Case Study in Saint Lucia

Strengthening Resilience and Coping Capacities in the Caribbean through Early Warning System Project

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Table of Content

1.0 Country Overview……..3

2.0 Introduction……7

3.0 Project Objective……8

4.0 Problems……8

5.0 Steps taken to address problems……9

6.0 Results……9

7.0 How the system works……9

8.0 Challenges……10

9.0 Lessons Learnt, way forward……10

10.0 Constraints……10

11.0 Appendix……11

Country Overview

Figure 1. Source: worldaltlas.com

Location: 13.59 N, 61.0W

Area: 616,000 sq. km

Highest Mountain: 950m

Rainfall: 1265-3420mm

Population: 180,000 (2012)

Economic Activities: Tourism and Agriculture

Government: Democracy. Independence in 1997

Historical Antidote: 7 times

Figure 2. Source: Mapsofworld

Figure 3. Highest Mountain

Saint Lucia

- Large ocean space 15,300 sq. km.
- Small, fragile economy that do not benefit from economies of scale
- Fragile ecosystems with high endemism
- Vulnerable to externalities
- Highly vulnerable to climate change

Biodiversity

Type	Saint Lucian Endemic Species	Indigenous Species	Alien Species	Total Species
Seed bearing plants	10	1009	282+	1291
Ferns	0	138	7	145
Mammals	1 (+1subspecies)	10	7	17
Birds	5 (+13 subspecies)	132	2	134
Reptiles	7 (+7 subspecies)	13	6	19
Amphibians	1	2	3	5
Beetles	144	777+	39+	816
Dragonflies	0	26	0	26
Files	19	na	na	134

Total number of species from 2009 biological inventory (Dalry 2009) in State of Environment Saint Lucia 2025

Drivers

Figure 3 Transportation
Source: Ministry of Transport, 25-30,000 in 1990 to approximately 61,000-2016

Figure 4 Tourism
Source: Ministry of Tourism, over I million visitor arrivals 2016

Figure 4. Housing

Figure 6. Manufacturing

Disasters

Disasters	**Year**	**Economic Impact** (US $ millions)
Hurricane Tomas	2010	336.00 (45% of GDP)
Hurricane Dean	2007	18.80
Hurricane Ivan	2004	2.60
Tropical Storm Lily	2002	20.00
Tropical Storm Debbie	2010	na
Tropical Storm Mathew	2016	na

Figure 7. The drought of 2010 was the worst in 40 years that started in September of 2009, one of the wettest months

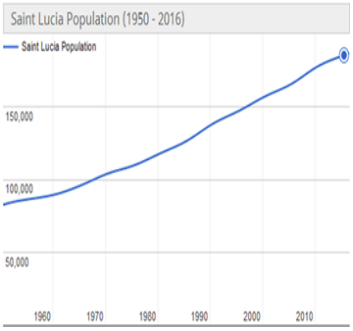
Issues

Marine pollution

Agriculture

Water Quality and Quantity

Improper Garbage disposal



Increased population

Increases in demands for water due to growing population coupled with a heavily silt dam (30%) that further reduces water availability, Further, there is the problem of non-revenue water due to leakages. It has been estimated between 30-56% to every 100 gallons produced. Increases in manufacturing, agricultural activities, broken sewer lines from septic tanks and improper disposal of garbage has led to contamination of some of the island's water sources. Marine/coastal pollution is generated by land or sea users making it one of the most polluted in the Caribbean.

Introduction

Customarily, Saint Lucia has been reactive to hazards while experiencing significant losses in lives and livelihoods. With a history of periodic hazards, the country has already made significant developments in reducing economic and mortality risk by developing effective early warning systems for droughts and flooding. The administration has made protection of its population a high priority by pursuing and investing significantly in the development of this Early Warning System. In January 2009, the government together with the JICA and the National Emergency Management Organisation implemented three Flood Early Warning Systems (EWS) whose effectiveness was well demonstrated by the much reduced loss of livelihoods. However, there were other partners that contributed towards this harmonization initiative such as University of the West Indies, (UWI), Caribbean Emergency Management Authority (CEDMA), University of Guyana (UG) and the Caribbean Institute of Meteorology and Hydrology CIMH.

The fiscal losses recorded associated to extreme hydro-meteorological events have increased significantly in Saint Lucia over the past 10 years, but with a more focused institutional framework the island is experiencing a reduction in these externalities partly due to better forecasting of vulnerabilities, more effective emergency preparedness sensitization programmes and actions owing to an increase in risk knowledge and vulnerability in communities

The national and policy outline for disaster management in Saint Lucia includes the National Emergency Management Organization (NEMO), which is supported by a network of 13 National Disaster Committees, 18 District Disaster Management committees. This harmonisation has a strong focus on disaster preparedness and response whilst developing community resilience and building capabilities towards a reduction of hazard susceptibility.

The advent of Early Warning Systems in Saint Lucia represents just the beginning for meaningful analytics lessons which replaces previous knowledge on disaster mitigation in that the information dissemination must be applicable, understandable and trusted by the persons within vulnerable communities. Community involvement in this project was critical in recognizing the impacts, requirements, and areas of weakness that needed addressing with the hope of developing a legal policy framework for hazards. Encompassed, would be legislative measures to ensure adherence to the early warnings. Early warning systems cannot be fully effective unless there is an integrated approach supported by a trusted functional system, there must be a strong communal effort to participate in raising awareness, conducting drills, willing to be knowledgeable on risk management, contingency planning, and persons who are keen to respond appropriately to the alerts therefore, the community must be a key partner from planning to implementation.

Over the past 7 years, Saint Lucia has been the recipient of several early warning systems projects through partner agencies such as AusAID, JICA, Carib-HYCOS, UNDP, NEMO and ECHO all using varying systems technologies of communication for dissemination of alert warnings. Consequently, the systems used presently include; the Dewetra platform, ACRONETWORK,

Flow and Digicel texting platforms, ftp sites (file transfer protocol) and more recently the VHF radio signals which was adopted from the Saint Lucia Meteorological Services.

Saint Lucia has been the recipient of several training components from institutions as CDEMA, NEMO, JICA. However, in Saint Lucia harmonization of early warning systems is best felt through the formation of the Flood and Drought Mitigation Committee where focal points from every Ministry meet regularly to discuss issues pertinent to Flood and Drought hazards and how best to incorporate mitigative measures in an event.

Project Objective

The primary objective of the project is to strengthen national preparedness mechanisms though improved monitoring and alert dissemination

The Problem

The coastal village of Dennery, located on the eastern side of Saint Lucia, is vulnerable to multiple natural and man-made hazards. Of concern to residents, is the susceptibility of the area to flooding. Recent severe events include the floods of October 05, 2010 when Dennery village was inundated by flash flooding caused by significant rainfall in the Errard region as well as the floods of October 30, 2010, the economic impacts of these events were severe and estimated to cost thousands of dollars for recovery and reconstruction. Mostly affected are residents of Dennery south who had to navigate through pools of water as their roads are totally submerged by flooding.

According to Charles Dominic, “Growing up in the village of Dennery in the early seventies there was no flooding but since the mangrove backfilled for housing the flooding started so the Government needs to widen the waterways to channel the water more efficiently into the sea,” adding that this will help mitigate the flooding that had crippled business activities.

Carmelite Sifflet another resident lamented, “Our streets have turned into ‘River Nile’ during heavy rainfall events to the extent that flood is flowing into our houses in record time and now has construct special shelves to place her moveable items and appliances on to prevent damages.

Another resident, Miss Agnes, claims she’s lived in her home for 20 years, and she remembers how the 2010 flood filled her downstairs apartment with about 4 feet of water destroying everything in the process. This time, she and her family and friends brought everything up from that apartment upstairs, including the washer. Whenever it rains now she stated, her husband must park their vehicle up by the church (which is now affected by the floods)

Hedwridge Alexander, is of the view that the re-training of the waterway after the mangrove was backfilled is the main contributor to the flooding of the village. The mouth of the new waterways now joins the main river at a 90-degree angle as opposed to 45-degree angle as in the past which facilitated the smooth flow into the main river.

Steps taken to address problem

There is a strong communal system in Dennery South that participated in raising awareness, drill exercises, risk damage and assessments, post needs damage and assessment, contingency planning, and persons who are willing to receive and disseminate the warnings also to respond appropriately to the alerts. In this process of data collection and monitoring, the community became a primary partner in the implementation from the planning to implementation of the EWS thus, within this context it was important to recognize that preparedness and mitigation efforts became the concern of persons within the project community. Importantly as well, community sensitization and awareness was regarded as vital components of risk reduction resulting in consistently engagement towards this end.

Consequently, numerous consultations with various stakeholders were held for discussions on strategies for engendering involvement in activities of the project. Further to this, these consultations were able to identify key community leaders, schools, other partners that contribute significantly to the wellbeing of the community and how best to foster collaboration with the EWS project. Additional to these from consultations, there was also a review of the schools disaster management plans, discussions on a community disaster management plan and a walk-through the community to identify key vulnerable areas.

Results

Sensitization of the community

Implementation of a multi-hazard CAP Early Warning System

Revision of a school disaster management plan

Partnering with the National Emergency Management Organisation (NEMO), Ministry for Education, Innovation, Gender Relations and Sustainable Development, Saint Lucia Fire and Rescue, the Saint Lucia Police Force and community businesses

How the system works

The instrumentations have been installed in Errard quarter of Dennery South and on the Morne Panache/Dennery ridge. It consists of:

1. Water level Radar Sensor and Solar Panel

2. Rain gauge and Solar Panel

3. Two data Loggers

Using GPRS transmissions, the multi hazard early warning system transmits a signal when thresholds are breached due to water level rises or increasing rainfall to the RDS encoders that are installed at two radio stations. Through a voice interrupt of normal broadcasting, an

alert is relayed to RDS receivers thereby warning residents and essential services of an impending hazard. These RDS receivers are equipped with a strobe light to accommodate persons who are hearing impaired. This system is intended to target all vulnerable persons who reside in the flood prone area of the coastal Dennery south community.

Challenges

- Flooding in areas is mainly due to poor drainage network and improper disposal of garbage.
- Conducting regular disaster risk drills within the community to test evacuation plan.
- The need for climate change financing to aid in recovery
- Lack of IT personnel to ensure maintenance of the system
- The need for capacity building
- Lack of cellular coverage for transmitting the signal for the water level sensor. Repeaters must be installed
- Lack of timely interventions by Government agencies such as desilting of rivers to facilitate a free flow thus reducing the incidents of flooding
- Lack of funding to undertake a sustained educational campaign
- Support from other relevant Government agencies and NGO's

Lessons learnt/way forward

- Strengthening of the disaster committee
- Promoting a multi-sectorial approach to disaster management
- Solicit more technical support for hazard mitigation
- Encourages a household vulnerability assessment
- Sensitization of the Community on the importance of adhering to proper building codes and safety regulations
- Strengthen the legal and policy framework for multi hazard management

Constraints

- Inadequate equipment for data collection and monitoring resulting in several gaps in data sets
- The need for capacity building in disaster risk management.
- Procurement of relevant software.
- Reluctance of some persons to embrace new technologies and innovations

Appendix

Dennery Village before and during flooding

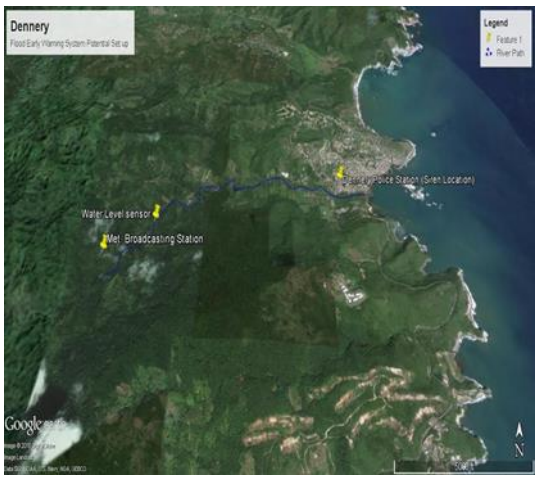
Town hall meeting with Director of NEMO

Satellite consultations with Community

Addressing Primary and Secondary Schools on EWS

Evacuation drill exercise with Secondary and Primary schools

Instrumentation



Satellite imagery

Rainfall Data, October 2010

CARDI rainfall station: October 2010

Date	*Rainfall (mm)*	*Remarks*
1	*0.4*	
2	*38.6*	
3	*45.2*	
4	*3.6*	
5	*194.8*	*Flash flooding*
6	*0.2*	
7	*0.0*	
8	*2.6*	
9	*0.0*	
10	*0.0*	
11	*0.4*	
12	*4.6*	
13	*0.0*	
14	*3.4*	
15	*24.6*	
16	*10.0*	
17	*0.0*	
18	*5.6*	
19	*5.8*	
20	*0.0*	
21	*23.4*	
22	*2.4*	
23	*8.4*	
24	*1.8*	
25	*1.2*	
26	*9.8*	
27	*3.6*	
28	*3.6*	
29	*32.2*	
30	*541.2*	*Hurricane Tomas*
31	*0.0*	

CARDI's meteorological station is 3.5 miles from the Dennery Community

Source: CARDI, Rainfall data