

# **UNCTAD National Workshop Jamaica**

30 May – 1 June 2017, Kingston, Jamaica

## **“Climate Change Impacts and Adaptation for Coastal Transport Infrastructure in Caribbean SIDS”**

### **Regional Climate Change Initiatives and Developments**

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# Caribbean Community Climate Change Centre

UNCTAD National Workshop Jamaica  
"Climate change impacts and adaptation for coastal  
transport infrastructure in Caribbean SIDS", 30 May – 1 June  
2017

Regional Climate Change Initiatives and Developments

*Knutsford Court Hotel, Kingston*

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## ORDER OF PRESENTATION

- ***Trajectory (knowledge strengthening & institutional capacity building)***
- ***What we have today in the Caribbean***
- ***Regional Strategy and Implementation Plan***
  - *Mainstreaming climate risks into planning processes*
- ***Regional modeling efforts and the availability of future climate scenarios***
- ***Some useful tools for climate impact assessment***
- ***The future (opportunities and challenges for the 5Cs and for the region)***

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## OVERALL MANDATE FOR ACTION ON CLIMATE CHANGE

- The Barbados Programme of Action 1994
  - need for International response to address the SIDS situation as among the most **vulnerable group** to the impacts of climate change
  - CARICOM member states affirm their commitment to goals of the UNFCCC
- The January 2005 Mauritius Meeting
  - reinforced the critical importance of adaptation and mitigation
  - recognized the failure of the International community to fully meet obligation for
    - Mitigation
    - Provision of necessary support for adaptation measures in developing countries.

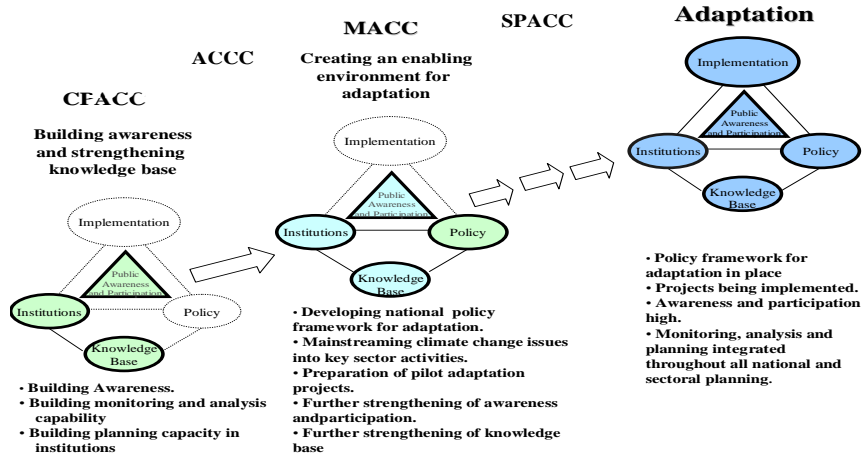


## CARIBBEAN CC ACTIVITIES

- Caribbean Governments have initiated regional action to address issue of Climate change which was accorded top priority in BPOA:
  - CPACC ( 1997 – 2001)
  - ACCC ( 2001- 2004)
  - MACC ( 2004 – 2008)
  - CCCCC establishment (2005)
  - SPACC ( 2007 – 2010)

# Summary of the CARICOM Programme of Adaptation (1997 – 2011)

(1997 – 2001) (2001- 2004) (2004 – 2008) (2007 – 2010)



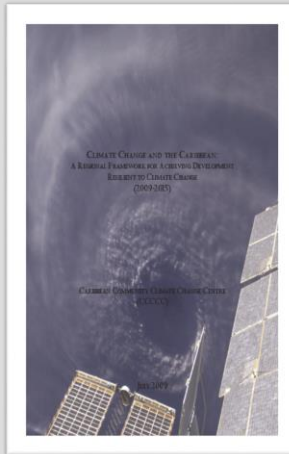
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## Regional action – the foundation



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## LILLIENDALL DECLARATION

- **Adaptation** and capacity building must be prioritised.
- **The need** for financial support to SIDS to enhance their capacities to respond to the challenges brought on by climate change
- **Our recognition** of the value and potential of standing forests, including pristine rainforest, and of its potential contribution to Reduced Emissions from Deforestation and Degradation (REDD).
- Facilitate the development, diffusion and deployment of appropriate and affordable low- and zero-emission technologies and renewable energy services;
- the need for increased technical and financial support for the development of renewable energy in the Caribbean



## Regional Strategy & Implementation Plan

- 2007 - CARICOM Heads of Government ask CCCCC to develop the regional climate change strategy
- 2009 – ‘*A Regional Framework for Achieving Development Resilient to Climate Change 2009-2015*’ approved by the CARICOM Heads of Government
- 2010 - Heads of Government tasked CCCCC to develop the IP for the Regional Strategy.
- Endorsed at COTED - to be presented to next Heads of Government meeting for their approval (December 2011).



## REGIONAL STRATEGIC FRAMEWORK

- This framework is comprised of five key strategies and associated goals designed to significantly increase the resilience of the CARICOM economies:
- 1. Mainstreaming climate change adaptation strategies into the sustainable development agendas of CARICOM states.
- **2. Promote the implementation of specific adaptation measures to address key vulnerabilities in the region.**



## REGIONAL STRATEGIC FRAMEWORK

- 3. Promoting actions to reduce greenhouse gas emissions through energy efficiency, conservation, and switching to renewable energy sources
- **4. Encouraging action to reduce the vulnerability of natural and human systems in CARICOM countries to the impacts of a changing climate.**
- 5. Promoting action to derive social, economic, and environmental benefits through the prudent management of standing forests in CARICOM countries



## What the Implementation Plan (IP) of the Framework provides

- ▶ The IP provides the process through which the framework can be implemented during the period 2012 – 2021.
- ▶ The IP is a living document that will be revisited every two years or as conditions dictate.



## Two significant regional developments

- Establishment of the Caribbean Regional Modelling Network
  - INSMET (Cuba)
  - CSGM (UWI Jamaica)
  - CSG (UWI, Barbados)
  - CCCCC (Belize)
  - Hadley Centre (UK)
  - Subsequently University of Suriname & UWI (Trinidad & Tobago)
- Establishment of the Caribbean Community Climate Change Centre(CCCCC)
  - Approved by Govts. 2002
  - Fully operational July 2005



## DEFINING ADAPTATION OPTIONS

- (a) downscaling global climate models
- (b) regional climate change projections
- (c) regional climate change scenarios
- (d) (c) + impact models (crop, hydrology models)
- (e) impacts of extreme events under different climate scenarios
- (f) Climate impact scenarios
- (g) Adaptation options



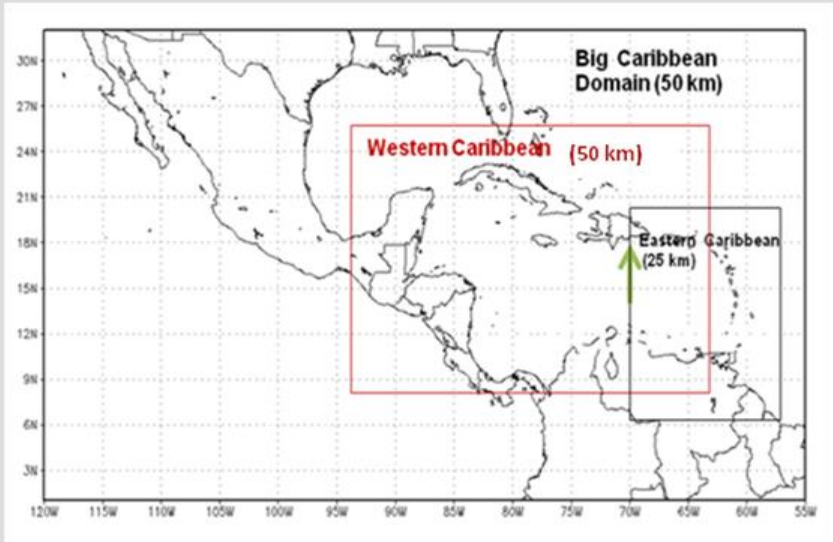
## INITIATIVES

- Downscaled present and future climate for the Caribbean region
  - Dynamical downscaling
  - Statistical downscaling
- Understanding Caribbean climate dynamics
  - Drivers e.g. Caribbean low level jet (CLLJ), tropical sea surface temperatures, sub tropical high, etc.
  - Role of large scale global forcing e.g. ENSO; AMO; etc.
  - Modes of variability
- Caribbean climate extremes
  - Drought, hurricanes, climatic indices
- Applied modelling initiatives
  - Agriculture, health, energy, etc.
- Supporting global initiatives
  - CORDEX





## Domains chosen for Caribbean Modelling Initiative



## AVAILABLE PROJECTIONS

- ECHAM5 25 km (Scenario A1B)
- HadCM3Q GCM ensemble 25 km (Scenario A1B):  
HadCM3 (aexsc) HadCM3Q3 (aexsa) HadCM3Q11 (aexsm) HadCM3Q14 (aexsl) HadCM3Q0 (aenwh) HadCM3Q10 (aexsk)
- ECHAM4 50 km (Scenarios A2 and B2)
- HadAM3P 50 km (Scenarios A2 and B2)

The 25 km ECHAM5 and 50 km ECHAM4 and HadAM3P data are available online through

<http://clearinghouse.caribbeanclimate.bz>



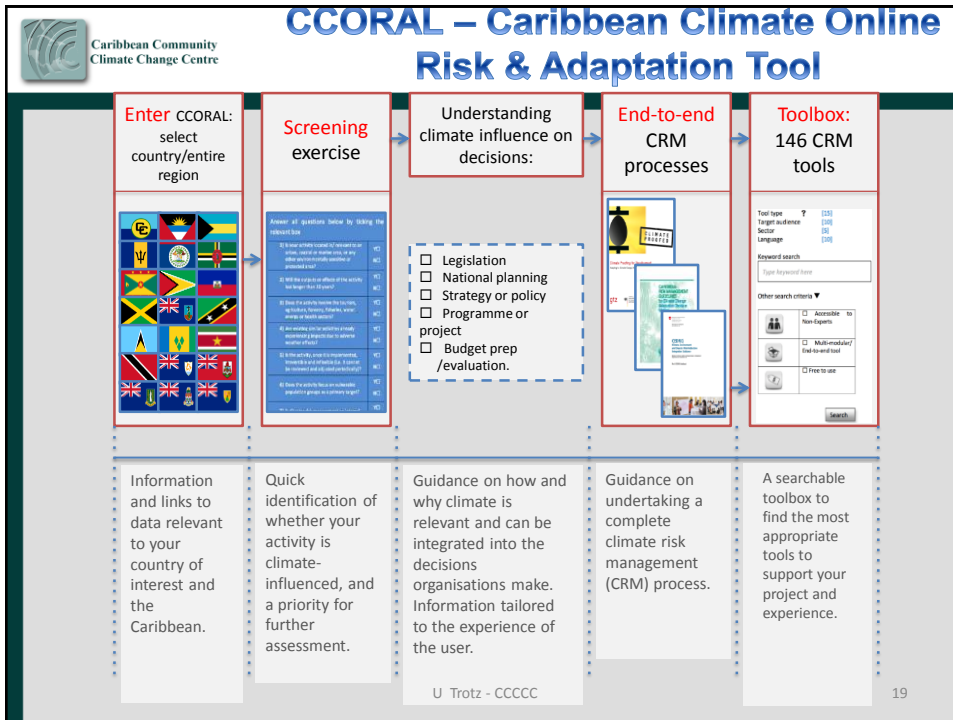
## AVAILABLE PROJECTIONS

- Completed the RCP4.5 and 8.5 for HADGEM, CNRM, MPI for 1960 to 2100 at multiple resolutions up to 10 -12 KM.
- The details can be found at - <http://www.cordex-lac.org/model-simulations>
- The model runs although completed are not yet ready for public consumption or sharing. As soon as it becomes available, they will be archived.



## Specific priority actions identified by the IP

- ▶ Develop and implement a risk management approach to decision making.
- ▶ Develop sector specific adaptation policies at the national level.
- ▶ Strengthen national and regional climate change negotiating skills.
- ▶ Implement the 'three-ones' principle to embed a co-ordinated approach to climate change security across governments:
  - One coordinating mechanism
  - One Plan
  - One monitoring and evaluation framework



**WEATHER GENERATOR**

Caribbean Community Climate Change Centre

- **Weather Generator**
- **Summary**
- The Weather Generator provides daily weather time series for use in impact assessments and impact models;
- Output is simply weather data for the future, so can be used across sectors (e.g., water, agriculture, health) in the same way as historic weather series;
- Although there will be only one future, the WG provides up to 100 possible futures.

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## WEATHER GENERATOR

### Technical Details

- Spatial and Temporal Scales: Daily weather data at 42 specific locations;
- Variables: Maximum and minimum temperature, precipitation, vapour pressure, sunshine and wind speed;
- Projected Changes: Observational base period and 30-year futures (centred on the 2020s, 2050s and the 2080s);
- Outputs Format: Ascii and CSV format



## WEATHER GENERATOR

- What It Does
- Provide longer sequences of weather variability that could then be used to determine the rarity of extreme events;
- For the future periods, we perturb some of the WG fitted parameters to take into account future changes that may occur;
- Provides daily timescale weather data (100 sequences of 30 years) for the control period (1971-2000 or 1981-2010) and for three 30-year futures (2011-40, referred to as the 2020s, 2041-70, the 2050s and 2071-2100, the 2080s).



## WEATHER GENERATOR

- **Benefits and Utility**
- It provides information for a single point location – directly comparable to what is observed at weather stations;
- Corrects some of the biases in the RCM output with respect to observations; particularly important when considering extreme weather events and impacts that are very sensitive to the absolute magnitude of weather variables;



## WEATHER GENERATOR

- WG output can be directly used by impact models (e.g. crop climate models) in exactly the same way that such models are used with historic weather sequences;
- WG provides 100 sequences, so the ideal use of the output is to pass each sequence through the impact model and determine the result (e.g. for a crop climate model, the yield);
- The yield produced with the control sequences (shown a distribution of results) can be directly compared with the distributions produced using the selected climate futures.



### Simple Model for the Advection of Storms & Hurricanes (SMASH)

- **Summary**
- Model runs historical storms over a user selected path. User also determines the category and speed of the storm
- Output variables are rainfall rate and wind speed
- Output data is provided in graphical form or raw data at a time step of 15 minutes for 0.25 degree grid boxes selected by the user

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- **Technical Details**
- **Geographical coverage:** Caribbean Region
- **Spatial and temporal scales:** 0.25 x 0.25 degrees, 15 minutes
- **Variables:** Precipitation rate (mm/hr) and Wind speed (knots)
- **Projected changes:** Inclusion of other notable tropical cyclones that impacted the Caribbean
- **Output formats:** csv or excel sheet and graphs

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### What It Does

- Allows a user to define a path within the Greater Caribbean region over which a notable storm travels according to the category and speed of their choice;
- Uses historical values of precipitation rate and wind speed at the chosen category and incorporates other user selections to provide data for rainfall and wind speed on 0.25 degree boxes at 15 minute intervals over the area of interest.



### What it does

- The tool lends itself to individual and institutional applications and can be considered an important planning and decision making tool;
- Used to provide rainfall series for three tracks at two speeds.



## OPPORTUNITIES & CHALLENGES FOR THE REGION

- Centre now an accredited Regional Implementing Entity (REI) for the Green Climate Fund (GCF).
- Regional/National projects can now be submitted for GCF support through the Centre (grant funding of 10 – 50 Million US dollars per project available).
- The PIOJ (Jamaica) and PACT (Belize) are accredited National Entities to the Adaptation Fund.
- Several initiatives regionally to identify institutions for accreditation
- Challenge for region to develop portfolio of projects ( National / Regional) eligible for GCF funding.



## Let's Connect!

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We Are Social...



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