

# THE PROGRAMME FOR BUILDING REGIONAL CLIMATE CAPACITY IN THE CARIBBEAN (BRCCC PROGRAMME)

Third (3<sup>rd</sup>) Meeting of the Consortium of Regional Sectoral  
EWISACTs Coordination Partners



*CIMH Headquarters, Husbands, St. James*

*July 19<sup>th</sup>-20<sup>th</sup>, 2016*

## Meeting Report

**Prepared by:** Shontelle Stoute, Shelly-Ann Cox, Roché Mahon, Wayne Depradine,  
Jodi-Ann Petrie, Adrian Trotman, Cédric Van Meerbeeck <sup>1</sup>

---

<sup>1</sup> Applied Meteorology and Climatology (AMC) Section, Caribbean Institute for Meteorology and Hydrology (CIMH)

## Table of Contents

<b>1</b>	<b>INTRODUCTION .....</b>	<b>4</b>
1.1	THE BRCCC PROGRAMME .....	4
1.2	SECTORAL EARLY WARNING INFORMATION SYSTEMS ACROSS CLIMATE TIMESCALES (EWISACTs) .....	5
1.3	THE CONSORTIUM OF REGIONAL SECTORAL EWISACTs COORDINATION PARTNERS .....	5
1.4	WELCOME REMARKS (ADRIAN TROTMAN, CIMH) .....	6
1.5	MEETING OBJECTIVES (SHELLY-ANN COX, CIMH).....	6
<b>2</b>	<b>SESSION I: REVIEW OF 2ND CONSORTIUM MEETING DOCUMENTS (DR. ROCHÉ MAHON, CIMH) .....</b>	<b>7</b>
2.1	DISCUSSION .....	7
<b>3</b>	<b>SESSION II: REVIEW OF SECTORAL EWISACTs PROGRESS TO DATE (DR. ROCHÉ MAHON, CIMH) .....</b>	<b>7</b>
3.1	DISCUSSION: .....	8
<b>4</b>	<b>SESSION III: REVIEW OF LETTER OF AGREEMENT (MR. ADRIAN TROTMAN AND DR. ROCHÉ MAHON, CIMH) 9</b>	
4.1	DISCUSSION: .....	10
<b>5</b>	<b>SESSION IV: TOWARDS THE DEVELOPMENT OF SECTOR-SPECIFIC CLIMATE PRODUCTS.....</b>	<b>11</b>
5.1	TOWARDS DEVELOPING HEAT ALERTS (ADRIAN TROTMAN, CIMH) .....	11
5.2	DISCUSSION: .....	11
<b>6</b>	<b>REVIEW OF RESEARCH CONSULTANCY TORS (SHELLY-ANN COX, ADRIAN TROTMAN AND DR. ROCHÉ MAHON, CIMH) .....</b>	<b>12</b>
6.1	DISCUSSION: .....	13
<b>7</b>	<b>SESSION VI: TOWARDS THE DEVELOPMENT OF SECTOR-SPECIFIC BULLETINS (DR. CÉDRIC VAN MEERBEECK, SHELLY-ANN COX, SHONTELLE STOUTE, WAYNE DEPRADINE AND JODI-ANN PETRIE, CIMH) .....</b>	<b>14</b>
7.1	DISCUSSION .....	15
<b>8</b>	<b>TESTING EXERCISE .....</b>	<b>16</b>
<b>9</b>	<b>NEXT STEPS .....</b>	<b>16</b>
<b>10</b>	<b>THE WAY FORWARD (MR. ADRIAN TROTMAN, CIMH).....</b>	<b>17</b>
<b>11</b>	<b>APPENDIX A: MEETING AGENDA .....</b>	<b>18</b>
<b>12</b>	<b>APPENDIX B: ATTENDEE LIST .....</b>	<b>21</b>
<b>13</b>	<b>APPENDIX C: FEEDBACK FROM BULLETIN TESTING FOCUS GROUP EXERCISES .....</b>	<b>22</b>

## List of Acronyms

Building Regional Climate Capacity in the Caribbean	BRCCC
Caribbean Meteorological Initiative	CAMI
Caribbean Agricultural Research & Development Institute	CARDI
Caribbean Climate Outlook Forum	CariCOF
Caribbean Community	CARICOM
Caribbean Society for Agro-Meteorology	CARISAM
Caribbean Public Health Agency	CARPHA
Caribbean Community Climate Change Centre	CCCCC
Caribbean Centre for Renewable Energy and Energy Efficiency	CCREEE
Caribbean Disaster Emergency Management Agency	CDEMA
Comprehensive Disaster Management	CDM
Caribbean Hotel and Tourism Association	CHTA
Caribbean Institute for Meteorology and Hydrology	CIMH
Caribbean Meteorological Institute	CMI
Caribbean Meteorological Organization	CMO
Climate Outlook Forum	COF
Caribbean Tourism Organization	CTO
Caribbean Water and Wastewater Association	CWWA
Disaster Risk Management	DRM
Disaster Risk Reduction	DRR
Early Warning Information Systems Across Climate Timescales	EWISACTs
Early Warning System	EWS
Global Framework for Climate Services	GFCS
Letter of Agreement	LoA
National Meteorological and Hydrological Service	NMHS
Pan American Health Organization	PAHO
Regional Climate Centre	RCC
Terms of Reference	TOR
United States Agency for International Development	USAID
The University of the West Indies	UWI
Work and Implementation Plan	WIP
World Meteorological Organization	WMO
Zero Order Draft	ZOD

# 1 Introduction

## 1.1 The BRCCC Programme

The Caribbean region has been increasing its resilience to the impacts of weather and climate-related hazards for more than 40 years. To address these impacts going forward, the American People, through the USAID, are funding a new Programme to build regional capacity for adaptation to climate variability and change in the Eastern Caribbean, in partnership with the WMO and the CIMH. Under an agreement signed in January 2014, USAID will provide funding support over three years (2014-2017) to the WMO, which will work in partnership with CIMH, to amongst other things, support the establishment of a WMO designated Regional Climate Centre (RCC) for the Caribbean, housed at CIMH (WMO, USAID, & CIMH, 2014).

The funds being provided are to strengthen the CIMH through:

1. Supporting institutional enhancements;
2. Increasing the range of products and services delivered to stakeholders;
3. Enhancing human and technical capacities at the CIMH and in NMHSs in the Caribbean; and
4. Improving service delivery mechanisms to national, regional and international stakeholders.

Since April 2013, the CIMH has been in the demonstration phase of becoming the WMO RCC for the Caribbean. WMO RCCs are Centres of Excellence (CoE) that produce regional climate products and services including short-, medium- and long-range forecasts in support of regional and national climate information needs. The information produced and capacity developed by CIMH enables CMO Member States to deliver better climate services to national and regional users. It is expected that through the implementation of Programme Component I - Technical Area III, the BRCCC Programme will improve the range and use of climate-related products and services at the appropriate spatio-temporal scales to sectoral decision-makers.

This Technical Area has four (4) Outcome Areas as follows:

1. Established relationships between meteorologists/climatologists, scientists from other sectors and policymakers from across sectors;
2. Initiation of the development, deployment and platform integration of sector specific forecasting/planning models in the form of early warning systems;
3. Enhanced institutional capacity; and
4. Enhanced adaptive capacity.

## 1.2 Sectoral Early Warning Information Systems across Climate Timescales (EWISACTs)

Climate variability and change occur on timescales ranging from sub-seasonal to seasonal to decadal and beyond, making it necessary to develop effective Early Warning Information Systems across Climate Timescales (EWISACTs). An important component of the BRCCC Programme is the establishment of EWISACTs. Early Warning Systems (EWS) are recognized by the *Regional Comprehensive Disaster Management (CDM) Strategy and Programming Framework 2014-2024*<sup>2</sup> and the *Implementation Plan for the 'Regional Framework for Achieving Development Resilient to Climate Change'*<sup>3</sup> as critical to the effective management of climate-related disasters and adaptation to climate variability and change. EWISACTs can improve the effectiveness and efficiency of sustainable planning, adaptation and mitigation strategies across major weather and climate-sensitive socio-economic sectors. If well aligned with priority sectors, sectoral EWISACTs can support regional growth resilient to climate risks.

## 1.3 The Consortium of Regional Sectoral EWISACTs Coordination Partners

A formalized sectoral mechanism in which regional sectoral partners are supported by CIMH to drive the development and implementation of sectoral EWISACTs, not only fosters sectoral ownership of this agenda, but also lays the foundation for the sustainability of sectoral EWISACTs long after the completion of the BRCCC Programme. The Consortium of Regional Sectoral EWISACTs Coordination Partners is therefore conceived to be a key mechanism to champion the design, development and delivery of tailored climate products and services in the agriculture and food security, disaster risk management, energy, health, tourism and water sectors<sup>4</sup>. The Consortium of Regional Sectoral EWISACTs Coordination Partners will work together in raising sectoral awareness about EWISACTs and formalizing an approach to the co-development of climate products and services. By providing an opportunity for representing sector issues, positions and recommendations related to weather and climate at the meetings of the Consortium of Regional Sectoral EWISACTs Coordination Partners, the Consortium is intended to facilitate the consultative and participatory processes necessary for successful EWISACTs development and implementation.

The Third (3<sup>rd</sup>) Meeting of the Consortium of Regional Sectoral EWISACTs Coordination Partners was held at the CIMH Headquarters, on July 19<sup>th</sup> to 20<sup>th</sup>, 2016. This meeting provided an opportunity for cross-sectoral dialogue between the CIMH and lead regional sectoral organizations. It also advanced prior discussions arising out of the Second (2<sup>nd</sup>) Meeting of the Consortium of Regional Sectoral EWISACTs Coordination Partners held on October 21<sup>st</sup> and 22<sup>nd</sup>, 2015.

---

<sup>2</sup> Developed by the Caribbean Disaster Emergency Management Agency (CDEMA) in 2014.

<sup>3</sup> Developed by the Caribbean Community Climate Change Centre (CCCCC) in 2011.

<sup>4</sup> The Global Framework for Climate Services (GFCS) has five initial priority sectors: agriculture and food security, water, health and disaster risk reduction and energy. The tourism sector has been identified as an additional priority sector for the Caribbean region.

The objectives of 3<sup>rd</sup> Consortium Meeting were:

1. To formalize the Consortium arrangement through the endorsement and adoption of a Letter of Agreement (LoA) across all partners;
2. To discuss collaboration on research consultancies;
3. To showcase new and emerging early warning information products; and
4. To report on progress to date in the development of sectoral EWISACTs.

The meeting was carried out according to the meeting agenda (see Appendix A). The meeting proceedings included presentations and guided discussions over six (6) sessions. Sessions 1-3 on Day 1 were closed to Consortium partners with all other sessions open for participation by other invited national and regional representatives.

A total of 21 participants attended the meeting over two days (see Appendix B). Mr. Frank Comito, CEO and Director General of the Caribbean Hotel and Tourism Association (CHTA) joined the meeting virtually on July 19th, 2016 for discussions on the Letter of Agreement (LoA). Dr. Farrell, Principal of CIMH, also joined remotely on that day.

All presentations made at the 3<sup>rd</sup> Consortium meeting can be downloaded at the following link: <http://bit.ly/3rdConsortiumMeetingPresentations>.

#### **1.4 Welcome Remarks (Adrian Trotman, CIMH)**

Mr. Adrian Trotman welcomed all participants to the meeting in his role as Chair of the 3<sup>rd</sup> Consortium Meeting. He emphasized that the main focus of the meeting would be to reach consensus on a version of the Letter of Agreement (LoA) to be signed by all partners.

Discussion:

Dr. Trotz (CCCCC) queried the omission of the Caribbean Community Climate Change Centre (CCCCC) in the LoA document, stating that inclusion of the CCCCC in the Consortium grouping would be beneficial, and further stating that CCCCC would want to be a part of the Consortium and lend its support.

Mr. Trotman responded by stating that CIMH is always willing to work synergistically with other regional organisations. He expressed his confidence that during the process of the meeting, it would be revealed what role the CCCCC could play in complementing the efforts of Consortium partners in the implementation of sectoral EWISACTs.

#### **1.5 Meeting Objectives (Shelly-Ann Cox, CIMH)**

Ms. Shelly-Ann Cox gave an overview of the meeting objectives (see section 1.1) and Agenda, which was adopted by all participants.

## **2 Session I: Review of 2nd Consortium Meeting documents (Dr. Roché Mahon, CIMH)**

In her presentation, Dr. Mahon gave an overview of the progress made to date at each Consortium meeting, with a particular focus on the 2nd Consortium meeting. At that meeting, there was a review of the meeting documents of the 1<sup>st</sup> Consortium and some adjustments were made to the Consortium and sectoral partners TORs and the sectoral EWISACTs WIP. Approval was given by each sectoral representative and the following was moved by CIMH: 1) the adoption of the Draft Conceptual Framework; 2) the adoption of Consortium and Sectoral Partner TORs; and 3) the adoption of Draft WIP 2015-2016. The successfully completed follow-up actions included: CIMH integration of Consortium comments and finalisation of the draft Climate Product Information sheets; CIMH invitation to Consortium partners to participate in the 2015 Dry Season COF, November 2015; CDEMA invitation to CIMH to serve its user baseline questionnaire at the 9<sup>th</sup> CDM conference, December 2015; CIMH invitation to Consortium partners to ClimPACT Training Workshop, February 2016; CIMH to liaise with heads of regional sectoral agencies to work towards the signing of LOAs to formally establish the Consortium of Regional Sectoral Partners.

### **2.1 Discussion**

Dr. Ulric Trotz (CCCCC) expressed his appreciation of the importance of what is being done under the sectoral EWISACTs portfolio. He stated that CIMH should expect support from CCCCC on this intervention.

Participants approved the Report of the 2<sup>nd</sup> Consortium Meeting after a brief overview of the most relevant sections was presented.

## **3 Session II: Review of Sectoral EWISACTs Progress to Date (Dr. Roché Mahon, CIMH)**

In her presentation, Dr. Mahon outlined general progress on each of the 15 outputs committed to be delivered under the four Outcome Areas of the WIP as of July 2016 (please see Appendix II for a full breakdown of the Sectoral EWISACTs Progress Report). She highlighted that one significant achievement to date has been the design and development of prototypes for 3 sector-specific climatic bulletins for the agriculture, tourism and health sectors. She noted that a proposal is on the table for the development of a water sector bulletin. Finally, participants were asked to note that the BRCCC Programme was granted a no-cost extension of an additional 6 months, pushing the termination date forward to July 2017 versus the original January 2017 end-date.

### 3.1 Discussion:

Mr. Trotman, CIMH informed the meeting that CIMH will launch an agro-meteorology web-based platform for the newly re-conceptualised Caribbean Society for Agro-Meteorology (CARISAM). This platform is a professional community supported by an interactive online portal which is designed to enhance collaboration and dialogue between the Caribbean agricultural and food security community (including forestry), meteorologists, and climatologists.

Mrs. Patricia Aquing (CWWA) added that CWWA will be revamping its website at the end of 2016. The ideas produced at the 3rd Consortium meeting was expected to aid in the design of the CWWA's updated webpage.

Dr. Trotz (CCCCC) stated that in the near future there will be resources/ infrastructure available to aid what is being done by the Consortium. However, he noted that one of the challenges with establishing the value of specialised climate information, such as bulletins, is showing how the information actually translates into decision-making. He suggested looking at case studies which concretely demonstrate the results of utilizing the information.

Dr. Mahon's response to Dr. Trotz's concern was that there is a provision in place for the development of case studies under the WIP. In the near-term, on a qualitative, descriptive level, these case studies can start to provide a picture of how climate information impacts sectoral decision-making in the Caribbean.

A suggestion was made by a participant to have the information for the water sector integrated within the other bulletins rather than having one separate bulletin for that sector.

With regards to the health sector, it was noted that INSMET has developed health-related climate indices and this is something the Cuban colleagues may want to share with the rest of the region. Dr. Farrell added that poor air quality is the biggest health threat worldwide. CIMH has looked at this and has established the Caribbean Aerosol Network to monitor air quality across the region. The Cubans are already partners in the Caribbean Aerosol Network.

Dr. Trotz noted that the CCCCC receives a lot of requests from the UWI, Cave Hill with respect to internships. He suggested that this could be an avenue in getting any needed research done. Dr. Farrell responded by saying that while it was possible to utilise interns, it posed a financial challenge for the Institute. To date, funding has been obtained through the CCRIF and the BRCCC Programme to support interns. He welcomed the opportunity for additional support for interns at CIMH.

In relation to the lack of progress in designing a web-based user interface tool to enable users to correlate forecasts to past impacts and appropriate response strategies, Dr. Trotz stated that the CCCCC could collaborate with CIMH for the development of this output. Specifically, the CCCCC has IT personnel that can offer support. He encouraged the sectoral EWISACTs team to liaise with the CCCCC on this.



Amrihka Singh of the CARICOM Secretariat noted that the outputs being produced by the Sectoral EWISACTs Consortium represents very good work. She expressed an interest in exploring initiatives to raise the awareness level of leaders as well as Cabinet Ministers with regards to the products and services provided by the CIMH and the NMHSs. Ms. Singh suggested that the products be put on display at the next meeting of the Heads of Government and indicated the willingness of the CARICOM Secretariat to assist in facilitating this.

Ulric Trotz, CCCCC concurred that sectoral Ministers need to be targeted. He suggested targeting Ministers with a presentation on the climate information toolbox that demonstrates the usefulness of the products to national sectoral decision-making.

Patricia Aquing, CWWA opined that we need to understand how Ministers think. Ms. Aquing suggested having a video clip showing the importance of the information to the water sector at the CWWA's next Ministerial meeting.

Dr. David Farrell, CIMH tabled a suggestion to talk about the potential of El Niño and La Niña events on the water sector as they will have an impact on water production in some countries. He also threw out a challenge to the CariCOF to look at climate EWS for air quality.

Lyndon Robertson, CARPHA noted that with every challenge, there is an opportunity. Mr. Robertson suggested that we assess what is happening across the territories and present to the Ministers - not only the negatives associated with climate but also the opportunities that can be harnessed.

In his response to a question about the future plans for DEWETRA, Dr. Farrell, CIMH explained that the platform was implemented particularly for Eastern Caribbean States and there is a lot of information already embedded in the platform to support the work of EWISACTs.

#### **4 Session III: Review of Letter of Agreement (Mr. Adrian Trotman and Dr. Roché Mahon, CIMH)**

As a background frame for the Consortium LoA discussion, Mr. Trotman introduced the session with a presentation on the evolution of climate services in the Caribbean region. This dates back to 1967 with the Caribbean Meteorological Institute (CMI) being the climate data centre as well as the training centre for the Caribbean. CMI evolved over the years into the Caribbean Institute for Meteorology and Hydrology (CIMH) where it expanded on the services provided. To date, the CIMH facilitates the Caribbean Climate Outlook Forum (CariCOF), training for meteorologists and hydrologists and is on its way to attaining designation later in the year (2016) as a WMO Regional Climate Centre.

In her presentation, Dr. Mahon offered an overview of past content changes made to the LoA since 2015, as suggested by Consortium partners. She stated that the document was initially drafted in December 2015 under the lead of CIMH. The second draft was done in February 2016 and circulated to the Consortium partners for comment in May 2016. Initial face-to-face

discussions were held at the 2016 Wet/Hurricane season CariCOF. Based on partner feedback, a third draft was completed and re-circulated in June 2016.

In closing, Dr. Mahon expressed confidence that the LoA was at a sufficiently mature stage of development and was close to the final text to be signed. She tabled two possible options for the signing of the LoA:

- a) Low-key signing via serial circulation of the LoA document to Heads of partner organisations; or
- b) High profile simultaneous signing event possibly at the 2016/2017 Dry Season COF

Participants were thereafter invited to suggest further final comments and revisions to the LoA text.

#### **4.1 Discussion:**

One major recommendation from the Consortium partner grouping was regarding the inclusion of the CCCCC as an official observer organisation to the Consortium's sectoral EWISACTs development process. Dr. Trotz accepted the invitation and other partners were happy to welcome the CCCCC on-board. A note was made regarding the necessary edits to be made to the LoA and TOR documents to reflect this change.

Dr. Farrell reiterated that CIMH is committed to acting as Secretariat to the Consortium arrangement and also acknowledged the Institute's intention to be a part of the long-term sustainability of this collaborative, regional effort. He proposed to have two other organisations on-board as observers – the UWI Climate Studies Group Mona and the Caribbean Development Bank.

Davina Layne of the CTO raised an inconsistency in language between the LoA and its accompanying TOR. Specifically, the LoA speaks to Disaster Risk Reduction (DRR) whereas the TOR speaks to Disaster Risk Management (DRM). In response, Adrian Trotman, CIMH stated that this inconsistency goes back to the framing of this sector as DRR by the GFCS and the effort by CIMH to match our framing and terminology as closely as possible to what is within this international framework.

Donna Pierre of the CDEMA and designated representative for the DRM sector suggested that a footnote should be inserted for clarity in this regard. After some discussion, consensus was reached by Consortium members to have a footnote in the document to explain the difference in the international versus Caribbean-centric framing of the sector, leading to the use of the term 'DRM' versus 'DRR'.

After much discussion, partners agreed concretely on the following edits to the LoA and the accompanying TOR document:

1. The CCCCC to be added as an observer organisation under Section 2.4, Observer Status of the LoA document;

2. A footnote should be added to reflect the Caribbean's versus GFCS framing/labelling of the DRR/DRM sector;
3. Global deletion of references to the CCREEE/Energy Partner/Energy Sector, noting that a clause in Section 2.3, Membership which allows for particular consideration to be given to a regional organisation that will support the Energy portfolio of the Consortium.

Partners agreed on the following next steps:

1. Re-circulation of LoA to the Heads of all partner and observer organisations; and
2. Receipt of feedback by Wednesday August 31<sup>st</sup> 2016.

## **5 Session IV: Towards the development of sector-specific climate products**

### **5.1 Towards Developing Heat Alerts (Adrian Trotman, CIMH)**

In his presentation on behalf of the CIMH Climatologist, Mr. Adrian Trotman emphasised that experience in the region and globally has shown there are several potential heat-related impacts that can occur at the sectoral level. Impacts may take the form of illness/morbidity and death/mortality which affects labour productivity; or alternatively may lead to increased cooling demand; damage to infrastructure; and also negatively affect crop survival and growth rates.

It is against this background that CIMH has begun work towards developing heat alerts for the Caribbean region. Mr. Trotman noted that currently, the CariCOF produces a seasonal temperature forecast and is in the process of experimenting with a 2-day hot spells outlook which may have broad applications to a wide range of sectors including health, energy and agriculture.

Mr. Trotman went on to outline the methodology around the development of the hot spells outlook. He presented the experimental seasonal heat wave frequency outlook maps and offered an interpretation of what the maps communicated. He informed the meeting participants that research around this outlook was ongoing and improvements are expected to be made to the draft prototype in the coming months.

### **5.2 Discussion:**

Ulric Trotz, CCCCC questioned whether we should regard heat as a hazard since we live in the Tropics. In response, Adrian Trotman of the CIMH noted that Caribbean people currently see heat through a narrow lens as just a discomfort and not as a hazard until it leads to mortality. He alluded to the advantages of developing a heat early warning product in a region of the world where it has been empirically demonstrated that there has already been a historical rise in temperature, especially if this trend is expected to continue in the future.

## **6 Review of Research Consultancy TORs (Shelly-Ann Cox, Adrian Trotman and Dr. Roché Mahon, CIMH)**

Draft concepts for five proposed sector-specific research consultancies were presented in this session.

Ms. Cox opened this session by stating that good progress had been made in advancing the methodological approach for the development of Sectoral EWISACTs. To date, the governance mechanism has been established, baselining and monitoring of user needs and provider capacity has been conducted, and the development of sector-specific information through the development of bulletins is in progress.

Ms. Cox began the review of the research consultancy TORs by outlining that the vision for the consultancies is to produce sector-specific spatial-temporal modelling frameworks. The first consultancy presented was the development of a modelling framework to provide spatio-temporal probabilistic forecasts of poultry heat stress risk in the Caribbean. Ms. Cox outlined that the consultancy will seek to explore the potential use of climate information for poultry heat stress early warning in the Caribbean and will use a participatory approach to rapidly translate investment in agro-climatic research into practice to improve national and regional agricultural outcomes.

Ms. Cox continued her presentation by outlining the second consultancy proposed for the agriculture sector which focused on the enhancement of irrigation use efficiency in Caribbean agriculture under a change in climate. The objectives include building the capacity in the region to the use of climate information for irrigation management; and to provide the necessary information for irrigation scheduling and quantification for Caribbean farmers.

Ms. Cox invited Mr. Trotman to give a brief synopsis of the third proposed consultancy for the agriculture sector which involved employing an existing approach referred to as Participatory Integrated Climate Services for Agriculture (PICSA) for the Caribbean context. Mr. Trotman outlined that the PICSA approach aims to facilitate farmers to make informed decisions based on accurate, location specific, climate and weather information; locally relevant crop, livestock and livelihood options; and with the use of participatory tools to aid their decision-making. He continued by stating that this work would be completed through an existing collaboration with the University of Reading in the UK. Guyana has been selected as the pilot country for the implementation of this consultancy.

After Mr. Trotman finished his overview, Ms. Cox invited Dr. Mahon to present the proposed consultancies for the health and tourism sectors. Dr. Mahon began by providing a background about dengue risk in the Caribbean stating that dengue costs the Caribbean about USD\$321 million annually. She continued to outline that the Caribbean remains the area within the Americas with the highest cost per capita ratio (ie. International dollars \$8.70 per capita). Dr. Mahon stated that the objectives of the consultancy are to work collaboratively with regional stakeholders to develop a modelling framework to provide spatio-temporal probabilistic forecasts of dengue risk for at least up to three months with a zero month lead time, using

information on the climatic conditions for the Caribbean. Outputs of the model should provide probabilistic risk maps that can be used for vector surveillance and control.

Dr. Mahon continued her presentation by outlining the significant contribution that the tourism sector makes to GDP and employment in the Caribbean. She also stated that tourist arrivals in CMO countries were nearly 6,000,000 in 2014. She detailed that the objective of the proposed consultancy for the tourism sector was to develop and validate statistical models to estimate the influence of intra-regional climatic conditions on tourist arrivals to the Caribbean and climatic conditions in the Caribbean's main tourist generating regions (e.g., the UK, US and Canada) on tourists arrivals to the Caribbean. It was proposed that models should provide an outlook for the influence of climate on tourist demand for at least up to three months with a zero month lead time. It is anticipated that the outputs of the models should provide probabilistic risk maps that can be used for tourism planning and marketing.

Dr. Mahon closed the presentation by outlining implementation considerations for the proposed consultancies. Notable considerations that may present challenges to implementation under the BRCCC Programme included the overall limited budget; the tight implementation timeline (October 2016 to March 2017); issues related to data availability, access and quality, as well as, human resource constraints.

Participants were invited to offer comments and suggestions regarding the content and direction of the proposed research consultancies.

## **6.1 Discussion:**

### *Irrigation scheduling and estimation model*

With regards to the proposed irrigation model for agriculture, Rasheeda Hall-Hanson, of the CARDI, commented that the main challenge is not having available irrigation infrastructure within certain countries.

### *Vector proliferation model*

Dr. Ulric Trotz of the CCCCC noted that there was a health concern associated with water storage.

Desmond King, MoH Barbados agreed noting that Barbados is characterized as water-scarce and therefore needs to have water storage facilities in homes. The challenge however is how to deal with the accompanying likely increase in the proliferation of mosquitoes. He further advised that since there is also the risk of yellow fever from the *Aedes aegypti* mosquito as a vector, taking a look at the associations between climate and Yellow Fever incidence may be relevant, especially since Yellow Fever is endemic to several Caribbean islands and there are now travel advisories issued in relation to some territories (e.g. Brazil).

Sally Edwards, of the PAHO, commented that mosquito density populations will need to be examined, in addition to outbreak densities. She suggested using countries that have different profiles as case studies for conducting the research underpinning the vector proliferation

model. Ms. Edwards also brought to the attention of the meeting that the correct technical reference is to 'dengue fever' and not 'dengue haemorrhagic fever'. She suggested that this change would need to be made in the TOR document.

Finally, participants offered suggestions around specific implementation issues associated with a limited financial and time budget. CIMH committed to thoughtfully integrating the insights gained from the discussion into its rationalisation of which consultancies would be implemented under the BRCCC Programme and following-up with participants regarding these decisions in the near future.

## **7 Session VI: Towards the Development of Sector-Specific Bulletins (Dr. Cédric Van Meerbeeck, Shelly-Ann Cox, Shontelle Stoute, Wayne Depradine and Jodi-Ann Petrie, CIMH)**

As an introduction to this session, Dr. Cédric Van Meerbeeck offered an overview presentation on the range of technical climate information products currently being produced by the Institute. He began by guiding the meeting participants through the Caribbean Regional Climate Centre's web site to familiarise them with the portal where they can access and download CIMH's climate information and products. Dr. Van Meerbeeck briefly introduced the RCC's climatology tools as well as climate monitoring and prediction products and services, followed by the bulletins that package the information in a digestible format. He concluded by highlighting the data services and programmes sections of the web site.

Ms. Cox followed his presentation by first providing an overview of the existing bulletins and newsletters currently provided by the CIMH which: 1) have a strong climate focus, and 2) are quite generic in nature. She continued by stating that there was a limited number of sector-specific bulletins operationally produced. Currently, only the agricultural sector benefits from the production of the monthly CAMI bulletin. Ms. Cox alluded to the fact that it was only practical in the short-term to prioritize a subset of sectors for the development and delivery of a tailored information bulletin. The agriculture, health and tourism sectors were chosen based on: (1) the number of existing products that can be collated, feasibly translated and repackaged for these sectors, and (2) the perceived capacity of Consortium partners to collaborate in operational co-development of the new and enhanced bulletins.

Ms. Cox continued her presentation by outlining the bulletin development process which began with an internal CIMH review of existing regional and national climate bulletins; as well as existing sectoral bulletins. This review provided a good background for the development of a concept note which was subsequently circulated among partners. Draft bulletin templates with simulated sector-specific climate messages were initially designed by the sectoral EWISACTs team and reviewed internally to demonstrate to partners the type of information that could possibly be provided on an operational basis. The first testing exercise of the zero order draft (ZOD) of the agro-climatic, tourism-climatic and health-climatic bulletins was conducted at the Wet/Hurricane Season CariCOF in May 2016. Feedback from the first testing exercise was taken into consideration and guided the development of version 2 of the ZOD which would be

demonstrated later in the presentation. Ms. Cox stated that it was anticipated that experimental bulletins would be co-developed and finalised with sectoral partners before a soft launch at the 2016/2017 Dry season COF. It was envisaged that the operational sector-specific bulletins would be launched officially at the BRCCC Programme EWISACTs 2017 close out meeting.

Ms. Cox invited Mrs. Shontelle Stoute, Ms. Jodi-Ann Petrie and Mr. Wayne Depradine to present the prototypes of the agro-climatic, tourism-climatic and health-climatic bulletins respectively. They first demonstrated version 1 of the ZOD bulletin for each sector before providing a summary of the feedback from the first testing exercise conducted at the 2016 Wet/Hurricane Season CariCOF. After presenting the feedback, they demonstrated version 2 of ZOD which incorporated the recommendations made at the COF. A comparison was made between the two versions to highlight the improvements made.

Ms. Cox returned to present the production and dissemination options conceptualized by the Sectoral EWISACTs team. She first outlined design considerations in the development of the bulletins including the displaying of the number of maps available for each climate product, and the pros and cons of developing static versus interactive bulletins. Reference was made to a 2012 article by Roncoli and colleagues about the added value of an interactive format.

Ms. Cox detailed that 5 options were being proposed for the dissemination of the sector-specific bulletins. These options were as follows:

1. Monthly static bulletins jointly produced by CIMH and partners;
2. Monthly static bulletins produced solely by CIMH;
3. Quarterly interactive bulletins produced jointly by CIMH and partners;
4. Quarterly interactive bulletins supplemented with monthly updates; and
5. The inclusion of climate information within existing sector-specific bulletins.

## **7.1 Discussion**

In response to the suggestion from Ulric Trotz, CCCCC to develop a heat comfort index, Cédric van Meerbeeck, CIMH acknowledged that this was difficult for the region due to different heat thresholds in the various climatic sub-regions.

In response to an expressed concern that there was still a general lack of understanding among some sectors of why climate information is necessary and how this information can be used, Mr. Trotman responded that CIMH has already convened Workshops with some sectors to address this.

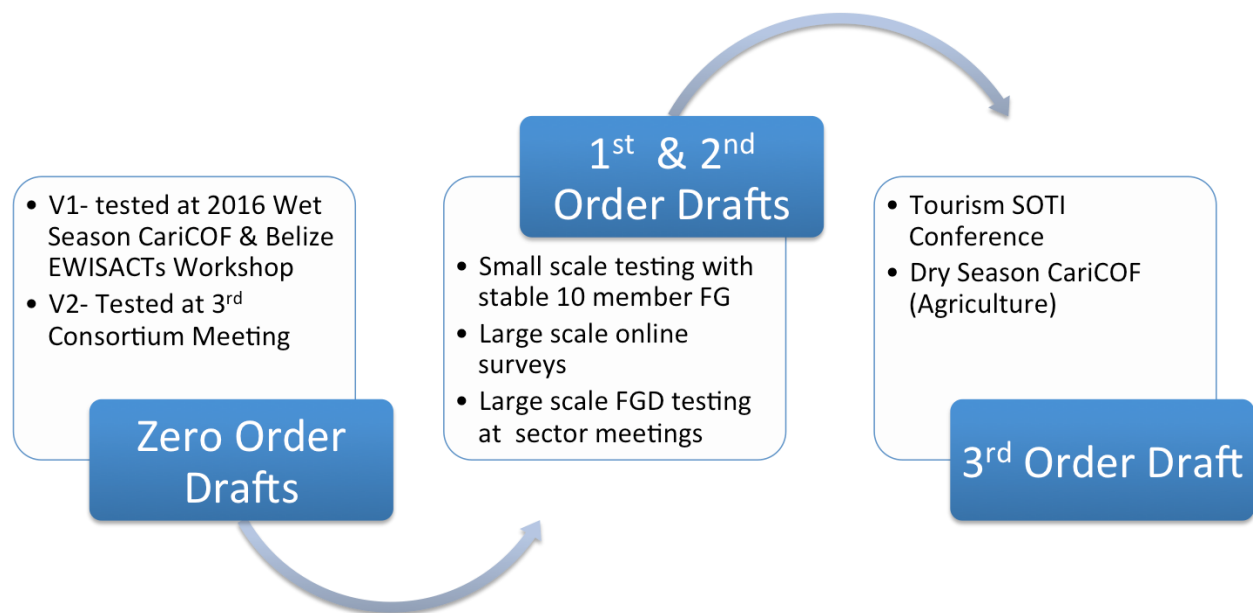
Jamie Paul of the Barbados Water Authority suggested that consideration be given to developing YouTube video tutorials showing how to find and use information on the bulletins.

## 8 Testing Exercise

Participants were thereafter invited to offer comments and suggestions regarding the sector specific bulletins before dividing into 3 groups to provide feedback on each bulletin. Each group was tasked with critically reviewing the content and design of the bulletins with the aim of suggesting areas for improvement (see Appendix C for a summary).

## 9 Next Steps

After the focus group presentations, Ms. Cox presented the way forward for the bulletin design and testing research process which involves an iterative research process employing a mixed methods approach (Figure 1).



**Figure 1: Bulletin design and testing research process**

Ms. Cox closed the presentation by asking partners for their assistance with this research process. Partners expressed their interest in the continued development of the bulletins and committed to supporting the CIMH in following up with their network of stakeholders.



## 10 The Way Forward (Mr. Adrian Trotman, CIMH)

Chair of the meeting, Mr. Adrian Trotman reiterated the next steps arising from the meeting as follows:

Ref.	Item	Responsibility
1.	CIMH to follow-up with CWWA on its participation at the 25 <sup>th</sup> Annual CWWA Conference	CIMH
2.	CIMH to collaborate with CWWA and CCCCC on consolidated technical session at the 12 <sup>th</sup> High Level Forum of Ministers responsible for Water	CIMH, CWWA, CCCCC
3.	CIMH to explore links with CCCCC Clearinghouse	CIMH, CCCCC
4.	CIMH to consult CCCCC on Output 4.1.2 'Design of a web-based user interface tool to correlate forecasts to past impacts and appropriate response strategies'	CIMH, CCCCC
5.	CCCCC to look into financial support to facilitate internships at CIMH to support the delivery of Output 4.1.1	CIMH, CCCCC
6.	CIMH to follow-up with PAHO for text to be included in the Caribbean Health Climatic Bulletin and arranging a bulletin testing exercise in the first week of October.	CIMH, PAHO
7.	CIMH to follow-up with CARDI about possibly presenting the CariSAM web platform and conducting a bulletin testing exercise at the Caribbean Week of Agriculture.	CIMH, CARDI
8.	CIMH to follow-up with CARPHA about possibly testing the Health-Climatic Bulletin at the Caribbean Health Research Conference.	CIMH, CARPHA

He closed the meeting by thanking everyone for their continued support to the sectoral EWISACTs development process.

## 11 Appendix A: Meeting Agenda

Tuesday, July 20<sup>th</sup>, 2016

TIME	SESSION		RESOURCE AGENCY/PERSON
0830 - 0900	Arrival and registration		All
0900 - 0915	Welcome remarks		Adrian Trotman, CIMH
0915 - 0945	Introduction of participants/Icebreaker Meeting objectives and adoption of Meeting Agenda		Shelly-Ann Cox, CIMH
0945 - 1000	<b><u>Session 1</u></b> <b>Review of 2nd Consortium Meeting documents</b>	Presentation of the Report of the 2nd Consortium Meeting	Adrian Trotman, CIMH
1000 - 1015		Discussion	All
1015 - 1030	COFFEE BREAK		
1030 - 1050	<b><u>Session 2</u></b> <b>Review of Sectoral EWISACTs Progress to Date</b>	Presentation of Sectoral EWISACTs Progress Report	Roché Mahon, CIMH
1050 - 1130		Discussion	All
1130 - 1200	<b><u>Session 3</u></b> <b>Review of Letter of Agreement (LOA)</b>	Review of Letter of Agreement (LoA)	Adrian Trotman/ Roché Mahon, CIMH
1200 - 1230		Discussion	All
1230 - 1330	LUNCH		
1330 - 1400	<b><u>Session 4</u></b> <b>Towards the</b>	Towards Developing	Cédric Van Meerbeeck, CIMH

TIME	SESSION		RESOURCE AGENCY/PERSON
	<b>development of sector-specific climate products</b>	Heat Alerts for the Caribbean- A Possible Prediction Framework	
<b>1400 - 1415</b>		Discussion	All
<b>1415 - 1445</b>		Review of Research Consultancy TORs	Roché Mahon/Shelly-Ann Cox, CIMH
<b>1445 - 1515</b>		Discussion	All
<b>1515 - 1530</b>		Summary and Close	Adrian Trotman, CIMH

Wednesday, July 20<sup>th</sup>, 2016

TIME	SESSION		RESOURCE AGENCY/PERSON
<b>0830 - 0900</b>	Arrival and Networking		All
<b>0900 - 0915</b>	Review of Day 1 and intro to Day 2 sessions		Adrian Trotman, CIMH
<b>0915 - 0945</b>	<b><u>Session 5</u></b> Review of sector specific climatic bulletins	Towards the development of sector-specific climatic bulletins	Shelly-Ann Cox/ /Wayne Depradine/ Shontelle Stoute/Jodi-Ann Petrie, CIMH
<b>0945 - 1100</b>		Sector-specific Climatic	Shelly-Ann Cox/

TIME	SESSION		RESOURCE AGENCY/PERSON
		Bulletin Testing Exercise	Roché Mahon, Shontelle Stoute, CIMH
1030 - 1045	WORKING COFFEE BREAK		
1100 - 1145	<b><u>Session 5</u></b> <b><u>Cont'd</u></b> Review of sector specific climatic bulletins	Group Presentations	All
1145 - 1215		Discussion	All
1215 - 1315	LUNCH		
1315 - 1330	<b><u>Session 6</u></b> Way forward on the LOA	Review of revised LoA	All
1330 - 1400		Discussion on next steps	All
1400 - 1415		Way Forward and Close	Adrian Trotman, CIMH

## 12 Appendix B: Attendee List

	Name		Organisation	Country	Contact
	Last	First			
1	Singh	Amrikha	CARICOM Secretariat	Guyana	amrikha.singh@caricom.org
2	Aquing	Patricia	CWWA	Trinidad	paquing@cwwa.net
3	Hall-Hanson	Rasheeda	CARDI	Jamaica	rasheeda.hall@gmail.com
4	Edwards	Sally	PAHO/WHO	Barbados	edwardss@paho.org
5	Lovell	Hampden	Meteorological Service	Barbados	hampden.lovell@barbados.gov.bb
6	Evanson	Danielle	UNDP	Barbados	danielle.evanson@undp.org
7	Sabir	Kareem	CZMU	Barbados	ksabir@coastal.gov.bb
8	Nurse	Danielle	CZMU	Barbados	dalissanurse@gmail.com
9	Johnson	Joy-Anne	DEM	Barbados	joy-anne.johnson@barbados.gov.bb
10	King	Desmond	Ministry of Health	Barbados	desmond.king@health.gov.bb
11	Charles	Amanda	CTO	Barbados	acharles@caribtourism.com
12	Layne	Davina	CTO	Barbados	layned@caribtourism.com
13	Pierre	Donna	CDEMA	Barbados	donna.pierre@cdema.org
14	Trotz	Ulric	CCCCC	Belize	utrotz@gmail.com
15	Robertson	Lyndon	CARPHA	St. Lucia	robertly@carpha.org
16	Trotman	Adrian	CIMH	Barbados	atrotman@cimh.edu.bb
17	Stoute	Shontelle	CIMH	Barbados	sstoute@cimh.edu.bb
18	Depradine	Wayne	CIMH	Barbados	wdepradine@cimh.edu.bb
19	Mahon	Roché	CIMH	Barbados	rmahon@cimh.edu.bb
20	Cox	Shelly-Ann	CIMH	Barbados	scox@cimh.edu.bb
21	Petrie	Jodi-Ann	CIMH	Barbados	jpetrie@cimh.edu.bb
22	Van Meerbeeck	Cédric	CIMH	Barbados	cmeerbeeck@cimh.edu.bb
23	Scott	Wazita	CIMH	Barbados	wscott@cimh.edu.bb

## 13 Appendix C: Feedback from Bulletin Testing Focus Group Exercises

### Tourism:

- Be sure to check sources and liaise with CHTA and CTO colleagues before posting information, especially regarding climate impacts.
- Link climate smart advisory to the information on page 2.
- State the impact also for the hotels and not just the tourist as operation costs are impacted.
- Coral bleaching episodes need to be highlighted.
- Keep the disclaimer.
- Should possibly mention sargassum with a link to further information.

### Agriculture:

#### Design of the Bulletin

- Sections are clearly laid out
- Provide links to other partner websites
- To ensure that the bulletin easily captures the attention of readers, use other colours especially to fill in the boxes.
- To reduce the wording on the bulletin, consider using flag icons to represent countries; a key for the flags will be needed
- The contact information can be placed at the bottom of page 2 (running across the page)
- The Purpose is relevant and should remain on all issues of the bulletin (especially for those persons who may not have seen the first issue). Move the Purpose to the front page using two (2) options:
  - Option 1  
Place the Purpose above Key Messages and shift Commodity Prices to the second page
  - Option 2  
Place the Purpose below July 2016 | Vol 1 | Issue 2. Centering it across the page
- On the first page, switch the location of the columns, ie the column with Key Messages moves to the right and the column with Climate Smart Agro-Advisory moves to the left

#### Content of the Bulletin

- Insert additional country links under Commodity Prices, at present there are only two (2) countries listed
- State which countries experienced dry spells for eg on 1st page Bullet 2 under Climate Smart Agro-Advisory
- State which countries received little rain for eg on 1st page Bullet 1 under What Happened

- Can also provide a reason for the little rain fall for eg due to the ongoing El Nino...
- Can also list the temperature ranges under bullet 2 under What Happened
- Consider separating Crop Information from Livestock Information. One concern however, would be if there is sufficient information to place under both headings
- Insert the word 'Islands' after 'Windward' throughout the document
- Insert a link to CDEMA's website under "Tropical Storm Activity" to allow persons to view the latest on storm activity for the Caribbean

### Language

- Reword the section under Tropical Storm Activity - at present the wording is ambiguous
- Remember your target audience: Instead of complicated words, opt for more user-friendly words. On page 2, instead of plant species use 'crops' under the heading Temperature and instead of alleviate use 'lessen'; under Drought Conditions
- On page 2 under the heading Temperature, insert the word 'especially' before poultry

### Figures

- The one figure is sufficient
- If there is a need to relay additional important information, can consider using other figures
- Make the map larger in size especially for the printed copy of the bulletin

### Length

- Two pages is good as it makes the document concise and does not burden the reader with excessive reading

### Other

- The bulletin can be disseminated to farmers and extension officers to assist them in planning their activities
- The static version of the bulletin is more practical for the farmers at present; whereas the interactive version can be used presently by the extension officers. The farmers can be informed that an interactive version is also an option.
- Option 1 is more practical for the farmers at present. However, the quarterly interactive should also be explored (option 4).
- The bulletin should be e-mailed early in the morning
- The bulletin information can be shared with the sector's partners
- The role of CARDI in this initiative can be to translate technical information to the farmers

### **Health:**

- The layout was good, as well as, colours.
- Use reputable sources for impacts rather than the media.

- Need to consider pathogens on the air condition units being dispersed throughout the air space.
- Have the bulletins on a quarterly time step.