The Role of Science Advice in Extreme Weather Events and Tackling Climate Change

Ronald Jackson
Executive Director, CDEMA
International Network for Government Science Advice Caribbean Capacity Building Workshop
Kingston, Jamaica, February 20, 2018
PRESENTATION OVERVIEW

- Background on CDEMA
- Reflections on the 2017 Hurricane Season
- War Gaming Exercise
- CDEMA’s use of Science in CDM Process
- Lessons, Challenges and Opportunities
CDEMA: WHO WE ARE...

- Institution of the Caribbean Community (CARICOM)
- Caribbean Disaster Emergency Management Agency is the regional inter-governmental Agency responsible for disaster management in the Caribbean Community (CARICOM)

CDERA
- September 1991

CDEMA
- September 2009
CDEMA MANDATE (since 2009)

- CARICOM’S Institution for functional Cooperation in DRM/CDM
- Mobilize and coordinate relief
- Provide immediate and coordinated response
- Mitigate or eliminate the immediate consequences of disasters
- Main broker of Regions Integrated Risk Management Strategy
- Secure, coordinate and provide reliable and comprehensive information
- Promote Integrated Disaster Risk Management and Resilience in CARICOM
- Encourage Disaster loss reduction and cooperative mechanisms
- Coordinate the establishment and maintenance of adequate disaster response capabilities

Disaster loss reduction and development of a culture of safety

- Encourage Disaster loss reduction and cooperative mechanisms
- Coordinate the establishment and maintenance of adequate disaster response capabilities
CDEMA PARTICIPATING STATES

The CDEMA System is made up of 18 Participating States (PS)

- Anguilla
- Antigua
- Bahamas
- Barbados
- Belize
- British Virgin Islands
- Dominica
- Grenada
- Guyana
- Haiti
- Jamaica
- Montserrat
- St Kitts and Nevis
- Saint Lucia
- St Vincent and the Grenadines
- Trinidad & Tobago
- Turks & Caicos Islands
- Suriname
**THE CDM STRATEGY 2014-2024**

**Regional Goal:** Safer more resilient and sustainable Caribbean States

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<tr>
<th><strong>Institutional Strengthening</strong></th>
<th><strong>Knowledge Management</strong></th>
<th><strong>Sector Integration</strong></th>
<th><strong>Community Resilience</strong></th>
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<td>DM Organizations (national and regional) Strengthened for Supporting and monitoring the advancement of DRM</td>
<td>Regional Network for Risk Informed Decision Making</td>
<td>Strategic Disaster Risk Management Programming for Priority Sectors</td>
<td>Standards for safe communities developed and applied</td>
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<td>CDM Integrated into policy, strategy, legislation</td>
<td>Integrated System for fact based decision making at all levels</td>
<td>Hazard Information integrated into development planning and programming for priority sectors</td>
<td>Community Based Disaster Management Capacity built/strengthened</td>
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<td>Development Partner Programming aligned</td>
<td>Incorporation of Community and Sector Knowledge in Risk Assessments</td>
<td>Incentive programs developed and applied for the promotion of risk reduction/CCA in infrastructure investment</td>
<td>Community EWS integrated, improved and expanded</td>
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<td>Strengthened Coordination for preparedness, response and recovery</td>
<td>Education and Training materials, standardized, improved and applied</td>
<td>Community Livelihoods safeguarded</td>
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<td>Adequate resourcing of CDM Programming</td>
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**Gender**

**Climate Change**

**Information Communication Technology**

**Environmental Sustainability**
CDM governance structure

CDM Coordination & Harmonization Council
- CDM Monitoring, Evaluation & Reporting Committee
  - Gender Working Group
    - Agriculture
    - Civil Society
    - Education
    - Health
    - Finance & Economic Development
    - Physical & Environmental Planning
    - Tourism
MANAGING RISK INFORMATION

Spatial data forms an essential basis for informing decisions before, during and after disasters.

CDEMA is mandated to “develop and maintain a comprehensive and reliable database of all relevant resources necessary to achieve the objectives of CDEMA and a system for updating the database.”

CDEMA has envisioned the Caribbean Risk Information System (CRIS) to be a digital/virtual platform for hosting risk management data/information accessible to stakeholders to facilitate analysis, research, greater awareness of risk management in the region and to support evidence based decision making processes.
CURRENT STATE OF PLAY IN THE REGION

Caribbean countries have inherent vulnerabilities to natural hazards due to small size, limited resource base, concentration of coastal development.

The magnitude, timing, location and impacts of a hazard event are difficult to predict.

Changing climate is increasing the unpredictable nature of weather patterns.

Increasing urbanisation of our societies are placing greater burdens on our environmental resources.

Changing societal dynamics - work-life patterns, lifestyle expectations, demographic changes, community fragmentation are increasing community vulnerability.

Disaster impacts set back or reverse development gains.
2017 AN ACTIVE SEASON ...

Wednesday September 6, 2017
Disaster loss reduction and development of a culture of safety

TROUBLE IN THE TROPICS

Three CAT 5 in two weeks, equaling second highest strength on record and strengthening over a short time period

Between 10-225% GDP
90-95% Infrastructure Damage
Incidence of 100% direct impact on the population

12 affected.
9 CARICOM Members/Ass. Members
>US$114 Billion in Damage and Losses
>200 Deaths (37 in CDEMA States)
75%-95% Damage to Building Stock
THE RESPONSE – IRMA & MARIA

- First support deployments dispatched within 24 hours of impact
  - Timing of Irma response affected by Hurricane Jose

- 194 persons deployed (at October 29, 2017) supporting
  - damage assessment and needs analysis
  - emergency response coordination
  - relief operations
  - search and rescue
ALL TOO FAMILIAR STORY

Direct impacts:

• Increased critical infrastructure damage; additional emergency preparedness requirements; higher operating expenses; business interruptions

Indirect societal impacts:

• Risk to future socio-economic development; especially where loss and damages are similar to GDP
ALL TOO FAMILIAR STORY

Direct Costs

• Destruction critical economic infrastructure
• Coastal degradation
• Short to medium term loss of revenue
• Increased expenditure to rehabilitate

Indirect Costs

• Future investment in some key industry affected by perception of increased risk
• Overall impact on local and foreign investment into the country.
LESSONS RECONFIRMED

- Need for enhanced response capacity for multiple and catastrophic events
- Importance of building standards, codes, and enforcement
- Engage in perpetual readiness, particularly for fast onset hazards
- Recognize vulnerabilities and provide measures to treat them
- Need for enhancements in understanding spatially the risk exposure, vulnerability and hazard interface
- Typically lengthy process for access of emergency grant funds - consider other measures to treat the immediate post-impact operations
WAR GAMING EXERCISE
A means of sensitization on how science can support a risk informed agenda.

Provide an opportunity for Policy Makers to think through their information needs to make critical decisions in managing risks and disasters.

Allows Scientific community to determine what resources or information they are in a position to provide to ensure successful management of risk at all phases.
SCENARIOS

Scenario 1 – A Tropical Wave impacts Jamaica causing widespread flooding

- Decision making when Jamaica is threatened and later impacted by a hydrological hazard how can the scientific community support?

Scenario 2 – A Major Hurricane Threatens and impacts Jamaica

- Decision making when Jamaica is threatened and later impacted by a major meteorological hazard

Scenario 3 – Post Disaster Activities – Response and Recovery Operations

- Some of the key decisions to be made after a disaster event what can scientist do to make this process more effective
### SCENARIO 1(A)

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<th>Period</th>
<th>Objective</th>
<th>Activity/Event</th>
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<tr>
<td>August 25, 2018</td>
<td>Responding to a Tropical Wave with potential to cause widespread across Jamaica</td>
<td>A Tropical Wave across the central Caribbean is dumping extremely heavy rain on parts of Jamaica since Saturday evening, August 25, 2018, causing major flooding and landslides. Flooding affected 10 of country's 14 parishes, with Clarendon the worst hit. The Health Ministry has issued gastroenteritis and leptospirosis alert. Met Service said the island experienced an unprecedented level of rainfall. Some parishes saw more rain over the four days than the usual average for the entire months of June, July and August</td>
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EXTREME RAINFALL HITS JAMAICA, MAJOR FLOODING AND LANDSLIDES
**SCENARIO 2(A)**

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<td>September 9, 2018 10:00 a.m.</td>
<td>Responding to a major Hurricane threatening Jamaica</td>
<td>At 10:00 a.m. the centre of Hurricane Gilbert was 200 miles east of Jamaica with 130 miles per hour winds. Hurricane winds extend 20 miles from its centre and Tropical Storm winds extend 100 miles out. The projected rainfall is 10-18 inches. Gilbert is travelling in a westerly direction at 20 mph; and on this current track the centre will pass over Kingston later tonight. At this rate, the effects of the outer bands will be felt in Jamaica by 5:00 p.m. today.</td>
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<td>September 1, 2017</td>
<td>Responding to a major Hurricane impacting Jamaica</td>
<td>Hurricane Gilbert impacted Jamaica with 130 miles per hour winds and 18 inches of rainfall. Severe flooding, major wind damage and Looting reported in several areas. Towns and villages completely devastated (unable to quantify as roads are blocked, power lines down and no telephones functioning in the area) An estimated 200,000 persons will require shelter and food. Approximately up to 50,000 persons will be displaced (including 5,000 tourists who were not able to leave).</td>
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“WAR GAMING EXERCISE”

HURRICANE GILBERT
CDEMA’S USE OF SCIENCE TO ADVANCE CDM
HOW CDEMA USES SCIENCE TO ADVANCE THE RESILIENCE AND SAFETY AGENDA

- Risk Assessments to inform our Response to Humanitarian Crisis and Disasters
- Advocacy and Policy advice
- Hazard Monitoring, Disaster Alerting and Early Warning
- Assessment of the Social, Environmental and Physical impacts of Disasters
- In the development of model tools for DRR Practice
- Provide Situational Awareness
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<th>Institutional (0-10)</th>
<th>Infrastructure (0-10)</th>
<th>Lack of Coping Capacity (0-10)</th>
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# Sub-National Disaster Risk Assessment Tool

## Hazard

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Impacts based forecasting

- Hazard Data
- Exposure Data
- Vulnerability Data
- CARIBBEAN DEWETRA
- Impacts Forecasting
Impacts based forecasting
Impacts based forecasting
Impacts based forecasting
CDEMA has started using SpatialEdge platform to dynamically pull tropical storm hazard data from National Hurricane Center.

While there are a few applications that provides the visualization of this type, we are further upping the ante to use these dynamic data in evaluating impact on population and exposure, at real time.

As hurricane change its course, the analysis results are reflected at the dashboard in real time.
HURRICANE MARIA - PROBABLE WINDSPEED
ANALYSIS RESULT – DOMINICA

Data on School, Bridge and Hospital not yet uploaded in the application
CIMH CLIMATE EARLY WARNING PRODUCTS

CLIMATE MONITORING

CARIBBEAN DROUGHT BULLETIN

March 2017 | Volume II | SHW 10

December-January-February Rainfall Summary

Min. and max. temperatures up to May

CLIMATE OUTLOOKS

Extremel y wet spells frequency shifts

Forecast for March to May 2017

UNUSUALLY U 1 extremely wet spell over months March to May (AGA Module 0). FORECAST: Very careful floods to be averted. In normal or less of the regime, look before. No mention to Bolivar, Cayman and Cuba. No significant changes in the usual amount of readings and, very wet or extremely wet spells expected. This forecast is supported by the meteorological anomalies in the surface and below, with the exception of some region in Bonaire, the ABC islands and Grenada (see the concluding results).

REMCAY: Risk level potential at a major concern until the end of April.

Caribbean Climate Outlook Newsletter March to May 2017

BORED BY: November 2016 to January 2017

Minimum Temperature Outlook MAI 2017

Confidence (%) for temperature to be:

Below-normal 40
Normal 50
Above-normal 10

MaAM min. & max. temp. in the Caribbean are likely to be below- to normal.
Consortium of Sectoral EWISACTs Partners

Regional Consortium

Health
Energy
Tourism
Agriculture
Water
DRM
Climate

Co-design  Co-develop  Co-deliver
Products & Services

CTO and CHTA sign the LoA, September 16th, 2016

CWWA signs the LoA, October 26th, 2016

CARDI and CDEMA sign the LoA, December 6th, 2016

CARPHA and CIMH sign the LoA, April 26th, 2017
LESSONS

- Multi-island Catastrophic impacts require ability to rapidly scale up regional response support
- Investment in building resilience at the individual, community and sector level is essential
- Recovery planning must be done ahead of a disaster
- Hydro-met hazards are requiring new scenario considerations
- Resilient Emergency Operations Centres are essential for effective coordination
- Resilience of our security arrangements is key
CHALLENGES

- Capacity to manage hazard events
- Data quality, sharing, access, analysis
- Effective capture, quantification and dissemination/reporting of impact
- Shared situational awareness
- Sustainable platform for consequence management
OPPORTUNITIES AND CHALLENGES

Main Opportunities

• To pursue synergies & promote harmonisation of approaches to building disaster and climate resilience through alignment of regional and global frameworks

• To share knowledge, expertise and good practices across regions

Key Challenges

• Understanding risk is key to implementation of Sendai Framework. Greater investment needed in the Caribbean region in understanding the level of risk associated with multi-hazards, and application of risk information to development planning decision.
ENABLING RESILIENCE

Finance and Economics
Physical and Environmental Planning
Agriculture
Education
Tourism
Civil Society
Health

GOVERNANCE, COORDINATION AND PARTNERSHIPS
ON THE ROAD TO RESILIENCE

- Defining what **RESILIENCE** means in the Caribbean SIDS and Low Lying Coastal States Context, Baseline and Measure.
  - What are the pillars of Caribbean Resilience
  - How do we measure progress towards attaining this goal

- Pursue a Comprehensive and Integrated Risk Management Agenda where Climate Change and Variability is part of the mainstreamed discussion on Managing Risk

- Development Resilience - Promote Risk Informed and Risk Sensitive Development Strategies Pursue Sound Recovery Planning – “Balancing the “urgent with the important” – move beyond the rhetoric of “building back better”

- Greater investment will be required to limit future such impacts in the near term and beyond
ON THE ROAD TO RESILIENCE

- Create an enabling environment - incentives and disincentives that foster appropriate development practices
  - Will require Public Private Partnerships
- Wide Stakeholder Engagement
- Strengthen National and Regional Protocols For Catastrophic Events and Multi-Island impact – Enhance the National and Regional Response Mechanisms
- Enhance national systems that deal with the vulnerable population in “times of blue skies” to address “grey skies” needs
TRANSFORMATIONAL OPPORTUNITY/ MOMENT

Balance National Actions to focus on existential risk and challenges ahead

Harmonize National Plans for CDM/SDG’s/C

Resilience advanced at Sector level through integration into policy and practice at Sector level

Leverage the opportunities of climate mitigation interventions to sustain resilience building agenda

Modernizing Development Planning and Approval Process

Advance Disaster Risk Management Policy and Legislation

Redefine Development Paradigm for SIDS and Low Lying Coastal States

Harmonizing Financing towards an integrated action plan to reduce risk, vulnerability and exposure and sustain national development gains

Debt Reduction/Forgiveness/ swaps
PRIORITIES

- Regional Training Centre - Deepening technical capabilities within national disaster organizations
- Knowledge management:
  - Build out of the CRIS – decision making platform
  - Risk Profiles for CDEMA PS
- Sector Mainstreaming
  - Supportive role; strategic guidance and promotion
- Community Resilience
  - Support to PS in advancing community resilience programmes including EWS
  - Safe Schools Programme
THANK YOU

Ronald Jackson, Executive Director, CDEMA
ronald.jackson@cdema.org