreamed at national levels and incorporated into key sectors of national economies (including tourism, health, agriculture and nutrition)	OUTCOME 4: Enhanced community resilience in CDERA states/ territories to mitigate and respond to the adverse effects of climate change and disasters

Other agreements which guide disaster management at the national level include:

1. Articles Establishing the Caribbean Disaster Emergency Management Agency
2. International Ship and Port Facility Security Code (ISPS Code)
3. Association of Caribbean States - Agreement to Create the Special Committee on Natural Disasters
4. Memorandum of Understanding between International Federation of Red Cross and Red Crescent Societies and United Nations Office for the Coordination of Humanitarian Affairs in regards to the International Federation assuming a Leading Role in Emergency Shelter in Natural Disasters

The country is signatory to approximately 26 multilateral environmental agreements, with responsibility for implementation across several ministerial portfolios. In 2004, the country approved the formulation of environmental policy as the key mechanism for implementation of the SGD. The National Environmental Policy (NEP) and National Environmental Strategy (NEMS) however, go well beyond the SGD and refer to all policies, plans, programmes and strategies including those developed under international and regional agreements. Hazard risk management, is also key element of the environmental strategy.

Worthy of note, is that the country from as early as 2004 formulated a preliminary set of indicators under a project aimed at promoting Integrated Development Planning (IDP) in the country.

Table 2 highlights some of the key agreements and instruments with the focal agencies/points, of particular relevance to the current disaster management framework.

Table 2. Disaster Management Agreements and Instruments and Focal Agencies/Points

Agreement/Instrument	National Focal Agency	Focal Point
Regional Portfolio among the CARICOM Heads of Government on Sustainable Development, to include Environment and Disaster Management and Water.	Office of the Prime Minister	Prime Minister
Caribbean Disaster Emergency Management Agency [CDEMA]	National Emergency Management Organisation	Director NEMO
International Atomic and Energy Agency [IAEA]	National Emergency Management Organisation	Director NEMO
National Platform for the Global Strategy for Disaster Risk Reduction for the Hyogo Framework	National Emergency Management Organisation	Director NEMO
International Strategy for Disaster Risk Reduction [ISDR]	National Emergency Management Organisation	Director NEMO
Caribbean Tsunami Warning Programme	National Emergency Management Organisation - National Tsunami Contact	Director NEMO
UNESCO IOC CaribeEWS	Saint Lucia Meteorological Service – Tsunami Warning Focal Point	Director Met Service
International Panel for Climate Change [IPCC]	Ministry for Economic Affairs	Permanent Secretary
United Nations Convention on Climate Change (UNFCCC)	Ministry for Physical Development and the Environment	Chief Sustainable Development and Environment Officer
International Health Regulations [IHR]	Ministry for Health	National Epidemiologist
International Ship and Port Security [ISPS]	Royal Saint Lucia Police Force	Designate Authority
International Civil Aviation Authority [ICAA]	Ministry for Civil Aviation	Civil Aviation Officer

SOURCE: NEMO Secretariat

As part of the UN/ISDR systems all countries are encouraged to establish **National Platforms for Disaster Risk Reduction** or other coordination mechanisms. Efforts in this regard, have been for the most part, indirect. There have been efforts by the government, however, in the area of environmental management directed in the areas of public awareness, development of systems for environmental monitoring and legislative review, institutional strengthening and capacity building.

Over the last few years, the HFA has been given increasing emphasis in the areas of monitoring disaster management and processes, and in this regard has been reasonably integrated into the DRR processes of the country. HFA progress reporting has been undertaken since 2009, and these reports have shown a growing concern for reducing disaster risk, with significant progress made against the objectives, goals and priorities of the Hyogo Framework for Action. Significant progress has been made in early warning, preparedness and response, with one notable effect of the HFA process being the bringing together of the many stakeholders in disaster risk reduction including national and local governments, parliamentary forums, inter-government organizations, non-government organizations, community-based organizations and practitioners, the private sector, academic and technical institutions, the media and international organizations. However, the country is still struggling to address underlying risk drivers (need for DRR) and gender and public awareness still not adequately addressed. Further, there is still limited investment in DRM particularly at the sectoral and community level.

The evidence for investing in DRR is clear as risks is increasing, as evidenced by the demonstrable impacts of multiple disasters, with regard to rising socio-economic losses, and further exacerbated by the impacts of climate change; sharp rises in damage to housing and critical local infrastructure and public assets such bridges, schools and health facilities are being reported. There is need to move towards standardised indicators and reporting and to improve the DRR dialogue and information sharing.

6. NATIONAL CIRCUMSTANCES

This section details the country's characteristics, such as: geographic location, territorial and political organization, demography and population aspects, socioeconomic situation, physical aspects (in terms of topography and morphology, climate, hydrology, ecosystems, etc).
In regards to government the section details its structure and organization, levels of decentralization, coordination mechanisms between the State and non-state actors.

6.1 - Physical Environment

6.1.1. Geographic location

Saint Lucia is situated in the Lesser Antillean Arc of the Caribbean Archipelago at latitude 13˚ 53' north and longitude 60˚ 68' west (**Figure 1**). The island is 42 km long, 22 km wide, and has a land area of 616 km^2. It is volcanic in origin and mountainous and rugged in topography, with steep slopes cut by fast-flowing rivers.

Source: Google Earth

Figure 2: Saint Lucia Map and Location in the Caribbean Archipelago

6.1.2 Physiography

The island is characterised by very rugged topography, with a central ridge of mountains, including Mount Gimie, the highest peak at 950m, and numerous steep off-shoot ridges extending towards the coast.

The island's soils have been divided into three mineralogical groupings18, allophanes, kaolinites and montmorillonites. The allophone group is representative of younger soils and occupies the highest rainfall areas particularly in the south. Kaolinitic soils occupy the older land surfaces in high rainfall areas in the north and finally, the montmorillonites are located in the drier and some intermediate areas. The interior soils tend to be inherently more stable to surface erosion (good aggregation on account of extent of weathering), but are easily degraded once the forest cover particularly on steep slopes are removed. The montmorillonitic (expanding lattice) clays dominate the thin soils around the coastal areas and are highly erodible once the vegetation is disturbed.

Saint Lucia has 37 main watersheds[19]; ten of these are small multiple drainage basin complexes[20] (Figure 5). They all radiate from the central mountain ranges of the interior towards the coast. Activities occurring in one area can very rapidly have negative environmental impacts on surrounding ecosystems and in particular, changes taking place in upper watershed areas very rapidly impact on lower watershed and coastal areas. Within these watersheds, 25 water catchments are harnessed for domestic water supply[21]. Most of the water consumed or used on the island comes from runoff from catchment areas in the upper reaches of 7 major river basins/ catchments, with headwaters mainly in the mountainous south-central area of the island. The catchments all tend to be narrow, deeply incised and steep.

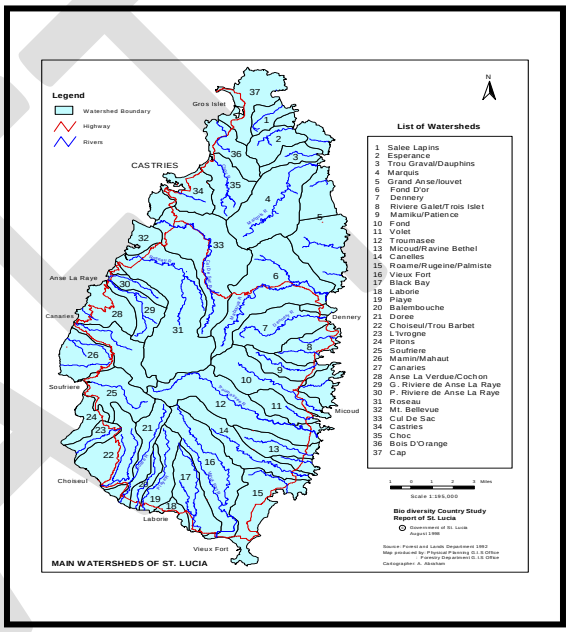


Figure 5. Watersheds and Rivers in Saint Lucia
Source: Biodiversity Country Study Report

[18] WEMP. Final Report: Volume 3.

[19] Migeot, J and Hawden, P. 1986. Saint Lucia Water resources: preliminary Assessment. Vols. 1&2. Ministry of Agriculture, Castries, Saint Lucia.

[20] Christopher Anthony Cox 2003 Integrated Watershed Management Planning for Saint Lucia. A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the requirements of the degree of Doctorate of Philosophy. McGill University, Quebec Canada

[21] AGRICO Ltd. 2001 Saint Lucia National Water Situation And Assessment Of National Water Profile. OAS/CSC/CCST Project Entitled "Cooperative Strengthening of National Institutions to Enhance Integrated Water Resources Management"

As a result of the rugged topography and the absence of intermediate collection points for surface water, such as lakes and ponds, the majority of rainfall flows to the sea with very little opportunity for ground water storage. The natural forested areas make a significant contribution to the interception of this rainfall, allowing infiltration into the sub surface, thereby contributing to the sustaining of base flows in the river systems beyond the rainy periods.

The forest reserves are regarded as exceptionally well preserved in the country, comprising mainly rainforest ecosystems. Preliminary findings from the National Forest Demarcation and Bio-Physical Resource Inventory Project (2009) highlight the diverse forest types (habitats) in Saint Lucia and large variety of biodiversity which they support, as well as protect the island's water resources. Between 1990 and 2000, it is estimated that the island lost 36% of its forest cover as a result of clearing of natural vegetation for agriculture, construction and other development purposes22. Current efforts are focused at increasing this cover within the Government Forest Reserve (protected forests), in an attempt to redress this loss.

Approximately 30% of Saint Lucia's land area is pastoral and arable land with less than 10% of the total land area occurs on slopes of less than five (5) degrees[23]. As a result, the application of some type of soil conservation measure is necessary on more than 90% of the land area for any type of use24.

In addition, the narrow coastal strip which circumscribes the island, is characterised by concentrations of haphazard and unplanned development (Figure 2), posing a growing threat to the sustainability of the fragile terrestrial, coastal and marine ecosystems. Coral reefs in Saint Lucia are under threat from high levels of sedimentation and other land based pollutants. For example, between 1995 and 2001, reefs along the central west coast, particularly those bordering the town of Soufriere, lost an average of 47% of coral reef cover in shallow waters and 48% in deeper waters; a trend which continues. Nearshore fisheries are also threatened.[25]

The combination of the steep topography and young volcanic soils, constantly subjected to seasonal high rainfall, make the island very susceptible to soil erosion. Vulnerability to disasters such as landslides is further exacerbated by the poor land management practices.

[22] ibid
[23] Most of the flat or gently-sloping land is found along the narrow coastal belt.
[24] GOSL. 1979. Watershed and Environmental Management Project. Hunting Technical Services for Ministry of Planning and Development,
[25] Department of Fisheries

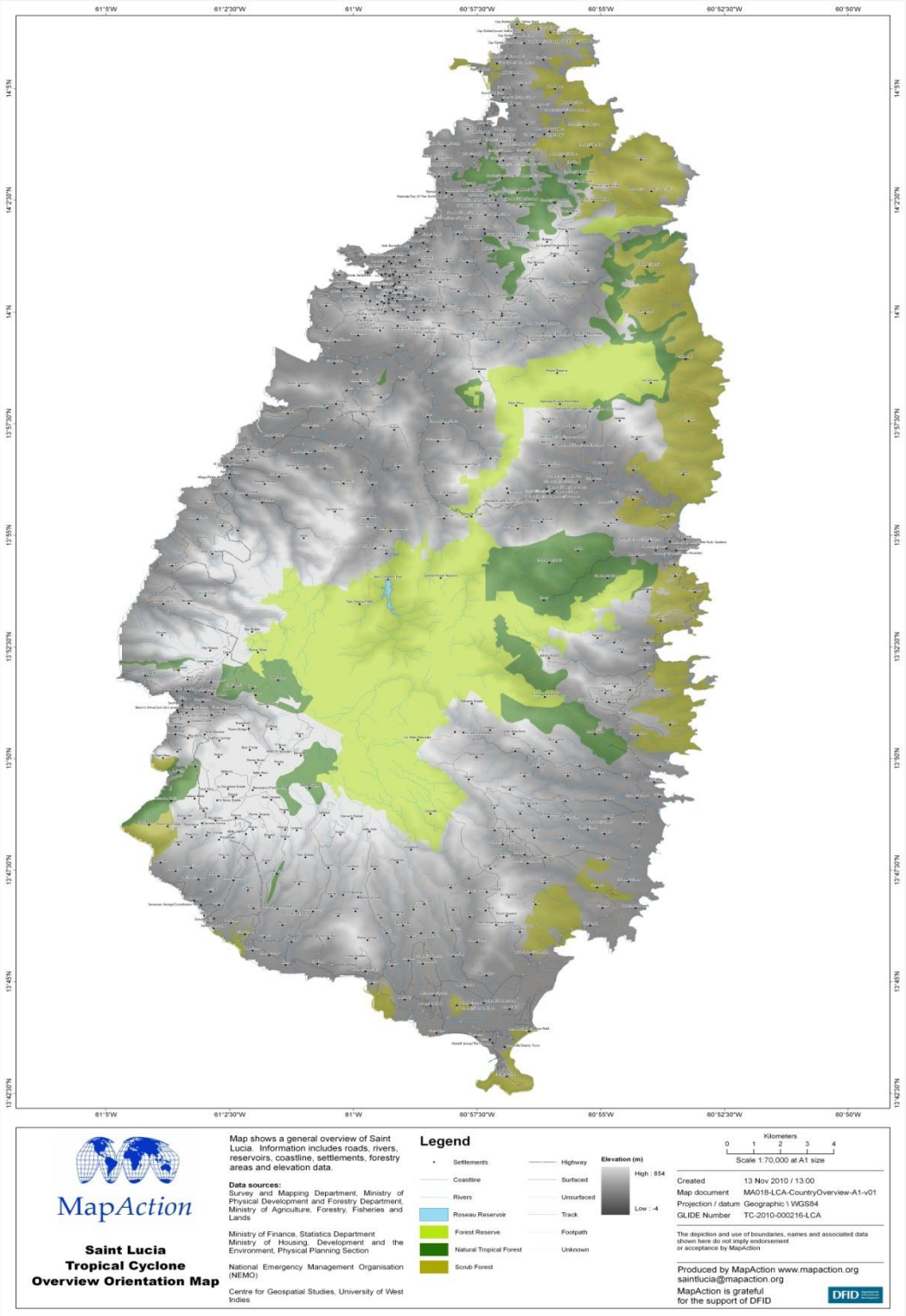


Figure 3: Saint Lucia Map Showing Settlement Locations

6.1.3 Climate and Weather

Saint Lucia experiences a tropical maritime climate, characterized by warm air temperature averaging approximately 28o C; Located within the north-east Trade Wind belt the island is normally under an easterly flow of moist, warm air and temperatures with average temperatures of 27 degrees C (790 F) and a relative humidity of 75%. Temperatures rarely rise above 33o C or fall below 20o C. The highest temperatures are recorded around June to September, and the lowest in the months of December.

The island's weather is influenced by synoptic weather systems, including the Atlantic High Pressure system (Bermuda Azores), the Inter-Tropical Convergence Zone, surface, mid and upper level low pressure systems, tropical waves and cyclones and the occasional frontal system.

The island has two climatic seasons based on rainfall. The wet season extends from June to November while the dry season runs from December to May. The volume of rainfall in the wet season is determined mainly by the frequency and intensity of tropical disturbances (waves, depressions, storms, hurricanes). These disturbances account for the greater amount of the recorded rainfall during that season. Local convectional showers and other weather systems account for the remainder.

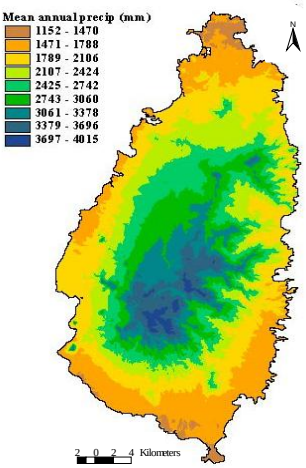


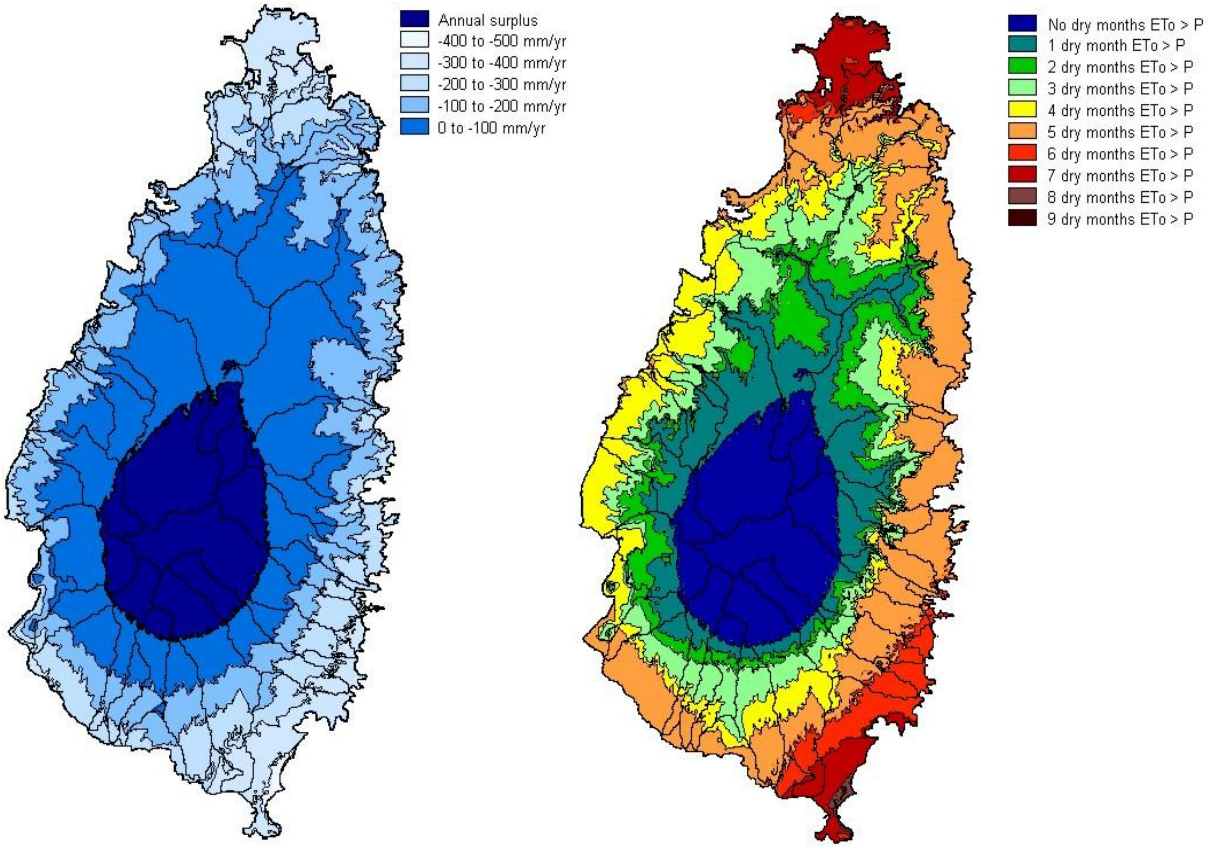
Figure 4.Spatial Distribution of Mean Annual Rainfall for Saint Lucia Source: Isaac & Bourque, 2001

Rainfall amounts show annual and spatial variation, with the orographic effects quite pronounced. Mean annual rainfall varies from 1,450 mm at Hewannora in the south, relatively flat coastal regions, to 3,450 mm at Edmond Forest in the elevated interior region.

Wind speeds are highest on average during the months of January to July, when the average is 24 km h^{-1}. Between August and December the speeds are less, averaging 16 km h^{-1}. Higher gusts are occasionally experienced with the passage of tropical disturbances and cyclones.

The amount of daily sunshine received over Saint Lucia is at a maximum from February to May and at a minimum around September. Radiation values vary widely over the island and this is mainly due to cloud cover. As such, elevated regions with greater cloud cover receive less direct radiation than the low-lying coastal regions.

Figure 4 shows spatial distribution of areas with high annual cumulative moisture deficit and number of dry months. These scenarios, against the backdrop of un-sustained river base flows, have serious implications for the island's water supply, in terms of water availability at both the community and national level. A further aggravation with regard to the national water supply are the various kinds of activities[26] taking place in upper watershed areas, which continue to rapidly impact on lower watershed and coastal areas, and have negative environmental impacts on surrounding ecosystems, in particular, the quality of surface water.



(1) Annual cumulative moisture deficit (2) Number of dry months (ET_o > P)

Source; Cox, Christopher, A. 2003. [27]

Figure 5: Estimated Annual Water Deficit Distribution for Saint Lucia

[26] These include among others, unsustainable agricultural practices, unplanned human settlements and poor solid waste management.

[27] Cox, Christopher, A. 2003. Integrated Watershed Management Planning for Saint Lucia. A Thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the requirements of the degree of Doctorate of Philosophy. McGill University, Quebec, Canada.

Climate Change

The onset of the climate change phenomenon imposes new hazards on Saint Lucia and exacerbates existing ones. It is well recognized that the special characteristics of small islands like Saint Lucia, already pose serious challenges to the attainment of sustainable development. These too make them inherently prone to a large range of potential impacts from climate change. Among these are relatively small size; an open economy with a negative balance of trade; a limited natural resource base; fragile ecosystems; limited human capacity and resources; limited technological capability, and low adaptive capacity.

The main impacts of climate change identified for Saint Lucia include changes in precipitation patterns manifested in longer dry spells (droughts), excessive rainfall (flooding, landslides), more intense storms, increased hurricane intensity, excessive heat and storm surge, especially due to hurricane activity, with storm surges expected to exacerbate with sea level rise. Climate change is thus expected to bring enormous and unpredictable changes at all levels, including challenges to food security and sustainable livelihoods and disproportionately impact on the poor and other vulnerable segments of society.

These unavoidable consequences of climate change are coupled with the fact that the majority of the country's human settlements and centres of economic activity are located in the coastal lowlands[28], and over 28% of the population is economically and socially vulnerable - under the poverty line.[29]

The extent of Saint Lucia's vulnerability to climate change and variability is also largely influenced by several non-climatic drivers. These drivers are largely socio-economic and ecological in nature. They include *inter alia*: global economic stresses, such as changing trade regimes, financial downturn, rising commodity and fuel prices, as well as stresses at the local level, including, demographics of people, poverty and unemployment.

For a climate vulnerable country like Saint Lucia, adaptation to climate change is a fundamental imperative and development priority. Key challenges in enhancing resilience to climate change in Saint Lucia are: managing the overall disaster risks to

[28] The high vulnerability of coastal communities to global climate change and sea level rise leads to increased inundation of coastal areas; loss of land, habitat, and ecosystems, as well as ecosystem services and consequently economic losses; reduction of access to communities; threats to sanitation and health; abandonment of community infrastructure; reduced investment on coastal areas; loss of life and livelihoods; and, loss of traditional values and resources, from climate induced disasters.

[29] Saint. Lucia Poverty Assessment Report, Kairi Consultants, 2005/6).

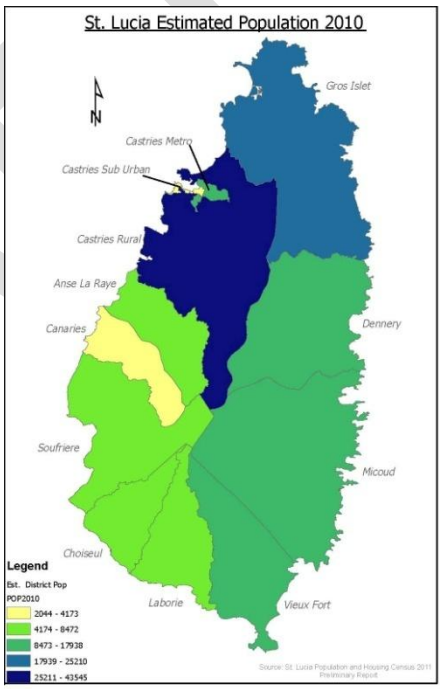
ensure social protection and minimise environmental degradation, protecting climate sensitive and critical infrastructure, promoting sustainable land use planning and reforestation, ensuring security of water supply through proper management of its limited potable water resources, and collecting and analyzing climate change related data and information in a comprehensive and sustainable fashion in order to be able to respond to the challenges posed by climate change and climate variability.

6.2 Socio-Economic Context

6.2.1 Population and demographics

Saint Lucia's population is largely African in origin, complemented by large groups of persons of mixed origin, and Indian descent and other smaller groups represented are Chinese, Portuguese, Syrian-Lebanese, Caucasian and Amerindian (Carib).

The estimated population for Saint Lucia as at the 2010 Census stood at 166,526[30], with an estimated household population of 157,775, representing an overall household population increase of 5.0 percent over 2001 census figures. According to the 2010 Census Report 51.1 percent of the total population is female and 48.9 percent is male. 24.1 percent of the population under 14 years and 33.3 percent between 14 and 34 years. Under 10 percent (8.6%) of the population is over 60 years, with 75 percent of this age group being female.



Preliminary 2010 Census results show that Saint Lucia's island wide population density is 796 persons per square mile[31]. Large segments of the island's population are located along the coastal belt, where low land agriculture, coastal resources, reefs, fisheries and tourism are the main sources of livelihood. Approximately 60 percent of the population resides along the north-west corridor. The island's population is rapidly becoming urbanised, with approximately 41 percent of the total population residing in the city of Castries and 55 percent of the population residing in the Castries-Gros-Islet corridor. A further 28 percent reside within the regions/districts of the Southern Quadrant, with the North-East and West-Central Quadrants being the least populated regions of the island, each having less than 10 percent of the total

[30] Saint Lucia Housing and Population Census, 2010

[31] This figure was calculated using a land area of 208 square miles that excludes Saint Lucia's forest reserve areas. Forest reserve areas cover approximately 30 square miles.

population. Overall the district of Castries accounted for 40 percent of the estimated population of Saint Lucia in 2010.

The Population Census of 2010 showed clearly that there has been substantial movement of the population away from Castries City and into Rural Castries and Gros-Islet. The next most populated district was Gros-Islet with a population share of 15.2% in 2010 up from 13% in 2001. This represented an increase of 21% in the population of the district from 20,872 in 2001 to 25,210 in 2010. Household population contractions were reported in the districts of Laborie, Dennery and Choiseul, with Laborie recording the largest household population decrease. The least populated district of Saint Lucia in 2010 was the district of Canaries.

6.2.2 The Economy

Table 3, Saint Lucia at a Glance, provides some key social and economic indicators of performance.

Table 3. Saint Lucia at a Glance

Population			**165,595**		
Area			616km2	**Habitable Area**	539.1 km2
Basic Demographics			**Population Density**	**Urban Population**	
Birth Rate (per 1000)		13.1	Per sq. km - 839.2	**2008 -** 41%	
Death Rate (per 1000)		7.7		2010 - 74%	
Infant Mortality Rate		13.43		**Avg Annual Growth 2004 -2010**	
Structure of Economy				**Age Structure**	
	%GDP (2010 est.)				
	2000	**2009**	**2010**		
Agriculture	7.0	4.2	3.2	0-14 years:	24.4% (male 20,035/female 19,021)
Industry	19.2	16.7	16.6	15-64 years:	66.4% (male 51,593/female 54,843)
Manufacturing	4.7	4.3	3.9	65 years and over:	9.2% (male 6,668/female 8,107)
Services	73.8	79.1	80.2		
Prices and Employment (2010)				**Poverty Statistics (2005/2006 vs 1995)**	
Inflation Rate (period average)		1.9%		05/06	1995
Unemployment Rate (average)		20.6 %		% poor	28.8 25.1
				% indigent	1.6 7.1
				Rural Poverty	29.6% -
				Urban Poor	16.3% -
				Vulnerability	40.3% -
School Enrolment (2010)				**Central Government Fiscal Operations (MXCD) FY10/11**	
Primary School Enrolment		18,594		Total Revenue and Grants	858.3
Secondary School Enrolment		15,655		Current Revenue	789.5
Tertiary		2,929		Total Expenditure	1,032.7

Source: Adapted from World Bank, 2010[32]

Over the last two decades, the country's economy has undergone significant adjustment that saw the services sector, and in particular tourism leading economic growth. Between 1990 and 2010, the contribution of agriculture declined from 13.85% to 3.24% of GDP while the tourism sector's contribution moved from 9.18% to 12.55% in the same period. Whereas the contribution of Agriculture to GDP is likely to show further decline because of emerging external market conditions, the sector will remain a key component of the local economy for employment generation, foreign exchange earnings and food security as well as to control rural-urban drift. Manufacturing and industry have remained as important productive sectors. The construction sector too has contributed immensely to GDP and employment.

The country's economic fundamentals remain solid, at the global level, but there are a number of externalities that have impacted and continue to impact the island's economy, such as changing trade regimes, rising fuel prices and the international financial crisis. Global trading arrangements have eroded traditional markets for trade in primary products, (in particular bananas), and cheaper imports continue to threaten local industries and increase the food import bill and balance of trade deficit.

Saint Lucia's economy continues to recover from the effects of the global crisis, at a subdued pace. Amid challenges in many of the key economic sectors, arising from severe drought in the earlier part of the year and the devastating effects of Hurricane Tomas in the last quarter of 2010, provisional estimates indicate that real GDP expanded by 1.0 percent in 2011, up from a revised growth rate of 0.6 percent in 2010. This performance was influenced by growth in the hotel and restaurants and construction sectors and supported by increased value added in the distributive trade services and real estate, renting and business activities. [33]

Box 4: Summary of Economic Loss in Saint Lucia as a result of Hurricane Tomas

The Economic Commission for Latin America and the Caribbean (UNECLAC) reports total cost of damage and losses to the different sectors amounting to EC$907.7 million (US$336.2 million). The total impact represents 43.4% of GDP; with the scale of impact nine times agricultural GDP, three times tourism GDP, 62% of exports of goods and services, 19% of gross domestic investment and 47% of public external debt.

[32] Adapted from Sources: World Bank, 2010. Saint Lucia at a Glance; GOSL, 2010. Economic and Social Review; GOSL, 2005/2006. Country Poverty Assessment Report for Saint Lucia. Prepared by Kairi Consultants.

[33] Government of Saint Lucia, (2011) Economic and Social Review

For the foreseeable future, Saint Lucia's economic growth and development will continue to be centred around tourism, agriculture, infrastructural development and commercial sectors, with tourism being at the core of the development thrust. Notably, key economic activities, and associated infrastructure such as airports, sea ports, fuel storage and hotels, as well as critical infrastructure such as hospitals, schools and security services tend to be concentrated along the coast and these have been deemed highly vulnerable to the impacts of extreme climate related events such as rainfall variability, land degradation and storm events.

In recent years, there has been a rapid increase in the exposure of economic assets and earning potential to physical hazards. While economic assets and jobs are being created, the risk of losing these economic assets and livelihoods from a disaster is increasing. Despite the magnitude of potential costs and loss of income, reducing disaster risks is still often perceived as a lesser priority than fiscal stability, unemployment or inflation. The impact of disasters, when all costs are calculated, can therefore represent major losses for government for example in livelihoods, infrastructure, health, housing and education.

Nonetheless, the emerging sectors of banking and insurance, though tied to the international financial systems, and as a result respond to anomalies at the global level, still present opportunities to manage disaster risks through mechanisms for risk transfer, thus assisting in making those key economic sectors more resilient to disaster related impacts.

6.2.3 Human Development (Poverty and unemployment, Education)

According to the 2011 United Nations Development Programme (UNDP) Human Development Report, Saint Lucia was ranked 82 out of 194 countries, a lower middle-income country, compared to 2008, when it was ranked 66 out of 179 countries. Country data shows a high Human Development Index (HDI) [34] of 0.723, and good social indicators, including low levels of maternal and infant mortality, universal primary education, low fertility, and increasing life expectancy. However, these exist alongside high and increasing levels of poverty – 25.1 percent in 1995 and 28.8 percent in 2005/06, one of the considerable social gaps and deficiencies, primarily in rural areas, and linked to high unemployment and underemployment rates[35]. Unemployment remains high, particularly among the youth, who make up over 33 percent of the population. The economically active population is estimated at one third of the

[34] Human Development Index (HDI): A composite index measuring average achievement in three basic dimensions of human development—a long and healthy life, knowledge and a decent standard of living.

[35] The Poverty Assessment (2005/06) identified the ripple effect of decline in banana earnings into other areas of the economy, spreading poverty beyond the agricultural sector and contributing to increased poverty and vulnerability in rural communities.

population, with 22 percent employed in agriculture, 25 percent employed in manufacturing and 53 percent in tourism and other services.

Declines in the key economic sectors, such as agriculture, have also exacerbated the effects of unemployment and poverty. The combined impact of these has contributed to a slowdown in economic activity in Saint Lucia over the last three years, evidenced in the contraction in the real GDP in the medium term, as a result of declines in tourism receipts and foreign direct investment.

Saint Lucia's first poverty assessment was conducted in 1995 and the second, in 2005/06. The report on the latter indicates that poverty in Saint Lucia has been primarily a rural phenomenon as predominantly rural districts such as Anse-la-Raye, Soufriere Choiseul, Laborie and Micoud. Poverty data from the Census Report (2010) show prevalence rates for poverty in excess of 35 percent in the south and south-west of the island Anse-la-Raye/Canaries, Choiseul, Vieux Fort, with some pockets in the north-east of the island (Figure 5).

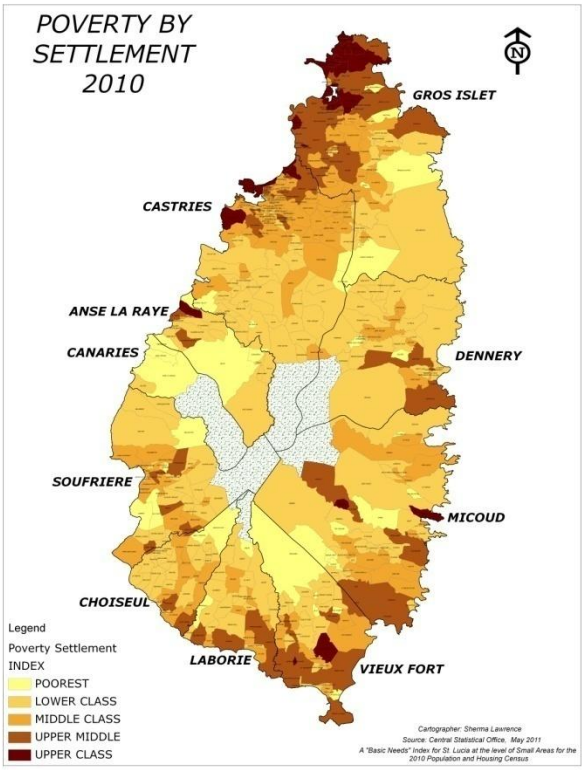


Figure 5.Geographic Distribution of Poverty in Saint Lucia
Source: Census Report 2010

Further, using an estimate of 25 percent above the poverty line (EC$ 6,357.50 per annum) as the criterion of vulnerability, 40.3 percent of the population was deemed to be vulnerable[36]. The report also found that the age group of those living below the poverty line was disproportionately young – 39 percent of children of age 0 – 14 years.

A positive correlation has been demonstrated with increasing incidence of poverty and increased vulnerability to impacts of disasters, in particular rainfall changes (floods and drought) and climate change impacts of sea level rise and storm surge. Further, "disasters have the tendency to exacerbate poverty and undermine development planning, particularly poverty reduction strategies"[37]), thus,

[36] Vulnerability in this case measures the proportion of the population that would be susceptible to falling into poverty as a result of an unanticipated event such a natural disaster or adverse economic shock.

[37] Ban-ki-Moon, address to meeting leading up to Rio+20

"addressing disaster risk reduction is inseparable from the broader sustainable development agenda." [38]

The interrelationship between poverty and disaster establishes the basis for the identification of potential threats of disaster related impacts to the welfare of the vulnerable segments of the population (e.g. the poor) with regard to land and water management and health and sanitation. This implicitly provides a means for addressing issues relevant to disaster management/disaster risk reduction, using the minimum poverty reduction platform outlined in the 2005 Poverty Assessment Report.

The country's continuing emphasis on human resource development as a key factor for sustained economic growth is reflected in a literacy rate for adults (age 15 and older) of 94.8 percent in 2005. Universal secondary education was achieved in September 2006. However, there remains a disparity in the performance of males and females in enrolment rates at all levels. Data from Education statistics: St. Lucia. UNICEF[39] indicates that enrolment rates among males and females at the primary school level were 98% and 95%, respectively (cf 91 and 94 in 2005). This contrasts with enrolment rates at the secondary level of 60.7 (72) percent and 78.3 (86) percent for males and females, respectively. Secondary and tertiary school enrolment was lower in poor households, especially in rural areas.

6.2.4 Gender, youth and children

Notwithstanding growing trends in the empowerment of women and a seemingly marginalization of males within the country, it has been recognized that men and women are affected differently by socio-economic and cultural factors such as poverty, literacy, and that these may influence their respective roles in responding to the DRR phenomenon. In particular, women given their multiple roles in society may bring particular knowledge and experience to bear in adaptation to vulnerability in this regard.

The relatively high level of poverty and vulnerability are associated with a variety of risks; evidenced by high unemployment especially among the youth; household vulnerability associated with adult illiteracy, poor housing and sanitation facilities, limited community organisational capacity and household assets to buffer against unforeseen events. The level of exposure to such risks is more severe among the youth and the elderly population. However, within the dynamics of gender, similar levels of vulnerability for males and females are reported, though higher levels of indigence was

[38] Nassir Abdulaziz Al-Nasser, address to meeting leading up to Rio+20
[39] UNICEF, Division of Policy and Practice, Statistics and Monitoring Section
UNESCO Institute for Statistics, Data Centre,
http://stats.uis.unesco.org/unesco/ReportFolders/ReportFolders.aspx, January 2008.

reported for poor men in at least one community, as residual employment tended to favour females.

The Social Protection and Poverty Reduction in the Caribbean, St. Lucia Country Review (October, 2004) noted that persons in the age group 15-24 accounted for 49.9 percent of the total unemployed population in 2001, which is one of the highest rates in the OECS. It goes further to indicate that apart from the loss in productive capacity, high levels of youth unemployment tends to lead to a higher prevalence of youths involved in criminal activity. The report also noted that these are inequities in the distribution and access to health services amongst the various population age groups.

It is worthy to note, that this year's (2012) International Day for Disaster Reduction (GA resolution 64/200 of 21 December 2009)40, placed the spotlight on women and girls who play a key role in community DRR, by making their communities more resilient to disaster and climate risks and helping to protect development investments.

It has been shown therefore, that initiatives aimed at social protection are vital to help to build partnerships with organizations involved with gender and disaster risk reduction. They also help create platforms for development of processes to create disaster resilience that are sensitive to gender and the at-risk/vulnerable populations in the society – children, youth, elderly.

6.3 Governance Structure

6.3.1 Political structure and organisation

Saint Lucia is an independent country, having gained independence from Great Britain on February 22nd, 1979. The country is one of the four Windward Islands and a member of the Organisation of Eastern Caribbean States (OECS) and the Caribbean Community (CARICOM).

The country has a Westminster style government with a constitution which guarantees human rights and civil liberties and a well established parliamentary democracy. The county has a multi-party structure, dominated by two political parties, with elections constitutionally due every five (5) years. Its bicameral parliament comprises the Senate or Upper House (11 seats: six members appointed on the advice of the Prime Minister, three on the advice of the Leader of the opposition, and two following consultation with religious, economic and social groups) and the House of Assembly with 17 members elected by popular vote from single-member constituencies.

The Head of State of Saint Lucia is the Governor General, who represents the British Monarch. The Administrative arm of Government comprises the Office of the Prime

[40] Observed on October 12, and had as the theme for 2012 "Women and Girls: The [in]Visible Force of Resilience",

Minister, the Office of the Attorney General and fourteen line Ministries[41]. The current Prime Minister, the Honourable Dr. Kenny D. Anthony, leader of the Saint Lucia Labour Party, was sworn into office following the country's general elections in November 2011. Whereas the Ministerial Portfolios and configurations of the Ministries undergo changes based on decisions of the Prime Minister, certain key portfolios of relevance to Disaster Risk Reduction include finance, sustainable development, physical development, legal affairs, infrastructure, agriculture, tourism, health, gender relations, education, commerce and business development. In fact, given the all-encompassing nature of DRR, all the ministries will in some measure play a role in ensuring the effective integration of a DRR approach in national development.

6.3.2. Local government and levels of decentralisation

Local government in Saint Lucia is founded upon the Constitution of 1979 which makes reference to local government. The Constitution however does not specify how local government should be organized. The Labour Party's Election Manifesto in the mid nineties saw a refocus on local government aiming at 'deepening the structures of democracy in Saint Lucia'. It took until 2000 when a Green Paper on Local Government was issued. It outlined the importance of citizen participation and devolvement of functions to local authorities but a subsequent White Paper and/or local government legislation was not drafted.[42]

For administrative purposes Saint Lucia is divided into 11 districts positioned below the central government. Local authorities within these 11 districts are divided into different types; the council of the capital city of Castries, three town- and six village councils. These district councils form the main local government institutions in the community/township. City, town and village councils have been appointed by Central Government ever since local elections were postponed in 1979. The responsibility for the appointment of council members falls under the Ministry with responsibility for Local Government.

Local government remained a priority when the current government formed a Task Force for the Reform of Local Government in 2006. There have been extensive and positive community consultations, and preparatory work undertaken to restore elected local government, but there has been no formal Act passed to date. National elections were most recently held in 2011, and the most recent developments in the sphere of local government have been the appointment of members to the various district (city/town/village) councils in 2012. The restoration of elected local is an imperative for the local agenda, as there continues to be the need for improved local governance.

[41] Listing of Ministerial Portfolios can be found in **Annex ..**
[42] Source: http://www.arial-programme.eu/en/pacific/59-saint-lucia.html

6.3.3. Coordination mechanisms between State and non-governmental actors

Prior initiatives by the GOSL, including the development of an Environmental Management Act (Draft, April 2008) and the establishment of the National Environmental Commission (NEC) as an overarching agency for environmental management, has presented a platform for the kind of institutional framework required to resolve the problems of coordination and collaboration among agencies, on environmental management issues, and particularly important for DRR.

There is also significant work being done through community-based organisations (CBOs) and the small number of Non-Governmental Organisations (NGOs) who already play critical roles in Disaster preparedness and response as well as integrated watershed management. Nevertheless, the attitude of civil society to effecting DRR practices that maintain a resilient economy is still inapt.

Linkages between national level and community level actions however, are not fully developed, and a holistic approach with coordinated and coherent action on disaster risk reduction across different sectors and between central and local governments is needed to ensure optimum use of human, technical and financial resources.

Support (through sensitization, capacity building, etc) needs to be provided to such organisations to allow them to fully contribute and/or facilitate the building resilience for DRR and sustainable development processes at the national, watershed and community levels. There may also be a need to nurture an NGO culture to expand avenues for implementation of DRR policy/initiatives.

A culture of sustainable development through building resilience, including land and water conservation, needs to be built at all levels of society. Specific focus in public education and outreach should be paid to vulnerable groups including women, children, the elderly, the youth, and vulnerable communities. Public education and awareness is necessary to engender attitudinal changes that will promote ownership of and facilitate sustainable development through building resilience to the negative impacts of disasters, and more so climate change disaster related events which are increasing in frequency.

6.4 Development Context

6.4.1 National Development Priorities

Saint Lucia's development agenda is guided by a number of national, regional and international policy imperatives and instruments. At the international level, Saint Lucia is

committed to achieving the Millennium Development Goals (MDGs)[43] agreed upon by the international community at the UN Millennium Summit in 2002. Saint Lucia is also committed to the implementation of the Barbados Programme of Action (BPoA)[44] and the Mauritius Strategy for Implementation (MSI) of Agenda 21. The BPoA and the MSI underscore the particular vulnerability of SIDS in the face of climate change and outline specific response measures to be taken at national, regional and global levels. The regional (CARICOM) development agenda is based on sustainable development, which encompasses economic, social, environmental and governance dimensions, while the sub-regional agenda of the Organisation of Eastern Caribbean States (OECS) is anchored in the dimension of human development.

The Government's development strategy over the medium term (2006-2011) focused on exploiting opportunities for sustained growth and development and the restructuring and repositioning of the economy for successful integration within an increasingly liberalized international and regional trading environment, in particular the CARICOM Single Market and Economy (CSME) and the OECS Economic Union. The development priorities described in the Medium Term Development Strategy (MTDS) are aimed halting any further decline in the agricultural sector, and encourage agriculture and wider economic diversification; provision of an enabling environment to foster increasing returns to the local economy through effective linkages; encourage education and human resource development; support the emerging informatics industry and financial services sector; and also encourage the adoption of appropriate technology as a means of achieving greater efficiency.[45]

Initially, this broad-based Plan did not address in a substantive manner the issue of disaster vulnerability and DRR. The country to date, has addressed such issues in more of a non-programmatic manner, using capital investments through World Bank funded projects such as the Emergency Recovery & Disaster Management Project, Second Disaster Management Project.[46] The current Disaster Vulnerability Reduction Project (DVRP) aims to measurably reduce vulnerability to natural hazards and the adverse impacts of climate change in Saint Lucia. The major outcomes expected from the project include: (i) Capacity built to identify and monitor climate risk at the national level; (ii) Reduced vulnerability of key sectors, assets and people to natural disasters, which will have sub-regional benefits for the economic union member states, with IDA funding of USD 10-15 million. However, the need to incorporate these considerations in the development planning process became quite apparent in the aftermath of Hurricane

[43] MDG Goal 7, which seeks to ensure environmental sustainability, seeks, in its first target, to "integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources.

[44] The BPoA sets forth specific actions and measures to be taken at the national, regional and international levels to support the sustainable development of Small Island Developing States (SIDS).

[45] GOSL Socio-Economic Review, 2011

[46] Primarily physical prevention and mitigation works, and strengthening emergency preparedness and early warning systems.

Tomas in 2010. To this end, a National Reconstruction and Development Unit (NRDU) was established with a view to strengthening the institutional framework necessary to accelerate the implementation of the developmental plans outlined in the National Vision Plan and related projects.

The development priorities of Saint Lucia provide opportunities for widening the scope of socio-economic and environmental sustainability to incorporate considerations for disaster vulnerability and DRR. While the country's vulnerability to disasters is projected to be exacerbated by climate change, the future vulnerability of Saint Lucia will also depend on its development path. In this context mainstreaming of DRR and adaptation to Climate Change adaptation, into development policies, plans and programs becomes a pre-condition for sustainable development.

Saint Lucia, like most of the other member countries of the OECD continue to report increasing trends in economic losses due to disasters from natural hazards such as hurricanes and climate related extreme events (these affect population, the environment and ultimately the economy). The island is also quite susceptible to the vagaries of international trade, exogenous economic and financial shocks. Hence economic loss risks can be further increased as a result of economic development pathways. The need to implement risk management strategies aimed at adaptation to climate change and reducing the impacts of disasters is thus critical for protecting health and safety, in terms of human life, livelihoods and the country's natural resources.

4.4.2 Financial analysis of public investment in DRR

Information on public investment in DRR has not been disaggregated in this specific regard. However, information from key capital projects undertaken with regard to mitigation activities can be used as a means to measure the level of public investment in DRR. World Bank sponsored projects such as the ERDMP and SDMP are some of these.

4.4.3 Knowledge and Information

Given that the future is inherently unknown, it is imperative that the continuous monitoring of trends in requisite disaster related events, through the use of appropriate indicators (e.g. climate and hydrologic parameters that could signal climate shocks and stresses such as temperature, precipitation, evapo-transpiration and soil moisture), as well as those measurable indicators of disaster impacts or of DRR responses/interventions, must be undertaken. Considerable improvement in data availability for some of these key DRR related parameters would be required through interventions to overcome current constraints in research and systematic observation such as:

- In most sectors, current datasets are either lacking or not developed for the specific purpose of assessing and monitoring specific disaster impacts , for example, climate change impacts and also the assessment of the effectiveness of DRR/adaptation measures. The absence or discontinuous nature of some critical data (e.g. for Climate Change and Detection Attribution - meteorological and hydrological, including sea level rise measurements), is a notable gap;
- Research and monitoring (systematic observation) and concomitant data management are areas requiring specific attention. While more data and information is now available for a few thematic areas, many of these databases and information sources are not consistently updated.
- The decision support systems pertaining to research and systematic observation, monitoring and evaluation and dissemination of data and information are inadequate to support the deployment of appropriate DRR measures;
- Data management systems that are operational for key indicators and priority regions/ ecosystems, including useful and efficient data sharing tools and platforms, need to be established;
- Information management systems would also need to be improved or new systems established to take into account relevant emerging issues related to DRR (e.g. sustainable land management (SLM), invasive species, tsunamis, among others);
- Efforts will need to be increased to obtain requisite equipment and skills for data collection and overall data management. Given existing personnel constraints, automated equipment and data collection tools (automatic rain gauges, stream flow gauges and other hydrometric monitors, marine stations, data recording PDS, GPS) should be considered wherever possible.
- Research and monitoring though greatly enhanced by introduction of GeoNode, - a data sharing tool at the national level, still needs to be supported by other means of promoting information management systems at the OECS or CARICOM level. Harmonisation and standardisation of information systems and other ICT protocols at the local level need to be pursued.
- Hazard maps based on more appropriate models; events mapping to validate the same; detailed digital elevation models (DEMs); up-to-date land use and vegetation maps are all necessary for informed decision–making and pro-activeness. Data to arrive at these include, but are not limited to: bathymetric data; beach profile data; data on pathogens; crop yields; vector borne diseases; water supply and abstraction volumes; stream flow; habitat shifts of climate sensitive species; fish landings by species; condition of coral reefs; data on dive and other nature based tours.

7. THE DRR LEGAL REGULATORY AND INSTITUTIONAL FRAMEWORK

7.1. Legal Framework

7.1.1. National and Provincial Constitution

The Saint Lucia Constitution Order 1978, vests authority in the Governor General for declaring a State of Emergency. When a State of Emergency exists, the Governor General is authorised to formulate orders under the provisions of the Ordinance to secure essentials of life to a particular zone, and for the preservation of the health, welfare and safety of the public. Orders so made may *inter-alia* provide for:

1. Requisitioning of all forms of transport and communications;
2. Requisitioning and regulating the supply and distribution of food, clothing, water, fuel, light and other necessities of life and for fixing maximum wholesale and retail prices in respect thereof;
3. Requisitioning of private lands, buildings and premises;
4. Conferring on any person the right to entry on or passage through or over any private lands, buildings, premises;
5. Demolition of any building or other structure deemed to be dangerous;
6. Disposal of the dead and for dispensing with enquiries under the Coroners Act and from the Ordinance.

5.1.2. Laws and Legal Provisions with the Rank and Force of Law

The CDERA model legislation was assented to in Saint Lucia since August 7, 2000. The Disaster Management Act (DMA) enacted in 2006 has since formed the foundation of the legislative framework for disaster management in the country.

The Act vests authority for declaring a national emergency in the Prime Minister. It provides the laws and regulations that establish the legal authority for the development and implementation of the disaster management programme and organization, and defines the emergency powers, authorities, and the responsibilities of the Governor General, elected officials, appointed officers and the Director of NEMO.

Section 11(3) -- The National Disaster Response Plan shall include – (a) procedures for, mitigation of, response to and recovery from emergencies and disasters by public officers, Ministries and Departments of Government, statutory bodies, local government units, and persons or organization volunteer or are required by law to perform functions related to the mitigation of, preparedness for response to and recovery and recovery from emergencies and disaster in Saint Lucia.

The remit of the Disaster Management Act, *inter alia*:

- clarifies the authority and role of the Director of NEMO
- outlines the composition and functions of the NEMO
- lists the required contents of the National Emergency Management Plan
- makes provisions for the management of specially vulnerable areas
- clarifies hazard inspections and the powers of hazard inspectors
- outlines regulations for the management of emergency shelters
- defines offences and spells out penalties

The Act also covers legislation for each of the following areas:

- Providing legal authority to the Disaster Management Organisation;
- Assigning roles and responsibilities;
- Providing for declaration of a disaster/disaster area; and
- Providing for declaration of a state of emergency.
- Legislation in place provides for succession of the National Disaster Coordinator, the Fire Chief and the Chief of Police.

Of note is that the Act does not make provision to address the issue of succession of key persons in whom powers are vested under the Act including: the Head of State, the Leader of Government, the Chief Justice and the Chief of Defense.

Other legislative Instruments or relevance to the disaster management framework are outlined in **Annex xx.**

Legislative Instruments of Relevance to DRR	
Health Practitioners Act - 16.11 of the Revised Laws of Saint Lucia	Authorization of the registration of person to practice as a General Practitioner, Specialist Practitioner or Temporary Practitioner medicine or dentistry in a state of emergency
Water & Sewage Act No. 14 of 2005	Declaration of water related emergency
Police Act 2004 Chapter 14.01	Authorisation to undertake measures to assist in the protection of life and property in cases of fire, hurricane, earthquake, flood and other disasters
Education Act No. 41 of 1999	Responsibilities of teachers to perform assigned duties as outlined in the school emergency plan to protect health and safety of students
Employees [Occupational Health and Safety] Act No. 10 of 1985	Responsibility of employer to provide information, training and supervision necessary to ensure the protection of his employees against risk of accident and injury to health arising from their employment.

Industrial and Commercial Buildings [Fire Safety] Act No. 14 of 1972	Duties of property owners for maintenance of fire escape routes

7.2. Policy and Regulatory Framework

7.2.1. Public Policy

There are eight (8) policies at the national level that are specific to the issue of DRM. These include:

1. Damage Assessment and Needs Analysis [DANA] Policy
2. Disaster Management Policy Framework
3. Donations and Importation of Relief Supplies
4. Emergency Shelter Management
5. Emergency Housing
6. Governmental Officers Security of Travel Policy
7. Hazard Mitigation
8. Mass Fatality

Other public and sectoral policies of relevance to DRM are outlined in **Annex xx.**

7.2.2. Regulatory Framework

The regulatory framework for DRM is embodied in the NEMP and CDM Strategy. As indicated the NEMP, which finds its legal authority in the DMA, defines regulations for the functions of agencies related to the mitigation of, preparedness for response to and recovery and recovery from emergencies and disaster in Saint Lucia. The CDM Strategy however, speaks more to the elements of DRM with guidelines for attaining the key results and the activities that will be implemented by the NEMO Secretariat in order to achieve these results and the overall goal of 'reinforcing the development potential of Saint Lucia by reducing risks from all hazards'.

Of note also are the guidelines contained with the various components of the NEMP, including:

(1) *Guidelines for Debris Management in a Disaster*
(2) *Strategy on the Management of Used Oil*
(3) *Guidelines for SUMA Team*
(4) *Post Disaster Food Protection Guidelines*
(5) *The Impact of Climate Change on Design Wind Speeds*
(6) *The Engineering Guidelines for Incorporating Climate Change into the Determination of Wind Forces*
(7) *Mass Crowds Events Guidelines*

These in fact currently provided the basis for the regulation of activities with regard to some of the DRM aspects and can therefore, inform future regulations in this regard.

Also important to note are some key related regulations such as the Physical Planning and Development Act and draft Physical Planning Regulations; and draft Environmental Impact Assessment (EIA) Regulations. These regulations are critical if the aspects of planning, prevention and mitigation are to be addressed within a DRR framework.

7.3. Legal Instruments and Technical Decisions on DRR Policy

Despite an extensive policy, legislative and regulatory framework with regard to disaster management, the primary focus has been that of disaster preparedness, response and recovery, with a limited focus on disaster planning, prevention and mitigation. Further, the existing legal instruments have found limited national-level action and enforcement, especially in the face of inadequate monitoring for compliance. This is probably due to absence of the more clearly defined regulations required to support and give form to the legislation, as well as the insufficiency of resources for monitoring and regulating compliance.

Given the emerging context of DRR, The DMA at this stage, which needed to be reviewed and amended to incorporate issues related to Comprehensive Disaster Management, Climate Change, Mass Crowd Events and the articles of incorporation of the Caribbean Disaster Emergency Management Agency [CDEMA], will also need to take into account new and emerging issues of DRR. In this regard, aspects such as SLM, invasive species, Tsunamis, among others, will need to be incorporated in the frame.

Some other significant pieces of legislation (e.g. the Physical Planning and Development Act; draft Physical Planning Regulations; draft Environmental Impact Assessment (EIA) Regulations, among others,) will also need to be revised to adequately incorporate the afore mentioned issues, to ensure a harmonised legislative framework. Development control protocols such land use planning, building codes and standards will also need to be developed and/or updated to take into account DRR elements, and adopted and enforced with a measure of urgency. Issues of capacity and authority of agencies responsible for DRR, including that of insufficient resources, will need to be addressed for monitoring and regulating compliance by publics / civil society with regard to protocols aimed at building disaster resilience.

7.4. Institutional Framework

The institutional framework for national disaster management in Saint Lucia is defined under the DMA. The authority for declaring a national emergency falls under the Disaster Management Act No. 30 of 2006 and is vested in the Prime Minister. When a state of disaster exists, the Prime Minister may make orders under the provisions of the Act to secure essentials of life to the zone and for the preservation of the health,

welfare and safety of the public. The Chairman of the National Disaster Management Organisation (Prime Minister) has the power to activate the National Emergency Management Plan.

7.4.1. Institutional Structure of DRR - National

The national structure for disaster management is described in **Figure 7.**

Figure 6. National Structure for Disaster Management in Saint Lucia

Saint Lucia's National Disaster Office (NDO) is a separate Government Department within the Office of the Prime Minister, the National Emergency Management Organisation (NEMO), headed by a national disaster coordinator (NDC), Director-NEMO, who reports to the Prime Minister. The NDC is a paid, full time position. The NDO has dedicated office space allocated for Executive Officers and Clerical and Support Staff with space allocated for training. During an emergency, the NDO transforms into the National Emergency Operations Centre (NEOC), the centre from which all commands are issued and to which all demands are made. The functions of all essential services and key ministries and national agencies are coordinated within the EOC, through the heads of these agencies.

The **NEMO Secretariat** serves as the coordinating unit under the jurisdiction of the Office of the Prime Minister and is responsible for handling all the financial and

operational aspects and also provides overall management and coordination for all disaster management related activities. Staffing within the NDO comprises seven (7) full time staff, 3 technical and 4 non-technical staff. The organizational chart for the NDO is provided in **Annex xx.**

During an emergency NEMO transforms into the National Emergency Operations Centre (NEOC), the centre from which all commands are issued and to which all demands are made. Located in the EOC are all heads of essential services. Ministries or sectors are also represented in the National EOC but at the same time co-ordinate several organisations/areas within the ministry/sector.

7.4.2 Multisectoral Platform for Disaster Risk Reduction

The existing governance structure for disaster management is particularly noteworthy, as it integrates all levels national, sectoral and community. Several government ministries/agencies are represented within the NEMO, including Finance and Planning, Health, Education, Welfare, Environment, Agriculture, Housing, Public Works, Tourism, Information, Defense and Security, Justice and Transportation; these agencies however, do not form part of the NDO.

All disaster-related activities, which currently are anchored in preparedness, response and recovery, are advised by the Saint Lucia National Emergency Management Advisory Committee (NEMAC). The NEMAC is a technical working group comprised of line ministries, non-governmental organizations, representatives from the private sector and is chaired by the Office of the Prime Minister – Cabinet Secretary. The NEMAC has an open membership and calls upon different expertise as and when needed. It convenes at regular intervals and on demand to receive updates on the Emergency Planning process. The NEMAC is therefore, able to play a key advisory role in the furtherance of a DRR agenda, to increase emphasis on prevention/mitigation and reduction of impacts of disasters.

7.4.3 Local Networking Groups drivers and risk management

The National Emergency Management Organisation (NEMO) is supported by a network of volunteers who comprise the ten (10) National Disaster Committees eighteen (18) District Disaster Committees, operating under the jurisdiction of the

NEMO, and involved in the planning and response against disasters. A similar structure as at the national level is established at the district level with every district having a distinct EOC.

There have been several other initiatives undertaken to promote local networking, particularly with regard to risk identification and management. A key partner in this regard has been the Saint Lucia Red Cross (SLRC), which has collaborated through DIPECHO funded projects, in the development of model disaster plans for schools and assisted in the design of the first set of disaster programmes at the community level. More recently (2010-2012), the SLRC has worked with about 10 communities, with and without NEMO groups, to undertake vulnerability and capacity assessments (VCA). Through this process, there has been capacity building at the community level for hazard identification and for undertaking small-scale, community-level, hazard mitigation measures.

Several projects have been funded at the community level by donor agencies such as the JICA – flood early warning systems; FAO – resilience building in the agriculture sector – disaster resilient green houses and water harvesting systems for mitigating the impacts of climate change such as drought.

There is still need to begin to generate gender disaggregated disaster impact data at the community level, so that special care is taken to meet the needs of both women and men in a disaster event (e.g. gender sensitive shelter management policy, etc.).

7.4.4. Budgetary resources for the development of disaster risk reduction activities

The NDO, the NEMO Secretariat, is financed under a separate budget head in approved national estimates of expenditure. A National Disaster Fund has been established in Saint Lucia.

Funding, however, for most disaster risk reduction activities is largely funded through donor funded projects. At the national level, the World Bank has funded disaster mitigation activities through the projects such as the Emergency Response Management Project (ERMP) and Second Disaster Management Project (SDMP). Community level activities have been funded by donors such as JICA, FAO, GEF small grants in the case of community projects to correct problems identified through the VCA process.

7.5. National Development Plan in Relation to DRR

7.5.1. DRR National Plan/Disaster Risk Management

The National Emergency Management Plan (NEMP) purposes to outline preparedness, prevention mitigation and response activities to an emergency situation associated with natural/man-made disaster or technological incidents on the island. It defines the organisational and functional mechanisms and procedures for carrying out a disaster program, including operational concepts relating to the various emergency situations, description of the overall responsibilities of the National Emergency Management Organisation [NEMO] and the role of all concerned sectors in assisting in minimizing loss of life and suffering. It also outlines the mechanism for effecting a rapid response to such disasters, with regard to maximizing the use of local, national, regional and international resources.

While the NEMP does not develop fully the areas of disaster prevention and mitigation, it outlines clearly the commitment of the GOSL to disaster preparedness, prevention, mitigation and effective response, that is, the full spectrum of DRM, and makes reference to same, with supporting information in annexes to the Plan. The Plan, however, highlights the responsibility of the NEMO for the coordination of risk reduction programmes and evaluation of effectiveness of risk reduction activities.

Disaster Risk Reduction (DRR) is the conceptual framework of elements considered with the possibilities to minimize vulnerabilities and disaster risks throughout a society, to avoid (prevention) or to limit (mitigation and preparedness) the adverse impacts of hazards, within the broad context of sustainable development[47].

The key elements of DRR are:

- Risk awareness and assessment including hazard analysis and vulnerability/capacity analysis;
- Knowledge development including education, training, research and information;
- Public commitment and institutional frameworks, including organizational, policy, legislation and community action;
- Application of measures including environmental management, land-use and urban planning, protection of critical facilities, application of science and technology, partnership and networking, and financial instruments;
- Early warning systems including forecasting, dissemination of warnings, preparedness measures and reaction capacities

[47] ISDR

The DRR elements listed above are well addressed in the country's Comprehensive Disaster Management Strategy and Programming Framework for the 2012 - 2017 period. The thematic areas selected for priority attention reflect a strong DRR approach including: hazard mapping and vulnerability assessment; flood management; community disaster planning; early warning systems; climate change; and knowledge enhancement.

The overall focus of the national CDM strategy is the building of resilience at national and community level to respond to and cope with hazard impacts. In this regard, concrete resources would be sought to expand and replicate several on-going best practices throughout the region.

The GOSL Natural Hazard Mitigation Plan (2006) defines substantial links with climate change adaptation, particularly with regard to similarities in hazard mitigation measures and climate change adaptation measures for sea level rise and severe hurricane events. While the implementation mechanism for the NHMP has not been fully elaborated, it is envisaged that the existing disaster management framework will with its demonstrated successes will be built on and extended to incorporate climate change adaptation in the DRR framework.

7.6 Reflections on the legal, regulatory, institutional and management capacity

There appears to be a growing recognition among stakeholders about the need for government to pursue effective disaster risk reduction policy, planning and implementation that is transparent and fully participatory. This of course will require fully developed coordinated and coherent action on disaster risk reduction across different sectors, public and private sector, and between central and local governments.

Currently, though institutional arrangements, legislation and policy for disaster risk reduction are reasonably well developed, but they tend to be anchored, in disaster preparedness, response and recovery, which do not have the authority or capacity to influence decisions related to national development planning and investment.

Current efforts of the NEMO are focused on eliminating or reducing the human loss and suffering resulting from natural disasters, with an emerging role of a more all-embracing disaster planning function. However, with the anticipated increase in climate related disasters, there will be a corresponding increase in the pressure placed on the NEMO and other disaster management related agencies to intensify efforts to respond accordingly. The work of the disaster management community will also be rendered even more difficult by the threats posed by climate change with regard to

extreme events, especially in the areas of tourism, infrastructure, human health, agriculture and water resources.

A legal, regulatory, and institutional framework, infused with a culture of accountability, will be required for effective governance and service delivery with regard to DRR. A key accountability measure to communities is the extent to which a government is able to address the risk of poorly planned and managed urbanization, environmental degradation, and poverty. Access to information, particularly information on disaster risks, will also generate a social demand for disaster risk management. Adequate national legislation will also be needed to promote the introduction of, and monitor compliance with, monitoring and accountability mechanisms. This will serve to improve policy coherence, enhance the efficiency and effectiveness of resources, minimize duplication and contradictory policies, deal with tradeoffs, and reduce the sensitivity of development activities to current and future climate related and other disasters.[48]

The need for proper parliamentary oversight and national auditing systems cannot be underscored. The scale and range of internal and international accountability mechanisms has not been fully explored, nor the potential for such mechanisms to be applied to the field of disaster risk reduction. Accountability measures can guide government and public awareness of, and support for, disaster risk reduction policies.

[48] Urwin,K and A. Jordan, "Does public policy support or undermine climate change adaptation? Exploring policy interplay across different scales of governance", 18(1) *Global Environmental Change-Human and Policy Dimensions* (2008), 180.

8. STATE OF DISASTER RISK IN SAINT LUCIA

8.1 CONDITIONS OF RISK IN THE COUNTRY

As countries use various approaches and concepts, the definition for reference on disaster risk is that developed by UNISDR: "The potential disaster losses, in lives, health status, livelihoods, assets and services, which could occur to a particular community or a society over some specified future time period."

The Risk Management Framework adopted by the Inter-American Development Bank (IDB) and presented in **Table 4** is also used as a context for assessing and evaluating risk.

Table 4. Key Components of Risk Management – IDB, 2000

Pre-Disaster Phase				Post-Disaster Phase	
A. Risk Identification	**B. Risk Mitigation**	**C. Risk Transfer**	**D. Disaster Preparedness**	**E. Emergency Response**	**F. Rehabilitation and reconstruction**
1. Hazard assessment (frequency, magnitude, and location)	1. Physical and engineering mitigation works	1. Insurance and reinsurance of public infrastructure and private assets	1. Early warning and communication systems	1. Humanitarian assistance	1. Rehabilitation and reconstruction of damaged infrastructure
2. Vulnerability assessment (population and assets exposed)	2. Land-use planning and building codes	2. Financial market instruments (catastrophe bonds and weather-indexed hedge funds)	2. Contingency planning (utility companies and public services)	2. Clean-up, temporary repairs, and restoration of services	2. Macroeconomic and budget management (stabilization and protection of social expenditures)
3. Risk assessment (a function of hazard and vulnerability)	3. Economic incentives for pro-mitigation behavior	3. Privatization of public services with safety regulation (energy, water and transportation)	3. Networks of emergency responders (local and national)	3. Damage assessment	3. Revitalization for affected sectors (exports, tourism, and agriculture)
4. Hazard monitoring and forecasting (mapping, and scenario building)	4. Education, training and awareness about risks and prevention	4. Calamity Funds (national or local level)	4. Shelter facilities and evacuation plans	4. Mobilization of recovery resources (public, multilateral, and insurance)	4. Incorporation of disaster mitigation components in reconstruction activities

Saint Lucia, like the most SIDS, is highly prone to devastating natural disasters. Its vulnerability can be attributed to: (a) its small geographical area, which accounts for the fact that disasters take country-wide proportions; (b) its location in some of the highest risk areas of the planet, such as mid-ocean ridges with strong volcanic and seismic activity, tropical cyclone belts, and direct exposure to the forces of the oceans; and (c) the fact that it is dependent on few sources of income, in the agricultural sector or in tourism, for a substantial part of its gross domestic product (GDP). These sources of income have been severely reduced for months by a single catastrophic event. Another critical factor which highlights Saint Lucia's vulnerability is its limited capacity to reactivate the development process. The fragility of ecosystems, coupled with limited human resources, often preclude any possibility of developing and implementing meaningful disaster-mitigation programmes.

8.2 Historical Disaster Analysis

This subsection describes and analyses major events that impacted the country.

While there is no historical record regarding the establishment of an office to deal with disasters, anecdotal evidence suggests that a desk was initially set up to deal with disasters sometime in the early 1980's, and by 1990 there was an established Office of Disaster Preparedness, under the supervision of a National Disaster Coordinator.

The DesInventar database was developed in 1994 by the Network for Social Studies in Disaster Prevention in Latin America http://www.desinventar.org to provide a mechanism for the formal historical recording and analysis of disaster events. The database is still to be utilized in country. However, a formal historical compilation on disasters was undertaken in 1999, with a Disaster Catalogue for Saint Lucia, originally produced by A. L. Dawn French, current Director of the NEMO. The catalogue is updated regularly as events occur.

The Saint Lucia Disaster Catalogue, first catalogues disaster events based on time period, database set up by century from 1700's to 2000's, with a second data set categorized by type of disaster event. The catalogue makes provision for the inclusion of data and information on: date of the event, brief description of the event, number of persons killed, number left homeless, costs and comments, however, not all the information for the parameters within the database have been filled in.

The listing of the history making events during the 1700 – 1800 range from hurricanes, earthquakes, health epidemic and civil unrest; and in the 1900's: range

from hurricanes, storms, fires, earthquakes, landslides, mass casualty (air, sea and terrestrial), pestilence and civil unrest. Of note, is that in that period prior to the establishment of an office for disaster management, events such as the 1854 Cholera Epidemic, the 1938 Ravine Poisson Landslide and the 1948 Castries Fire required that the [Colonial] Government of the day appoint persons to coordinate the response.

A summary of type of disaster events and frequency of occurrence during the three time periods is presented in **Table 4.**

Table 5. Summary of Disaster Events and Frequency of Occurrence in Saint Lucia 1700 - 2000's

Type of Event	1700-1800's		1900's		2000's	
	No. of Events	Loss of Lives	No. of Events	Loss of Lives	No. of Events	Loss of Lives
Earthquake	1	1	4	NA	2	0
Fire	NA	NA	5	3	2	3
Landslide	NA	NA	5	100	NA	NA
Medical	2	1509	NA	NA	3	1
Oil Spill	NA	NA	2	0	3	0
Hurricane/Storm/Flood	4	823	15	35	6	8
Other	1	8	9	70	5	2

Other – covers mass casualty events such as civil unrest, airplane crash, boat tragedy, building and infrastructure collapse
Source: Disaster Catalogue
NA – Data not available

The data show a decreasing trend in the occurrence of certain types of disasters such as fires and changes in the type of medical emergency (from deadly epidemics such as yellow fever and cholera to less impacting dengue and influenza). While there has been an increasing trend in the occurrence of disasters such as hurricanes/storms/floods, the data however, show a decreasing trend in loss of lives in that regard.

A range of natural disasters has impacted Saint Lucia over the last century, some of which may have been exacerbated by unsustainable and poor development practices. Since Hurricane Allen in 1980, Saint Lucia has been affected by:

- At least six (6) hurricanes and tropical storms, three of them occurring during the 2002 –2007 period

- About eight (8) major land slippages, which have resulted in the destruction of homes, dislocation of approximately 145 families, loss of biodiversity particularly from landslides at La Sorcière, and costs totaling over two million Eastern Caribbean Dollars (EC$2M);

- Tropical storm Debbie, which caused major flooding, landslides and damage to bridges, homes and road infrastructure in 1994; and
- A series of earthquakes in 1990 and, in November 2007, an earthquake of magnitude 7.3 on the Richter scale, followed by a number of aftershocks.

In particular, 2004 was a record year for the Caribbean with regard to multi-event, multi-island impact of hurricanes and tropical systems, as well as for the Tropical Atlantic and Gulf coast of the United States. Events brought into sharp focus the impacts of worst-case scenarios, and revealed the many inadequacies of coping capacities in all territories. Grenada and the Cayman Islands suffered extensive destruction, and Haiti, Jamaica and the Bahamas were also severely affected. There were some 6,000 casualties (mostly in Haiti) and some US$6billion loss of assets in eight (8) states. 2005 also brought a series of tropical systems to several islands including some of the same islands viz. Jamaica, Bahamas, Grenada and Cayman.

In recent times disaster analysis has been guided by the Damage Assessment and Needs Analysis (DANA) Policy (2007) and more recently the use of the UNECLAC Damage and Loss Assessments (DaLA) methodologies. This has brought into sharp focus the issue of increasing cost, evidenced by the colossal losses related to loss of lives and property, human injury, destroyed tourism and general infrastructure, crops and livestock, and household and commercial and industrial assets, following the passage of Hurricane Tomas in October 2010.[49] This results in a huge drain on the country's economic resources.

In many instances, the GoSL has borne the majority of the rehabilitation costs, since most persons affected do not have insurance coverage or adequate financial means to undertake restoration works and recovery of livelihoods. Given the likelihood of increased climate related disasters, these rehabilitation costs are expected to increase. It is however recognized that adverse effects of natural disasters can be reduced if appropriate DRR and adaptation measures are implemented.

Further, the CDM strategy states "growing attention to technological or human induced hazards also necessitates a stronger multi-hazard approach and a broadening of concern beyond natural events, particularly hurricanes. Safety and security issues are high on the global and regional agendas and need to be elevated on the national agendas. Terrorism, biosecurity, food security, and the environmental health and security implication of "open borders» are but some of the concerns.

Recovery planning has received short shrift to date, and rebuilding of vulnerability must be avoided. In summary, all phases of the disaster cycle must continue to be

[49] Damage and loss assessed at over USD$500 Million for Hurricane Tomas, 2010.

treated but with deepened attention to loss reduction, and in a more programmatic way – CDM using the Results-Based Management (RBM) and Program-Based Approaches."

8.3. Hazards[50] /Threats:

The major hazards to which the country is exposed are described under this sub-section.

Hazard Background Information:

The BTool Country Assessment report for Saint Lucia (2007)[51] indicates that volcanoes, earthquakes, hurricanes, storm surges, floods, landslides and coastal erosion are potential disaster issues facing the country.

The island is part of a volcanically active ridge formed along the subduction zone in the Eastern Caribbean. As a result, the island is affected by volcanic and seismic activity. The landscape carries evidence of volcanic activity, namely lava domes, volcanic necks/plugs or 'pitons', explosion craters, pyroclastic flows and surges, and lahars. The potentially active centre is the Soufrière Volcanic Centre, found in the southwest of the island. The Sulphur Springs geothermal field form part of the Soufrière Volcanic Centre. The island experienced at least five swarms of shallow earthquakes over the last hundred years, occurring in 1906, 1986, 1990, 1999, and 2000 (Seismic Research Unit, 2002).

Saint Lucia has been affected several times by tropical storms and hurricanes within recent times. Storm surges, floods and landslides often accompany these events. Coastal erosion is a continuous threat to property and communication networks, along with anticipated sea level rise that make the coastal zone particularly vulnerable to beach erosion, loss of habitat for marine life, loss of fresh water aquifers, and damage to coastal infrastructure.

8.3.1 Naturally occurring

8.3.1.1 Type geodynamic/geo hazard

The National Risk Register (2006) identifies 3 sub-categories of this hazard/threat for the island: Earthquake; Volcanic eruption and Tsunami.

[50] "Natural hazard: natural process or phenomenon that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage". UNISDR Terminology 2009.

[51] USAID/OECS, 2007. Risk Management Benchmarking Tool (BTool), National Assessment: Saint Lucia.

- Earthquake sub-categories include ground vibration, liquefaction and ground rupture (unlikely for Saint Lucia). Other threats under this sub-category include secondary effects, common to a number of other hazards such as fires, landslides etc., which may result due to the ground vibration effects.

- Volcanic activity include emissions, and seismic related geophysical processes, such as mass movements, landslides, rockslides and surface collapses, debris or mud slides, pyroclastic flows, surges, ashfall, mudflows for the volcanic threat; [secondary effects such as landslides, the pyroclastic flows and surges would actually cause damage through various mechanisms such as their physical impact, heat (so therefore, fires) etc.]
- Tsunami

Hydro-meteorological factors are considered important contributors to some of these processes. Hence increase in incidence of hydro-meteorological events, with the advent of climate change, is likely to bring about increase incidence of these hazards.

8.3.1.2 Type hydro- meteorological

Phenomena included under this type of hazard include tropical cyclones (hurricanes and tropical storms associated with high winds), thunderstorms, coastal storm surges, heavy rainfall resulting in floods including flash floods, drought, heat waves and cold spells, effects of El Niño Southern Oscillation (ENSO) and La Niña. In the Caribbean, rainfall is influenced by the El Niño Southern Oscillation (ENSO) and fluctuations in other large scale climate systems. An El Niño episode generally brings with it warmer and drier conditions, while La Niña brings colder wetter conditions, hence the reason for significant inter-annual variability and anomalies.

Five sub-categories under a classification of severe weather were created within the National Risk Register for these types of phenomena.

Links to Climate Change

Important to note, is that current and future climate predictions for Saint Lucia indicate increased frequencies of extreme/severe weather events. These events are anticipated have negative impacts on social and economic infrastructure such as housing, water, agriculture, ports, schools, hospitals, tourism plants, health services, communications, etc., are likely to cause major social and economic stresses which can be alleviated by appropriate and timely adaptation measures. The nature-based sectors, such a coastal resources, marine biodiversity and forest biodiversity are not expected to fare well, either. All of the anticipated impacts are likely to trigger some form of disaster that have cross cutting, multi-sectoral impacts. These include: coastal erosion with loss of near

shore housing and coastal infrastructure[52]; landslides; loss of ecosystem services including loss of agricultural production and biodiversity and water and food security; forest fires[53]; and damage to forest ecosystems due to wind damage; damage to properties and threat to life and livelihoods associated due to more intense storms; climate related health impacts - Vector and Waterborne Diseases are expected to become more prevalent with climate change.

8.3.2 Anthropogenic/ Man-made

8.3.2.1 Type socio-natural hazards

These type of hazards are associated with high population density in urban areas, where the effects of human activities can result in inadequate basic-service provision such as supply disruptions with fuel, water, electricity, communications and retail supplies; health with regard to inadequate emergency response cover, education,

Deforestation is also another aspect of this type of hazard that can lead to land degradation and disaster impacts.

Most of the man-made hazards are likely to result in disaster in the form of mass casualty. Primary hazards in this regard though include armed conflict and related consequences, especially internal displacement and migrations.

Transport related incidents including airport crash, sinking of vessels, major vehicular accidents on road network, collisions involving movement of hazardous and radioactive materials; also civil unrest – industrial action – withdrawal of labour; issues of public safety and security with regard to mass crowd gatherings

The National Risk Register covers these types of hazards under the categories of civil unrest, industrial action/staff shortage, public safety and security, supply disruption, structural emergency and transport. Each category is further broken down into sub-categories that manifest the hazard at the micro/ site specific level. For example Sub-categories under transport include: Airport Crash, Sinking of Vessels, Collision of vessels at sea, Major crash on road network, Incident on Road Tunnel, Crash transporting hazardous material, crash transporting radioactive materials, with levels of risk identified for each sub-category.

[52] Coastal infrastructure is vulnerable to the impacts of climate change including storm surge and SLR. Assessments to determine the expected degree of impact are critical for deriving cost-effective adaptation interventions.

[53] In the dry season the Fire Department responds to increase occurrences of forest and bush fires in dry life zones around the island. The GOSL has recognised the need to enhance the capacity of the Fire Department to address climate induced fires.

8.3.2.2 Type Technological Hazards

These types of hazards are considered in the context of both intentional and unplanned. These stem from **CBRNE: chemical, biological, radiation, nuclear and environmental pollution** from fires, explosions, toxic spills, bioterrorism, mining and oil/gas extraction in highly sensitive environmental areas, among others. Pollution from unexploded arms and munitions are also considered under this hazard.

The national Risk Register identifies three main related categories in this regard and sub-categories of each. The three categories include environmental pollution/infestation, fire/explosion and terrorism.

8.3.3 Health emergency Hazards

These types of hazards are associated with Illnesses and epidemics of major occurrence in humans, but also in animals and plants/phytosanitary. Examples include: avian flu, traditional and haemorrhagic, malaria, yellow fever, cholera, among others.

The National Risk Register identifies Animal health diseases – both zoonotic and non-zoonotic, with recent epidemics such as dengue and influenza.

8.4 Vulnerability

This subsection addresses conditions determined by physical, social, economic, environmental and political factors and processes that increase the susceptibility and exposure of a community to hazards.

'Risk is not only associated with the occurrence of intense physical phenomenon but also with the vulnerability conditions that favor or facilitate disaster when such phenomenon occur. Vulnerability is intimately related to social processes in disaster prone areas and is usually related to the fragility, susceptibility or lack of resilience of the population when faced with different hazards".[54]

8.4.1 Definition of the analysis criteria and methodology

Currently, criteria and methodologies for analysis of vulnerability have not been clearly defined with regard to disaster risks. The vulnerability and adaptation (V&A) assessments for the Second National Communication (2010) on Climate Change for Saint Lucia however, utilised certain criteria and methodologies to assess vulnerability to the impacts of climate change and climate variability, and these have served as the starting point in this regard.

[54] Summary report for session "Visions of Risk and Vulnerability: Patterns, Trends, and Indicators", World Conference on Disaster Reduction, held in Kobe, Hyogo, Japan, January 18-22, 2005.

The V&A assessments were conducted on a sectoral basis, hence criteria for impact assessment were sector-specific and were aligned to key thematic areas in the sector.

The methodology proposed for the V&A assessments was that provided by the Climate Studies Group Mona[55] and was utilized to qualitatively analyse vulnerability of each sector, using primarily an outcome approach, while seeking to integrate the vulnerability approach.

Outcome vulnerability was the implicit framework used for the exercise. An outcome approach to analysing vulnerability is best suited to the well defined, closed-system impacts/issues, identified for each sector, and appears to be particularly useful for operationalising the IPCC's definition of vulnerability to climate change. It stems from early approaches to hazards analysis; usually results of this type of vulnerability assessment are around technologically focused adaption and mitigation strategies. The outcome-vulnerability approaches constrain policy questions to: 'what is the vulnerability of current systems if current management and policy continues?'

The scenario approach provided a useful tool for assessing the extent of the country's vulnerability from large to small degrees of changes in climate. This approach is particularly important for an island such as Saint Lucia, whose economy, and by extension, its socio-political structures, is largely natural resource-dependent, and therefore, likely to be directly affected by changes in climate parameters. This approach is also quite applicable to other types of disaster related events.

It is therefore, imperative that Saint Lucia continues the process of vulnerability/impact assessments particularly with regard to DRR in ongoing and projected development programmes, plans and projects. This is necessary if appropriate DRR and climate change adaptation options are to be developed and the impacts minimised with regard to changes in the external environment.

8.4.2 Components

Key drivers of vulnerability identified include *inter alia*:

Development Imperatives and Land Use Changes

[55] Climate Studies Group Mona, Department of Physics, University of the West Indies, Mona Campus

The island is characterized by limited land space. Further, land use patterns are generally in conflict with land capability prescriptions. Main areas of conflict relate to unsustainable agricultural, land development and human settlement (e.g. squatting) practices. Development imperatives with respect to land resources are also influenced by population growth and demographic changes.

Unemployment and Poverty

The vulnerability of the poor in developing countries to the short term impacts from climate change disaster events and other disasters is well noted. The increased frequency and severity of adverse weather events is likely to have a negative impact; and is a factor that should be taken into account when defining DRR policy.

8.4.3. Analysis of Vulnerability: fragility, Exposure, Resilience

In Saint Lucia, a high percentage of the population lives along the coastal area. Most of these settlements have very little room for expansion except through hillside residential development – areas that are highly susceptible to the ravages of extreme events such as hurricanes.

Poor land use planning and associated squatter developments, deforestation and developments in disaster prone areas have exacerbated vulnerabilities, while the absence of approved building codes and standards has resulted in a housing stock prone to damage by floods, landslides and high winds. The island already suffers from a water deficit in some areas and the number of proposed golf courses and other large tourism and other developments will exacerbate this situation. National development Plans which involve large hotel plants close to the sea and marinas along the rough east (Atlantic) coast will, are likely to add to the economic vulnerability of the island as a whole and the tourism industry in particular. These developments will also threaten important marine and terrestrial ecosystems and will erode the resilience of natural systems to the impacts of climate change. Maintaining a balance across the three pillars of sustainable development, that is, economic, social and environment, will certainly be a major challenge for the GOSL.

The vulnerability and adaptation (V&A) assessments for the Second National Communication (2010) for Saint Lucia reveal vulnerabilities to climate hazards across all sectors of the economy, including water resources, coastal systems and resources, agriculture, fisheries and food security, tourism, natural ecosystems and biodiversity, human health, infrastructure and financial services. This has borne out

the predictions of Caribbean scientists and their global counterparts that Saint Lucia and other Caribbean states are in a position of increased vulnerability to the effects of climate change. Predictions of higher temperatures, rises in sea level, precipitation changes (drought and floods), increased hurricane intensity and the threat to human life, property and livelihoods resonate in a real way to Saint Lucians, following the drought of 2009-2010 and Hurricane Tomas in 2010.

Further, the cost of CC adaptation strategies and measures proposed for critical sectors of the economy in the Saint Lucia SNC V&A exercise, will constitute a significant portion of Saint Lucia's GNP. These major costs are associated with upgrading of critical infrastructure and public sector assets such as health care centres, hospitals government offices, to name a few . A small island with a small population, these financing needs for climate change adaptation alone is quite substantial. Mobilizing and effectively utilizing the necessary financing is going to be a looming challenge.

Vulnerable Areas/Regions

The Disaster Preparedness and Response Act # 13 of 2000 gives particular focus to disaster risk reduction, by addressing specifically the issue of *Specially Vulnerable Areas*. This requires that the NEMO, the National Hazard Mitigation Council (NHMC) and particularly the Ministry with responsibility for Physical Planning and Development, work together to establish where these vulnerable areas exist in Saint Lucia and delimit them considering the different types of hazards. Special Enforcement Areas have also been declared under the Physical Planning and Development Act, Section 43 which makes provision for the Minister to prevent squatting or other unauthorized development.[56] Knowledge of these areas will

[56] **PHYSICAL PLANNING AND DEVELOPMENT ACT, SECTION 43 WHICH STATES: SPECIAL ENFORCEMENT AREAS**

(1) Despite anything contained in the provisions of this Act the Minister may, for the purpose of preventing squatting or other forms of unauthorised development, by order published in the Gazette, declare any area to be a special enforcement area.

(2) Without prejudice to the provisions of section 51, where an area is declared to be a special enforcement area under subsection (1) the Head of the Physical Planning and Development Division may upon service of a notice on the owner or occupier of the land, not less than 14 days before the intended action, remove, demolish or alter any development where such development has commenced without the written permission of the Head of the Physical Planning and Development Division and where the Head of the Physical Planning and Development Division is satisfied that permission would not have been granted for that development.

allow for better development planning that considers risk and vulnerability in order to implement adequate mitigation measures.

Figure 8, highlights the multitude of areas impacted by a number of hazards during Hurricane Tomas, and now deemed vulnerable areas.

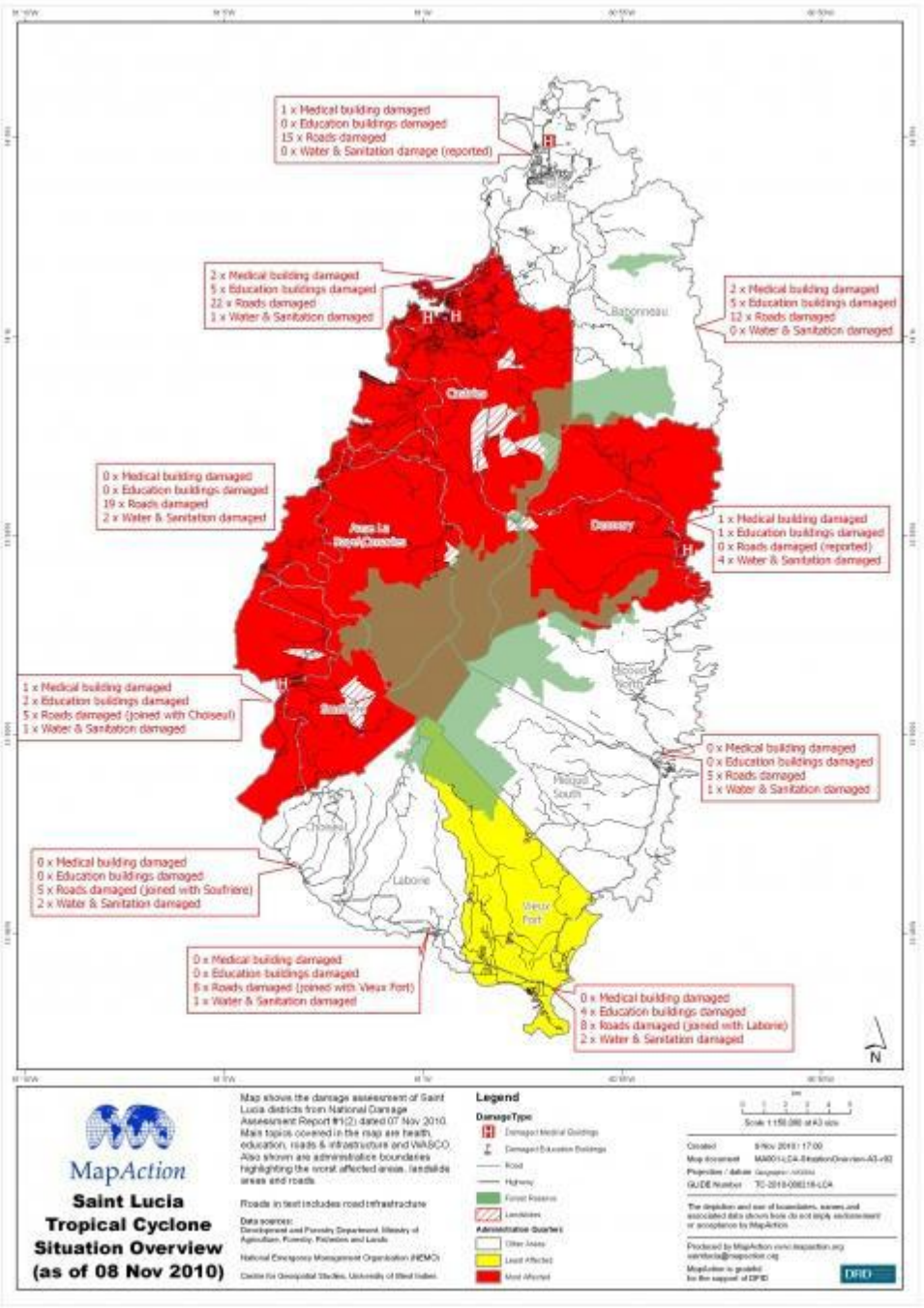
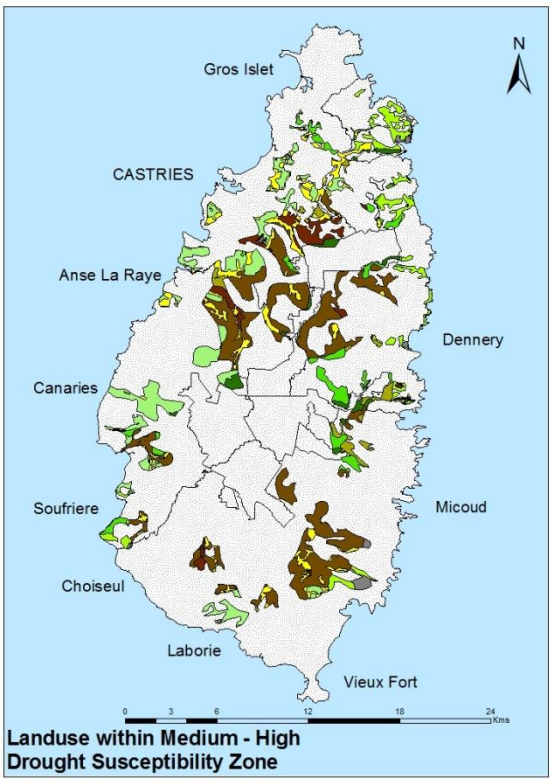


Figure 7. Vulnerable areas Identified during Hurricane Tomas

Two climatic factors for which vulnerability mapping data are available, are also used to illustrate potentially vulnerable zones in Saint Lucia. These maps show an interaction of land use and vulnerability to climate variability and long term climate change impacts. This is done with respect to precipitation change (drought) and extreme events (flooding). This is illustrated in Figures 11 and 12. Vulnerability with regard to areas being prone to landslides and floods is also presented.

Drought vulnerable regions are indicated in the north, south east and southern parts of the island and in areas of land use ranging from forest to agriculture to residential/commercial.



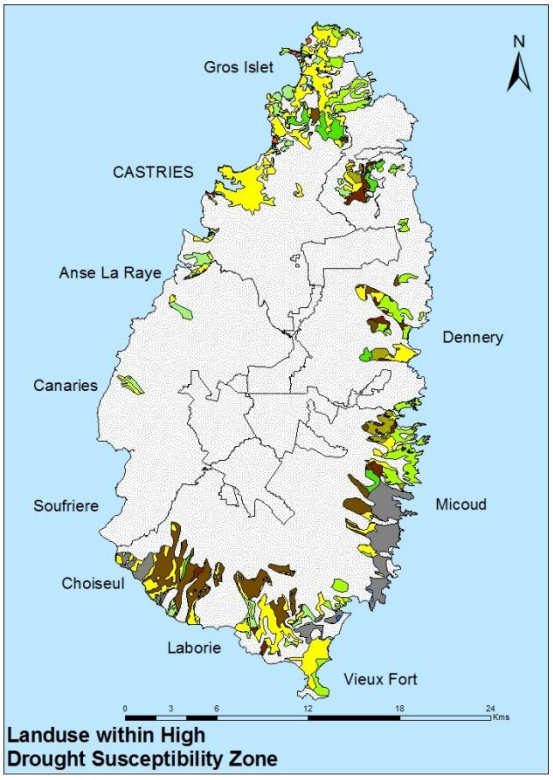
Legend

Description			
Forest Reserve		Scrub Forest	
Densely Vegetated Farming		Builtup Area	
Intensive Farming		Touristic	
Mixed Farming		Grasslands	
Other Vegetation		Bare Ground/Scrub	
Natural Tropical Forest		Mangrove	
		Ponds	
		Quadrants	

Description	Hectares	Total	%
Bare Ground/Scrub	228.81	2739.86	8.35
Densely Vegetated Farming	4209.58	13651.96	30.83
Forest Reserve	396.42	9415.31	4.21
Grasslands	4.54	187.79	2.42
Intensive Farming	667.55	2952.64	22.61
Mixed Farming	428.57	1555.83	27.55
Natural Tropical Forest	949.89	4786.10	19.85
Other Vegetation	2219.14	8626.33	25.73
Ponds	4.87	42.55	11.44
Scrub Forest	1047.95	6303.03	16.63
Touristic	4.95	110.31	4.48
Builtup Area	1614.90	10020.98	16.12

Source 1: Drought Susceptibility; Ministry of Physical Development, Housing, Urban Renewal & Local Government Nov. 2007
Source2: 2008 LandUse Map ; Compiled by GIS Team (E. Charles-Soomer, R. Rock) :Vulnerability Assessment Second National Communication 2010; Sustainable Development and Environment, Ministry of Physical Development.

Figure 11: Vulnerability Zones in Saint Lucia: Drought



Legend

Description			
Forest Reserve		Builtup Area	
Densely Vegetated Farming		Touristic	
Intensive Farming		Grasslands	
Mixed Farming		Bare Ground/Scrub	
Other Vegetation		Mangrove	
Natural Tropical Forest		Ponds	
Scrub Forest		Golf Course	
		Quadrants	

Description	Hectares	Total	%
Bare Ground/Scrub	1522.6015	2739.86	55.57
Densely Vegetated Farming	1715.6028	13651.96	12.57
Forest Reserve	7.3452	9415.31	0.08
Golf Course	31.0216	64.43	48.15
Grasslands	29.3998	187.79	15.66
Intensive Farming	452.9869	2952.64	15.34
Mangrove	39.3810	183.65	21.44
Mixed Farming	382.9953	1555.83	24.62
Natural Tropical Forest	571.4563	4786.10	11.94
Other Vegetation	746.5684	8626.33	8.65
Ponds	17.2006	42.55	40.43
Scrub Forest	1653.4670	6303.03	26.23
Touristic	42.9248	110.31	38.91
Builtup Area	4091.1121	10020.98	40.83

Source 1: Drought Susceptibility; Ministry of Physical Development, Housing, Urban Renewal & Local Government Nov. 2007
Source2: 2008 LandUse Map ; Compiled by GIS Team (E. Charles-Soomer, R. Rock) :Vulnerability Assessment Second National Communication 2010; Sustainable Development and Environment, Ministry of Physical Development.

Figure 8**: Vulnerable Zones in Saint Lucia: Flooding**

Landslide hazard and risks are mapped in **Figures 10 and 11.** Much of the island is subject to at least moderate landslide hazard, with only a strip of land from Choiseul to Vieux Fort and small pockets of flat land around the remainder of the island subject to low landslide hazard. Much of the islands road infrastructure traverses areas of high or extreme landslide hazard. Communities with limited road access are particularly vulnerable to isolation

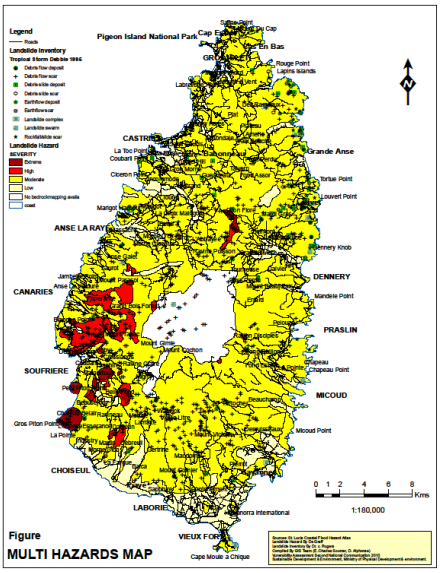
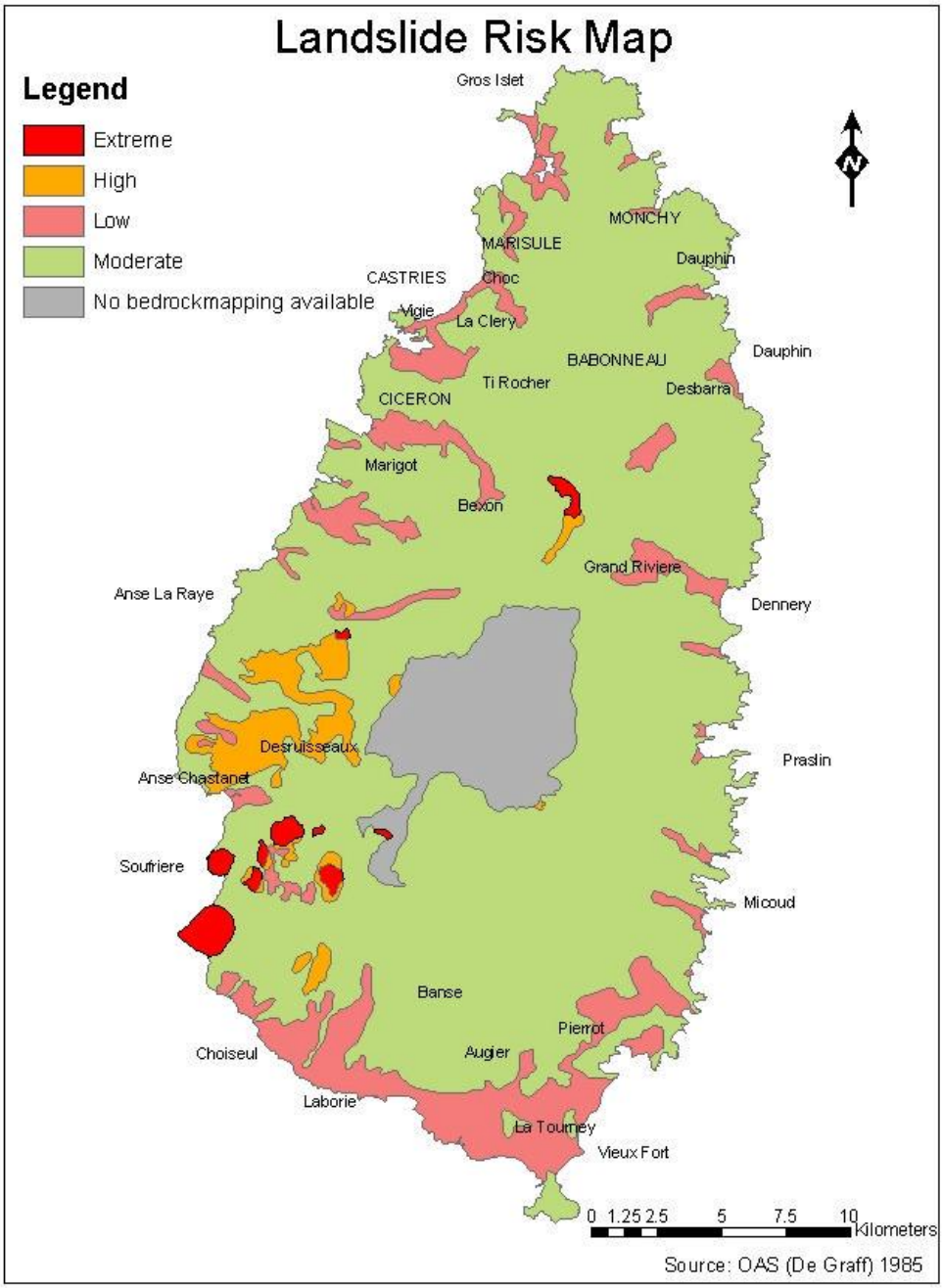


Figure 9. Landslide Hazard Map
Source: GIS Team Vulnerabiltiy Assessment, SNC, 2010


Landslide Risk Map
Legend
Extreme
High
Low
Moderate
No bedrockmapping available
Gros Islet
MONCHY
MARISULE
Dauphin
CASTRIES
Choc
Vigie
La Clery
BABONNEAU
Dauphin
Ti Rocher
Desbarra
CICERON
Marigot
Bexon
Grand Riviere
Anse La Raye
Dennery
Desruisseaux
Praslin
Anse Chastanet
Soufriere
Micoud
Banse
Pierrot
Choiseul
Augier
Laborie
La Tourney
Vieux Fort
0 1.25 2.5 5 7.5 10
Kilometers
Source: OAS (De Graff) 1985

Floods

Opadeya[57] (2006) identifies three flood hazard zones (high, medium & low)and the locations of these flood hazard zones. The map which is done at scale 1: 25 000 (i.e. medium scaled map), identifies important settlements, road networks and the catchments contributing runoff to the hazard zones are shown on the map. Flood hazard map results are summarised in the table below.

Table 7. Summary of Flood Hazard Map Results[58]

Flood hazard Category	Low	Medium	High
Locations	Most of the island	Gros Islet coastal plain (NE)	Coastal plain north of Hewanorra Airport
		Flat lands on northern and eastern sides*	Flat lands on eastern and north eastern sides*
		Coastal plain from Hewanorra Airport to Micoud settlement	Areas on western side of island
		Dennery river flood plain	
		Fond D'or river flood plain	
		Cul de Sac River flood plain	
		Parts of Roseau river flood plain	Roseau river flood plain*

NB: *Maps were not included in the report that worked from so precise locations could not be provided in the table above.

However, some of the detailed map assessment shows that within the City of Castries, the north-central and eastern streets are most prone to flooding.

The island-wide flood hazard maps identify likely regions to be flooded for extreme rainfall & give a mean depth of flood waters within regions. They do not provide detailed information of flood water levels or velocities and cannot provide locations of specific hazardous places. Further, they cannot incorporate detailed hydraulic properties

[57] Opadeya, Vincent Cooper & Jacob

[58] The map must be interpreted with caution as results do not represent flood depths at precise locations but rather represents flood depths at approximate locations. Mismatch of city blocks' orientation and model grid system for performing the hydraulic analysis was cited as the root of this uncertainty.

of drainage facilities in the region. Notwithstanding these limitations, these maps are still quite useful.

Vulnerable Groups

Though it is not possible to accurately predict which groups of people will be most affected by future emergencies, events in the recent past have shown that some characteristics of older adults put them at greater risk of illness and death during many types of emergencies. Research done by the CDCP shows that for example, older adults may have impaired mobility, diminished sensory awareness, multiple chronic health conditions, and social and economic limitations—all of which can impair their ability to prepare for, respond to, and adapt during emergencies. An emergency or disaster also can disrupt vital support systems that older adults rely on. For many older adults, independent living is made possible only with help from friends, family, and in-home services that provide meals, home-based health care, and help with the activities of daily living.[59]

Vulnerable populations are defined by one expert group as follows: "People who cannot comfortably or safely access and use the standard resources offered in disaster preparedness, relief and recovery. They may include people with sensory impairments (blind, deaf, hard-of-hearing); cognitive disorders; mobility limitations; limited English comprehension or non-English speaking; as well as people who are geographically or culturally isolated, medically or chemically dependent, or homeless."8

Vulnerable Sectors

The Vulnerability and Adaptation (V&A) assessments conducted during the Second National Communications (SNC) highlighted the vulnerabilities of several sectors including; water resources; land resources; agriculture; coastal sector; marine resources; forest terrestrial resources; health; financial services; and critical infrastructure. **Table 8** summarizes the impacts of different climate hazards on various sectors.

[59] Centers for Disease Control and Prevention. *Identifying Vulnerable Older Adults and Legal Options for Increasing Their Protection During All-Hazards Emergencies: A Cross-Sector Guide for States and Communities.* Atlanta: U.S. Department of Health and Human Services; 2012.

Table 8: Summary of Impacts of Climate Hazards on Different Sectors

Anticipated Climate Change Impacts	Sectors										
	Agriculture	Coastal Zone	Critical Infrastructure	Disasters	Financial Services	Forest Biodiversity	Health	Human Settlements	Marine Biodiversity	Tourism	Water
Sea level Rise	L	H	H	H	H			H	H	H	L
Increased Storm Intensity	H	H	H	H	H	H	H	H	H	H	H
Increased temperatures	H	H		H		H	H	H	H	H	H
High Rainfall Intensity	H	H	H	H	H	H	H	H	H	H	H
Drought conditions	H		M	H	M	H	H	M		M	H

(Key: H- high, M- medium, L-Low)

Source: Saint Lucia SNC- V&A Synthesis Report, 2011

The table indicates that all the key sectors contributing to the national economy have some measure of vulnerability to the key anticipated climate change impacts, some of which are already being felt. For example, Saint Lucia has already recorded severe drought conditions, increased insurance claims for storm-related damage to the built environment and agricultural interests, shoreline erosion, increases in sea surface temperatures and higher average temperatures

8.4 Capacity Building

This subsection addresses the level of progress reached in developing institutional and community capacity for DRR.

It also includes an institutional mapping of the organizations that work on DRR, the level of coordination among them, as well as a mapping of DRR programmes, initiatives, plans and an inventory of tools.

The ability of a country to implement a DRM programme is dependent on the availability or access to local and regional trained personnel in DRM. In view of the fact

that DRM programmes are multi-disciplinary, the country need to have access to capacity building programmes that would enhance its capacity to undertake many of the technical tasks. Developing institutional and community capacity at all levels (systemic, institutional and individual), including improving the knowledge base of the society, however still remains a key requirement for DRR. In particular, institutional capacity, with regard to a science base of information for validating, monitoring and linking DRR with sustainable development using appropriate indicators of DRR, requires strengthening. Capacity to undertake predictive analysis is also another area to be addressed and would require, proper instrumentation for data collection, data management, including development or expansion of computerised databases.

In the 34 areas identified by the BTool in which a country should have human capacity to manage DRM programmes, the Country Assessment in this regard showed Saint Lucia scoring an overall of 88% in this category. This demonstrates an improved level of staffing.

The Pan American Health Organisation had also previously reported well developed capabilities for disaster management in Saint Lucia, with very active participation from all stakeholders.

National Disaster Management is very active and well developed. St. Lucia has achieved Disaster Management capabilities which other Caribbean countries can follow. Numerous agreements with the private sector, NGO's, Service Organizations, and neighbouring French Departments have been implemented. Health sector mitigation activities have begun and are expected to continue. St. Lucia has all possible disaster plans available and updated thanks to the National Emergency Management Organisation St. Lucia. [SOURCE: http://www.disaster-info.net/carib/stlucia.htm]

Capacity building initiatives for the country have been outlined as outputs under the 4 outcomes of the national CDM Strategy, listed below:

i) Enhanced institutional support for CDM program implementation at national and regional levels
ii) An effective mechanism and programme for management and sharing of CDM knowledge is established and utilised for decision making;
iii) Disaster risk management has been mainstreamed at national level and incorporated into key economic sectors (tourism, health, agriculture, etc.);
iv) Enhanced community resilience to mitigate and respond to the adverse effects of climate change and disaster

Details on capacity building activities in this regard are provided in **Annex xx.**

The successful implementation of a DRR approach, which would also embody climate change adaptation initiatives, will require the availability of a wide range of skills[60], supported by adequate technological resources. Measures to increase the available technical capacity at the national and sectoral level, will of need focus on the development of training and educational programmes for targeted groups of actors responsible for key elements in DRR. Further, DRR capacity building will build on other platforms such as climate resilience building where interventions are currently being deployed, under the SPCR/PPCR with the aim of transferring knowledge that will allow for adaptive replication.

According to [SNC V&A, Disaster Management, 2010] Information and Communications Technology Management in NEMO has been hampered by an absence of the requisite trained staff as well as associated resources. Areas identified for additional staff are in the Operations (5), Public Information and Education (1), Administration and Support (1), and Radio Operation (1) sections. (See the proposed staffing structure in **Annex xx**.)

Initiatives at the national level though, have been aimed at improving the information management systems or establishing new systems to take into account relevant emerging issues, including DRR related factors such as climate change and sustainable land management. Strengthening Research and Systematic Observation (RSO) and Data and Information Acquisition and Knowledge Management for DRR are key. Currently, research and monitoring in Saint Lucia is already being enhanced through the promotion of the use of an open access platform for access, management and publication of geospatial data for informed decision making, namely, a GeoNode Pilot. There are other data sharing tool and other information management systems at the OECS and CARICOM levels with regard to DRR such as the B-Tool and HFA monitoring tools.

Efforts however, will need to be increased to obtain requisite equipment and skills for data collection and overall data management. Taking into account the limitations of the rugged topography of the island, existing personnel and other resource constraints, the use of automated equipment and data collection tools, such as automatic hydrometeorological monitoring equipment, and GPS and GIS technologies for data recording and management are an imperative.

[60] These include key technical skills such as climate modelling, mapping capability using Geographic Information Systems (GIS), software, satellite imagery and Global Positioning Systems (GPS) among others

8.4.1 Mapping institutions and levels of coordination

The framework for comprehensive disaster management (CDM) is illustrated in **Figure 11**.

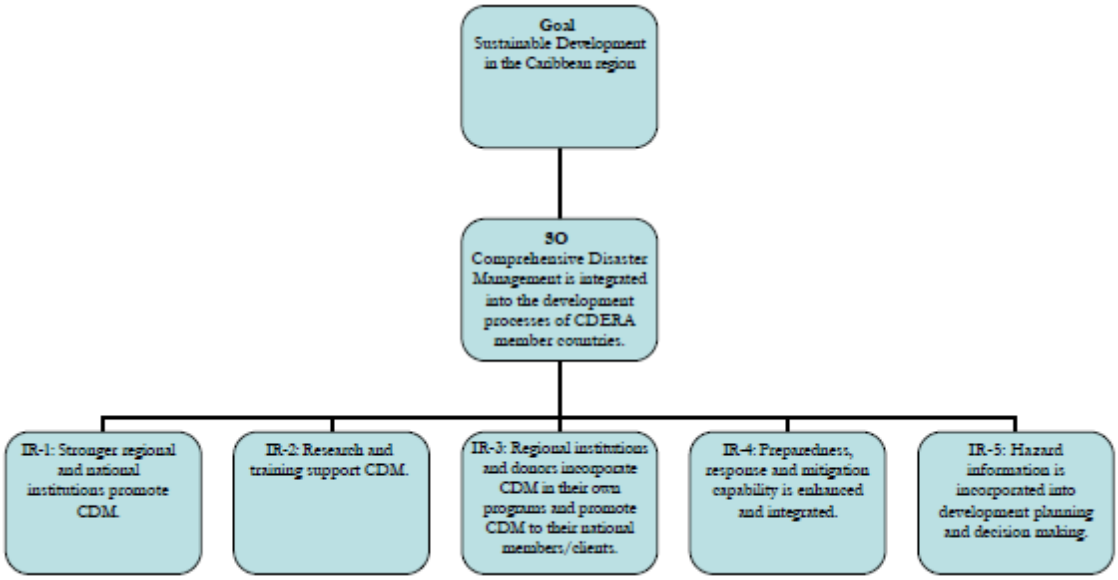


Figure 10. Comprehensive Disaster Management Framework
Source: CDM Strategy

From an institutional standpoint, DRR matters fall under the purview of the NEMO – Office of the Prime Minister (Cabinet Secretary) in the Ministry of Finance and Economic Affairs. However, DRR implementation is in fact within the remit of all Government ministries with key functions associated with portfolios for Physical Development and planning), Sustainable Development, and Infrastructure.

The National Emergency Management Organisation (NEMO) is a collaboration of Government, Non Government, Faith Based Organisations, Civil Society and many other citizenry groups and individuals, collectively responsible for having the country in a state of preparedness in case of an emergency; also for responding to the needs of the country after a disaster and co-ordinating the response at local, regional and international levels.

The Organisational Structure of the NEMO, provided in **Annex…** (Source: Appendix 1, NEMP Executive Summary), maps institutional relationships and levels of coordination of each of the key actors in the disaster management framework. The NEMO Secretariat, has also been designated as the technical focal point for several disaster related activities.

Table 10 summarises the roles of the various institutions that currently have DRR related mandates in Saint Lucia, as well as some of the key regional links.

Table 9: Institutions in Saint Lucia with responsibilities linked to DRR

Hazard/Function/ Emergency Procedure	Main Responsible Organisation	Key Support Organisations (secondary)	Sectoral Plans
1.Warning/ Monitoring	Meteorological Office Ministry of Works	Ministry of Agriculture	
2.Notification	NEMO Secretariat	National Committees, District Committees. Government Ministries.	
3.EOC	NEMO Secretariat	Disaster Committees, District Committees, Ministries, Private Sector	Sectoral EOCs, MOW, MOH, CMU, Private sector plan
4.Communications	Telecommunications Committee	Private sector. Amateur radio operators.	MOW. Private Sector Plan
5. Transportation	Transportation Committee	MOW, Volunteers. Private Sector.	MOW
6.Evacuation	Royal Saint Lucia Police Force	District Committees, Transportation Committee	
7.Shelter management	Shelter Management Committee.	MOE, District Committees, Social Organisations. MOH. Supply management Committee.	Respective Agency Disaster Plan and SOP.
8.Search and Rescue	Fire Service. (land) Police (maritime)	Transportation Committee, MOW.	
9.Security	Royal Saint Lucia Police Force	Neighbourhood Watches Community Action Program for Safety [CAPS] Fighting Against Increasing Threats to Humanity [FAITH]	Ops Orders and Respective Agency Disaster Plan and SOP.
10.Medical attention	Ministry of Health	MOH. Private sector. Transportation committee. Fire service, police.	MOH Plan.
11.Environmental Health	Ministry of Health	MOH. Shelter Management Committee.	MOH Plan.
12.Damage & Needs Assessment	Damage Assessment Committee	Ministry of Works	MOH, MOW, Private Sector Plan
13.External Assistance	Ministry of External Affairs	NEMO Secretariat	Ministry of External Affairs - Guidelines

			in case of Disasters
14. Supply Management.	Supply Management Committee	Governmental Ministries. Private sector. Transportation Committee	Private Sector Plan
15.Public Information	Information Committee (GIS)	NEMO, Media Houses,	Respective Agency Disaster Plan and SOP.
16.Protection and Rehabilitation of Infrastructure	Works/Rehabilitation Committee	MOW, Private sector	Recovery Plan
17. Environmental Protection and Rehabilitation	Saint Lucia Solid Waste Management Authority	MOW. Transportation Committee.	Recovery Plan
18.Reconstruction	Ministry of Planning	NEMO Secretariat, MOW. All Ministries, Private Sector.	Recovery Plan

Source: Adapted from National Emergency Management System (2007, Revision 2011) and review of other documents

Roles and responsibilities of the various agencies with regard to DRR have not been fully elaborated in the NHMP. However, the best practices exhibited within the existing governance structure for **Disaster Management,** provide a sound platform for building an appropriate structure for effective governance for DRR.

8.4.2 Mapping programs, initiatives and plans for DRR

Several initiatives e.g. programmes, plans, projects, application measures, have been undertaken at the local, national and regional level with regard to DRR, that is measures used to minimise vulnerabilities and disaster risks and FG avoid (prevention) or to limit (mitigation and preparedness) the adverse impacts of hazards. A matrix highlighting these initiatives is provided in **Annex xx**. Some of the most recent are elaborated on below.

Recent work by the FAO (January 2012), in collaboration with CDB, the Caribbean Disaster Emergency Management Agency, the Caribbean Community Climate Change Centre and the Caribbean Water Initiative project assisted representatives from 18 Caribbean countries in preparing road maps to develop or improve their Disaster Risk Management Plans for hurricanes, floods and droughts in the Agriculture Sector.

Another regional initiative was the Caribbean Open Trade Support Program (COTS), funded by the United States Agency for International Development (USAID), which was designed to help facilitate the transition of countries in the Eastern Caribbean from traditional trading regimes to open trade and to enable them to compete more successfully and sustainably in the global economy. Working with the Organization of Eastern Caribbean States (OECS) Secretariat, national institutions and other organizations, the USAID-funded COTS team is therefore designing a series of activities to improve the ability of national governments, civil society organizations, and the private sector to

proactively plan and implement actions to reduce vulnerability to natural disasters and create greater economic resilience when they do occur. COTS focused on the following activities to help reduce the region's vulnerability to natural hazards:

- Assisting the OECS Secretariat and selected national governments to develop and utilize a methodology for identifying and prioritizing risk reduction actions and for quantifying reductions in the risk profile.
- Working directly with businesses and related associations to enable businesses to become more resilient to the impact of natural disasters.
- Assisting in the development of market-based incentives for risk reduction activities, e.g., through the insurance and financial sectors.
- Supporting the development of a vulnerability tool to be used throughout the region to assist countries to assess their vulnerability to natural and man induced disasters.
- Assisting selected countries in the implementation of their risk reduction action agenda by strengthening elements of their legislative and institutional frameworks, and implementing actions that result in a measurable reduction of the countries' exposure to natural disasters.

At the national level, there has been some adaptive research work undertaken on CC impacts and adaptation to climate change by the SDED in conjunction with other regional and international agencies that aims to improve the scientific basis for impacts/adaptation assessment and decision making. This includes evaluation of fitness for purpose of climate model data, climate downscaling, development of novel methods for assessment of impacts of climate change, especially biodiversity and water resources, and adaptation, with a focus on robust decision making and challenges posed by large climate changes.

Some work has also been done on mapping the spatial dimensions of some hazards have been mapped (flooding, drought, landslides) and the 2005/2006 Survey of Living Conditions points to locations of various vulnerable groups (female headed households, children under the age of 14 years and the elderly). There is still need however, to map the social dimensions of these vulnerable groups to help reinforce better decision making and more targeted programming.

World Bank funded projects such as the Emergency Recovery & Disaster Management Project (ERDMP), Second Disaster Management Project (SDMP), as well as the current Disaster Vulnerability Reduction Project (DVRP) all aim to measurably reduce vulnerability to natural hazards and the adverse impacts of climate change in Saint Lucia. Work undertaken under the ERDMP (2004 – 2007) and SDMP (2007- 2010), involved significant physical prevention and mitigation works, and strengthening emergency preparedness and early warning systems, have been undertaken. These include flood protection work at Saint Lucia's main airport in the south; capacity strengthening of the

former Ministry of Communications, Works, Transport Public Utilities (current Ministry of Infrastructure, Port Services and Transport) to respond expeditiously after natural disasters; retrofitting shelters, in particular schools and libraries, with the requisite emergency equipment to improve their level of preparedness, among others. The project also sought to strengthen and develop the early warning system of the National Meteorological Service (NMS) and provide training and capacity building for community based disaster management organizations, shelter managers and the staff of the NMS.

More recently, in 2010, Saint Lucia has identified under its SPCR, Climate Change Adaptation (CCA) and Disaster Risk Reduction (DRR) activities which include measures that contribute to sustainable land management (SLM) such as slope stabilisation and re-afforestation, to be implemented using co-financing from the DVRP. The SPCR has also identified the need for establishment of appropriate fiscal incentives and regimes to encourage the adoption of climate change adaptation/resilience building measures. Adaptation financing for tangible resilience-building measures at the community and national level such as retrofitting of buildings with climate-appropriate designs and re-design and modification of critical infrastructure, such as ports, to adapt to storm surge, coastal flooding and sea level rise, have also been identified. These initiatives would contribute in no small measure to the DRR process.

8.4.3 Inventory of tools

The BTool assessment for Saint Lucia has identified several tools and resources required to effectively and efficiently managed the six components of disaster risk management activities. These include:

- Policies and plans
- Standards and regulations
- Legislation
- Human capacity
- Financial resources
- Technical tasks and contents.
- Public education and awareness
- Infrastructure development
- Administrative arrangements
- Assignment of responsibilities
- Stakeholders participation
- Information management
- Monitoring and evaluation of programmes
- Effective use of disaster risk management products

Most of these are discussed under other sections of the report. However, this section presents an overview of available monitoring and evalution tools, the HFA monitoring tool and the Risk Management Benchmarking Tool or BTool.

HFA Monitoring Tool[61]

The 'HFA Monitor' is an online tool, developed by the UNISDR to enable governments to easily capture the information on progress in HFA, generated through a multi-stakeholder review process. The primary purpose of the tool is to assist the countries to monitor and review their progress and challenges in the implementation of disaster risk reduction and recovery actions undertaken at the national level, in accordance with the Hyogo Framework's priorities.

As per the recommendations of the Hyogo Framework, States are responsible for reporting at country level while regional intergovernmental organizations and institutions, international organizations and ISDR system partners are responsible for reporting at regional and global levels respectively.

The UNISDR secretariat facilitates the biennial cycles of monitoring and reporting of progress on implementation of disaster risk reduction priorities, with support from relevant partners at the national, regional and global level, and across thematic areas.

The online tool is structured according to ten sections, covering the 'Outcomes' of the stated strategic goals of the last review period; HFAs three strategic goals; twenty two 'core indicators' relevant to the HFAs five priorities for action; six 'drivers of progress'; four 'future outlook' statements; and a section to capture the stakeholders involved in the review process. Progress made in each of these areas can be monitored online with the help of this tool and countries can conduct a self assessment against generic 'levels of progress' provided.

Reporting through HFA progress reviews have been carried out for the country from 2009. The GOSL is now engaged in a second round of self-assessment of the country's progress in implementing the Hyogo Framework for Action (HFA).

Risk Management Benchmarking Tool (BTool)

[61]HFA Monitor is accessible on the web at: http://www.preventionweb.net/english/hyogo/hfa-monitoring

The Risk Management Benchmarking Tool (BTool) was developed at the regional level by the USAID/OECS – ESDU, to improve the ability of national governments, civil society organizations, and the private sector to proactively plan and implement effective and efficient actions that would reduce their vulnerability to natural disasters and create greater economic resilience when they do occur. The BTool has the following utilities:

- A tool for evaluating the adequacy of current disaster risk management tools.
- A tool for evaluating the readiness and capability of local national institutions to deal with the risk of disaster.
- A list of best practice recommendations for disaster risk management.
- A tool for regional benchmarking of nations and programmes.

The Benchmarking Tool is designed as a self-administered tool with responsibility for oversight, data analyses, data storage, data management, and quality control assigned to an independent regional lead agency. It is not intended, at this time, to be comprehensive given the following multi-dimensions of disaster risk management: risk exposure, geographic extent, and vulnerable elements.

In terms of risk exposure, it was designed for multi-hazards with the scope to rework it for a particular hazard. In geographic extent, it could be redesigned for use at national, community, or enterprise levels. It is, however, customizable to meet specific dimensions. In its present form, it covers all the vulnerable elements in general but may be redesigned to focus on any one of the following vulnerable elements: affected population, infrastructure, economy, and environment.

The BTool provides the following benefits to the country and region as a whole:

- It provides a snapshot of a country's exposure to natural disaster.
- It can be used to build support for the allocation of resources to reduce risk in areas defined by the BTool.
- It can be used to prioritize national and regional programmes of activities.
- It can be used as an incentive at the political level to stimulate action due to the comparative nature of its scores against another country.
- It provides information, in a consistent manner, on the state of readiness of each country. This information can be used by regional and international funding agencies to define or redefine programmes of assistance to the county/region.

The HFA progress reports to date have shown a growing concern for reducing disaster risk, with significant progress made against the objectives, goals and priorities of the Hyogo Framework for Action. One example is the measurable progress in the reduction in the number of deaths linked to hydro-meteorological hazards as a result of better understanding and improved preparedness and early warning systems. However, while there has been real progress made in early warning, preparedness and response; there remains an urgent need to address underlying risk drivers and investment in DRM particularly at sectoral and community level;

9. RISK ASSESSMENT FOR COUNTRY DRR

9. RISK ASSESSMENT FOR COUNTRY DRR

9.1 Defining criteria and analysis methodology

Defining criteria for disaster risk (DR) analysis/management has been for the most part difficult, due to the lack of a comprehensive conceptual framework of disaster risk that facilitates DR evaluation and intervention from a multidisciplinary perspective. Most of the available indices and evaluation techniques are not capable of presenting risk in terms that are easily interpreted by the diverse types of decision-makers. Risk need to be made manifest in a manner that attracts the attention of the stakeholders, to make it feasible to move forward decidedly in the reduction of disasters[62].

Due to a lack of data on parameters needed to derive most of these risk management indicators, the use of qualitative indicators measured on subjective scales is unavoidable. Consequently, the weighting or considerations of some indices have been undertaken using expert opinion and informants at the national level. There has been little analysis using numerical techniques that are consistent from the theoretical and statistical perspectives.

The country in keeping with the Disaster Preparedness and Response Act No. 13 of 2000 has developed **A National Risk Register.** There is also a **Saint Lucia National Climate Change Risk Register,** dated October 28, 2008.[63] Of note, is that the register was purposed to assist disaster responders in identifying potential significant risks threatening the performance of critical functions in the event of an emergency, which ought to enable them to focus resources in the right areas, and develop appropriate continuity strategies.

The methodology for formulating the register involved a literature review, which combined the identification of past events together with subjective hazard analysis within the context of the probability of a repeat event.

The National Risk Register (2006) identifies main hazards/threats for the country. **Table 6.** provides a summary of the main categories of hazards/threats identified based on the National Risk Register (2006). Brief description of the process or phenomenon is provided in the table, with threats/hazards elaborated on in the

[62] Summary report for session "Visions of Risk and Vulnerability: Patterns, Trends, and Indicators", World Conference on Disaster Reduction, held in Kobe, Hyogo, Japan, January 18-22, 2005.

[63] Information provided in the document is deemed valid only at the date of publication as risks are intended to be monitored on an ongoing basis.

narrative for this sub-section. Hazard/risk maps available for the relevant phenomenon (landslide, drought, floods) are included in **Annex xx.**

Table 10. Main Categories of Hazards/Threats Identified for Saint Lucia

Type of Emergency/Hazard	Category of Emergency/Hazard	Sub-Category of Emergency/Hazard	Risk Rating
Natural Disaster and Severe Weather	▪ **Geodynamic/Geological hazards:**	▪ Earthquakes, ▪ Volcanic activity ▪ Tsunamis, (Hydro-meteorological factors are important contributors to some of these processes.)	▪ Medium ▪ Low ▪ Low .
	. **Hydro-meteorological hazards:**	▪ Hurricane high winds ▪ Coastal Flooding ▪ Flooding of Rivers/Streams ▪ Flash Flooding ▪ Extreme High Temperatures ▪ Drought	▪ High ▪ High ▪ High ▪ High ▪ High ▪ High ▪ High
Anthropogenic/Man-made	▪ **Socio-natural hazards:** High population density in urban areas with inadequate basic-service provision (water, electricity, health, education, transportation). .	▪ **Mass Casualty - Armed Conflict – consequences of internal migration and displacement** Public safety and security Civil disturbance Supply disturbance Transport ▪ **Deforestation** ▪ **Structural Emergency**	▪ Low – Medium ▪ High ▪ Low – Medium
	▪ **Technological hazards:** (intentional or unplanned)	▪ **Fire and Explosion** ▪ **Environmental Pollution/ Infestation** Harmful release – CBRNE Toxic spills Oil/Gas extraction Illegal dumping ▪ **Terrorism** – bio-terrorism	▪ Medium ▪ Medium ▪ Not rated
Health Emergencies	▪ Pandemic: Epidemic	▪ Public/Human Health ▪ Animal Health – (zoonotic diseases) ▪ Plant Health	▪ High ▪ High ▪ High

The system of Indicators of Disaster Risk and Risk Management developed by the Inter-American Development Bank (IDB), is purposed to assist countries move toward a more analytically rigorous and data driven approach to risk management decision-making. It allows countries to detail the potential economic losses that could be suffered in the event of a natural disaster and evaluate how effective their governments are in managing these risks. It therefore serves as useful guide for disaster risk management with regard to policymaking and government actions to reduce human, infrastructure, financial, and economic losses caused by earthquakes, floods and other natural events.

The System of Indicators proposed permits the benchmarking of the evaluations of each country in different periods, with a measurement approach that enables:

- Representation of disaster risk at the national level, allowing the identification of key issues relating to their characterization from an economic and social point of view.
- Risk management performance benchmarking of the different countries to determine performance targets for improving management effectiveness.

Four components or composite indicators reflect the principal elements that represent vulnerability and show the advance of different countries in risk management. This is achieved in the following way:

1. The **Disaster Deficit Index**, DDI, measures country risk from a macro-economic and financial perspective when faced with possible catastrophic events. This requires an estimation of critical impacts during a given exposure time and of the capacity of the country to face up to this situation financially.
2. The **Local Disaster Index**, LDI, identify the social and environmental risk that derives from more recurrent lower level events which are often chronic at the local and sub national levels. These particularly affect the more socially and economically fragile population and generate a highly damaging impact on the countries development.
3. The **Prevalent Vulnerability Index**, PVI, is made up of a series of indicators that characterize prevailing vulnerability conditions reflected in exposure in prone areas, socioeconomic fragility and lack of resilience in general.
4. The **Risk Management Index,** RMI, brings together a group of indicators related to the risk management performance of the country. These reflect the organizational, development, capacity and institutional action taken to reduce vulnerability and losses, to prepare for crisis and efficiently recover.

More detailed information on the indices can be found in **Annex xx.**

At present, in-depth analysis using the IDB risk indicators cannot be readily pursued, due to a lack of data, as well as an inadequacy of skills for undertaking such analysis.

9.2 Definition of risk scenarios

Risk scenarios for the country have been outlined in the national risk register for Climate Change. These scenarios focused on Climate Change risks, identify seven (7) potential hazards across nine (9) critical sectors as follows:

Climate Change Impacts/Hazard Identification		
Storms/Hurricanes: Storm Surge Coastal Erosion High Winds	**Precipitation:** Floods Droughts	**Temperature:** Extreme Events Cold Spells
Critical Sectors: Agriculture Financial Forestry and Biodiversity Marine and Coastal Resources National Security	Tourism Health Water Resources Coastal Zone and Human Settlements	

With regard to risk scenarios for Climate Change, the 4th Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) makes reference to a number of direct observations of recent changes in climate which are likely, to very likely[64], attributable to human influence. These include, among others, changes in wind patterns, rainfall distribution and air temperature. The climate baseline for Saint Lucia with regard to these parameters and which provides the platform for determining how the parameters thereof are influenced by climate change is provided in **Annex xx.**

The various scenarios or models[65] used to define CC risks, have all demonstrated that mean temperatures in Saint Lucia are expected to increase markedly over the next

[64] In the IPCC Summary for Policymakers, the following terms have been used to indicate the assessed likelihood, using expert judgment of an outcome or a result: *Virtually certain* > 99% probability of occurrence, *Extremely likely* > 95%, *Very likely* > 90%, *Likely* > 66%, *More likely than not* > 50%, *Unlikely* < 33%, *Very unlikely* < 10%, *Extremely unlikely* < 5%.

[65] Global Climate Models (GCMs) and Regional Climate Model (RCM)

century[66]. The scenarios derived from the various models also describe a discernible shift in the precipitation climatology, (See Annex xx).

One of the outputs describing the current and future CC scenarios generated for the island during the formulation of the Second National Communication (SNC) on Climate Change, is presented in Box 4.[67]

Box 1: Summary Future and Current Climate for Saint Lucia

1. There is evidence to suggest that the climate of Saint Lucia is changing.
2. Minimum temperatures have increased at a rate of ~0.16°C per decade, and maximum temperatures at ~0.20°C per decade.
3. There is no statistically significant trend in historical rainfall which shows considerable inter-annual variability.
4. The warming trend is expected to continue. The country is projected to be warmer by up to 1.2°C by the 2030s, 2.1°C by the 2060s and 3.6°C by the end of the century.
5. The projected rate of warming is marginally more rapid for December, January, February (DJF) and September, October, November (SON).
6. The frequency of very hot days and nights will increase, while very cool days and nights will decrease.
7. There is a likelihood that the country will be drier (in the mean) by the end of the century. Global Climate Models (GCMs) show a median decrease of up to 22% for annual rainfall while the Regional Climate Models (RCMs) suggests a decrease of up to 57% by the end of the century.
8. Median GCM decrease in rainfall is 4-6% by the 2030s, 5-10% by the 2050s and 10-23% by the 2080s.
9. The proportion of total rainfall that falls in heavy3 events also decreases in most GCM projections, changing by -56 to +15% by the 2090s.
10. Climate change will likely make the dry period early in the year and June-July drier.
11. Hurricane intensity is likely to increase (as indicated by stronger peak winds and more rainfall) but not necessarily hurricane frequency.
12. Caribbean Sea levels are projected to rise by up to 0.24 m by mid century.
13. Sea surface temperatures in the Caribbean are projected to warm, perhaps up to 2°C by the end of the century.

Source: GOSL, 2009.[68]

[66] This will require Saint Lucia to adjust its building designs, using natural ventilation or energy efficient cooling systems.

67 Climate change projections generated by the Climate Studies Group (CSG) of the University of the West Indies (UWI), Mona Campus.

[68] GOSL, 2009. Saint Lucia Second National Communication under the UNFCCC. Saint Lucia Current Climate and Future Projections. Prepared by Climate Studies Group (CSG) of the University of the West Indies (UWI), Jamaica.

There is need therefore, to define risk scenarios for other non-Climate Change related hazards, based on a holistic approach that will enable multi-hazard analysis and promote more effective, fit-to-purpose solutions/ interventions. Due consideration must be given also to the fact that risk is clearly most detailed at a micro social or location/site specfic scale.

9.3 Prioritization of risk scenarios and areas of intervention

Saint Lucia is a country with limited experience in the area of disaster risk analysis. Prioritisation of risks has been limited again to the sphere of climate change and areas of intervention proposed in this regard through the SNC process.

Methodologies and tools for technical support exist for risk assessment/ analysis and those can facilitate effective DRR interventions at the local, municipal and national levels.

At the present time in Saint Lucia there is little analytical basis for targeted policy and programme development for areas, sectors and populations most economically and socially at risk to disasters.

However, broad level risk analysis, considering the components of the IDP Risk indicators, can point to some of the aspects or DRR that require efforts to improve and create an appropriate National Disaster Management Plan. It is also apparent that while the country risks from a macro-economic and financial perspective in terms of responding to catastrophic events may decrease, the country still does not have resources to face catastrophic events. Further, the country presents predominant conditions of high exposure and susceptibility, social fragility and lack of resilience that favour risk accumulation and incapacity to respond to disasters.

The 2011 GAR highlights some key issues for consideration with regard to risks, under the section "Revealing risk: Visible trade-offs for informed choices". These are:

- The sheer scale of recurrent and probable maximum losses should be enough to shock governments into action.
- Governments are liable for a significant part of total expected losses – and they rarely have the contingency financing to match this liability.
- Governments need to decide how much risk they are willing to retain and how much they can afford to transfer.
- A balanced portfolio of prospective, corrective and compensatory risk management strategies is the most cost-effective way to reduce disaster risks and support development.

10. STRATEGIC GUIDELINES FOR COUNTRY DRR

10.1 STRATEGIC GUIDELINES FOR COUNTRY DRR

One of the aims of adopting a DRR approach is to help countries transform to a sustainable disaster resilient development path.

The negative impacts of climate variability and change, including the increase in the occurrence and severity of disasters and increased competition over natural resources; and the special needs of most vulnerable countries and Small Island Developing States, coupled with **poorly planned urbanization that increases vulnerabilities, calls for concerted actions at the level of local government and communities.** There is need therefore, to leverage new entry points for disaster risk reduction by taking advantage of new developments since the inception of the Regional Strategy for DRR, and integrate them into existing mechanisms.

Admittedly, one of the means to achieve effectiveness in DRR is through the establishment of an appropriate institutional framework with adequate policies, procedures and guidelines that would stipulate and enforce investment processes for disaster risk reduction in the development planning.

This means re-discovering and adopting the existing risk analysis methodologies and management instruments that have been developed over the last few years but have had a low rate of dissemination and application. Measures to facilitate risk reduction in development planning ought to associate the risk reduction aspects in the poverty reduction and transformation of the country investments, which are priority areas on the government agenda.

Integrating DRR issues into all aspects of development planning and defining a common agenda for action will require investments in RSO and knowledge generation specific to the problems of Saint Lucia. Knowledge gaps are a key impediment to integrating disaster risks into development initiatives and major capital investments. Firstly, information on the likely damages at the regional, country and sector levels for different disaster risk scenarios is needed. Social impacts, particularly on the poor and vulnerable in society, also need to be mapped, understood, and addressed. Further, appropriate risk indicators/indices need to be developed in support of this.

Saint Lucia has taken a number of steps to address DRR related issues over the years and has updated policies and plans that will contribute to successful implementation of DRR related programmes. However, institutional and technical capacity building is a continuous undertaking and resources for doing so must be committed so that DRR issues are handled effectively and decisively to facilitate Saint Lucia's move towards a disaster resilient development path.

Government needs to give attention to DRR in a holistic manner. The DRR approach is a comprehensive approach, which includes both hard and soft interventions to address the elements of the DRR conceptual framework for resilience building, namely:

- Risk awareness and assessment including hazard analysis and vulnerability/capacity analysis;
- Knowledge development including education, training, research and information;
- Public commitment and institutional frameworks, including organizational, policy, legislation and community action;
- Application of measures including environmental management, land-use and urban planning, protection of critical facilities, application of science and technology, partnership and networking, and financial instruments;
- Early warning systems including forecasting, dissemination of warnings, preparedness measures and reaction capacities

Hence the necessary hard costs, that is investments in application measures and technologies must be supported by a range of training, capacity building, data management, knowledge management and policy support activities. These softer costs will contribute directly to the sustainability of the investments made.

However, resources alone will not be sufficient to address all of the issues, and the detailed strategy developed in a consultative fashion would provide a fair basis for blending multilateral funds and provide an opportunity to attract co- financing or parallel financing from other development partners.

Strategic directions for DRR implementation were charted coming out of the consultative process, as well as through literature review – in particular findings of the GAR and recommendations emanating from the work of UNISDR on Making Cities Resilient. These are presented under the five elements of DRR.

Risk Awareness and Assessment

Develop a national disaster inventory system to systematically monitor losses and assess risks at all scale using probabilistic models)

Maintain up-to-date data on hazards and vulnerabilities; prepare risk assessments utilising appropriate and valid risk indicators and use these as the basis for development plans and decisions.

(e.g. risk mapping of vulnerable groups especially in terms of the social dimensions, will help to profile each of these groups within the context of the vulnerable situations in which they live and to

identify their coping and adaptive capacities. The mapping will also help to identify hotpots of high vulnerability in the country).

Knowledge Development

- Ensure that education programmes and training on DRR are in place at all levels, in particular schools and communities
    - share local knowledge and experience with other actors

Continue to utilize Regional Platform to continue to advocate and provide technical advice and support mechanisms by Regional Economic Communities – CARICOM, OECS, national governments and partners, for the implementation of the Regional Strategy for Disaster Risk Reduction and its Programme of Action (2006-2015);

Public commitment and Institutional Frameworks

Demonstrate good risk governance in political will by placing policy responsibility for DRR, including climate change adaptation in a central ministry with (true/real) high level of political authority over national development;

Perform Risk Governance by ensuring coherence of policy and planning; decentralisation/layering of DRM functions using an incremental approach; shift in culture of public administration required to engage citizens and affected communities; give consideration to local governance: use principle of subsidiarity and appropriate levels of devolution including budgets and to civil society)

Build risk governance capacities through the institutionalisation of multi-sectoral, multi-stakeholder national/community platforms for DRR and appropriate mechanisms to foster organisation and coordination for DRR that integrate disaster and climate risk management, based on participation of citizen groups and civil society:

Promote the creation of partnerships/build local alliances with institutions dealing with disaster risk reduction, such as National Meteorological and Hydrological Services (Met Office, WRMA), the health and financial sector institutions, academia, specialised centres, research and scientific institutions, NGOs and civil society organisations, for purposes of achieving the objectives of the Regional Strategy and Programme of Action (2006 2015) and form part of a multi-sectoral National Platform for Disaster Risk Reduction;

Emphasize the mainstreaming of disaster risk reduction in planning and finance, the health, education, urban development, infrastructure, energy, water and sanitation, industry, agriculture and food security sectors, among other national priorities;

Strengthen accountability – Ensure social accountability through increased public information and transparency; social demand and accountability with regard to the right for information on disaster risks/vulnerabilities and measures to reduce risk and manage disasters:

- legislation supported by penalties and incentives
  - Apply and enforce realistic risk-compliant building standards/ regulations and (safer) land use planning principles
  - Provide incentives for homeowners, low-income families, communities, businesses and the public sector to invest in reducing the risks that they face
- use performance based budgeting and rewards

Employ suitable mechanisms to manage Risk - anticipate and share risks that cannot be reduced (invest in risk transfer to protect against catastrophic loss and anticipate and prepare for emerging risks that cannot be modeled)

Continue to mobilise political support, and to advocate for international community, institutions and development partners to support the country's efforts to institutionalize DRR;

Strengthen sub-regional mechanisms in order to achieve the objectives of the HFA and the Regional Strategy for Disaster Risk Reduction, through the Programme of Action.

Application of Measures

- Invest in risk reduction (risk which can be most efficiently reduced and which produce positive economic and social benefits); increase country investments in disaster risk reduction through the allocation of a certain percentage of the national budget and other revenue dedicated to disaster risk reduction and incorporate in financial reporting:
  - invest in and maintain critical infrastructure that reduces risk, such as flood drainage; assess safety of schools, health facilities and other critical buildings and upgrade where necessary

- Integrate DRM into Existing Development Instruments and Mechanisms:

- Regulate urban and local development (use participatory planning and budgeting to upgrade informal settlements, allocate land and promote safe building); identify safe land for low income citizens and develop upgrading of informal settlement where feasible
- Protect ecosystems (employ participatory valuation and management (co-management) of ecosystem services and mainstreaming of ecosystem approaches in DRM; protect ecosystems and natural buffers to mitigate floods, storm surge and other hazards that country is vulnerable to
- Offer Social Protection (adapt conditional cash transfer and temporary employment schemes; bundle micro-insurance and loans; consider social floor and poverty line;); after disaster ensure that needs o most vulnerable placed at the centre of reconstruction - adequate support for persons and community organisations to design and implement responses, including rebuilding homes and livelihoods
- Use national planning and public investment systems to include risk assessments in national and sector development planning and investments
- encourage economic development in rural areas and smaller development areas (villages, districts) in order to reduce the pressure of accelerated migration to high-risk peripheral areas and informal settlements

Early Warning Systems

- Install early warning systems and emergency management capacities for vulnerable communities/areas and hold regular public preparedness drills for various hazards …. Storms, tsunami, floods, volcanic event, health, agriculture, etc.

11. CONCLUSIONS AND RECOMMENDATIONS

11.1 Conclusions and Recommendations

- DRR implementation is cross-sectoral in nature and the impacts of poor land management are usually manifested in effects on the country's natural resources and the population. These impacts may however, be further exacerbated by the realities of indirect drivers of climate change such as socio-economic and ecological challenges, including market forces, population and demographics, poverty and unemployment.
- Findings of the 2011 Global Assessment Report for DRR (GAR, 2011) show that "accounting for disaster losses is a first step towards taking responsibility for, and assessing, disaster risk. Adapting existing development instruments such as national public investment planning, conditional cash transfers and temporary employment programmes, can help to scale up disaster risk management efforts to reach millions of risk-prone citizens. Such strategies reduce disaster risk and strive towards the objectives of the HFA, and are also important for adapting to climate change and achieving the Millennium Development Goals"[69].
- The implementation of DRR therefore calls for a coordinated, broad-based, multi-sectoral response aimed at mainstreaming DRR issues into the planning and development process. The perception of, and response to, these existential threats must pervade the national planning process, the operations of government agencies, the practices of the commercial/private sector and the actions of all citizens, from where and how they choose to build their homes, to how they transfer risks.
- The Country Profile Document has endeavoured to provide recommendations on the type of DRR construct that is results oriented and strategic in terms of its impact. It is hoped, therefore, that the Document has provided a basis for identifying potential areas to enhance the capacity of the requisite institutions, agencies, communities, groups, etc. to effect a more coordinated response to DRR implementation for the realisation of sustainable disaster resilient development.
- It is further anticipated that the beneficiaries will utilise the observations made regarding the key performance drivers, in particular policy environment, the organizational framework and institutional and individual capacities, gaps and constraints to pursue real capacity enhancement and improve practices and skills in a manner to ensure that the desired improvements in DRR implementation can be achieved.

[69] UN 2011. 2011 Global Assessment Report

- The singular risk is that these outputs may not be effectively applied by the beneficiaries and potentially lose validity, unless the requisite efforts are made to fully integrated them into a functional framework for addressing current gaps and constraints. Additional sensitisation training may well be required to enhance stakeholder awareness and education with regard to the benefits of a DRR approach that would further enhance the application of outputs.
- The Government of Saint Lucia, and in particular all agencies responsible for national development, must therefore, be committed, in conjunction with development partners, to assume their relevant roles and work towards capacity enhancement, to ensure a well constructed framework, integrating elements of policy, institutional structures and processes and organizational and individual capacities, to effect a more coordinated response to DRR implementation for the realisation of sustainable disaster resilient development.
- Requisite resources must be committed and reflected within the National Budget to create the right environment for the implementation of DRR activities, including adequate human and technical resources, financial resources for investments in DRR, etc.

7. ANNEXES

- Appendixes, Maps, Tables, Graphics, other

8. REFERENCES

WHY IS THIS AFTER THE APPENDICES?

Flood Hazard Map use limitations

Island-wide flood hazard maps identify likely regions to be flooded for extreme rainfall & give a mean depth of flood waters within regions. They do not provide detailed information of flood water levels or velocities and cannot provide locations of specific hazardous places. Further, they cannot incorporate detailed hydraulic properties of drainage facilities in the region. Notwithstanding these limitations, these maps are useful for:

- Providing information on areas of focus during large rainfall events, including roadway sections likely to be under water during these events but that information is not exhaustive as localised flooding may occur on other roadway sections.
- A broad predictions about the areas likely to be affected on forecasting of particular extreme rainfall events
- Broad assessment of the hazards associated with the development of infrastructure including roads (and their elevations), and housing on the island
- Use as guide for determining areas for further detailed flood studies

Detailed flood hazard maps are very useful in specifying the extent of inundation, flood water depths and in some cases the velocities of the flood waters. The information contained in these maps are useful for informing engineering designs and construction of infrastructure and housing; developing detailed emergency plans; assist with accurate location of amenities within floodplains and can form the basis for undertaking flood mitigation projects to minimise the impact of flooding. Detailed flood hazard maps can be put into the following uses:

- Finalisation of engineering designs for infrastructure
- Design of emergency plans in the event of warning of extreme rainfall
- Deciding on locations for critical facilities and for detailed land-use planning
- General information on expected water depths for various return periods and approximate locations of these depths.
- Identification of most hazardous zones within the floodplain

Detailed process for map updating

Author provided a description of the conditions that could trigger the need to update flood hazard maps as well as the recommended frequency at which the input data needs to be updated (Table 7 of report on page 21).

Updating process requires the following:

Secure supply data through MOU btwn relevant agencies, with specific reference to the supply of current and accurate data in the most efficient manner.
Supply of resources (human & equipment/tools) for the production and maintenance of maps through adequate budgetary allocations.

Recommendations

Main ones made on the following:
Improvement of hydrologic database at both country-specific and regional scales
Use of island wide map to establish priorities among identified hazard zones as well as the basis for the development of a programme for detailed flood hazard maps in each priority area
Map updating
Training
Installation of debris traps, specifically for woody debris, to address flooding within city of Castries

An adequate hydrologic database for conducting comprehensive flood studies should have the following datasets:-
Stream flow
Hourly rainfall data

> Report noted that available daily rainfall data is insufficient for describing the rapid response of the small, steep catchments that are typical of our island. Several continuous rainfall gauges are required to capture the significant rainfall variability over the island. One such gauge exists at Union Agricultural station.
>
> A deficiency in hydrologic database results in either:-

- Costly flood mitigation strategies due to over design for safety or
- Under designed strategies resulting in frequent flooding with attendant damage costs