



**The 2019 Dry Season Caribbean Regional Climate Outlook Forum (CariCOF)
Port of Spain, Trinidad and Tobago
November 25 – 29, 2019**

Report

Collaborators:





1. Introduction

Addressing Climate Change and increasing climate variability are regional and national priorities established by Heads of Government of the Caribbean Community. Climate variability and change, as exemplified by extreme weather and climate events, such as droughts, floods and tropical cyclones, continue to pose significant risks for the Caribbean region. These make early warning information systems critical components of preparedness, risk reduction and adaptation.

Regional Climate Outlook Forums (RCOFs), promoted by the World Meteorological Organization (WMO), are active in several parts of the world. These RCOFs are critical for the development and effectiveness of early warning systems as they provide real-time seasonal climate forecasts and interpretation across relevant time and spatial scales. The Caribbean Climate Outlook Forum (CariCOF) is a significant step towards providing relevant and necessary climate services for over 25 Caribbean states and territories. CariCOF is viewed by WMO as one of the most successful and innovative RCOFs globally.

Since the 2012 CariCOF, the Caribbean Institute for Meteorology and Hydrology (CIMH) has been coordinating climate forecasting activities leading to a consistently growing body of climate forecasters who (i) contribute to the monthly production of consensus-based seasonal climate outlooks and (ii) engage with the user community, both nationally and regionally to facilitate awareness-building within climate sensitive sectors. At the 2012 CariCOF, it was also agreed that the hosting of such forums, roving across the region, just prior to the beginning of the wet and dry seasons in the Caribbean, be pursued. The 2019 CariCOF Wet/Hurricane Season Concept note can be accessed at <https://rcc.cimh.edu.bb/files/2019/11/CariCOF-Concept-Note-November-2019.pdf>.

In collaboration with the WMO, through the Climate Risk and Early Warning Systems (CREWS), and with the University of the West Indies and the Inter-American Bank through the Investment Plan for the Caribbean Regional Track of the Pilot Program for Climate Resilience, the 2019 Dry Season CariCOF Stakeholders Forum took place on 27th November in Port of Spain, Trinidad and Tobago. This forum was preceded by training for meteorologists and climatologists from across the region in the art of climate forecasting (25th – 26th November). In this forum for the upcoming dry season, greater emphasis was placed on the agriculture and water sectors. The agenda can be found in [Appendix I](#).

Parallel to the training of meteorologists and climatologists, the 7th Consortium of Regional Coordination Partners of the sectoral Early Warning Systems across Climate Timescales (EWISACTs)

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was convened. In this meeting it was anticipated that the draft Road Maps and Plans of Action, a Letter of Agreement and Terms of Reference documents for the next phase of the collaboration amongst the regional partners would be finalized and adopted, in principle by the partners.

To end the week of activities, a workshop entitled Climate Change in the Caribbean – Strengthening the Science to Services Interface, was held November 28th to 29th. This workshop was hosted by The Meteorological Office of the United Kingdom, in partnership with the CREWS initiative and CIMH, as part of the Commonwealth Climate Service Demonstrator.

1.2 Participants

Participants to the workshop were from National Meteorological and Hydrological Services (NMHSs) across the Caribbean, national Ministries/Departments of Agriculture and national water agencies, the CIMH, international trainers, stakeholders from both Trinidad and Tobago and regional organisations representing climate sensitive sectors, academia and political mechanisms (see [Appendix II](#)).

2. Pre-CariCOF Training

Meteorologists and climatologists from across the region were engaged in training in the science behind climate modelling over the first two days of the CariCOF activities. The focus of the sessions was on understanding canonical correlation analysis as a statistical prediction method, verification of climate forecasts from outputs of the Climate Predictability Tool (CPT)¹, and interpretation and presentation of climate outlooks. The 2019-20 dry season climate outlooks were also finalized. See [Appendix III](#) for the agenda.

3. CariCOF Forum Presentations

3.1 Welcome Remarks

3.1.1 Mr. Kenneth Kerr (Trinidad and Tobago Meteorological Services)

Mr. Kerr welcomed all participants to the 2019 Dry Season CariCOF as he spoke on the behalf of the Director of the Trinidad and Tobago Meteorological Services. He thanked CIMH for choosing Trinidad and Tobago again for hosting such a forum, as the first forum was held in May 2013.

¹ Climate Predictability Tool (CPT), developed by Dr. Simon Mason of the IRI. <https://iri.columbia.edu/our-expertise/climate/tools/cpt/>

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He noted that the recently released IPCC's special reports on the impacts from global warming, climate change and land, and ocean and cryosphere send a clear and strong message that small islands are in line to experience stresses from such for an extended period to come. This represents a climate crisis for the region. Some of these events to come will continue to exceed the region's adaptive capacity.

3.1.2 Dr. David Farrell (Principal, CIMH)

Dr. David Farrell welcomed all participants to the 2019 Dry Season CariCOF and reiterated the comments of Mr. Kerr that Trinidad and Tobago was where the first Wet Season CariCOF was held back in 2013. He thanked Trinidad and Tobago for their extensive support over the years.

The recent drought of 2009-2010 had motivated the team at the CIMH, with the support of the National Oceanic and Atmospheric Administration (NOAA), to rejuvenate the climate outlook forum. Dr. Farrell stressed that sustaining a forum is essential to the region. He thanked Dr. Roger Pulwarty for his role in the rejuvenation process of CariCOF. Through CariCOF there has been significant research from CIMH as well as from experts across the region. In addition, national climate outlook forums (NCOFs) have also developed out of CariCOF and it is important that every country tries to establish such a forum in their country.

3.1.3 Mr. Glendell DeSouza (Caribbean Meteorological Organisation, CMO)

In his welcome address Mr. Glendell DeSouza addressed the issue of the effects of climate change highlighted for the Caribbean region and the fact that these effects need to be translated to the national level as each country would be affected differently. In order for this to happen each country would need to build human and infrastructural capacity. Knowledge needs to be utilized to create scenarios at the national level. Mr. DeSouza thanked the CIMH for its many years in human capacity development towards enhancing climate science within the region. He highlighted that the Meteorological Services are under strain since their budgets are being cut but yet their expectations are increasing. This issue is being addressed by the WMO as they have created a country support initiative in which projects would be created to assist countries. Those Caribbean countries not belonging to the WMO would still gain from such an initiative through the CMO.

Mr. Arturo Lopez-Portillo (Association of Caribbean States, ACS)

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Mr. Arturo Lopez-Portillo thanked the CIMH and other organizers for having the ACS a part of the CariCOF. He also relayed greetings on behalf of the Secretary General of the ACS who could not be present at this time.

Mr. Lopez-Portillo noted that climate change and climate variability continues to pose a serious challenge to Small Island Developing States (SIDS) and there has been a notable increase in recent times in hazards. These hazards have affected agriculture and livestock, human lives, and infrastructure and in addition, have set back SIDS many years in development. This is why CariCOF is critical to the region as it provides seasonal outlooks which help in disaster risk reduction.

3.1.4 Mr. Ainsley Henry (Pilot Project for Climate Resilience, PPCR)

In his address, Mr. Ainsley Henry mentioned that the PPCR is ongoing in six pilot countries (Dominica, Grenada, Haiti, Jamaica, St. Vincent and the Grenadines and Saint Lucia) under seven components. The relationship with the CIMH has fostered multiple training capacity building exercises for many meteorologists and meteorological offices across the region. There is also an ongoing effort to develop a roadmap to provide climate tools across the region.

Mr. Henry congratulates the CIMH as well as the regional meteorologists and climatologists for their excellent and invaluable work to increase climate resilience in the region.

3.1.5 Prof. Chris Hewitt (Meteorological Office of the United Kingdom)

Professor Chris Hewitt expressed his honour to be a part of the opening ceremony of CariCOF and thanked the CIMH for their collaboration over the past year in making their contribution to CariCOF a reality. The Meteorological Office of the United Kingdom will be engaging stakeholders over a day and a half with a focus on long-term climate change. He stressed that the regional climate outlook forum process in the CariCOF is excellent and looks forward to successful collaboration in the subsequent sessions.

3.1.6 Mr. Tim Stew MBE (British High Commission)

The British High Commissioner Mr. Tim Stew MBE, addressed the gathering of the opening ceremony with delight that the Meteorological Service of the United Kingdom is here to share knowledge and experience with the region. Also, CariCOF activities come just before the 2019 United Nations Climate Change Conference COP 25. Since climate change poses a threat to global prosperity and security this region of SIDS is very vulnerable to impacts. Climate change is not a distant threat but it

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is now, and therefore there is the need for us to join together in our efforts to reduce emissions, protect our environment and adapt to the consequences being seen all over the world.

3.1.6 Hon. Minister Le Hunte (Minister of Public Utilities)

The Honorable Minister Le Hunte expressed great honour to address such a group of persons in the discussion of mitigation and adaptation to challenges of climate change. He stressed that we all know that climate change is a real and present threat to the economies, infrastructure, and populations of countries around the world. Here in the Caribbean we are just as vulnerable to impacts as the others, if not more so. The Honorable Minister noted that events over the past few years have shown us that the concerns shared by our leaders, within the region, are far from misplaced. Devastating hurricanes, eroding coastlines, rising sea levels, and harsh dry seasons have impacted islands of the region. Just last year (2018) Trinidad and Tobago experienced one of its worst dry periods in 70 years. He mentioned that the country has been sensitizing the population as they enter into this dry season.

It is necessary that we all take collective action to protect ourselves from the effects of climate change. The impact of climate change underscores the importance of early warning systems with critical components of preparedness and risk reduction and adaptation. Regional climate outlook forums like this CariCOF, as promoted by WMO, precipitate the development of early warning systems. Minister Hunte emphasised that even though CariCOF is focused on a sustained forum, the efforts of individual countries must not be overlooked. Trinidad and Tobago has made significant strides in developing an early warning system aimed at strengthening resilience, reducing vulnerability and minimizing loss and damage associated with adverse weather and climate events. He encourages everyone to learn from and share with each other and once you return to your respective countries implement the knowledge gained. Also, continue to build on the relationships and networks that have been developed.

3.2 Dry Season Climatology of the Caribbean and Review of the 2018-19 Dry Season of the Caribbean (Mrs. Shontelle Stoute, CIMH)

The first technical presentation of the day was made by Mrs. Shontelle Stoute of CIMH. In her presentation Mrs. Stoute gave an overview of the climatology of the Caribbean Dry Season, presenting the rainfall and temperature patterns as well as the drivers of the season. She also looked at the conditions leading up to the 2018-2019 dry season and a recap of any notable events of that season. It was the existence of a weak El Nino that contributed to drier than normal conditions across the region where some territories were affected by short term drought. Water restrictions were in effect in some

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territories and some farmers were affected by the drought. Rains in April 2019 brought some relief to these conditions.

Mrs. Stoute also looked at the water status leading into the 2019-2020 dry season and indicated that there were some territories entering into this dry season with below normal rainfall totals, which could affect soil moisture, small and larger surface reservoirs as well as aquifers.

3.3 Dry Season Climate Outlook - rainfall, temperature, wet days/wet spells, drought, dry spells (Mr. Kaidar Kisson, Trinidad and Tobago Meteorological Services)

Mr. Kaidar Kisson, of the Trinidad and Tobago Meteorological Services presented the 2019 Dry Season Climate Forecasts. Following are the key messages of the presentation.

1. Recently:

- Particularly hot Caribbean heat season (May to October), with all-time high temperatures of nearly 40°C in Cuba and Jamaica.
- Severe (or worse) long term drought in many pockets of the Caribbean. In Trinidad: Navet and Arena water reservoirs below capacity due to rainfall deficits during the wet season.

2. Current outlook for the early dry season:

- Water availability a potential concern by February in view of evolving long term drought in Barbados, much of Belize and in Cayman Islands, and possible drought in other currently affected areas.
- Frequent dry spells expected in the western half of the Caribbean, with short term drought evolving in parts of the Bahamas, Cayman Islands, and western Cuba, limiting crop productivity.
- Increasing dryness by February accompanied by an increased potential for wild fires.
- Extreme wet spells possible through December in Belize and the islands, throughout the period in the coastal Guianas, leading to concerns of flash flood potential.
- Heat not a major concern in coming months (cool season).

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3. *Be prepared for:* growing water shortages in areas already in drought

3.4 Interpreting Seasonal Forecasts

Following the delivery of the climate outlook for the upcoming dry season, participants were then invited to participate in an interpretation exercise. They were divided into four groups, focusing on providing information to the public based on the country's recent climate situation and the climate outlooks. The scenario can be found in [Appendix IV](#).

3.5 2019 EWISACTs Roadmap and Plan of Action (Dr. Roché Mahon, CIMH)

Dr. Roché Mahon presented on regional progress on the Sectoral Early Warning Information Systems across Climate Timescales (EIWSACTs) portfolio in the Caribbean within the last six months (May to November 2019). She summarized advancements made across the five pillars of the Global Framework for Climate Services as follows:

1. Observations and Monitoring:
 - a. Further progress on cleaning of the Caribbean Climate Impacts dataset
 - b. Preliminary conceptual framework for impacts measurement developed
2. Research, Modelling and Prediction:
 - a. Health-Climate:
 - i. *Development of a climate driven spatio-temporal modelling framework for vector-borne diseases*

Published:

1. Lippi, C., Stewart-Ibarra, A. M., Romero, M., Hinds, A. Q. J., Lowe, R., Mahon, R., . . . Ryan, S. J. (2019). *Spatiotemporal tools for emerging and endemic disease hotspots in small areas—an analysis of dengue and chikungunya in Barbados, 2013 – 2016*. medRxiv: 19011262; doi: <https://doi.org/10.1101/19011262>
2. Stewart-Ibarra A. M., Romero M., Hinds A. Q. J., Lowe R., Mahon R., Van Meerbeeck C. J., et al. (2019) *Co-developing climate services for public health: Stakeholder needs and perceptions for the prevention and control of Aedes-transmitted diseases in the Caribbean*. PLoS Negl Trop Dis 13(10): e0007772. <https://doi.org/10.1371/journal.pntd.0007772>

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- ii. Support to CARPHA on Caribbean climate arbovirus data, PPCR funded consultancy
- iii. CIMH, CARPHA and PAHO collaboration on research Consultancy for the ‘Development of Climate Early Warning for Mosquito Vector, *Aedes Aegypti*, Proliferation’ under the Expanded Weather and Climate Forecasting and Innovative Product and Service Development and Delivery in the Caribbean Project, funding support provided by the CDB through the ACP-EU NDRM project

b. Tourism-Climate:

- i. *Development of a climate driven spatio-temporal modelling framework for tourism*

Support to CTO with Research Consultancy technical outputs under ACP-EU NDRM:

- 1. Regional Sustainable Tourism Policy finalised
- 2. Risk Management Guide for the Caribbean Tourism Sector
- 3. Exploratory research towards the development of a Climate-driven spatio-temporal modelling framework for Caribbean tourism

c. Social science:

i. Under development:

- 1. Trotman, A, Mahon R and Van Meerbeeck, CJ. Chapter 8, State of Caribbean Climate Report, "Adding value to climate information through services"

d. Climate science:

i. Under development:

- 1. Van Meerbeeck, CJ, Trotman, A, Mahon R. Chapter 6, State of Caribbean Climate Report, "Climate Extremes and Early Warning: From excessive rainfall and flooding to drought, heat and hurricanes"

e. Other:

i. 6th Consortium Meeting Report

3. Climate Services Information System:

Operational sector-specific bulletins:

- a. Quarterly TCB and HCB: Vol 3, Issue 2 (JJA 2019); Vol 3, Issue 3 (SON 2019);

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- b. Monthly ACB: Vol 3, Issues 1-6
- 4. Capacity Development:
 - a. Draft 5 - Sectoral EWISACTs Roadmap and PoA 2020-2030

3.6 Focus Group Exercise: Impacts Reporting for Impacts-based Forecasting in the Caribbean

Dr. Mahon gave a brief presentation underscoring the need for robust impacts data to inform the region's transition to impacts based forecasting. Impacts reporting is a key process underpinning the collection of impacts data. The focus of the research exercise is to better understand how impacts reporting happens at national and sectoral levels, and explore pathways for connecting and/or strengthening the reporting of impacts to the Caribbean Climate Impacts Database (CID) which is envisioned to be a centralized evidence-based information archive that supports the forecasting and modelling of climate risk.

Participants were thereafter invited to divide into 4 focus groups: 1 Met; 1 Agriculture; 1 Water; 1 Mixed Sectors, and each group participant was asked to share their experience on the following:

1. How are climate and/or disaster impacts captured at the sectoral level? Please describe the current impacts reporting process for your sector/organisation (if any).
2. What are the challenges to reporting large and small climate and/or disaster impacts?
3. What are the enablers to reporting large and small climate and/or disaster impacts?
4. Are there any future plans for strengthening impacts reporting at the sectoral and/or national level?

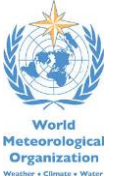
3.7 PICSA in the Caribbean (Mr. Adrian Trotman, CIMH)

Mr. Adrian Trotman gave an overview of the work done through the Participatory Integrated Climate Services for Agriculture (PICSA) in the Caribbean. With the financial support of the Government of Japan under the management of the UNDP, this project is now being rolled out in Dominica with an objective to strengthen the disaster management capacity of women, in particular. The PICSA approach helps the farmer decide their farming approach for the next season by conceptualizing their options. These options would be devised through four phases, involving twelve steps. These phases include:

1. **Long before the season.** This is where historical climate data is analysed. The farmer also assesses crop, livestock and other livelihood options as well as all those who would participate in planning.

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2. **Just before the season.** In this phase seasonal outlooks are considered and plans revised, if necessary.
3. **During the season.** The farmer pays attention to short-term forecasts and warnings
4. **Shortly after the season.** The farmer reviews the weather, his production, the climate outlooks and also looks at his approach.

3.8 Probability of Exceedance (Mrs. Shontelle Stoute, CIMH)

In this presentation, Mrs. Stoute illustrated the usefulness of an experimental product “Probability of Exceedance”. The probability of exceedance simply calculates the probability of exceeding a particular threshold over a given period and computations are done using the CPT tool. Demonstrations were presented for sweet potato, Irish potato and pumpkin.

Following this presentation, a participant queried whether such a product can be tailored for the tourism sector and he was given the affirmation that it can be done, once the input parameters are known.

4.0 Strengthening the Science to Services Interface

The last day and a half of the CariCOF activities were geared towards strengthening the science to services interface and facilitated by the Meteorological Office of the United Kingdom. Its focus was on long-term climate change for Caribbean islands and included a mixture of plenary talks from experts, group discussions and activities, as well as a question time with an expert panel. The topics included the Sea Level Rise Tool based on new scientific work on climate projections for the Caribbean. The agenda can be found in [Appendix V](#).

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Appendix I: CariCOF Dry Season Agenda

The Caribbean Climate Outlook Forum (CariCOF)

2019 Dry Season

Port of Spain, Trinidad and Tobago, 27th November, 2019

AGENDA

Wednesday, 27th November, 2019

TIME	SESSION	PRESENTER/FACILITATOR
0900 - 0945	Welcome remarks Feature address	Shakeer Baig, T&T Meteorological Services David Farrell, CIMH Arturo Lopez-Portillo, ACS Ainsley Henry, PPCR British High Commission, TBD Hon. Minister Le Hunte, Minister of Public Utilities
0945 - 1005	Dry Season Climatology of the Caribbean & Review of the 2018 Wet Season in the Caribbean	Shontelle Stoute, CIMH
1005 - 1030	Dry Season Climate Outlook (rainfall, temperature, wet days/wet spells, drought, dry spells)	T&T Meteorological Services
1030 - 1050	COFFEE BREAK	
1050 - 1110	Open discussion on the Seasonal Forecast	T&T Met & Cedric Van Meerbeeck
1110 - 1130	Interpreting Seasonal Forecasts	Adrian Trotman & Cedric Van Meerbeeck (CIMH)
1130 - 1230	Interactive exercise – Implications of Seasonal Forecasts	Adrian Trotman, CIMH
1230 - 1330	LUNCH	
1330 - 1400	EWISACT's Roadmap and Plan of Action	Roche Mahon, CIMH,
1400 - 1500	Focus group exercise	Roche Mahon, Jodi-Ann Petrie, CIMH

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1500 - 1515	COFFEE BREAK	
1515 - 1535	PICSA in the Caribbean	Adrian Trotman
1535 - 1555	Probability of Exceedance	Shontelle Stoute, CIMH
1555-1610	Closing	Adrian Trotman

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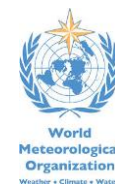


Appendix II: Participant List

Country/Affiliation	Last Name	First Name	Country/Affiliation	Last Name	First Name
AACARI	Browne	<u>Claude</u>	CCCCC	Jones	<u>Albert</u>
ACS	Lopez-Portillo	Arturo	CCCCC	Trotz	Ulric
Agriculture	Motilal	Cavelle	CCREEE	Bodley	<u>Charlin</u>
Anguilla	Scarbrough	Jaleel	CDEMA	Riley	<u>Elizabeth</u>
Antigua	Paige	Orvin	CHTA	Duffy Mayers	<u>Loreto</u>
APUA	Yearwood	Veronica	CIMH	Trotman	Adrian
Aruba	Kock	Karel	CIMH	van Meerbeeck	Cedric
Bahamas	King	Arnold	CIMH	Stoute	Shontelle
Barbados	Browne	Tia	CIMH	Allen	Teddy
Belize	Augustine	Michelle	CIMH	Kirton-Reed	Lisa
British High Comm	Joe	Janelle	CIMH	Mahon	Roche
BVI	Castro	Miguel	CIMH	Petrie	Jodi-Ann
BWA	Paul	Jaime	CIMH	Applewhaite	Andrea
CARDI	Flemming	<u>Kistian</u>	CIMH	Farrell	David
CARPHA	Clauzel	Shermaine	CMC	Chance	Kenton
Cayman Islands	Gall	Winston	CMO	DeSouza	<u>Glendell</u>

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Country/Affiliation	Last Name	First Name	Country/Affiliation	Last Name	First Name
CMO	Laing	<u>Arlene</u>	Guyana	Dhiram	Komalchand
CSGM	Whyte	<u>Felicia</u>	GWP-C	Lewis	<u>Simone</u>
CSGM	Taylor	Michael	Haiti	Colas	Waldo
CTO	Charles	<u>Amanda</u>	Jamaica	Brown	Glenroy
Cuba	Alpizar	Milena	Jamaica	Saddler	Ainsworth
Curacao	Werlemann	Frans	Montserrat	Gerrald	Gerren
CWWA	Williams	<u>Wayne</u>	NOAA	Fuhrman	Steven
CWWA	Santana	Candice	OECS	Isaac	<u>Cornelius</u>
Disaster (Trinidad)	David	Jerry	Physical Planning	Lueng Woo-Gabriel	Candace
Dominican Republic	Matos	Miriam	PPCR	Henry	Ainsley
Environment	Rampersad	Neil	PPCR	Kavanaugh	Jean-Pierre
GDA Water	Benjamin	Stephen	Trinidad and Tobago Public Utilities	Victor	John
Grenada	Miller	Trisha	RADA	Webb-Lawrence	Francine
Guyana Ministry of Agriculture	Melville	Jonathan	SKI Water	Parris	Charles
Guyana	Ramlakhan	Doodnauth	SLU Agriculture	Mathurin	Junior

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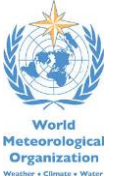




Country/Affiliation	Last Name	First Name
St. Kitts	Barry	Gassano
St. Lucia	Saltibus	Vigil
St. Maarten	Connor	Desiree
St. Vincent	McDonald	Joan
Suriname	Mitro	Sukarni
SVG Agri	Browne	Karomo
TCI	Henfield	Tiffany
Trinidad and Tobago	Kerr	Kenneth
Trinidad and Tobago	Kissoon	Kaidar
Trinidad and Tobago	Benjamin	Gary
Tobago TEMA	Thompson	Carisse
UK MET	Sanderson	Michael
UK MET	Jones	Richard
UWI	Villarroel-Lamb	Deborah
UWI	Cooper	Vincent
WASA	McMillan	Marissa
WRA	Chadee	Anthony

Collaborators:





Appendix III: Pre-CariCOF Training Agenda

CariCOF 2019-20 Dry Season - Seasonal Forecast Training Workshop
Port of Spain, Trinidad, Trinidad and Tobago
25th – 26th November, 2019

Workshop Agenda

Day 1: Monday November 25th, 2018 – Understanding Canonical Correlation Analysis as a statistical prediction method, verification of climate forecasts in CPT

09:00 – 09:15 Welcome and Opening Remarks (TTMS, CIMH)

09:15 – 09:30 Workshop Objectives (Cedric Van Meerbeeck, CIMH)

09:30 – 10:00 CCA – The basics of regression models (Cedric Van Meerbeeck, CIMH)

10:00 – 10:15 CCA – understanding principal components, EOFs, modes (Teddy Allen and Cedric Van Meerbeeck, CIMH)

10:15 – 10:30 *Break*

10:30 – 11:00 CCA – understanding hindcast models in CPT (Cedric Van Meerbeeck and Teddy Allen, CIMH)

11:00 – 11:45 CCA – understanding hindcast models in CPT (hands-on)

11:45 – 12:15 Operational seasonal to sub-seasonal climate products and services provided by RCC-Washington (Steven Fuhrman, NOAA)

12:15 – 13:30 *Lunch (provided)*

13:30 – 14:00 Hindcast model validation and forecast verification – Goodness Indices, ROC and hit (skill) score (Simon Mason, IRI)

14:00 – 14:30 Hindcast validation in CPT (Cedric Van Meerbeeck, CIMH)

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- 14:30 – 14:50 Forecast verification – assessing the quality of global forecasts (Simon Mason, IRI)
- 14:50 – 15:10 Forecast verification – assessing the quality of global forecasts – hands-on (Simon Mason, IRI, and Cedric Van Meerbeeck, CIMH)
- 15:10 – 15:25 *Break*
- 15:25 – 15:55 Forecast verification – verifying national forecasts using hit (skill) score and ROC (Simon Mason, IRI)
- 15:55 – 17:00 Forecast verification – verifying national forecasts in CPT (Simon Mason, IRI)

**Day 2: Tuesday November 26th, 2019 – Interpretation and presentation of climate outlooks, 2019-20
Dry Season CariCOF climate outlooks**

- 09:00 – 10:00 Presenting climate outlooks – necessary components and presentation structure (Cedric Van Meerbeeck, CIMH)
- 10:00 – 10:15 Presenting climate outlooks – taking stock: (how) do the different countries present climate outlooks? (*All*)
- 10:15 – 10:30 *Break*
- 10:30 – 11:00 Presenting climate outlooks – are we really interpreting the drought information correctly? (Adrian Trotman & Cedric Van Meerbeeck, CIMH)
- 11:00 – 12:00 Presenting climate outlooks – distilling implications from monitoring, climatology and forecast information (Cedric Van Meerbeeck, CIMH)
- 12:00 – 12:15 CPT 16 – an update on new features and functionalities (Simon Mason, IRI)
- 12:15 – 13:30 *Lunch (provided)*

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13:30 – 14:15 Results of the sustainable tourism project (ESSA)

14:15 – 15:15 Preparing the 2019-20 Dry Season climate outlooks – all

15:15 – 15:30 *Break*

15:30 – 16:45 Preparing the 2019-20 Dry Season climate outlooks – reaching a consensus

16:45 – 17:00 Closing Remarks (Adrian Trotman, CIMH)

END OF WORKSHOP

Collaborators:





Appendix IV: Interpretation Exercise

Scenario:

You have been assigned to represent your Ministry on a multi-sectoral National Committee for Climate Services.

The Committee has just received a presentation on recent climate conditions, as well as, upcoming seasonal climate for the 2019/2020 Dry Season from the country's National Met Service.

The Prime Minister believes that the information is of national importance and mandates the Committee to develop key messages around the upcoming seasonal climate conditions and possible associated sectoral impacts.

The Prime Minister wants the Committee to deliver these messages to the general public at a Press conference at mid-day today.

Task:

1. Review the suite of monitoring and forecast information provided (Met Rep leads during groupwork)
2. Provide a summary on recent climate conditions, as well as, upcoming seasonal climate for the 2019/2020 Dry Season for the country (Met Rep presents at beginning of press conference)
3. Formulate and message out 3 **probable impacts** that can be expected given the country's prevailing and upcoming seasonal climate context for 1) water resources, 2) agriculture, and 3) any other sector in your group (Sector reps present in turn during press conference)
4. Formulate and message out at least 3 **concrete actions** that each sector can take to prepare for these impacts (Sector reps present in turn during press conference)

Belize recent climate conditions and impacts:

For much of the past 5 years, northern Belize has been facing recurrent droughts. This year's drought in the north has been among the most intense since 1981 up until the end of September, thus significantly affecting agriculture and hydrological systems. There has been significant media reporting on reduced crop productivity in northern portions of the country since this year's summer.

Collaborators:





Some semblance of wet season rainfall returned during October, though not making up for the great deficit of water accumulated over the previous months.

Barbados recent climate conditions and impacts:

Only 3 of the last 12 months (November 2018 to October 2019) experienced at least normal rainfall in Barbados. In fact, the last 6 months (until October 2019) all received below normal rainfall at the two main/reliable stations in the country. Earlier in the year, after experiencing low water levels in country's three aquifers, the Barbados Water Authority (BWA) initiated its Stage 1 measures for water shortage, restricting use of water until 31 August 2019. With below normal rainfall since that date, and increasing deficits of water, the BWA extended the restrictions until 30 November.

Guyana recent climate conditions and impacts:

Northern Guyana experiences two rainfall seasons per year. Typically, its secondary Dry season starts around November/December. Apart from October when rainfall in some parts of northern Guyana was below normal, rainfall over the past six months was above normal

Collaborators:





Appendix V: Strengthening the Science to Services Agenda

Climate change in the Caribbean – Strengthening the science to services interface

Funded by WMO CREWS programme

Port of Spain, Trinidad and Tobago, 28th – 29th November 2019

AGENDA

Day One: Thursday, 28th November 2019

TIME	SESSION	PRESENTER / FACILITATOR / CHAIR
9.00 - 9.30	Welcome, introduction & overview	Prof. Chris Hewitt, Met Office Dr David Farrell, CIMH Chair: Dr Jane Strachan, Met Office
9.30 – 10.30	Climate Change Science Overview talks	Dr Richard Jones, Met Office, Oxford University Visiting Professor & IPCC WG1 Coordinating Lead Author Prof. Michael Taylor, UWI Chair: Cedric Van Meerbeeck, CIMH
10.30 - 11.00	BREAK	
11.00 - 12.00	Climate change Science Overview talks - Caribbean impacts	Dr Ulric Trotz, Caribbean, Community Climate Change Centre Dr Deborah Villarroel-Lamb, UWI Chair:
12.00 – 12.30	Climate Science to Services	Prof. Chris Hewitt, Met Office Adrian Trotman, CIMH Chair: Deborah Villarroel-Lamb, UWI
12.30 – 13.30	LUNCH	
13.30 – 15.00	Discussion: Communicating Climate Risk	Chair: Dr Jane Strachan, Met Office
15.00 – 15.30	BREAK	
15.30- 17.00	Break out group One: Co-development of Caribbean Sea Level Rise Tool Break out group Two: Future Climate change impacts	Chair: Dr Mike Sanderson, Met Office Chair: Dr Richard Jones, Met Office
18.00	WORKSHOP DINNER	

Collaborators:





Day Two: Thursday, 29th November 2019

TIME	SESSION	PRESENTER / FACILITATOR / CHAIR
9.00-9.20	Recap of Day 1	Dr Jane Strachan, Met Office Chair: Prof. Chris Hewitt, Met Office
9.20- 10.40	Break out group Two: Co-development of Caribbean Sea Level Rise Tool Break out group One: Future Climate change impacts	Chair: Dr Mike Sanderson, Met Office Chair: Dr Richard Jones, Met Office
10.40 - 11.10	BREAK	
11.10-11.30	Feedback from Break out groups 2 and 3	Chair: Dr Richard Jones, Met Office
11.30 -12.30	Plenary Discussion - Expert panel question time – bringing together climate change science into services for Caribbean decision-making	Plenary Speakers Chair: Dr Jane Strachan, Met Office
12.30 – 12.45	Next Steps – Agree output and close	Chair: Prof. Chris Hewitt, Met Office
12.45 – 14.00	LUNCH & CLOSE	

Collaborators:

