**CONFERENCE ON BUILDING A SCIENCE AND DATA-BASED AGENDA FOR
DECISION-MAKING ON RESILIENCE IN THE CARIBBEAN**
October 20-21, 2022
Rosseau, Dominica
REPORT

1. Background

Over the past two years, Caribbean countries have sought to maintain the necessary fiscal conditions to recover from COVID-19's devastating socioeconomic impacts. However, given that the region is one of the world's most susceptible to man-made climate change and related disasters, new global challenges have threatened efforts to achieve equitable and transformative recoveries. Climate change and the COVID-19 pandemic have not only adversely affected the region's biodiversity but also stalled decades of progress against poverty, food insecurity, and reducing inequality, severely reducing the gains made toward achieving Sustainable Development Goals.

COVID-19 and an impending climate crisis has made indispensable, the need for timely, accurate data to assist governments in making rapid and informed decisions. To strengthen the Caribbean's national and regional decision-making mechanisms required to face these challenges, the Executive Secretariat for Integral Development (SEDI) of the Organization of the American States (OAS) in collaboration with the Climate Resilience Execution Agency for Dominica (CREAD) and Inter-American Institute for Global Change(IAI) hosted a regional conference on *Building a Science and Data-Based Agenda for Decision-Making on Resilience in the Caribbean* on October 20-21, 2022, in Rosseau, Dominica.

The Conference brought together over 70 high-level experts and stakeholders from Caribbean governments, regional and international organizations, the private sector, and academia—each with an extensive background in the fields of resilience and risk reduction—to discuss climate change's impacts on the Caribbean Community (CARICOM) economies and identify gaps, challenges, and opportunities to reduce vulnerabilities and increase resiliency in the Caribbean using science-based data.

Participants exchanged good practices and lessons learned from their national, regional, and global resilience initiatives in five sessions[1] on the following topics:

1) From Climate Vulnerability to Climate Resilience: Essentials for Sound Decision-making
2) Decision-making Essentials for Energy Resilience
3) Building Resilience with Geospatial Intelligence
4) Science for Building Citizen Resilience
5) Resilient Health Systems

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[1] See Annex I for an overview of each session, the details of which informed the findings in this report.

2. Event Summary

The Conference helped generate consensus among participants that resilience building must be embraced as an evidence-based, decision-making process in which all critical actors—including Governments, businesses, social partners, academia, and, most critically, citizens—promote resilient and sustainable development, highlighting the importance of robust science and data to inform sound decision-making on Caribbean resilience-building. While some isolated regional scientific and data-gathering activities on resilience are currently ongoing, the event, by design, emphasized the need for current and future activities to be relevant, transdisciplinary, multidisciplinary, integrated, and institutionalized to help the region overcome the social, economic, and environmental challenges to resilient and sustainable development.

Inviting scientists from both within and outside the region helped build awareness of what science and data-gathering activities on resilient and sustainable development are in progress nationally, regionally, and globally, and helped spotlight the institutions involved, conveying to international participants the impressive array of outstanding scientists and science-based institutions that exist in the Caribbean.[2] Additionally, the event helped identify opportunities for south-south and north-south cooperation among scientists and scientific organizations and in scaling successful and promising initiatives.

The Conference also highlighted the importance of building citizen resilience to internal and external shocks, and emphasized the critical role citizens could play in generating their own data to support both their personal wellbeing and the realization of social, economic, and environmental resilience.[3] In this, the OAS reinforced its reputation as a longstanding and earnest partner in the sustainable development of the region with the ability to leverage its national, regional, and global network of partners to contribute to the capacity building and institutional strengthening needs of the region.

A significant outcome of the Conference was the firm commitment in Prime Minister of the Commonwealth of Dominica Honorable Roosevelt Skerrit's Opening Address to advocate within the OECS Authority and CARICOM respectively for the implementation of the outcomes of the event. Prime Minister Skerrit pledged specifically to, with the CARICOM Cabinet, champion the creation of a portfolio on Risk and Resilience supported by a regional coordinating and collaborative mechanism tasked with leveraging resources for capacity building and institutional strengthening to mitigate risk and strengthen resilience to external shocks.

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[2] This point is particularly significant; several participants—including those based within the region—indicated they were not aware of the excellent research currently underway in the Caribbean.

[3] It is believed that this was the first time that the issue of citizen resilience was placed at "front and center" of a discourse on resilience in the Caribbean.

3. The Way Forward

The final session of the Conference was devoted to a reflection on possible follow-up actions in the context of a forward thinking, institutionalized response in the short, medium, and long-term. Accordingly, the session was designed around a panel discussion among representatives of the National Oceanic and Atmospheric Administration (NOAA), the University of the West Indies (UWI), the World Bank, the Caribbean Development Bank (CDB), the Caribbean Institute for Meteorology and Hydrology (CIMH), and the Development Bank of Latin America (CAF).[4]

The session recommended **developing…**

a "Collaboratory on Risk and Resilience" comprising national, regional, and global agencies to serve as a strategic planning entity and facilitate co-creation and sharing of knowledge

a regional coordinating mechanism charged with aligning risk abatement with institutions responsible for horizontal coordination,

a national integrated planning platform to generate a robust baseline of data for risk management and resilience building, anchored by a geospatial information framework

a robust national and regional surveillance system for chronic and non-chronic diseases profile

an assessment of the implementation of risk mitigation, transdisciplinary training in the Caribbean

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[4] Those at the panel discussion included Dr. Roger Pulwarty (NOAA), Dr. Michael Taylor (UWI), Paul Saunders (CDB), Dr. David Farrell (CIMH), and Dr. Stacey Richards-Kennedy (CAF).

a recently signed MOU between CAF and the OAS as a basis for generating data to develop policy, governance frameworks, and the design of a green project facility

that more thought be given by the UWI to determining how best to leverage what it represents for the region in areas such as knowledge generation, capacity building, dialogue and coordination, and partnership support research

And considered…

UWI's role in education towards a culture of resilience in the Caribbean, conscious of the need to fill gaps in the curricula such as science diplomacy, translating science for easy assimilation by decision-makers, and strengthening links to behavioural science

CDB as a definite source of funding for projects on resilience building (concessional funding is available to aid scientific institutions)

strengthening the capacity of national and regional CSOs to support citizen resilience[5]

that local knowledge be factored into scientific discussion

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[5] Australia's Citizen Science Association was cited as a model in the promotion of public participation in scientific research to increase scientific knowledge.

4. **Next Steps (OAS/SEDI)**

1. Complete and circulate the Final Report to participants and to regional/international agencies with a science/data, resilience/sustainable mandate that were absent at the Conference.[6]

2. Present the final report alongside an accompanying execution strategy across SEDI's departments to the Inter-American Council for Integral Development (CIDI) and the to the Chairs of respective Sectoral Ministerials e.g Sustainable Development, MSMEs etc. The presentation will likely consolidate interest from other regions for a similar conference, setting the basis for a hemispheric cooperation program.

3. Establish a Guiding Coalition/Steering committee comprising a core group of regional and global agencies to assist with the design of a collaborate framework on science and data for a resilient and sustainable Caribbean.[7]

4. Commission a study to build an inventory of both ongoing and planned science and data activities across the Caribbean, the results of which will be used to identify critical data gaps and to frame future work plans and meetings.

5. Survey critical decision-making processes on risk and resilience. Ongoing and future research will focus on the critical decisions frameworks which can assist Caribbean countries in their transition from vulnerability to resilience.

5. **Annex I: Session Outcomes**

During each session, participants were evenly divided into working groups to discuss and provide recommendations on ongoing activities and priorities for action that could improve decision-making through science and data for each of the topic areas. Participants demonstrated significant levels of

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[6] Including the OECS Commission, CARICOM Secretariat, the Caribbean Community Climate Change Centre, the Caribbean Agricultural Research & Development Institute, the Caribbean Catastrophe Risk Insurance Facility, UNESCO, UWI Global Tourism Resilience Centre, the UWI Global Institute for Climate Smart and Resilient Development, the Inter-American Institute for Cooperation on Agriculture, the Caribbean Regional Fisheries Mechanism, and Jamaica's Scientific Research Council.

[7] This group might include representatives of UWI, NOAA, CDEMA, CCRIF, CARPHA, CARICOM, OECS, CCCCC, CIMH and the OAS.

engagement during these work sessions. Stakeholders agreed that a new strategy to communicate complex data—one emphasizing community involvement—would be required to counter misinformation and disinformation. Additionally, they believed that to obtain more accurate data, strategies including data mapping and gap analyses should be implemented, and that an academia-led process of cloud migration should be considered to make the data accessible to other institutions and regional policymakers.

Session 1: From Climate Vulnerability to Climate Resilience: Essentials for Sound Decision-making

During this session, discussions were tailored to provide an overview of the status of climate science, highlighting limitations of the modeling/forecasting tools currently in use. Considering both the science of climate risks and their volatile nature, this session, moderated by the Climate, Resilience Execution Agency for Dominica (CREAD) and featuring representatives from CIMH, UWI Mona, NOAA, the Society for Risk Analysis, the World Bank, and Texas A&M's Institute for Sustainable Communities, prioritized action for sound regional decision-making based on key metrics for determining critical climate change impacts, generating the following recommendations.

Priorities for action that can improve decision-making through science and data:

- Collaborate to fill knowledge gaps and validate existing regional and national science-based and data-driven models to support resilience and promote direct access, interoperability, and flexibility adapted to a Caribbean context.
- Develop institutional and human capacity, with a particular emphasis on the next generation of professionals, to improve the interacting of science and policy and bring greater focus to climate issues. This requires the appropriate hardware, software, professionals, protocols, and partnerships to design more effective, adaptive policies.
- Promote greater community and stakeholder engagement through participatory processes and strategies to support community-led regional resiliency efforts.
- Improve institutional capabilities and methodologies to access and utilize data at the policy and the community level more effectively.

Recommendations on ongoing activities that can be scaled up and replicated across the region:

- Expand and improve the *Caribbean Multi-Hazard Early Warning System*.

- Develop a "resilient" regional data management system to serve as a central repository of information, data, methodologies, and information on multi-hazard risks.
- Establish resilience and climate action financing facilities/revolving funds in collaboration with global and regional International Financial Institutions (IFIs) to make affordable financing for climate and resilience-based projects available for Micro, Small, and Medium Enterprises (MSMEs) and communities.
- Share a list of available, accessible, and adaptable science solutions, technologies, and their associated costs for regional stakeholders, communities, and decision-makers.
- Train the next generation of advocates and policymakers focusing on MSMEs, youth, and professionals to promote resilience in the Caribbean. Provide fellowships and training for scientists to advance learning on how to translate climate data into actionable policies.

Session 2: Decision-making Essentials for Energy Resilience

This session explored the challenges utility companies face investing in building resilience within their systems while threatened by more active hurricane seasons. In addition, it examined existing public-private partnerships and partnerships in the tourism industry to determine whether similar models might increase investment in energy resilience. Finally, it addressed the emerging environmental challenges posed by renewable energy. Discussions moderated by the government of Dominica and including representatives of the Caribbean Centre for Renewable Energy and Energy Efficiency (CCRREE), the Caribbean Electric Utility Services Corporation (CARILEC), Small Island Developing States (SIDS DOCK), Harvard University, Dominica Electricity Services (DOMLEC) and the University of Delaware, led to the creation of the following roadmap to facilitate energy resilience in the Caribbean.

Priorities for action to improve decision-making through science and data:

- Develop an open-data system featuring a large, centralized, cloud-based data storage with linkages to smaller databases, allowing institutions, including academia, to conduct more collaborative research. This would quickly establish regional benchmarks, generate deeper insight, and encourage more diverse inputs, leading to greater interfacing between scientists and policymakers.
- Establish a comprehensive framework including a Barrier Analysis to properly identify potential barriers through an interdisciplinary approach using geospatial tools. The framework should also identify available resources across Caribbean communities through mapping and data literacy exercises, ensuring that the data collected is helpful, meaningful, and transformative.
- Implement communication and change management as integral pillars to our strategy, being mindful that misinformation campaigns can undermine an entire policy effort. Artificial Intelligence (AI) technology would help create technological transparency and accountability –

both essential to ensure buy-in from communities given that purely scientific models often exclude community perspectives on priorities to reduce vulnerability and increase resilience.

Recommendations on ongoing activities that can be scaled up and replicated across the region:

- Expand the use of available technologies—such as Amazon Web Services (AWS)—which allow institutions to access data and carry out research, visualization, and analysis. Data accessibility is a top priority.
- Diversify and further develop CCRREE's energy sector model, SIDS Dock multi-risk model, and other community assessment models to deepen regional knowledge and strengthen the region's innovation ecosystem.
- Build human capacity in government agencies allied with academia to extract, translate, and interpret data using leading policy analysis tools to maximize the transfer of scientific data relevant to government decision-makers.

Session 3: Building Resilience with Geospatial Intelligence[8]

This session considered the requirements for geospatial data and examined products for supporting decision-making in disaster prevention, mitigation, preparedness, and response. It additionally explored multilateral agreements for making data and products available in case of an emergency, and those agreements which considered participating in developing the Hemisphere's geospatial intelligence sector to identify opportunities for horizontal and triangular cooperation. During discussions moderated by the National Academy of Sciences featuring representatives from the United Nations Platform for Space-Based information for Disaster Management and Emergency Response (UN-SPIDER), the World Bank's Global Facility for Disaster Reduction and Recovery (GFDRR), the University of Illinois at Urbana Champaign's National Center for Supercomputing Applications (NCSA), National Aeronautics and Space Administration (NASA) Earth Science Applied Sciences, Argentina National Space Activities Commission (CONAE), U.S. Geospatial Intelligence Foundation (USGIF), and SpaceX/Starlink, the following recommendations to advance geospatial intelligence in the Caribbean were proposed.

Priorities for action that can improve decision-making through science and data included:

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[8] The National Geospatial-Intelligence Agency defines geospatial intelligence as "the exploitation and analysis of imagery and geospatial information to describe, assess, and visually depict physical features and geographically referenced activities on the Earth."

- Understand that Geo-spatial data needs to be more accessible, relatable, and applicable for decision-makers to encourage greater stakeholder participation across institutions and sectors. Data must be integrated with interdisciplinary (resilience, disaster preparedness, risk management) approaches to understand system uncertainties better.
- Communicate and disseminate geospatial data more effectively so that policymakers and stakeholders can use it for decision-making.
- Build capacity and skill development at different scales with cross-collaboration programs among experienced institutions and countries. Early adoption and continued technological development to introduce employment opportunities are vital to ensuring sustainability. Ensure financial sustainability through public-private partnerships to build, operate, and maintain these systems long-term. Integrate geospatial intelligence in efforts to build community resilience.
- Promote the political, regulatory, and institutional environments needed to encourage geospatial intelligence science and technology approaches in planning and infrastructure development.

Recommendations on ongoing activities that can be scaled up and replicated across the region:

- Conduct assessments to discover gaps in the following areas:
  - Human capacity: identify current or future users through user assessments
  - Operational strategies: data infrastructure, institutions involved and current policies, technologies to deliver data assessments (including hardware, software, and available networking systems)
  - Financing and partnerships: determining availability of resources and partnerships to create a resilient and coordinated participatory ecosystem

Session 4: Science for Building Citizen Resilience

Those most impacted by emergencies and disasters are often the first to respond to them. Evidence shows that broad, top-down resilience assessments and strategies are neither as practical nor as effective as participatory, community-based, and bottom-up approaches. For this reason, adopting a 'community-wide approach' to resilience involves sub-national and national governments, the private sector, academia, and community-based organizations. Discussions moderated by the government of Dominica alongside representatives from the Caribbean Disaster Emergency Management Agency (CDEMA), UWI Cave-Hill, the Inter-American Institute for Global Change Research (IAI), the Economic Commission for Latin America and the Caribbean (ECLAC), Meta, the Caribbean Natural Resources Institute (CANARI), and the CDB moderated by the government of Dominica resulted in the following.

Priorities for action that can improve decision-making through science and data:

- Expand community involvement – critical to make data and science more accessible to those who rely on its findings the most.
- Encourage participatory approaches to data collection and encourage communities to co-develop and build their own data sets. Promote partnerships across all levels and incentivize community engagement. Leverage social and behavioral sciences, data, and analysis to support a community's informed decision-making – maximizing personal agency to support citizen resilience (e.g., when dealing with complex situations such as evacuations). Share good practices, invest in and improve education protocols, and refine practical approaches to further empower communities.
- Engage financial sectors to promote innovative financing options.
- Guarantee construction sectors build according to minimum code standards and consider both the broader environmental impacts of their work, and their effects on community resilience.

Recommendations on ongoing activities that can be scaled up and replicated across the region:

- *The Caribbean Vocational Qualifications* program on Resilient Construction – including free, open-source guidance to build resilient homes.
- Dominica's *Enhancing Resilient Reconstruction in Dominica* program, in partnership with the World Bank, for resilient construction buildings (including new and existing constructions with affordable financing options).
- Implement data preservation solutions—either through physical storage or cloud-based solutions such as AWS—to save a population's vital data. Leverage social and behavioral sciences to connect people and support resilient communities (e.g., by using smartphone notifications as part of an early warning system).

Session 5: Resilient Health Systems

Over the past decade, the Caribbean has been challenged by compounding climate and health hazards (tropical storms, extreme heat, and droughts) and overlapping epidemics of mosquito-borne diseases (dengue, chikungunya, and Zika). The COVID-19 pandemic has both exhausted public health infrastructure and drained public health funding, resulting in fewer available resources to address the impacts of climate disasters on health. In response to these threats, Caribbean countries have invested in innovative climate change adaptation strategies, including a Health-Climatic Bulletin and the development of early warning systems for climate-sensitive diseases.

In a roundtable moderated by the Institute for Global Change Research (IAI), representatives from the government of Dominica, the Caribbean Public Health Agency (CARPHA), the Pan-American Health Organization (PAHO) and the Johns Hopkins Health Equity Group, discussed the following:

Priorities for action that can improve decision-making through science and data:

- Create multidisciplinary and multisectoral dialogue spaces to engage with doctors, academic scientists, and policymakers more effectively.
- Train frontline workers to better understand the impacts of climate on public health, improving patients' outcomes and enhancing community intervention strategies.
- Build systems that capture and measure linkages between climate and health, alongside the required infrastructure (either physical or cloud-based) to store and analyze the data. Locate existing studies attributing climate impacts and disasters to worsening health outcomes (particularly mental health) to support intervention measures.
- Collaborate and partner with academia, institutes, and centers of excellence to support data analysis and provide the necessary regional context to guide policymakers. Health workers already have many responsibilities; tasking them with additional work may not prove sustainable.
- Develop hazard monitoring and early warning services through collaboration with science partners. Additionally, develop a database repository to bring together data from across sectors for more informed, inclusive decision-making.

Recommendations on ongoing activities that can be scaled up and replicated across the region:

- Promote data-sharing dialogues, protocols, and frameworks among trusted local partners to improve responses to natural events, strengthen health systems, and relieve burned-out hospitals and health professionals. Improve science dissemination strategies to communicate the actual impacts of climate on health more effectively on health and to alert communities in real-time of natural and health hazards.
- Create a 'Central Repository' with patients' health records from birth to death. Hospitals, pharmacies, and health clinics use different systems and separate databases, which impedes access to critical data that can provide insights to address a community's urgent needs.
- Train nurses and other medical personnel how to use electronic systems to seamlessly access, manage, and analyze data from a patient's health record.[9]

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[9] An example of a good practice: Dominica passed regulations for quickly sharing relevant health information during a natural disaster.