The Role of Information Communication Technology in Advancing Risk Resilience in Small Island Developing States

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VULNERABILITY OF THE CARIBBEAN REGION

- 2nd most hazard prone region in the world;
- 60% of population, 70% of economic activity with 2 miles of coastline
- Regular annual disaster losses of US $3 billion
- Significant loss to social and productive sector >68% loss to GDP

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VULNERABILITY OF THE CARIBBEAN REGION

Clarendon Jamaica, Flood, 2002

Grenada, Hurricane Ivan 2004

Earthquake, Dominica, 2004

Port-au-Prince, Earthquake, Haiti, 2010

VULNERABILITY OF THE CARIBBEAN REGION

Plymouth, Montserrat ,Volcanic Eruption, 1997

Vieux Fort, Saint Lucia, St. Judes Hospital Fire 2009

Dennery, Saint Lucia, Flood, 2010

Pond Casse, Road Failure, Dominica, 2013

COMPREHENSIVE DISASTER MANAGEMENT

Reactive → ***Anticipatory***

Disaster Office → ***Shared Responsibility***

FROM: *a focus on individual hazards*

TO: *viewing hazard exposure as an ongoing process and aims to reduce vulnerability across all sectors*

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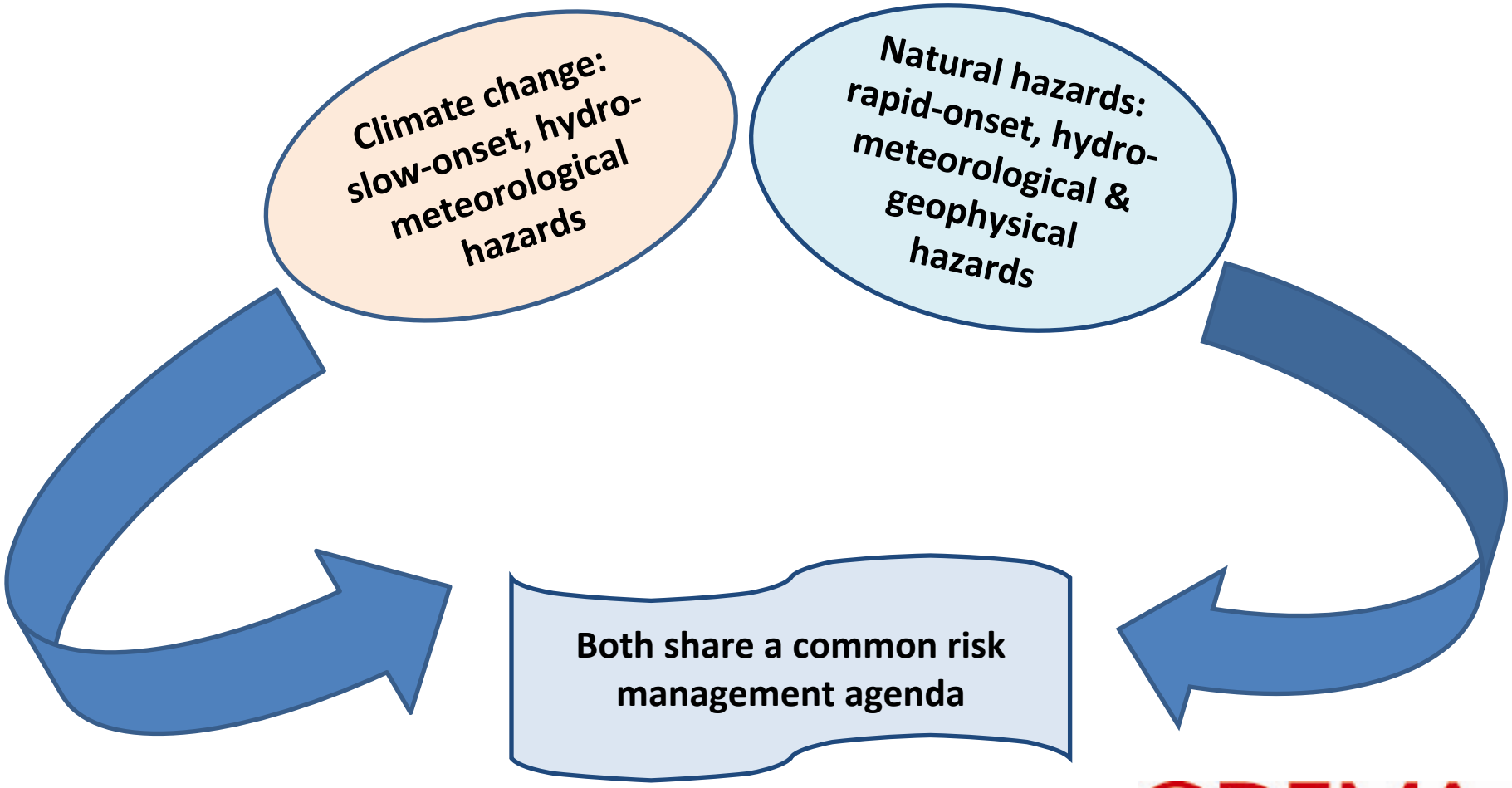
LINKAGES BETWEEN CLIMATE CHANGE & DISASTER AGENDAS



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INFORMATION AND COMMUNICATION TECHNOLOGIES (ICTS) - DEFINITION

- ICT (Information and Communications Technology - or technologies) is an umbrella term that includes any communication device or application, encompassing: radio, television, cellular phones, computer and network hardware and software, satellite systems and so on, as well as the various services and applications associated with them, such as videoconferencing and distance learning.

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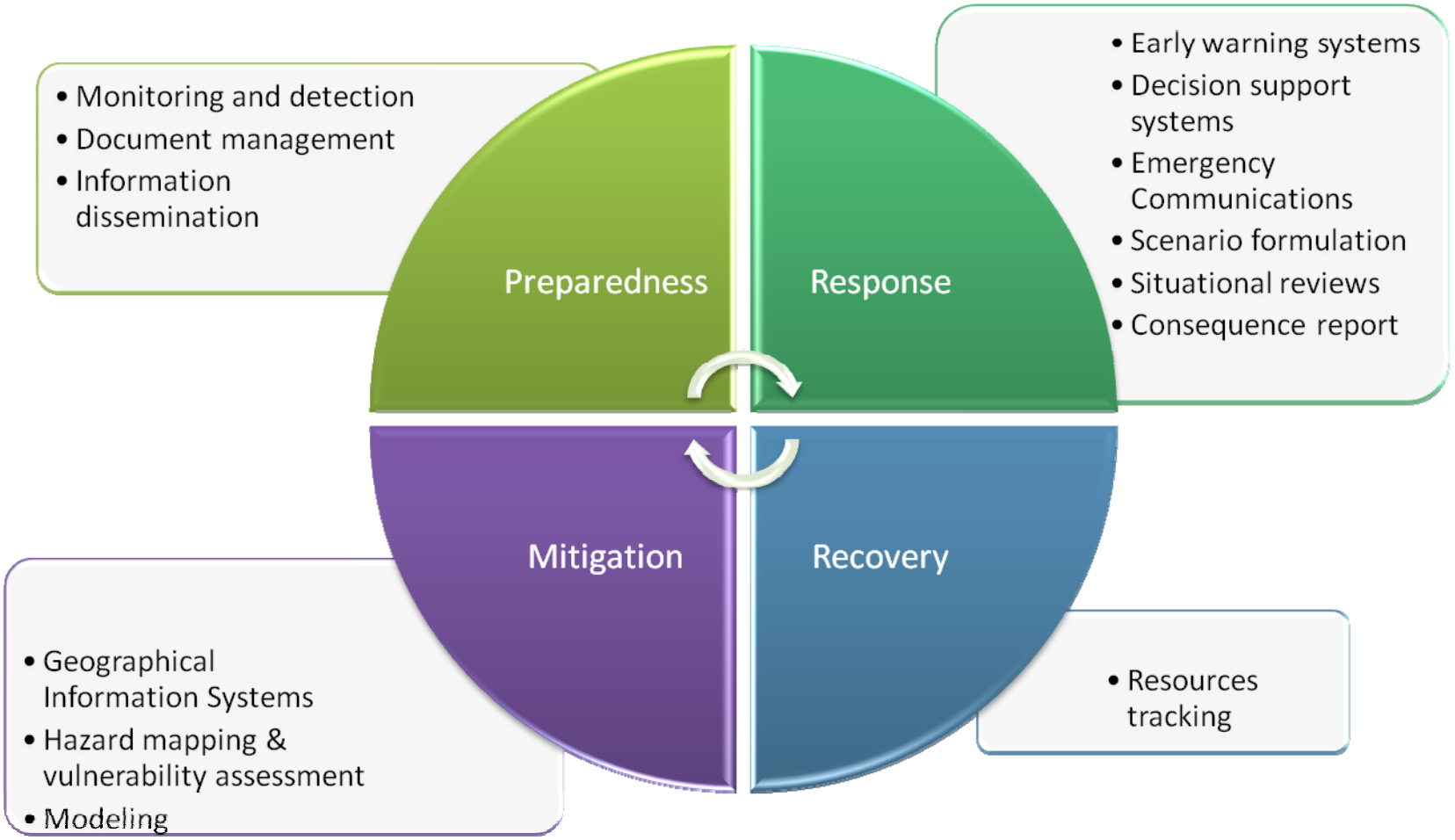
CONTRIBUTION OF ICTS TO DISASTER MANAGEMENT



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ADMINISTRATION SUPPORT

ICTs used in the CDEMA system to support administrative and operational capabilities of the CDEMA Coordinating Unit (CU) and the National Disaster Offices (NDOs) of the PS:

- standard office productivity;
- project planning and management;
- human resources and administration;
- information storage and dissemination;
- fleet management; and
- creation and maintenance of information databases

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GEOGRAPHICAL INFORMATION SYSTEMS

GIS integrates hardware, software, and data for capturing, managing, analyzing, and displaying all forms of geographically referenced information. GIS technology contributes to resilience building in several ways:

- Analyzing where disasters have occurred in the past and what impacts they have had to assist in the development of more efficient methods to reduce future disaster risks.
- Monitoring information about the locations of key physical assets to assist in planning for their protection, as well as in determining suitable locations for new infrastructure.
- Determining what hazards might potentially impact a state and then determine the alternatives available to reduce the direct and indirect impacts.

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GEOGRAPHICAL INFORMATION SYSTEMS

The DEWETRA Platform

The DEWETRA platform is a real-time integrated system for hydro-meteorological and wildfire risk forecasting, monitoring and prevention. The system is based on the rapid availability of different data which help establish up-to-date and reliable risk scenarios.

The integration of all relevant data for risk management can significantly increase the value of available information and the level of knowledge of forecasters and disaster managers. Different sources of information are ingested and managed within the platform, taking into account their diverse space-time scales and degrees of uncertainty and reliability. The DEWETRA platform uses a three-tiers software architecture: a strong middle-ware ensure robustness and computational load balancing, whereas a Web-GIS interface facilitate the information distribution.

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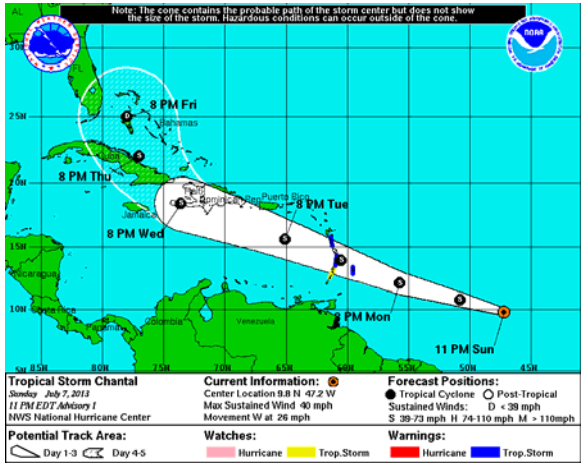
EARLY WARNING SYSTEMS

EWS provide the capacity to generate and disseminate timely and meaningful warning information to enable individuals, communities and organizations threatened by a hazard to prepare and to act appropriately and in sufficient time to reduce the possibility of harm or loss.



- Traditional electronic means are still valid in the Caribbean (television, radio, internet, telephone (fixed line and cellular) due to widespread availability.
- Sophisticated ICT-based warning systems have been developed for hurricanes and volcanoes.

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EARLY WARNING SYSTEMS

Technical Components of the Hurricane Early Warning System

•*Radar* – When a hurricane approaches an island, it is monitored by land-based weather radar. This radar provides detailed information on hurricane wind fields and other changes to support accurate short-term warnings for especially flooding.

•*Satellites* – Geostationary satellites orbiting the earth at an altitude of about 37000 km provide the National Hurricane Centre with imagery that helps provide estimates of the location, size and intensity of a tropical storm and its surrounding environment.

•*Reconnaissance Aircraft* – The US Air Force provides operational reconnaissance by flying aircrafts into the core of hurricanes to measure wind, pressure, temperature and humidity as well as to provide accurate location of the centre of the hurricane. The National Oceanic and Atmospheric Administration also flies aircrafts into hurricanes to aid scientist in better understanding the dynamics of these systems and improve forecast capabilities.

•*National Hurricane Center Models* – The National Hurricane Center uses several computer models to help forecast the path, speed, and strength of hurricanes. Data from weather satellites, reconnaissance aircrafts and other sources are fed into the models.

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EARLY WARNING SYSTEMS

Volcano Early Warning System in Montserrat

In the spring of 2008, Montserrat completed deployment of the emergency solutions platform for alerting residents of volcanic activity. The 2wcom early warning solution uses RDS (Radio Data System) technology to trigger alerts and pass critical text and voice information to targeted groups of 2wcom receivers including homes, schools and critical agencies at risk during an eruption. In May 2008, the DMCA began testing the system by continuously alerting residents and tourists when the Soufrière Hills volcano showed signs of activity.

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DECISION SUPPORT SYSTEMS

- DSS are technologies that integrate computer hardware and software designed to complement the cognitive processes of humans in their decision making. Essential components are: a data bank containing information about a particular environment; data analysis capability; normative models; and technology for the interactive use of the data and models which links the disaster manager with other components of the DSS.

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DECISION SUPPORT SYSTEMS

WebEOC

Web EOC is a web-based DSS which can be used during the planning, mitigation, response and recovery phases of any emergency. It can also be used by agencies during day-to- day activities to manage routine, non-emergency related operations.

WebEOC contains a set of default electronic display status boards which provide the User with the ability to generate, post, transmit and share information, real-time, among other WebEOC users. These status boards are the equivalent to large, chronological or topical paper-based boards that are typically used in EOCs. An agency can use any or all of these boards "as is", or build an unlimited number of status boards and forms tailored to local requirements.

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SUPPLIES TRACKING

- Systems designed to provide assistance in sourcing and tracking relief supplies in disaster relief operations.

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SUPPLIES TRACKING

CDEMA Relief Supplies Tracking System

The Relief Supply Tracking System (RSTS) is an online database designed to facilitate the management and tracking of disaster relief supplies. It supports better management and coordination of relief operations by providing a means to collect, organize and analyze disaster relief information.

The RSTS was developed to provide assistance in sourcing and tracking relief supplies in disaster relief operations by capturing information on identified needs, assistance pledged, and assistance en-route or dispatched and assistance received during disaster response operations.

The RSTS utilizes mainly the Inventory functionality of Sahana which is a free and open source software (FOSS)-based disaster management system that grew out of the events during the 2004 Asian tsunami disaster.

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ICT PLATFORM FOR DRM IN THE CDEMA SYSTEM

- In 2009, CDEMA conducted an assessment which sought to understand the state of ICT capacity and needs within the NDOs of the PS. It determined that there was significant variation in the ICT practices and capabilities of NDOs and pointed to the need to define the requirements for ICT "platforms" for NDOs.

- Subsequent to the assessment, three (3) ICT levels were developed to provide guidance to PS on ICT standards and effective utilisation. These levels were *Level 1, Level 2 and Level 3*; Level 1 being the minimum acceptable standard and Level 3 the highest standard.

- The CDEMA CU has been working with the PS to ensure that all NDOs reach and maintain at least a Level 1 ICT level.

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CHALLENGES

Some challenges remain in the widespread use of ICTs in disaster management in the Caribbean:

- Lack of human and financial resources to maintain the functionality of technologies provided
- Deficits in technical capabilities which will ensure full utilisation of ICTs
- Constantly changing and advancing technologies, making it difficult for SIDS to stay current
- A plethora of tools, sometimes with overlapping objectives, have been developed

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