



SUSTAINABLE DEVELOPMENT UNIT ■ LATIN AMERICA AND THE CARIBBEAN

Disaster Risk Management in Latin America and the Caribbean Region: GFDRR Country Notes

St. Lucia

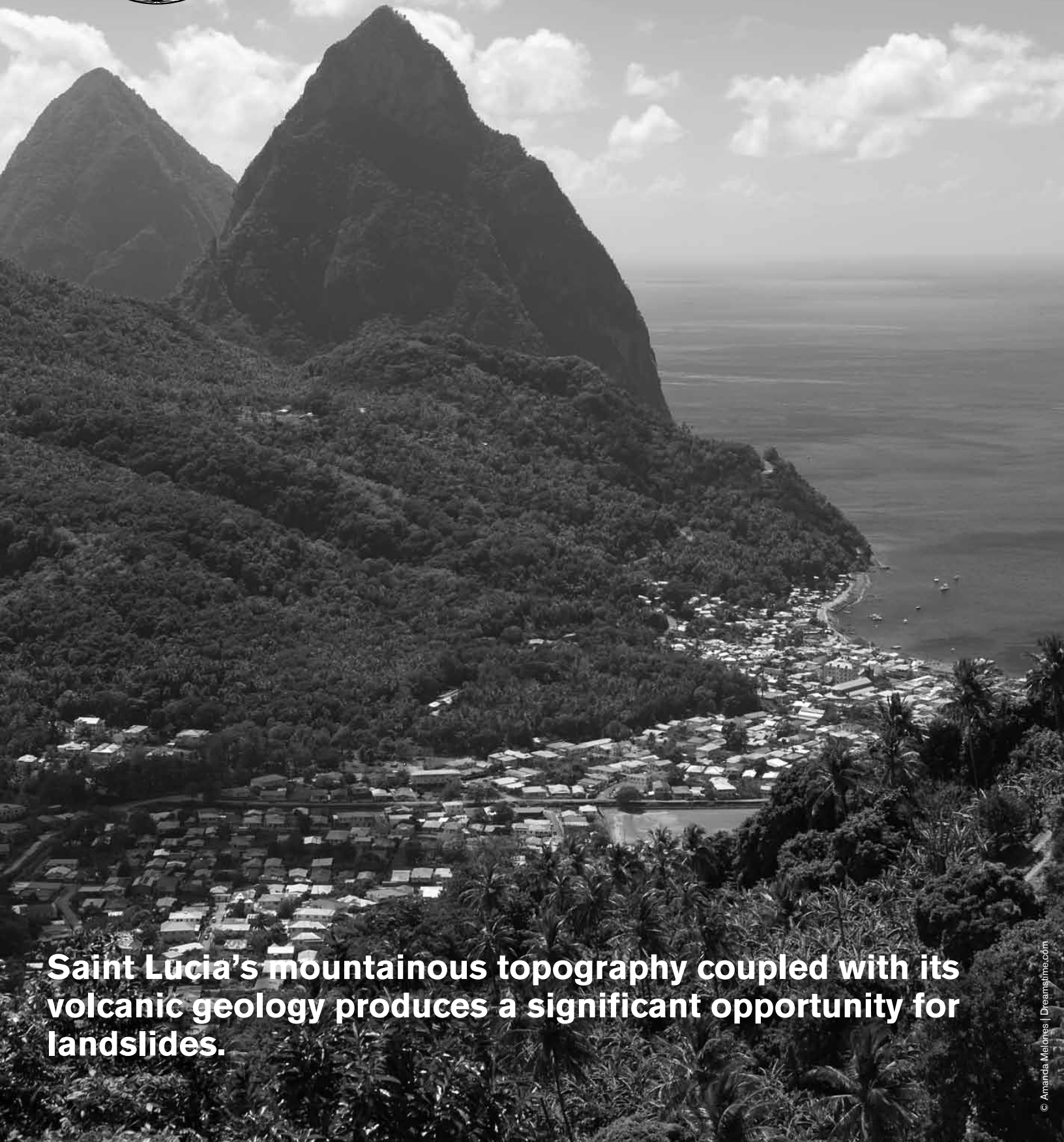
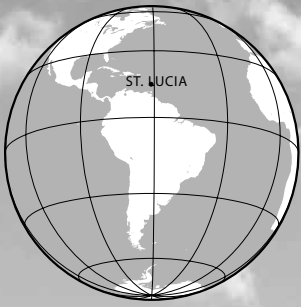


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SAINT LUCIA

Natural Disasters from 1980 - 2007^b

Affected People

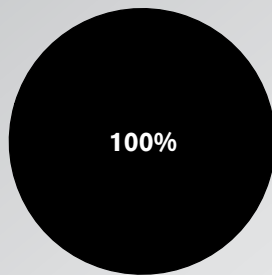
Disaster	Date	Affected (Number of People)
Storm	1980	80,000
Storm	1983	3,000
Storm	1994	750
Storm	1999	200
Mass mov. wet	1996	175
Storm	1980	0
Storm	1986	0
Storm	1987	0
Storm	1988	0
Storm	2004	0

Economic Damages

Disaster	Date	Cost (US\$ x 1,000)
Storm	1988	1,000,000
Storm	1980	87,990
Storm	2007	40,000
Storm	1983	1,290
Storm	2004	500
Storm	1980	0
Storm	1986	0
Storm	1987	0
Storm	1994	0
Mass mov. wet	1996	0

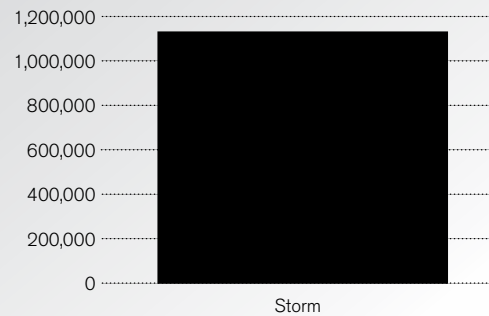
Statistics by Disaster Type^b

Population Affected by Disaster Type



■ Storm

Economic Damages / Disaster Type (1000s US\$)



^a UN (2009). <http://www.preventionweb.net/english/countries/statistics/?cid=145>. Source data from EM-DAT. Data displayed does not imply national endorsement.

DISASTER RISK PROFILE

Saint Lucia is located in the Eastern Caribbean in the Windward Island chain at 13° 53' N latitude and 60° 58' W longitude. Bordered to the north by Martinique and to the south by St. Vincent and the Grenadines, Saint Lucia supports a population of approximately 170,000. The island of Saint Lucia occupies approximately 616 km² with a length of approximately 50 km on the north-south axis and 25 km along the east-west axis. The island is mountainous of volcanic origin, with its highest peak, Mt. Gimme, rising some 950 meters above sea level.

Saint Lucia is located in the Atlantic hurricane belt, and while infrequent, the island is exposed to potentially serious storm impacts. Notable storms include Hurricane Allen, 1980; Tropical Storm (later Hurricane) Debby, 1994; and while not making landfall in Saint Lucia, Hurricane Lenny in 1999 and Dean in 2007.

Hurricane Allen was devastating, causing extensive damage to Saint Lucia as a Category 3 storm. The storm claimed 9 lives and severely damaged infrastructure and agriculture. Tropical storm Debbie caused extensive damage in the agricultural sector and heavy rainfall resulted in extensive landslide in Saint Lucia. Most recently, Hurricane Dean in 2007 passed in the straits between Martinique and Saint Lucia. While a Category 2 storm, at that time, damage to Saint Lucia was estimated in excess of US\$6 million due primarily to high winds, flooding and storm surge. While Hurricane Lenny (1999) did not directly impact Saint Lucia, waves generated by the storm had major coastal impacts. Damages from 6-meter waves were significant in Saint Lucia and throughout the island chain.

Saint Lucia experiences landslides, particularly in the aftermath of heavy rains. Additionally,

the island periodically experiences earthquakes of generally lower magnitudes. The island is classified as seismic zone 2 on a 4-class scale, indicating low to moderate earthquake risk. Finally, storm surge and flash flood are among the other risks regularly faced by the island.

Geological Hazards

Saint Lucia is exposed to low to moderate seismic risk (seismic zone 2 on a 0-4 scale¹).

The island lies on the eastern margin of the Caribbean plate and is regularly subjected to low intensity tremors (less than magnitude 4.0) associated with regional plate activity. While considered a relatively low risk to the country, earthquake is a concern. A magnitude 7.4 event occurred in November 2007 located off the coast of Martinique. The shock was felt throughout the Caribbean and in Saint Lucia caused minor damage to some structures.

Volcanic hazards are limited with one active center on the island. The Qualibou Caldera is located on the south-west side of the island and includes active steam vents, hot springs and boiling muds. The last recorded eruption was in 1766. This was relatively minor, ejecting ash into the air that thinly spread over a large area. Recent activity includes a swarm of minor volcanic earthquakes which was recorded in 1990.

Floods and Landslides

The principal flood threat in Saint Lucia is from storm surge and coastal wave action. Particularly at risk are low-lying coastal areas such as the town of Dennery and the area of Anse La Raye which

¹ SEOC (Structural Engineers Association of California) zone system. Zone 2 corresponds to a Z factor of 0.500 as defined under CUBIC 1985. Values obtained from Gibbs (1999), Appendix 1, Table 3.

have experienced significant flooding in the past. Flash flooding in the interior presents a risk to local inhabitants along streams and coastal erosion due to wave action can threaten adjacent tourism activities.

Saint Lucia's mountainous topography coupled with its volcanic geology produces a significant opportunity for landslides. Much of the island's housing is distributed along steep slopes and poorly engineered and constructed housing is particularly at risk. Loss of watershed integrity, particularly on slopes above inhabited areas serves to destabilize slopes and increase risks for property losses. This risk is increased during the annual rainy season (May-November) and during the passage of tropical depressions and hurricanes from July to November.

Determinants of Vulnerability to Adverse Natural Events in Saint Lucia

Saint Lucia maintains a large dam² located at the Roseau Reservoir in the mountains near the center of the country. The reservoir serves as the principal water supply for the northern portion of the country. Commissioned in 1996, the John Compton Dam was designed and constructed to international specifications. However, the impact of potential seismic events on the structure must be considered when developing downstream areas.

Poorly regulated construction and land use practices are among the biggest contributors to risk from losses in Saint Lucia. Lack of uniform enforcement of building codes contributes to the vulnerability of island infrastructure.

Due to the steep topography of the island, land use is a major factor in determining vulnerability to adverse events. Loss of vegetation, particularly in upper watersheds, has resulted in increased runoff

potential and slope destabilization. In some cases, poor drainage management associated with small interior communities promotes soil saturation and subsequent landslip.

Informal settlements are generally located in the interior where landslip risk is greatest. These are also the communities least likely to have access to significant engineering support. The lack of legal title (land ownership/tenure) has led to unsustainable land use and poor land conservation practices which results in soil erosion and land slippages as well as silting of rivers and coastal waters.

Other environmental aspects such as deforestation and soil erosion, particularly in the northern region, might be a result of the impact of natural hazards and may impact Saint Lucia's vulnerability.

Critical infrastructure in Saint Lucia is relatively concentrated, as is the case on most of the islands. The principal port in the capital, Castries, is the island's primary supply center and its only significant container facility. The vast majority of the goods and supplies available in Saint Lucia pass through this port. Power-generating capacity is dependent on three diesel-generating facilities. Water production for the north of the island is managed through the Theobalds water treatment facility in Castries and in the south by steam extraction systems supplying water to various small treatment centers around the south of the island. George F. L. Charles Airport is located in Castries and facilitates regional travel while the Hewanorra International Airport is situated in the south of the island, about 50km from the capital.

Towns in Saint Lucia built in relatively flat stream valleys adjacent to the coast are the areas most susceptible to storm surge and flooding. This risk has increased over years with loss of upper watershed

² Named after John Compton, former Prime Minister of Saint Lucia.

through its conversion to agricultural use. Increased rainfall runoff has increased coastal flood potential.

Economically, Saint Lucia is heavily invested in tourism. Some 62% of the national GDP is derived from the services sector of which tourism is a major contributor. Dependence on agriculture has steadily decreased. Estimated at 5.4% of GDP, the agriculture sector has shrunk some 14% from 2000 to 2005. The increased importance of the tourism industry as a major economic force presents a significant economic risk to the country as disaster losses in this sector include reputational risks that can affect tourism travel well beyond the disaster recovery period.

The health infrastructure is comprised by 36 health centers/polyclinics, a psychiatric hospital, a private facility and 4 hospitals.³ The Victoria Hospital is the main healthcare facility in the country. St. Jude Hospital was partially destroyed by fire in September 2009 and it is currently closed, though it continues to function out of the nearby George Odlum Stadium. In the north a new general hospital is under construction with the support of the European Commission.

Climate Change and Global Warming

St. Lucia has recently been cited as one of six Caribbean countries in the world's top 40 climate "hot spots" by the Germanwatch Global Climate Change 2009 Risk Index.⁴ The country was ranked 27th out of 150 countries based on an analysis

of weather events between 1998 and 2007. The 2010 Global Climate Risk Index is based on figures from 2008 and is also an analysis of the worldwide data collection on losses caused by weather-related events during 1998–2008. St. Lucia was ranked 92nd for the decade with GDP losses of 0.57%.⁵ Two factors were cited: the impact of global warming on rising sea levels which increase the risk of storm surges, and secondly the increase in the strength of hurricanes.⁶

Climate change models⁷ have predicted that St. Lucia will undergo a warming and drying trend and is expected to endure more frequent heat waves and droughts, rainfalls with increased intensity, and rising sea levels as predicted for the rest of the Caribbean consistent with the projected global median.⁸ It is known that inter-annual climate variability of either the Pacific or Atlantic explains a significant amount of the total variance in rainfall in the Caribbean and Central America.⁹ Probable climate change impacts in St. Lucia include higher temperatures, higher storm intensities and, possibly, more frequent El Niño-Southern Oscillation (ENSO)¹⁰ events, exacerbating existing health, social and economic challenges affecting St. Lucia.

Changes in sea surface temperature as a result of climate variability could increase the intensity of cyclones and heighten storm surges, which in turn will cause more damaging flood conditions in coastal zones and low-lying areas. According to the World Bank's study, "Sea Level Rise and Storm Surges",¹¹ the impact of sea level rise and intensified storm surges in Latin America and the Caribbean will be high. While data is not available for St. Lucia, data

³ PAHO (2007).

⁴ McLymont-Lafayette (2008).

⁵ Harmeling (2009). Table 5.

⁶ McLymont-Lafayette (2009).

⁷ Hadley Centre Coupled Model, Version 2 (HADCM2), as reported in Mulligan (2003). Same modeling data as used by the Intergovernmental Panel on Climate Change (IPCC).

⁸ Chen et al. (2008).

⁹ Giannini et al. (2002).

¹⁰ El Niño-Southern Oscillation; commonly referred to as simply El Niño, a global coupled ocean-atmosphere phenomenon.

¹¹ Dasgupta et al. (2009).

for Puerto Rico is showing an increase of 51.84% - with 53.81% of the coastal population exposed and potential losses of coastal GDP projected to exceed 52.71%.

DISASTER RISK MANAGEMENT FRAMEWORK

Disaster preparedness and response activities are vested with the National Emergency Management Organization (NEMO) in conformance with the responsibilities and authorities assigned in the Disaster Management Act of 2006.¹² These include Disaster management/response, disaster planning, and risk assessment and mitigation activities. Saint Lucia is a signatory to the Caribbean Disaster Emergency Response Agency¹³ Agreement which provides regional support to Saint Lucia in the event of a major disaster.

Saint Lucia's revised Disaster Management Plan has been formally adopted (2007). Under this plan, disaster coordination is focused on the offices of NEMO which is charged with planning, mitigation, and response functions. NEMO operates under the direction of the Prime Minister who chairs NEMAC, the National Emergency Management Advisory Committee. This committee is composed of the Permanent Secretaries of the various Saint Lucian Ministries, as well as chairs of the national committees and heads of key agencies such as police, fire, Red Cross, ports authority and others.

Fifteen national disaster committees have been established with a focus on their respective sectors such as telecommunications, shelters,

works, health, transport and others. These committees work with NEMO to provide specialized expertise in their respective sectors. Additionally, community-based response and planning is represented by eighteen District committees which cover the country.

The National Emergency Management Plan includes numerous plans and policy documents to guide prevention, mitigation and response.

These documents guide disaster mitigation and management by assigning specific responsibilities and procedures under a policy framework for disaster risk management and reduction. Documents supporting the national plan include Standard Operating Procedures (SOPs), policy documents, guideline documents, national emergency plans, sectoral/agency response plans, and a number of agreements.¹³ The Governor-General may, by proclamation which is then published in the Official Gazette, declare that a state of emergency exists.¹³

ACTIVITIES UNDER THE HYOGO FRAMEWORK FOR ACTION

**Hyogo Framework for Action (HFA)
Priority #1: Policy, institutional capacity and consensus building for disaster risk management**

Saint Lucia has enacted a significant disaster legislation and is signatory to a number of regional and international conventions for disaster management. The country has developed and approved a number of policies, plans and

¹² OAS-DSD (2006a).

¹³ As of September 2009, the agency was renamed to the Caribbean Disaster Emergency Management Agency.

¹⁴ <http://stlucia.gov.lc/nemp>.

¹⁵ OAS-DSD (1978b).



St. Lucia

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standard operating procedures relevant to disaster risk reduction. These include:

- The Emergency Powers (Disasters) Act #5/1995¹⁶
- The Disaster Preparedness and Response Act, 2000¹⁷
- The Disaster Management Act # 30/2006
- Mitigation Policy & Plan
- Integrated Natural Hazard Risk Management Policy 2004 (draft)

NEMO leads the disaster management initiative with the support and the participation of most agencies in all sectors. However, a coherent national multi-sectoral plan is yet to be developed.

NEMO is working with other national ministries and agencies to systematically integrate DRM within specific agency activities and what currently exists is not as systematic as it could be. However, NEMO provides DRM elucidation to the activities, programs and projects of a number of public and private sector agencies including the Climate Change Unit, the Sustainable Development Unit, the Ministries of Physical Development, Agriculture, Fisheries, etc.

While much progress has been made, DRM policy implementation advancements at the national level are impeded by staffing and funding constraints. Additionally, individual Ministries have yet to fully integrate DRM principles in the management of their respective portfolios.

¹⁶ OAS-DSD (1995).

¹⁷ OAS-DSD (2000b).

HFA Priority #2: Disaster risk assessment and monitoring

Vulnerability assessments, hazard maps and risk assessments for critical facilities have been prepared for flooding due to storm/wind surge, high wind, drought and debris flow. While maps have been developed, they have not been integrated in the decision support or policy-making process. Presently, NEMO does not support a GIS capability and there is currently no program supporting additional hazard mapping or updates to current hazard maps. Supporting base maps have been prepared in a GIS format and include infrastructure and drainage, national topography, land use, rainfall, soils, geology, etc. These are of varying age, prepared in the 1980s and 1990s, and may not reflect current conditions.¹⁸

The Saint Lucia Meteorological Service provides 24-hour weather forecasting service and is a member of the Caribbean Meteorological Organization.

The US National Hurricane Center provides longer-term hurricane forecasting support to the region.

The Seismic Monitoring Unit based at the University of the West Indies in Trinidad monitors seismic activity (earthquakes and volcanoes) in Saint Lucia. There are seven seismic monitoring sensors on the island.

Systems are in place for early warning at the community level for weather phenomena and volcanoes; however, early warning for other hazards is presently lacking. Although efforts are underway to establish an early warning system for tsunamis on a national scale and for floods due to rain on a community-level, both themes are being pursued under regionally promoted projects.

A regional Tsunami Early Warning System is currently being addressed under an international

effort. Wave monitoring sensors are located within Saint Lucian territorial waters. Information from these sensors all feed into the Global Tsunami Monitoring Network. National Focal Points have been identified and efforts are ongoing to establish community level warning mechanisms.

HFA Priority #3: Use knowledge, innovation and education to build a culture of safety and resilience at all levels

Information has been made available and accessible through most media forms to reach the public audiences. This includes TV, posters, newspapers, radio, internet, text messaging, libraries, town criers, loud hailers, fliers, and others. Work on current media programs needs to focus on influencing behavioral change rather than simply sharing information. Available technology such as Geographic Information Systems (GIS) is under-utilized. Additionally, programs need to be strengthened that educate residents to the availability of the information, and how to use it to reduce their vulnerability and improve personal safety.

A Safer Buildings Program was introduced at a tertiary-education-level institution and efforts are ongoing in an attempt to make it an elective in the curriculum. With the support of USAID-Office of Foreign Disaster Assistance (OFDA) a 'Safer Schools Program' is being introduced into the Saint Lucia Education System.

Saint Lucia was involved in the development of the B-Tool and is a B-Tool user. The Disaster Risk Management Benchmarking Tool (B-Tool) was developed by the OECS as a Disaster Risk Management assessment tool; it is also a methodology for identifying and prioritizing a country's risk reduction

¹⁸ CDERA (2003d).

activities and for quantifying reductions in risk profiles. Saint Lucia ranked third of the five countries that took part in the activity.

NEMO has provided Public Service Announcements (PSAs), both audio and video, for all major hazards to all major media houses for public distribution. These were received under a regional project coordinated by CDEMA. Additionally, NEMO has developed ten video and audio productions in English and Creole on response planning for the key hazards. Ad-hoc expert presentations are done for specific hazards via radio and TV; and NEMO staff and volunteers also engage in presentations to communities, public and private sector agencies and town hall meetings, sensitizing citizens to DRM.

HFA Priority #4: Reduction of the underlying risk factors (reduction of exposure and vulnerability and increase of resilience)

The Physical Planning Act includes some DRM considerations and requires the enforcement of some building codes. The act provides for the review of development plans by NEMO to evaluate how DRM considerations are addressed. While progress is being made in this area, existing building codes need revision and updates. Additionally, there is a need for improved enforcement. Input by NEMO on development plans needs to be incorporated to improve the incorporation of DRM considerations.

The Program for the Regularization of Unplanned Developments (PROUD) is aimed at regularizing squatter settlements in the country and integrates DRR-related considerations. Responsibilities under the program, including the DRR considerations, were recently transferred to the Ministry of Housing.

The development approval process requires that Environmental Impact Assessments be conducted for development proposals of a certain size and/or located in certain locales.

Enforcement of EIA recommendations, however, is an issue as they are sometimes not incorporated into a projects design requirements.

Saint Lucia has for more than a decade invested in vulnerability reduction through public works and community level investments. These investments have included hurricane proofing of health facilities, small mitigation works, sea defenses at Dennery Village, the construction of a hazard proof Emergency Operations Center in Castries with associated satellite warehouses across the island, and community based landslide risk reduction.

HFA Priority #5: Disaster preparedness, recovery and reconstruction at national, regional, and local levels

NEMO maintains a national warehouse for disaster response equipment and supplies as well as satellite warehouses distributed throughout the island to pre-position response supplies. The Emergency Operations Center is co-located with the national warehouse.

Under the National Disaster Response Mechanism, eighteen district committees report to the NEMO Secretariat to coordinate local response and assess damages. Communication is maintained via VHF, HF & CB radios and telephone, text messaging and email. Additionally, a national Damage Assessment and Needs Analysis (DANA) Committee is fed into by eighteen district-level DANA committees. These committees are responsible for making the required assessments before and after disaster events.

NEMO supports an annual disaster exercise with the Air and Sea ports Authority. NEMO also participates in two regional exercises (FA HUM and Region Rap). Other exercises are held on a more ad-hoc basis.

Saint Lucia is a member of the regional Caribbean Disaster Emergency Management Agency (CDEMA). A security agreement (the Regional Security System, RSS) also provides security and other support in disaster response. An MOU with Martinique caters for the provision of air-lift for medical evacuations from Saint Lucia to Martinique and other such air services by the Martinique military. Seismic activity in Saint Lucia and the other CDEMA Participating States is being monitored by the Seismic Monitoring Unit in Trinidad.

An initial allocation of funds is set aside from the National Consolidated Fund for response to any declared disaster. It is expected that this allocation will be augmented depending on the magnitude of impact and the scale of the response. Additionally, Saint Lucia is a subscriber to the Caribbean Catastrophic Risk Insurance Facility, CCRIF.¹⁹

Vulnerability assessments of the health sector infrastructure have been carried out relatively recently. The Victoria Hospital, main healthcare facility in the country, was assessed in 1993 and 1996. These assessments looked at the structure of the facility. A revision of that assessment was carried out in 2000. Soufriere and St. Jude Hospitals were both assessed in 1993.

KEY DONOR ENGAGEMENTS

Existing Projects with Donors and International Financial Institutions	Funding Agency / International Partners	Allocated Budget and Period (US\$)	HFA Activity Area(s)
Additional Financing to the Saint Lucia Disaster Management Project II	World Bank	3.96 million 2008-2011	1, 2, 3, 4, 5
Disaster Management II project (DMP II)	World Bank	8.9 million 2004-2011	1, 2, 3, 4, 5
Comprehensive Disaster Harmonised Implementation Program (CDM HIP)	CDEMA / CIDA / DFID		1
Caribbean Risk Management Initiative	UNDP	2.1 million 2004-2010	1,2,3
Enhancing Resilience to Reduce Vulnerability in the Caribbean	Government of Italy	4.5 million 2009-2011	1, 2, 3, 4, 5
Mainstreaming DRM in the OECS countries	IADB	400,000 2008-2011	
Regional DRM Strategy for the Caribbean Tourism sector	IADB	800,000 2007-2009	
Regional Monitoring and Evaluation Framework for DRM in the Caribbean Tourism Sector	IADB	750,000 2009-2012	

¹⁹ The CCRIF is the first multi-country risk pool in the world, and is also the first insurance instrument to successfully develop a parametric policy backed by both traditional and capital markets. It is a regional insurance fund for Caribbean governments designed to limit the financial impact of catastrophic hurricanes and earthquakes to Caribbean governments by quickly providing financial liquidity when a policy is triggered.



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Special thanks and appreciation are extended to the partners who support GFDRR's work to protect livelihood and improve lives: ACP Secretariat, Australia, Bangladesh, Belgium, Brazil, Canada, Colombia, Denmark, European Commission, Finland, France, Germany, Haiti, India, International Federation of Red Cross and Red Crescent Societies, Ireland, Italy, Japan, Luxembourg, Malawi, Mexico, the Netherlands, New Zealand, Norway, Saudi Arabia, Senegal, South Africa, South Korea, Spain, Sweden, Switzerland, Turkey, United Kingdom, United Nations Development Programme, United States, UN International Strategy for Disaster Reduction, Vietnam, the World Bank, and Yemen.