

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

First (1st) Meeting of the Consortium of Regional Sectoral
EWISACTs Coordination Partners

CIMH Headquarters, Husbands, St. James

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Meeting Report

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LIST OF ACRONYMS

Acronym	Definition
AMC	Applied Meteorology and Climatology
BRCCC	Building Regional Climate Capacity in the Caribbean
CARDI	Caribbean Agricultural Research & Development Institute
CAMI	Caribbean Agrometeorological Initiative
CARICOM	Caribbean Community
CariCOF	Caribbean Climate Outlook Forum
CARIWIN	Caribbean Water Initiative
CCCES	Caribbean Centre for Climate and Environmental Simulations
CDEMA	Caribbean Disaster Emergency Management Agency
CDM	Comprehensive Disaster Management
CDPMN	Caribbean Drought Precipitation Monitoring Network
CID	Climate Impacts Database
CIMH	Caribbean Institute for Meteorology and Hydrology
CARILEC	Caribbean Electric Utility Services Corporation
CARPHA	Caribbean Public Health Authority
CTO	Caribbean Tourism Organization
CCCCC	Caribbean Community Climate Change Centre
CHTA	Caribbean Hotel and Tourism Association
CRM	Climate Risk Management
CSGM	Climate Studies Group, Mona
CZMU	Coastal Zone Management Unit
DRM	Disaster Risk Management
DSS	Decision Support System
EWISACTs	Early Warning Information System across Climate Timescales
EWS	Early Warning System
GFCS	Global Framework for Climate Services
GPC	Global Producing Centre
NMHS	National Meteorological and Hydrological Services
OECS	Organisation of Eastern Caribbean States
RCC	Regional Climate Center
RCOF	Regional Climate Outlook Forum
SPI	Standardised Precipitation Index
TOR	Terms of Reference
USAID	United States Agency for International Development
WIP	Work and Implementation Plan
WMO	World Meteorological Organization

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1.0 Introduction

The United States Agency for International Development (USAID) funded Programme for Building Regional Climate Capacity in the Caribbean (BRCCC Programme) was created to facilitate the development of the World Meteorological Organization (WMO) Regional Climate Centre (RCC) for the Caribbean to be housed at the Caribbean Institute for Meteorology and Hydrology (CIMH). The BRCCC programme will focus on: (i) infrastructure development, (ii) increasing the range of products and services delivered to stakeholders, (iii) enhancement of human and technical capacities at CIMH and in National Meteorological and Hydrological Services (NMHSs) in the Caribbean, and (iv) improvement of service delivery mechanisms to national, regional and international stakeholders.

Climate variability and change occur on timescales ranging from sub-seasonal to seasonal and 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*² and the *Implementation Plan for the 'Regional Framework for Achieving Development Resilient to Climate Change'*³ 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 these priority sectors, sectoral EWISACTs can support regional growth resilient to climate risks⁴.

The First (1st) Meeting of the Consortium of Regional Sectoral EWISACTs Coordination Partners was held at the CIMH Headquarters, May 6th to 7th, 2015. This meeting provided an opportunity for dialogue with lead regional sectoral representatives and other organizations. It also advanced progress towards the establishment of the Consortium as the governance mechanism for sectoral EWISACTs implementation at the regional level.

The objectives of the meeting were:

1. To familiarize sectoral stakeholders with the Global Framework from Climate Services (GFCS), the Programme, the concepts of climate services, Regional Climate Centre and the structure of Early Warning Information Systems Across Climate Timescales;
2. To discuss sectoral climate-related strategies and present approaches to Early Warning Systems within sectors;
3. To strategize for the development of sectoral EWISACTs under the BRCCC Programme;
4. To endorse in principle a Conceptual Framework for sectoral EWISACTs in the Caribbean;

² Developed by the Caribbean Disaster Emergency Management Agency (CDEMA) in 2014.

³ Developed by the Caribbean Community Climate Change Centre (CCCCC) in 2011.

⁴ Adapted from the Terms of Reference of Consortium of Regional Sectoral EWISACTs Coordination Partners.

5. To confirm in principle sector partners and formalise the establishment of a regional sectoral EWISACTs Coordination Mechanism;
6. To endorse in principle Draft Terms of Reference (TORs) to support a regional sectoral EWISACTs Coordination Mechanism; and
7. To endorse in principle a Work and Implementation Plan (WIP) for the development of sectoral EWISACTs.

All prospective members of the Consortium were represented. It should be noted that the Caribbean Electric Utility Services Corporation (CARILEC) attended virtually on day 1 via GoToMeeting, while the Caribbean Community Climate Change Centre (CCCCC) attended virtually on both days. There was a total of 33 participants (see [Appendix A](#)). The meeting proceeded according to the Agenda (see Appendix B) and was segmented into eight sessions. Presentations were followed by guided discussions. An official statement was submitted from the CCCCCs and was duly read (see [Appendix C](#)).

2.0 Welcome Remarks (Dr. David Farrell, Principal, CIMH)

Dr. Farrell welcomed all participants to CIMH and expressed his hopes that this meeting would contribute a tangible future outcome in which sectoral early warning systems are developed for climate impacts. He mentioned that the BRCCC Programme is one of the most advanced programs at CIMH. The present assembly of meeting participants was both welcomed and historic. Dr. Farrell specially welcomed the participation of the tourism sector, through the Caribbean Tourism Organisation (CTO) and the Caribbean Hotel and Tourism Association (CHTA). He also underscored the importance of the participation of the Caribbean Community CARICOM Secretariat and the Organisation of Eastern Caribbean States (OECS), as regional and sub-regional agencies that can help with the coordination and management of the sectoral EWISACTs initiative. He gave an overview of the continued services and offerings of the CIMH to the Caribbean and remarked that efforts were being made to expand and improve the Institute's capacity. In this regard, he noted that CIMH has an important role to play in supporting the delivery of climate services, especially with respect to providing portals for data and information.

Talks surrounding climate products began in 2007 and have since advanced under the GFCS. As we go forward, we are considering the impact of heat and dust and their impact on the health sector. CIMH has advanced its forecasting capabilities with new products and services for seasonal forecasting. Dr. Farrell pointed out that climate data is the most critical piece of intellectual property that each country possesses and it should be carefully managed. Data is important for modelling and impact studies and in this regard, CIMH through its Caribbean Centre of Climate and Environmental Simulation (CCSES) is positioned to lead regional efforts for impact assessments on the climate variability timescale. It is this expanded remit that will aid in enhancing the Institute's thrust to be fully designated as a RCC of the WMO. He concluded that while the BRCCC Programme is an important initiative for helping to mitigate losses due to climate-related hazards, it cannot reduce all losses, so sustained actions would be needed to continue this adaptation process.

As the ministers of government talk about the interplay between the climate and economy, key persons are brought to the table with CIMH providing technical information for decision-making. Dr. Farrell hopes that this would not be a one-off discussion but that they become an integral part of the Caribbean Climate Outlook Forum (CariCOF).

3.0 Session 1: International and Regional Context of Climate Services in the Caribbean (Facilitated by Mr. Adrian Trotman)

3.1 The GFCS and the BRCCC Programme (presented by Dr. David Farrell, CIMH)

In his presentation, Dr. Farrell gave an overview of CIMH and its mandate which is explicitly: *“To assist in improving and developing the Meteorological and Hydrological Services as well as providing the awareness of the benefits of Meteorology and Hydrology for the economic well-being of the CIMH member states. This is achieved through training, research, investigations, and the provision of related specialised services and advice.”*

He also highlighted two of CIMH’s roles as the Caribbean’s RCC in demonstration phase (as designated by the WMO) and as the CCCES.

He addressed some concerns arising out of the position of CIMH as the WMO RCC (demonstration phase). (CCCCC) coordinates efforts on response to climate change, where it works on effective solutions and projects to combat the environmental impacts of climate change and global warming⁵. Dr. Farrell emphasised that a shorter-term focus is necessary as you need to deal with nearer-term climate variability before looking at the longer-term ‘change’ timescale. In this regard, CIMH is in the process of developing operational products for the region’s climate sensitive sectors, as well as, evaluating how these products can be used to better inform the decision-making process. Doing this bridges the gap between short-term and long-term adaptation.

Dr. Farrell stressed the need for capacity building for two reasons: 1) many people do not have access to climate information to shape their circumstances and 2) existing climate services are not focused. Dr. Farrell presented the evolution of the GFCS since the first call for this framework by the WMO in 2009. He shared information on the five pillars of the GFCS and how the BRCCC Programme falls within this framework. He noted that many efforts have been made to pilot climate services within the Caribbean, and noted initiatives that have advanced that cause including the Caribbean Agrometeorological Initiative (CAMI). Research was highlighted as being essential for making climate services robust. In this regard, he mentioned the collaboration between the CIMH and the University of the West Indies, Climate Studies Group (CSGM), Mona and welcomed their participation in the meeting. He further noted that climate services under the BRCCC Programme needed to be suitably customized for sectoral use and in this regard, he listed seven pre-requisites for effective climate services. These were namely that climate services should be:

- **Available:** at time and space scales to suit user needs,

⁵ <http://www.caribbeanclimate.bz/>

- **Dependable:** delivered regularly and on-time,
- **Usable:** presented in user specific formats so that the client can fully understand,
- **Credible:** for the user to confidently apply to decision making,
- **Authentic:** entitled to be accepted by stakeholders in the given decision contexts,
- **Responsive and flexible:** to the evolving user needs, and
- **Sustainable:** affordable and consistent over time.

There are four climate sensitive areas/sectors that have been agreed to be targeted under GFCS: 1) Agriculture and Food Security, 2) Water, 3) Disaster Risk Reduction, and 4) Health. Through the BRCCC Programme, the Caribbean stands to make an original contribution to the global climate services agenda by piloting initiatives in the Energy and Tourism sectors. Dr. Farrell noted that while tourism is not listed among the four targeted sectors of the GFCS, the Caribbean will be the first to pilot actions in this sector. The tourism sector has been included in Caribbean climate services because of its climate sensitivity and its importance to the socio-economic development of Caribbean States. If successful, the Principal noted that this could serve as a blue print for other regions around the world. Energy is also an important sector and this too have been prioritised for the Caribbean. CIMH sits on the Intergovernmental Committee of the GFCS and is therefore in a good position to lead on developing and enhancing climate services in the Caribbean. Through the BRCCC Programme, the regional agencies represented on the Consortium of regional sectoral partners will serve an important role as conduits to influence national level stakeholders within the six climate sensitive sectors. This could serve to enhance the awareness, understanding, and utilization of products and services developed by the CIMH and through the BRCCC Programme in particular.

3.2 Climate Services (presented by Dr. Cedric Van Meerbeeck, CIMH)

In his presentation, Dr. Van Meerbeeck stated that the vulnerability of certain sectors/groups to drought and flood events and the delivery of evidence-based information mitigate the impacts of these and drives Early Warning Information Systems (EWIS). In such a warning system, we are not only concerned with a particular timescale but all timescales. Due to the Caribbean's vulnerability to climate related hazards, there is a need for Climate Risk Management (CRM).

The WMO has proposed a definition of CRM as follows:

“A systematic and coordinated process in which climate information is used to reduce the risks associated with climate variability and change, and to take advantage of opportunities, in order to improve the resilience of social, economic and environmental systems” (Martinez et al. 2012)

The need for strong links between science and policy was emphasized as crucial to CRM, as well as, the need to manage a full range of scenarios from crisis to missed opportunities. In laying the foundation for an understanding of climate services and EWISACTs, Dr. Van Meerbeeck explained a number of terms. These included weather (instantaneous state of the atmosphere), climate (mean atmospheric conditions averaged over 30 years) and noted the distinction between climate variability and climate change. CIMH is working towards delivering evidence-based, data driven

information for decision-making. The CRM chain must be followed as in Figure 1 below and where links are missing, we must create them.

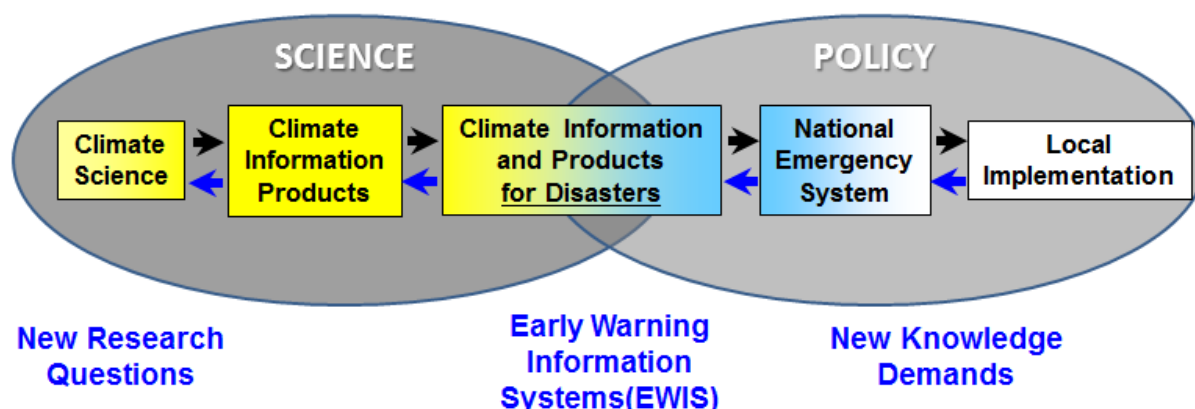


Figure 1: Climate Risk Management Information Chain applied to Disaster Risk Management (DRM)

It is important that we know what kind of risk we want to manage and also to recognize that climate encompasses both climate change and climate variability. Management of risk at a seasonal timescale would be ideal as at the moment, some of our worst impacts occur at this scale and also especially given the sensitivity of socio-economic activities to climate.

With respect to preparedness, there are different stages that CIMH wants to support. Figure 2 below shows the Ready-Set-Go stages and the actions to be taken at each stage follows in Table 1.



Figure 2: Decision Making Across Timescales (Credit: Simon Mason, IRI)

Table 1: Actions associated with decision making across timescales

Stage	Action(s)
Ready	<ol style="list-style-type: none"> 1. Begin monitoring mid-range and short-range forecasts 2. Update contingency plans. 3. Train volunteers 4. Sensitize community well in advance. In this way, they would know of the impacts (how likely or how severe) 5. Enable EWS
Set	<ol style="list-style-type: none"> 1. Continue monitoring shorter timescale forecasts 2. Mobilize assessment team 3. Alert volunteers 4. Warn community

	5. Local preparation activities
Go	1. Deploy assessment team 2. Activate volunteers 3. Distribute instructions to the community; evacuate if needed

Efforts have been made to improve seasonal forecasting in the Caribbean region through the formation of a Regional Climate Outlook Forum (RCOF). RCOFs bring together national, regional and international climate experts, on an operational basis, to produce regional climate outlooks based on input from NMHSs, regional institutions, RCCs Global Producing Centres of long-range forecasts (GPCs) and other climate prediction centres. The Caribbean Outlook Forum (CariCOF) is the regional forum for the Caribbean and has served the Caribbean, along with some sections of Central and South America.

Some examples of early warning/forecasting products developed through CariCOF include: 1) seasonal precipitation outlooks (3 and 6 month timescale), 2) seasonal temperature outlooks (3 and 6 month timescale), and 3) a monthly Caribbean Climate Outlook Newsletter⁶. The move beyond just the production of a seasonal precipitation or temperature Outlook came about as the CariCOF team tried to make the link with what they knew (via monitoring) and what they know was possible (via forecasting). A synthesis of these perspectives has led to the development of the [Drought Outlook](#) with specific alert levels and activities for the user to undertake. Another way to look at drought early warning is through the Caribbean Drought and Precipitation Monitoring Network (CDPMN), which does drought monitoring, early detection and capacity building. The Drought Outlook, produced by CariCOF is therefore complimented by a Caribbean [Drought Bulletin](#) produced by the CDPMN. The Caribbean Drought Bulletin assesses the current drought situation based on monitoring and prediction information using the Standardized Precipitation Index (SPI), overviews the main drought impacts and communicates to stakeholders. Adding another component - the Climate Impacts Database (CID) - it becomes a Caribbean Drought Early Warning System.

Though some progress has been made with providing early warning information systems for the Caribbean, further improvements are needed. These include - but are not limited to - greater customization of products for sectoral application and packaging of information. The Consortium with its experience with sectoral issues and needs can help greatly with making products and information more useable to sectoral stakeholders.

3.3 Questions/ Comments

Participants expressed their views on the usefulness of the products. While most reported that the products were helpful, some reported (e.g., tourism representatives) that they were unaware of the existence of these products. An appeal was also made for training in the use of the products, as well as, translation into more user-friendly language to enhance adoption and utilization within the different sectors. Following are some questions/comments from the participants and CIMH responses.

Dr. Avery Hinds, Caribbean Public Health Agency (CARPHA):

⁶ Available at <http://rcc.cimh.edu.bb/long-range-forecasts/caricof-climate-outlooks/>

- We should identify and make strong links with persons who can help in mitigation.
 - o *Dr. David Farrell responded in the affirmative. This will be looked at.*

Mr. Garfield Barnwell, CARICOM Secretariat:

- In moving from science to policy, the packaging of scientific outputs needs to be addressed so that policy-makers would connect with the information and make use of it. Also, information on the format and context of needs to be addressed. As, a farmer and a person working in finance would look at information differently. We need to package the information in such a way that different users would not have to re-interpret the information.
 - o *Mr. Adrian Trotman, CIMH: With respect to packaging, the involvement of social scientists is key. Relationships have been established with communications specialists to collaborate with stakeholders. In addition, CIMH has emerging experience with social science as it works along the University of Arizona and Columbia University. For example, the Institute's social networks will be looked at to see how far our reach is and how to communicate efficiently.*
 - o *Ms. Donna Pierre, Caribbean Disaster and Emergency Management Agency (CDEMA): Moving from science to policy is important in terms of bridging the gap.*
 - o *Mr. Kareem Sabir, Coastal Zone Management Unit (CZMU): One way to package information is to communicate an estimate of losses. This will however, be different across nations.*
 - o *Ms. Loreto Duffey-Mayers, Caribbean Hotel and Tourism Association (CHTA): It is challenging pooling information together from different agencies.*
 - *Mr. Adrian Trotman: We need to work at having a coordinating mechanism to collate information.*
 - *Dr. Roché Mahon, CIMH: The Caribbean DEWETRA platform may be an accessible, centralised platform to provide climate information.*

4.0 Session 2: Sectoral Strategies and Approaches to Early Warning (Facilitated by Dr. Dale Rankine)

4.1 Sectoral Presentations on Climate-related Strategies and Present Approaches to EWS within sectors

Representatives from six climate sensitive sectors were asked to make a presentation on the present challenges faced from climate and early warning strategies and adaptation measures that can be taken. These presentations can be viewed here. A summary is presented below.

4.1.1 Agriculture and Food Security (Presented by Dr. Leslie Simpson, CARDI)

The major climate factors posing a challenge to the agriculture sector outlined by Dr. Simpson are severe weather events (tropical storms and hurricanes), high rainfall variability, floods, drought, increasing temperatures and saline intrusion into aquifers (as a result of sea level rise). These

challenges cause destruction to crops, livestock and physical infrastructure. The most impactful hazard is drought given the reliance on rain-fed production with little supplemental irrigation.

Proposed adaptation measures to address these impacts include mainstreaming climate studies into all of the CARDI agriculture research programs and determining the range of climate information needed.

Dr. Simpson stated that any EWS or platform should comprise of short-term weather forecasts, seasonal climate forecasts, as well as, pest disease modelling and forecasting.

The gaps that need to be addressed to see the integration of climate information into the agriculture sector stem from the provision of site-specific information for both weather and climate (all timescales), timely updates to bulletins and also a more effective communication strategy for disseminating weather and climate information to the user.

4.1.2 Health (Presented by Dr. Avery Hinds, CARPHA)

The Agency places focus on proper water storage to help control vector populations and the spread of vector-borne diseases and appropriate waste disposal. The Agency leads efforts in public health emergency preparedness and infrastructure and helps with building capacity to cope with health emergencies. While there are no climate-related forecasts issued, during the passage of severe weather events, CARPHA liaises with CDEMA in providing warnings for Health Systems.

Climate factors that prove challenging to the health sector include:

- Drought - giving rise to fires (smoke related ailments); dust (allergies and respiratory illnesses); food security issues; water scarcity (water storage, vector borne diseases, water-borne illnesses);
- Floods - giving rise to injuries and drowning; vector borne diseases; food borne diseases; communicable disease in displaced populations; and
- Extreme weather systems.

Earthquakes and tsunamis were also mentioned. Perceived needs include:

- Faster dissemination of information from regional agencies on impending climate-related hazards;
- More granular data on projected impacts of climate hazards to improve preparedness/impact-mitigation strategies;
- Information sharing between agencies (impacts and interventions);
- Formal central platform/forum for sharing data; and
- Integration of climate related information relevant to health with CARPHA data on health outcomes.

4.1.3 Disaster Risk Management, (Presented by Ms. Donna Pierre, CDEMA)

The Caribbean Disaster Emergency Management Agency (CDEMA) has a 10 year (2014-2024) Comprehensive Disaster Management (CDM) Strategy and Results Framework that guides its programmes in the Caribbean. It covers a wide range of thematic areas including climate variability and change, Information and Communication Technologies (ICT), Gender, and has environmental sustainability as a cross cutting theme. The Strategy covers multiple sectors and listed among these are agriculture, civil society, education, health, finance, and tourism. The Agency has a regionally coordinated network of national disaster management organisations (NDMOs) that serves the needs of, and provides warnings for, national stakeholders. Several past initiatives to build capacity in EWS include the JICA⁷ (flooding), UNDP⁸ (alerts) and Intra-ACP/EU-ERC⁹ (tsunami) initiatives.

CDEMA is in the process of developing a platform- the Caribbean Risk Information System (CRIS) - to host risk management data. This platform may be able to interface with the DEWETRA Platform of CIMH.

Several opportunities were identified by the CDEMA representative for the integration of climate information:

- UNDP CAP EWS initiative - Strengthening resilience and coping capacities in the Caribbean through integrated early warning systems;
- *OAS¹⁰ EWS initiative* – This is still in the very early stages but can lend itself to being a beneficiary of incorporating climate information;
- Caribbean Risk Information System – A platform being developed by CDEMA to host risk management data and information to facilitate analysis, research, greater awareness of risk management in the region; and, to aid in providing material to drive evidence-based decision-making processes. Complementing the CRIS is the establishment of a Regional Technical Working Group

4.1.4 Tourism (Presented by Ms. Gail Henry, CTO; Ms. Denaye Hinds, CHTA/CAST, Ms. Loreto Duffy-Mayers, CHTA)

Both the CTO and the CHTA represent a high number of sector stakeholders. The CTO has a public sector focus with 30 Member States, while the CHTA is private sector-based and represents 34 Hotel and Tourist Associations. The sector has a number of frameworks and manuals that cover different hazards and risks; however there is great reliance on public sector warnings from national disaster offices.

Challenges and gaps for the sector include, capacity building to mainstream DRM, and adaptation to climate variability and change. There is also a challenge with the need for financial services to link standards and incentives to risk reduction as well as the recurrent challenge of coastal erosion and under-representation from the tourism private sector. Recently, the tourism sector has been faced

⁷ Japan International Corporation Agency.

⁸ United Nations Development Programme.

⁹ Collaboration between the African Caribbean Pacific, European Union and Enhancing Resilience to Reduce. Vulnerability in the Caribbean (ERC) Project.

¹⁰ Organisation of American States

with the problem of the Sargassum sea weed (specifically the issue with smell, guests having to evacuate hotels).

There was little prior knowledge of the early warning climate products offered by the CIMH. While some customization would be necessary for full utilization; the view was expressed that the sector could benefit much from provision of such information. Some influence on hazard preparedness in the sector is exerted by overseas (European and North American) tour operators who often check for hazard mitigation strategies in the Caribbean based on disasters that have occurred outside the region. A number of gaps were identified including the need for capacity building, financial resources, and standards for the private sectors, hurricane guarantees, and risk reduction insurance schemes.

Priorities and strategies for improvement include awareness and capacity building at various levels (policy and decision-making to operational) along with evidence-based decision-making and the need for more sustainable tourism. For the private sector, there is a need for cross-collaboration and stakeholder involvement to understand and address climate variability and change. Climate information needs to be presented in a way that tourism operators and policymakers can relate to and there is a need for training for private sector tourism enterprises.

Also listed among priority actions for the sector were: finding a mechanism to forecast the outbreak of seaweed, presenting sharing of good practices, using the sustainable development agenda and assuming the cost of inaction in order to stimulate further investments in early warning systems.

4.1.5 Water (Presented by Mr. Ivan Rodrigues, CWWA)

Water usage in the Caribbean has a clear climate signal. Usage can be increased by up to 20% when there are high temperatures (as occurs in summer). In addition, water demand generally increases after the passage of tropical cyclones, and these events also occasion the need for improved designs of storage and drainage systems. Presently, the water sector is affected by extended dry seasons, flooding events, sea level rise, salt water intrusion, hurricane events and the effects of El Nino. A number of countries in the region are water-scarce and rely on desalination, and the cost of processing this water is much higher than for surface water sources. The cost for this extra processing is not borne by the consumer and places a strain on water providers. Desalination is also becoming increasingly popular in domestic water supplies by private individuals and companies alike. There is therefore the need to forecast the water availability, storage levels, and domestic consumption. The sector is regulated in part by the International Water Resource Management Strategy, which provides a policy framework. There is one major conflict of interest that the sector faces in most islands where the chief user of the resource, mainly the National Water Authority, is also the manager of water. This can create challenges for effective water management.

The sector promotes water conservation and water re-use as part of its management of the resource. More use could be made of climate forecasts and outlooks to inform conservation efforts and water restrictions. Among challenges facing the sector are inequitable distribution of water, revenue losses and abuse of stand pipes and fire hydrants. The media could play a greater role in public education and awareness-raising. A number of successful awareness campaigns have been run through schools.

4.2 Questions/Comments

Several comments/questions were posed to the presenters.

Mr. Garfield Barnwell, CARICOM Secretariat: Questioned whether the CDM Strategy (2014-2024) was developed in the context of the Caribbean Single Market and Economy (CSME). The CDEMA representative responded that this matter would have to be deferred to management. However, note was made that while the CSME may not be explicitly mentioned, the Strategy tries to address issues that are germane to the future socio-economic development of the region.

- Mr. Barnwell expressed his concern with the number of frameworks outlined by the tourism representatives. He noted that Caribbean countries are at different stages of development and there is a need for certain thresholds in capacity levels to be obtained before countries can utilize these frameworks. *Ms. Duffy-Mayers of CHTA responded by stating that while the country may be at a certain threshold, the tourism sector may be further ahead than the country itself.*

Dr. David Farrell, CIMH noted that reduced water availability (caused by droughts) will affect the tourism sector. Since tourism uses up to 10 times more water per capita than any other sector. Seaweed has a known climate signal and could perhaps be modelled successfully. This could be looked at through future collaboration.

5.0 Session 3: Sectoral Applications of CIMH's Climate Information Products and Services (Facilitated by Dr. Roché Mahon, CIMH)

5.1 Overview of CIMH Climate Products (Presented by Dr. Cedric Van Meerbeeck, CIMH)

CIMH is on the road to becoming the Regional Climate Centre that will support regional and national climate activities via the creation of regional climate products (including long-range forecasting). The mandatory functions of the RCC will be but are not limited to, generating regional tailored products (including consensus-based seasonal climate outlooks), providing online access to RCC products, performing regional climate diagnostics, developing regional climate datasets and archiving, establishing a regional historical reference climatology, and implement a regional Climate Watch.

A Climate Watch is encapsulated in the Caribbean Drought and Precipitation Monitoring Network (CDPMN). Drought would be monitored using a combination of local station data from numerous Caribbean countries to produce Caribbean SPI and Deciles. Other monitoring products (eg. temperature) will be produced in 2015.

Producing a reference historical climatology of each country for rainfall and temperature provides contextual information for seasonal climate monitoring and prediction. At CIMH, work has already been done in computing the median, upper and lower thresholds of rainfall.

Activities producing tailored products began as a collaboration between the CariCOF, the CACFO and the IRI. The resulting Drought Outlook takes past information into account to determine what is likely to occur in the future and produce a set of actions for the anticipated alert level. There is also the CariCOF Climate Outlook Newsletter, the Caribbean Drought Bulletin and the Regional Agroclimatic Bulletin. The intention is to have all the products available via the website of the (new) Regional Climate Centre (<http://rcc.cimh.edu.bb/>).

5.1.1 Discussion

During a round table discussion, the question was posed to sectors on their level of awareness of the products. Some of the sector represented were not aware of the products being produced and where there had been awareness of the products, there were not readily utilised.

5.2 The Use of Drought Early Warning Information in the Agriculture Sector (Presented by Dr. Leslie Simpson, CARDI)

Agriculture stakeholders uses many of the products developed under the CAMI Project, including the seasonal climate forecasts for precipitation and temperature, as well as, the drought alerts. The sector also utilizes national weather forecasts and would like to make better use of pest and disease modelling. However, use of the products by CARDI professionals is very limited as they are not very familiar with them. There was an appeal for training and capacity building in this regard. There is also a need for a better form of communication between the Meteorological services and CARDI as it is currently done via e-mail.

The current range of actions and measures taken to cope with drought include rainwater harvesting and storage, the use of heavy duty pond liners, the use of solar pumps and black plastic tanks, increased use of trickle irrigation, and soil water conservation systems (mulching). Measures to improve the region's adaptation to drought should include an increase in the number of weather data collection sites, integration of early warning systems with on-farm planning and activities, expansion of crop simulation modelling to include a greater range of crops and continued to development of more efficient on-farm solutions including improved germplasm.

5.3 Delivering Sectoral Climate Products and Services – National Perspectives

The national level case studies presented some examples of how early warning climate information is directly applied by key climate sensitive sector at the regional level

5.3.1 Jamaica Meteorological Service (Presented by Ms. Jacqueline Spence)

Ms. Spence shared good practice examples of products and tools that have been developed for the agriculture sector in Jamaica. The development of these products was largely driven by the CAMI Project, with technical support from the International Research Institute for Climate and Society at Columbia University and funding support from the USAID. Products developed include a local towns forecast, agro-met and drought bulletins, web-based and mobile applications for dissemination of

information and receipt of feedback. The products have been positively received and efforts are underway to refine them, and offer further training and capacity building in the use of the same.

5.3.2 Barbados Water Authority (Presented by Ms. Jamie Paul)

Ms. Paul reported that the BWA makes good use of the CIMH drought bulletins, as well as all of the Outlooks in addition to data and information from the Meteorological Service of Barbados. The actions in the sector including water restrictions that guided by the expected precipitation. Ms. Paul emphasized that as drought conditions become more apparent, water conservation efforts are escalated.

5.3.3 Coastal Zone Management Unit, Barbados (Presented by Mr. Kareem Sabir)

The Coastal Zone Management Unit (CZMU), Barbados does not directly utilize the climate products of the CIMH, however, it conducts wave height monitoring, and supports a coral reef early warning system (CREWS). It also maintains a tsunami hazard early warning system. It was expressed that the climate products could be useful moving forward.

5.3.4 Ministry of Agriculture, Barbados (Mr. Leslie Brereton,)

The Meteorological Service which falls under the aegis of the Ministry of Agriculture produces daily and short-range forecasts which are utilized by the Ministry. Further, efforts are needed in awareness raising, training and capacity building to enhance the application of climate products.

5.4 The Caribbean Dewetra Platform (Presented by Mr. Shawn Boyce, CIMH)

Participants were given the opportunity to view the Caribbean Dewetra platform in operation as Mr. Boyce gave a brief demonstration of its components. The platform has controlled user-access and can provide, information on critical climatic parameters including precipitation, temperature, relative humidity, wind speed and direction. Dewetra allows for viewing of observational data and can also interface with weather radar to track the transit of severe weather systems across the Caribbean. It also can be used to assess hydro-meteorological risks, including floods and landslides. The initial geographical range was for the Eastern Caribbean sub-region, but this has since been expanded to the rest of the Caribbean. Efforts are underway to increase the range of data in the platform to include socio-economic data such as demographic information, and to support the development of regional and country-specific tools based on user needs.

5.4.1 The CDEMA Experience (Presented by Ms. Donna Pierre, CDEMA)

Dewetra is a real-time data and information integration system for hydro-meteorological risk forecasting, environmental monitoring and disaster risk mitigation.

This platform was developed in order to provide a new application for assessing risk and managing emergencies. It has shown to be of value in disaster risk management as it aids in preparedness, mitigation, response and recovery.

There has been collaboration between CIMH and CDEMA for training on using the Dewetra platform. This has begun and is expected to continue in the near future across some countries within the region.

5.4.2 Discussion

Representatives from the tourism sector lauded CIMH's efforts in producing the Dewetra platform as they can foresee its integration into the sector.

Mr. Lester Arnold, OECS: How does the real time information coincide with other images from radar?

Mr. Boyce: It depends on where the information is coming from. There is a larger time delay with satellite information. Data will only become available on the platform as long as the radar is in operation. Where systems are in place to share data, then it will be available on the platform.

Professor Michael Taylor, UWI Climate Studies Group, Mona: Dewetra is a very useful tool and the UWI would be interested in having user access. It could help to significantly enhance applied research and impact assessment.

5.5 The Caribbean Climate Impacts Database (Presented by Ms Shelly-Ann Cox, CIMH)

Ms. Cox presented briefly on the web-based CID and showcased its usefulness in recording impacts on different sectors. The (CID) is an inventory of climate-related impacts, as well as, suggested response procedures based on these impacts. The database has multiple records dating back to pre-1900 and allows for uploading of information via different media formats (email, Twitter). The CID complements the Dewetra platform. At present data has been compiled for sixteen countries using the flood database of CDEMA and the CID is set to be launched at the CariCOF, on June 2, 2015.

5.5.1 Questions/Comments

CSGM Mona: Who will have access to the database and at what level?

Ms. Cox: The CID will be open access. Access to the database will be via user profiles in which the user would be able to report impacts. However, restrictions will be put in place on the way a user is able to export these impacts. In the case of consultants, a fee would be required for the information. A registration page is currently being set up.

CARICOM Secretariat: The big question to the reports of these impacts would be whether they are self-imposed or if they actually occurred from the event(s). As we have seen in the past there have been large impacts from small events – one such case being the removal of mangroves to control mosquitoes and praedial larceny. This platform is useful but we still need case studies for informing policy-makers.

CSGM Mona: It may not be CIMH's responsibility to make the case studies. Other government mandated agencies can take the data and conduct the studies.

6.0 Session 4: Understanding Sectoral Opportunities and Limitations to Sectoral EWISACTs

6.1 Group Discussion on Key National and Sectoral Issues, Critical Gaps and Opportunities for Sectoral EWISACTs (Facilitated by Dr. Cedric Van Meerbeeck and Dr. Dale Rankine, CIMH)

6.1.1 Water

Even though climate products are used by the Barbados Water Authority (e.g., the Drought Bulletin, precipitation and temperature Outlooks) at some levels within the organization to inform decision making, the information is not always filtered down. For example, there is insufficient use of the information by distribution/operation managers. This is mainly due to the fact that the products are not well understood. It is important for BWA to have an internal discussion platform to review the climate outlook products.

CWWA stated that the major limitation to the penetration and ultimate use of the information is the size of the water utility. If the water utility is small then the same person receiving the information is likely to be the decision-maker.

The needs outlined by the water sector included the need for usable “near future” climate predictions.

6.1.2 Agriculture

Some professionals are not aware of the products and in the case where they are aware, they are not used because they do not understand them. The issue suggested by the representative from CARDI is inertia which, in part, could be alleviated through more training.

Within the agriculture community the professionals have not made the relation between agriculture and climate. No effort has been made to increase the one’s knowledge regarding climate and its effects. They are unaware of how the information would benefit the sector.

If new products are to be developed by the Consortium, the priority lies in appropriate language, timing of delivery and training in the use of products.

6.1.3 Health

There is a problem of knowing whether everyone within the sector actually use the products, in an organisation consisting of five sub-sections. However, in Trinidad and Tobago the products are not directly used.

This sector sees the potential use of the CID for prediction of certain impacts. However, there is a question of whether resources can be mobilized for research using the CID.

The request for wind and evapo-transpiration projections on a climate timescale was rebutted by CIMH due to the fact that wind has a low predictability and the lack of data to make evapo-transpiration predictions. However, representative from UWI-CSGM suggested that new strides are being made in wind forecasting on the climate timescale.

6.1.4 Disaster Risk Management

CDEMA currently uses the Dewetra platform and encouraged other sectors to use the available products. Stakeholder consultation is also necessary as it would provide the vehicle along with training in gaining a better understanding and usage of the products.

Products addressing climate risk are necessary.

6.1.5 Tourism

The tourism sector was not aware of the climate products available. If more stakeholders were aware then they would have made use of the products.

The sector needs to have the information tailored for them as it would be useful in many ways. Information on risk and liability along with information from tourist source regions (in terms of temperature predictions and severe weather for hotels, tour operators, transport etc.) would be useful.

There are subsectors using information in different ways (e.g. water access in hotels). This points to the necessity of having the middle link in the DRM information chain in place (interpretation of climate information into water availability).

6.2 Comments

The CARICOM Secretariat suggested that a stronger link between CIMH and donor agencies is needed through raising more awareness of excellent innovation.

7.0 Session 5: Presentation of Draft Conceptual Framework and Methodology for sectoral EWISACTs in the Caribbean

7.1 Draft Conceptual Framework for Sectoral EWISACTs in the Caribbean (Dr Dale Rankine, CIMH)

Dr. Rankine reviewed the objectives and the methodology.

The three objectives of the framework were: 1) to design, develop and deliver an increased range of sector driven climate products and services; 2) to design, develop and deliver integrated decision support processes and tools; and 3) to design, develop and deliver capacity building and training programs in support of climate services.

The list six steps of the proposed methodology for the development of sectoral EWISACTs of the conceptual framework are outlined below:

1. Establish management, coordination and ownership mechanisms at regional and national levels.
 - a. Integrated multi-sector partnership for EWISACTs development.

- b. Bears hope for (cost) effective and complementary interventions and not competitive or isolated actions
 - c. Utilizes existing Institutions and programs for climate services
 - d. Strengthen coordination at national level
- 2. Baseline sector specific risk, user's needs and providers' capacity.
 - a. Assess sector specific risks: Assess, document key knowledge gaps of climate-related hazards and vulnerabilities - Synthesis of existing data and information
 - b. Assess legal and institutional context: examine current frameworks, policies and plans. Identify optimal institutional arrangements, partnerships and plans to operationalize EWISACTs-regionally and nationally
 - c. Assess users' needs: A major gap is understanding the nature of needs, capability to incorporate information into decision-making, format of information required, 'language for transfer'
 - d. Assess providers' capacity to deliver climate services: both for CIMH, and NHMS (there is interdependence).
 - e. Formal baselines tied to consensus-based indicators lacking. Enhance work beyond CariCOF
- 3. Develop new and improve on existing impact models.
 - a. This includes enhancing forecasting for decision-making.
 - b. Refining existing models and outputs.
 - c. Collaborating to develop new impact models for the Caribbean context.
 - d. Integrating socio-economic indicators.
 - e. Improving prediction capabilities.
- 4. Develop, test and validate sectoral EWISACTs products and prototypes.
 - a. Iterative testing of new products to validate outputs.
 - b. Customize tailored products to meet sector specific needs.
 - c. Continuous improvements to products until desired results are attained.
- 5. Integrate products and prototypes within Decision Support Systems (DSS).
 - a. Explore its compatibility with other existing platforms.
 - b. Expand Dewetra to all targeted sectors
 - c. Incorporate new products, as well as, the CID into the Dewetra platform.
- 6. Strengthen capacity to provide, absorb and utilize climate information. This includes a series of actions including:
 - a. Training and capacity building of sector stakeholders
 - b. Enhancement of NHMS
 - c. Direct interfaces with users of information to help with translation of science into sectoral actions

7.2 Discussion – Feedback from Sectoral Partners on the Draft Conceptual Framework and Methodology (Facilitated by Mr Adrian Trotman, CIMH)

Mr. Garfield Barnwell, CARICOM Secretariat:

- Even though he supports much of what was presented, there is a need to clarify whether CIMH wishes to establish a mechanism or an institutional approach.
- In addressing science and technology issues, perhaps we need a model (such as one for CARPHA)

Dr. Roché Mahon, CIMH: We envision the Consortium for to be one in which sectoral agencies sit. This is a long-term agenda and we are currently at the beginning of the process. This can be viewed as the first phase of development. We need to look at a longer framework as we move forward.

Dr. Dale Rankine, CIMH: Having the consortium allows periodic updating of information and other projects which could assist in the advancement of the process.

Dr. Leslie Simpson, CARDI: Resources are needed to carry the initiative forward. It may be important to include the private sector as well since they are equipped with resources to support regional organizations. We would need to think of a way to get it done.

Mr. Garfield Barnwell, CARICOM Secretariat: Next step would be for CIMH to fashion a concept note to present to Heads of Governments outlining what we in the region desire to have.

8.0 Session 6: Consortium TOR Review and Discussion

Before the adoption of the TOR a review of the draft TOR was given by Dr. Mahon.

8.1 Draft TORs to Support a Regional Sectoral EWISACTs Coordination Mechanism (Facilitated by Dr. Roché Mahon and Dr. Cédric Van Meerbeeck, CIMH)

Sectoral participants were invited to present TORs to support a regional sectoral EWISACTs and coordination mechanism.

8.1.2 Agriculture (Presented by Dr. Leslie Simpson, CARDI)

The proposed role of the agricultural EWISACTs Partner will include but not be limited to:

- Bringing important emerging challenges related to weather and climate in the agricultural sector to the CIMH;
- Promoting the provision and dissemination of relevant EWISACTs information to the farming community;
- Providing and supporting a mechanism for increasing the awareness and utilization of suitable and usable EWISACTs information to the farming community; and
- Providing support to the training of the farming community to better understand and interpret weather and climate information for the planning of adaptation solutions.

Added action items to Agriculture EWISACTs:

1. Give advice on: Best planting/harvest dates for respective crops, given rainfall and drought forecast;

2. Based on Climate Change projections, provide alternative crop options: of Drought and Heat tolerant Crops/Cultivars;
3. Liaise with *inter alia* the Meteorological Service for provision of local forecast information for the farming community; and
4. Coordinate the Conduct of crop simulation modelling and other research efforts to assess crop sensitivity to climate extremes (temperature and rainfall) and propose remedial measures.

8.1.3 Health (Presented by Dr. Avery Hinds, CARPHA)

The proposed role of CARPHA will include:

1. With respect to data and information, exploit data and information for the benefit of its stakeholders and partners in a number ways. This will include:
 - a. Obtaining data and information from multiple sources;
 - b. Monitoring local, regional and international trends;
 - c. Providing interpretation and analysis where appropriate;
 - d. Disseminating information to key stakeholders through a variety of methods; and
 - e. Contributing towards formalising data sharing arrangements between CARPHA and CIMH.
2. In regards to health response coordination for climatic and other emergencies/disasters:
 - a. Provide rapid technical advice and emergency support to Member States requesting assistance with a public health threat (natural or man-made);
 - b. Provide a mechanism which supports multi-sectoral risk assessment, and response
 - c. Conduct and coordinating activities in collaboration with relevant national, regional and international stakeholders;
 - d. Promote a systems approach to support strengthening public health infrastructure in order to leverage common structures, functions and capacities in pursuit of sustainability; and
 - e. Contribute to global health agreements and facilitating Member States progress towards full implementation of the International Health Regulations (IHR 2005).
3. In advocacy:
 - a. Help to link to relevant response agencies for risk and impact mitigation relevant to health threats;
 - b. Develop collaborative partnerships; and
 - c. Resource mobilization.

CARPHA also pledges support to the examination of issues that cut across issues or sectors, or depend upon the ways in which environmental or other issues interact via:

- Partnerships and collaboration;
- Workforce development and training;
- Plans, policies and programs;
- Governance and leadership;

- Monitoring and evaluation; and
- Research.

8.1.4 Disaster Risk Management (Presented by Ms. Donna Pierre, CDEMA)

CDEMA proposed responsibilities include:

1. Provide technical assistance to Participating States to understand and incorporate the use of the Climate Services products and tools into their Country Centred Work Programmes;
2. Assist Participating States with the integration of the outputs of the climate services tools and products into their National Disaster Management Plans (Response Plans inclusive of the Hazard Specific Plans);
3. Collaborate with the CIMH to provide training to the NDMOs;
4. Collaborate with the CIMH to increase awareness on the Climate Services and Products using existing platforms – TAC, CDM Conference;
5. Support the development of institutional arrangements to sustained results; and
6. Facilitate broader dialogue and sustained engagement with priority sectors using the existing CDM CHC Sector Sub Committee mechanism.

8.1.5 Tourism (Presented by Ms. Gayle Henry, CTO)

The CTO is able to perform or commit to:

1. Provide technical guidance and support on development and implementation of regional tourism EWISACTs;
2. Feedback provision on relevant technical documents re tourism climate products and services;
3. Advice provision on tailored climate products and services for tourism sector based on consultation with CTO Members;
4. Identification of critical gaps and opportunities for inter-sectoral linkages and synergies at regional level;
5. Assist in technology promotion and knowledge transfer and facilitation of sustainability of sectoral EWISACTs outputs;
6. Advocacy and awareness building on key issues and possible solutions at the level of the Tourism Ministerial Council and Board of Directors and with partner agencies to facilitate tourism sector EWISACTs visibility;
7. Utilize various platforms for promoting tourism sector EWISACTs e.g. meetings, conferences, website, traditional and social media;
8. Technical input from an assigned CTO staff member; and
9. Assistance in coordinating receipt of feedback from CTO Member countries on tourism-related EWISACTs.

CHTA/CAST is able to commit to:

1. Facilitate information and awareness to NHAs:
 - a. Links between RCC to CHTA/CAST Resources webpage;
 - b. Monthly Webinar Series – dedicate one session; and
 - c. CHIEF (Caribbean Hotel Information & Education Forum) – potential track under sustainability.
2. Facilitate data sharing and information validation:
 - a. Facilitate the identification of historical climate related impacts to tourism enterprises; and
 - b. Validate tourism specific climate bulletins produced by CIMH (monthly).

8.1.6 Water (Presented by Ivan Rodrigues, CWWA)

CWWA is willing to commit to:

1. Promotion of water conservation and water reuse as a method of coping with potential climate change impacts and water scarcity;
2. Promoting integrated water resource management - development of regional water resources policies and regulations;
3. Promotion of watershed management and sustainable water use;
4. Circulating information conducting/coordinating activities with membership to sensitize them of the work being undertaken at CIMH and the BRCCC program;
5. Assist with membership training /capacity building so that climate data/analysis/forecast would be better understood and utilized - to promote a better understanding of climate variability and climate change;
6. To support data sharing among its membership and with the CIMH; and
7. To support CIMH efforts to make the presentation of its forecast and other information more user friendly.

8.2 Discussion

During the discussion, there were several comments made and questions asked.

Mr. Kareem Sabir, CZMU: Is there scope for oceanographic regional expertise captured within the membership?

Dr. Mahon: No. The essence of the Consortium is a mechanism of mainstreaming climate services into sectors.

Dr. Van Meerbeeck: We are not at the stage to include in this TOR.

Mr. Garfield Barnwell, CARICOM Secretariat:

- It is usually good to include a member state(s) for accountability, transparency and also to act as a champion.
- Are you making provision for a mid-term review?
- Is it a mechanism or an institution? At a political level, you would get support for a mechanism.

Dr. Van Meerbeeck: It is better seen as a mechanism within the RCC with the institution being the RCC hosted by CIMH.

Dr. Farrell: The Consortium should become operationalized within the RCC. There is a need for sustainable funding as it's life should be beyond the BRCCC Programme.

To this end CIMH will commit to refining the language of the TOR and it was suggested by Dr. Farrell that CIMH work along with the CARICOM Secretariat in refining the language.

Dr Farrell highlighted that Section 2.12 of the TOR needs to be revised as it should only be for the duration of the BRCCC Programme.

Mr. Lester Arnold, OECS suggested that there be a face-to-face meeting at least once per year.

Mr. Kareem Sabir, CZMU: Someone should be committed to creating a sustainability plan.

Dr Farrell: CIMH could support Consortium as its role under RCC

The meeting made a commitment to further review and rationalise the TORs in collaboration with the CIMH.

9.0 Session 7: Work and Implementation Plan Review (Facilitated by Dr. Cédric Van Meerbeeck)

9.1 Presentation by Dr. Roché Mahon

Dr. Mahon drew the attention of the meeting to the hardcopy of the draft Work and Implementation Plan (WIP) document provided in the meeting pack. Dr. Mahon first discussed the process for the development of Outputs under the four prescribed Outcome Areas outlined in the WIP. She then went on to describe each output, as well as, provide a rationalisation for the choice of outputs. Sector representatives were then invited to comment on the nature and scope of proposed Outputs.

Discussion (Facilitated by Mr. Adrian Trotman, CIMH)

Ms. Elizabeth Riley (CDEMA), stated that there is a lot of work proposed under Outcome Area III. She is not certain if it would be completed for the six named sectors in the eighteen month timeframe. The question is whether consultants would be hired to complete the tasks?

Dr. Mahon: Yes, consultants may be hired. There are aspects in Outcome Area II which will be done by CIMH as we would want to build our own capacity ourselves.

The sectoral partners made a commitment to review the WIP document and prioritize Outputs and provide feedback for their individual sectors.

10.0 Session 8: Way Forward

10.1 Endorsement in Principle of Meeting Documents

By the end of the day, adoption of the draft documents was not possible. However, the documents were endorsed in principle with a commitment from sectoral representatives to participate in reworking the documents within two weeks.

In his closing comments Dr. Farrell stated that this was a good opportunity to do something interesting from a regional perspective. With key sectors being present, collaboration can be achieved and thus reach out to the Heads of Government for buy-in. Dr. Farrell emphasised that the CIMH is committed to this work in-kind and some funding. He encouraged others to request that funds be allocated to support this initiative when writing letters to donors. Much on the program is achievable but only through committed work. It is important that we set the goal high enough that in the end, USAID sees decent products and we possibly receive additional funding.

Appendix A: Participant List

	Name		Organisation	Country	Contact
	Last	First			
1	Simpson	Leslie	CARDI	Jamaica	leslieasimpson2000@yahoo.co.uk
2	Spence	Jacqui	Met Office	Jamaica	jampence21@gmail.com
3	Rodrigues	Ivan	CWWA	Antigua	ivan@apua.ag
4	Barnwell	Garfield	CARICOM	Guyana	garfield.barnwell@caricom.org
5	Hinds	Avery	CARPHA	Trinidad	hindsave@carpha.org
6	Hinds	Denaye	CHTA	Bermuda	dhinds@obmi.com
7	Taylor	Michael	CSGM	Jamaica	michael.taylor@uwimona.edu.jm
8	Jean	Allison	CARILEC		aaJean@carilec.org
9	Ayala	Nancy	CCCCC	Belize	nayala@caribbeanclimate.bz
10	Arnold	Lester	OECS	St. Lucia	larnold@oecs.org
11	Duffy-Mayers	Loreto	CHTA	Barbados	
12	Henry	Gail	CTO	Barbados	ghenry@caribtourism.com
13	Pierre	Donna	CDEMA	Barbados	donna.pierre@cdema.org
14	Sabir	Kareem	CZMU	Barbados	ksabir@coastal.gov.bb
15	Harvey	Ena	IICA	Barbados	ena.harvey@iica.int
16	Waithe	Roxanne	IICA	Barbados	
17	Brereton	Leslie	MOA	Barbados	lesliestjbrereton@yahoo.com
18	Paul	Jaime	BWA	Barbados	jaime.paul@bwa.bb
19	Lazarus	Cedric	FAO	Barbados	cedric.lazarus@fao.org
20	Mahon	Roche		CIMH	Mahon
21	Rankine	Dale		CIMH	Rankine
22	van Meerbeeck	Cedric		CIMH	van Meerbeeck
23	Trotman	Adrian		CIMH	Trotman
24	Cox	Shelly		CIMH	Cox
25	Stoute	Shontelle		CIMH	Stoute
26	Farrell	David		CIMH	Farrell
27	Scott	Wazita		CIMH	Scott

Appendix B: Agenda

**Building Regional Climate Capacity in the Caribbean (BRCCC) Programme
First (1st) Meeting of the Consortium
of Regional Sectoral EWISACTs Coordination Partners
CIMH, Husbands, St. James
May 6th - 7th, 2015**

Meeting Objectives:

1. Familiarize sectoral stakeholders with the Global Framework for Climate Services (GFCS), the Building Regional Climate Capacity in the Caribbean (BRCCC) Programme, the concepts of climate services, Regional Climate Centre (RCC) and the structure of Early Warning Information Systems Across Climate Timescales (EWISACTs);
2. Discuss sectoral climate-related strategies and present approaches to Early Warning Systems (EWS) within sectors;
3. Strategize for the development of sectoral EWISACTs under the BRCCC Programme;
4. Endorse in principle a Conceptual Framework for sectoral EWISACTs in the Caribbean;
5. Confirm in principle sector partners and formalise the establishment of a regional sectoral EWISACTs Coordination Mechanism;
6. Endorse in principle Draft TORs to support a regional sectoral EWISACTs Coordination Mechanism; and
7. Endorse in principle a Work and Implementation Plan for the development of sectoral EWISACTs.

Wednesday 6 May

TIME	SESSION		RESOURCE AGENCY/PERSON
8:30 – 9:00	Arrival and registration		All
9:00 - 9:10	Welcome remarks		Dr. David Farrell, CIMH
9:10 - 9:30	Introduction of participants/Icebreaker Meeting objectives and adoption of Meeting Agenda		Mr. Adrian Trotman/ Ms. Shelly-Ann Cox, CIMH
9:30 - 9:45	Session 1 International and regional context of climate services in the Caribbean	The GFCS and the BRCCC Programme	Dr. David Farrell, CIMH
9:45 – 10:00		Climate Services and Early Warning Information Systems Across Climate Timescales (EWISACTs)	Dr. Cédric Van Meerbeeck, CIMH
10:00 – 10:30		Discussion	Mr. Adrian Trotman, CIMH
10:30 - 10:45	Coffee break		
10:45 – 12:45	Session 2 Sectoral strategies and approaches to early warning	Sectoral presentations on climate-related strategies and present approaches to EWS within sectors (<i>10 minutes per presentation</i>)	Dr. Leslie Simpson, CARDI; Ms. Allison Jean, CARILEC; Dr. Avery Hinds, CARPHA; Ms. Donna Pierre, CDEMA; Ms. Gail Henry, CTO/Ms. Loreto Duffy-Mayers, CHTA/Ms. Denaye Hinds, CHTA CAST; Mr. Ivan Rodrigues, CWWA
12:45 – 1:45	Lunch		
1:45 – 2:00	Session 3 Sectoral applications of CIMH's Climate Information Products and Services	Overview of CIMH climate products	Dr. Cédric Van Meerbeeck, CIMH
2:00 – 2:15		The Use of Drought Early Warning Information in the Agriculture Sector	Dr. Leslie Simpson, CARDI
2:15 – 3:15		Delivering sectoral climate products and services – National perspectives (<i>Presentations by 4 national representatives, 15 minutes per presentation</i>)	Ms. Jacqueline Spence, Jamaica Met Service; Ms. Jaime Paul, Barbados Water Authority; Mr. Kareem Sabir, Coastal Zone Management Unit (Barbados); Mr. Leslie Brereton, Ministry of Agriculture (Barbados)
3:15 – 3:30		The Dewetra Platform – The CDEMA Experience	Ms. Donna Pierre, CDEMA
3:30 – 3:45	Coffee break		
3:45 – 4:15	Session 3 Cont'd	The Dewetra Platform - <i>Interactive exercise</i>	Mr. Shawn Boyce, CIMH
4:15 – 4:45		Climate Impacts Database - <i>Interactive exercise</i>	Ms. Shelly-Ann Cox, CIMH
4:45 – 5:00		Summary and Close	Dr. Dale Rankine, CIMH

Thursday 7 May

TIME	SESSION		RESOURCE AGENCY/PERSON
8:30 – 9:00	Arrival		All
9:00 - 9:10	Review of Day 1 and introduction to Day 2 sessions		Drs. Dale Rankine and Roché Mahon, CIMH
9:10 – 10:10	Session 4 Understanding sectoral opportunities and limitations to sectoral EWISACTs	Group discussion on key national and sectoral issues, critical gaps and opportunities for sectoral EWISACTs	All Facilitator: Dr. Cédric Van Meerbeeck, CIMH
10:10 – 10:25	Coffee break		
10:25 – 10:45	Session 5 Conceptual	Draft Conceptual Framework for Sectoral EWISACTs in the Caribbean	Dr. Dale Rankine, CIMH
10:45 - 11:45	Framework review	Discussion <i>Feedback from sectoral partners regarding the Draft Conceptual Framework</i>	All Facilitator: Mr. Adrian Trotman, CIMH
11:45 – 12:45	Lunch		
12:45 – 1:00	Session 6 TOR review	Draft TOR for the Consortium of Regional Sectoral Early Warning Information Systems Across Climate Timescales (EWISACTs) Coordination Partners	Dr. Roché Mahon, CIMH
1:00 – 2:00		Draft sectoral TORs to support a regional sectoral EWISACTs Coordination Mechanism (10 minutes per sectoral presentation)	Dr. Leslie Simpson, CARDI; Ms. Allison Jean, CARILEC; Dr. Avery Hinds, CARPHA; Ms. Donna Pierre, CDEMA; Ms. Gail Henry, CTO/Ms. Loreto Duffy-Mayers, CHTA/Ms. Denaye Hinds, CHTA CAST; Mr. Ivan Rodrigues, CWWA Facilitators: Dr. Dale Rankine and Dr. Roché Mahon, CIMH
2:00 – 2:20	Session 7 Work and Implementation Plan review	Development of Sectoral EWISACTs: Draft Work Plan 2015-2016	Dr. Roché Mahon, CIMH

2:20 – 2:50		Discussion <i>Feedback from sectoral partners regarding the draft WIP</i>	All Facilitator: Mr. Adrian Trotman, CIMH
2:50 - 3:05	Coffee break		
3:05 – 3:10	<u>Session 8</u> Adoption of key meeting documents and Way forward	Adoption in principle of Draft Conceptual Framework	All
3:10 – 3:15		Adoption in principle of Consortium and sectoral TORs	All
3:15 – 3:20		Adoption in principle of Draft Work Plan 2015-2016	All
3:20 – 3:50		The Way Forward: Regionally and Nationally	Dr. David Farrell, Mr. Adrian Trotman, CIMH
3:50 – 4:05		Summary and Close	Dr. David Farrell/ Mr. Adrian Trotman/ Dr. Roché Mahon, CIMH

Appendix C: Statement from The Caribbean Community Climate Change Centre (CCCCC)

By ALBERT JONES

"Thanks for the opportunity to address this gathering of this First Meeting of the Consortium of Regional Sectorial Partners to coordinate and structure the Early Warning Information Systems Across Climate Timescales (EWISACTs).

I am pledging the support of the 5C in this initiative, and after hearing the cries and pleas for more environmental data collection across the region, I need to stress that we will do our endeavor best to support these efforts in any way we can.

We are presently looking at developing a program to do intensive data harvesting across the region and is collaborating with NOAA in its Caribbean Strategy to move this forward. With NOAA's guidance from what is available for Puerto Rico and the Virgin Islands, we want to translate those Online Tools, that in the first instance, will deal with Coastal Inundation and Flood Hazards Mapping. We are hoping to gather data from the individual CARICOM Member States on their National Activities in acquiring Topographic and Near-Shore Bathymetric Data. In this collection initiative, we are looking for data with 2m or less resolution. In cases where they don't exist, we are hoping to execute the necessary surveys to get the needed data.

Additionally, we are listening to the desires for increase in-situ data collection in the individual countries and so we intend to increase our support in this area as well. This is to address the needs for Terrestrial, Sea-Level and Coral Reef Monitoring. Ideally, we will dialogue with the individual data collecting institutions on maximizing our data collection network in conjunction with the Spatial and Temporal needs of the Climate Products we want to deliver across the region.

We at the Centre stand committed to these efforts and again will pledge our support to this Consortium as we move forward to build our Resilience to Climate Variability and Change. Thanks again for this opportunity."

Best Regards
Albert

Albert R Jones
Instrumentation Officer
Caribbean Community Climate Change Centre
Lawrence Nicholas Building, Ring Road, P.O. Box 563
Belmopan, Belize

Annex 1: Synthesis of Responses to online feedback form

Executive Summary

The first meeting of the Consortium of regional sectoral EWISACTS coordination partners was convened at the headquarters of the Caribbean Institute for Meteorology and Hydrology (CIMH) in Barbados, May 6-7, 2015. This consortium is a key mechanism for the Programme for Building regional climate capacity in the Caribbean (BRCCC programme) and brought together sector leads from the six climate sensitive sectors targeted under the project. An online survey (with 10 questions) was carried out over the period May 7- June 23 to ascertain feedback from the participants regarding the meeting. A total of 11 respondents participated representing nine agencies, including all but one of the consortium members.

The main feedbacks of the respondents are briefly summarized below:

- I. Main reasons for attending the meeting was to participate in the consortium and gain better understanding of Caribbean EWISACTS;
- II. The presentations and interactive exercises were regarded as being useful and the discussion segments were deemed mostly productive;
- III. Most respondents felt that the duration of the event was right, however some expressed the view that the meeting could have allotted more time for its deliberations;
- IV. The meeting venue, hotel accommodation and catering services were deemed acceptable;
- V. The presentations made, information shared as well as opportunities networking were among key features most liked about the meeting;
- VI. With respect to areas for improvement participants voiced that more time was needed for discussion and pre-meeting sectoral consultations.
- VII. The consortium mechanism was embraced by all, and expectations are high for the way forward and some very useful comments were offered for inter-agency and cross-sectoral collaboration

1. Background

The islands of the Caribbean are inherently vulnerable to the adverse impacts of climate variability and change. These impacts include damage and loss associated with changing weather and precipitation patterns, more frequent and intense storms, more frequent and intense flooding and drought; sea level rise that is accelerating coastal erosion and threatening infrastructure; saltwater intrusion into coastal aquifers further reducing freshwater supplies; and increased air and sea surface temperatures that influence hurricane severity. The vulnerability is therefore pervasive, not only because of the physical location and size of the islands, but also because of their geography and high concentration of settlements and infrastructure within narrow coastal zones. Further, the main socioeconomic sectors on which life and livelihoods depend are very sensitive to climate. In recognition of this, and in an effort to address same, the Programme for Building Regional Climate Capacity in the Caribbean (BRCCC Programme) was launched in January 2014.

The BRCCC programme is funded by the generous support of the American people through the United States Agency for International Development (USAID) in the sum of USD 5.085 million. The programme features a partnership between the World Meteorological Organization and the Caribbean Institute for Meteorology and Hydrology (CIMH) and targets action in six climate sensitive sectors (Agriculture & Food Security, Disaster Risk Management, Energy, Health, Tourism and Water). The development and piloting of early warning information systems across climate time scales (EWISACTS) for these sectors are being specifically carried out. Central to this pursuit is effective regional coordination within the eight participating countries of the Eastern Caribbean and across the targeted sectors. Accordingly a consortium of regional sectoral EWISACTS coordinating partners was established and convened its first meeting over two days (May 6-7, 2015) at the headquarters of the CIMH, in Barbados.

The meeting presented to the consortium members background information, products and services offered by the CIMH. Further, it provided a forum to review and refine the consortium terms of reference, conceptual framework, as well as the work and implementation plan for the project. Five of the six member organizations of the consortium attended, while another the Caribbean Electric Utility Corporation (CARILEC) participated virtually (via GoToMeeting) but did not

complete the survey. This report gives a synthesis of responses of consortium members to an online survey regarding the meeting.

2. Methods

An online survey (in google forms) was developed and circulated to all participants at via email on 7th May 2015. The survey comprised ten (10 questions) with six closed and four open ended questions and participation was voluntary. Excluding the staff of the CIMH, the survey was sent to a total of 20 persons and data collection was terminated on 23 June 2015. A total of 11 persons (from nine agencies) completed the survey. The details of respondents are given in section 3 below.

3. Responses

This section gives details of the responses to the open and closed questions in the online survey. For ease of reference the actual questions posed are quoted before the responses are given. In all cases the total number of respondents is 11, except for question 1, where multiple responses were allowed for that question. The only invited member of the consortium that did not respond was CARILEC. A spreadsheet with all the detailed responses is annexed (soft copy) to the report.

3.1 Participating Institutions

A total of nine institutions responded including five of the six consortium lead agencies in addition to three institutions with observer status. Table 1 gives details of the agencies that participated in the survey.

Table 1. Agencies participating in the online survey

Agency	Number of Respondents	Sector/Interest Represented	Status: Consortium member/Observer
Caribbean Agricultural Research and Development Institute (CARDI)	1	Agriculture & Food Security	Consortium member
Caribbean Public Health Agency (CARPHA)	1	Health	Consortium member
Caribbean Hotel and			

Tourist Association/Caribbean Alliance for Sustainable Tourism (CHTA/CAST)	2	Tourism	Consortium member
Caribbean Disaster Emergency Management Agency (CDEMA)	2	Disaster Risk Management	Consortium member
Caribbean Tourism Organization (CTO)	1	Tourism	Consortium member
Caribbean Water and Wastewater Association (CWWA)	1	Water	Consortium member
Food and Agriculture Organization of the United Nations (FAO)	1	Agriculture & Food Security	Observer
Meteorological Service, Jamaica	1	National Meteorological Service (Provider of climate products)	Observer
Organization of Eastern Caribbean States (OECS) Commission	1	Sub-regional Coordination	Observer
Total number of respondents	11		

3.2 What were your main reasons for attending this meeting?

This question provided four options and participants were allowed to select multiple answers. As seen in figure 1, most respondents (9) indicated that their main reason was to participate in the consortium. A total of 5 respondents were desirous of gaining a better understanding of Caribbean EWISACTS and the implication for their sector. Two respondents (including the CHTA/CAST) expressed interest in offering better insights into how the BRCCC programme could be implemented.

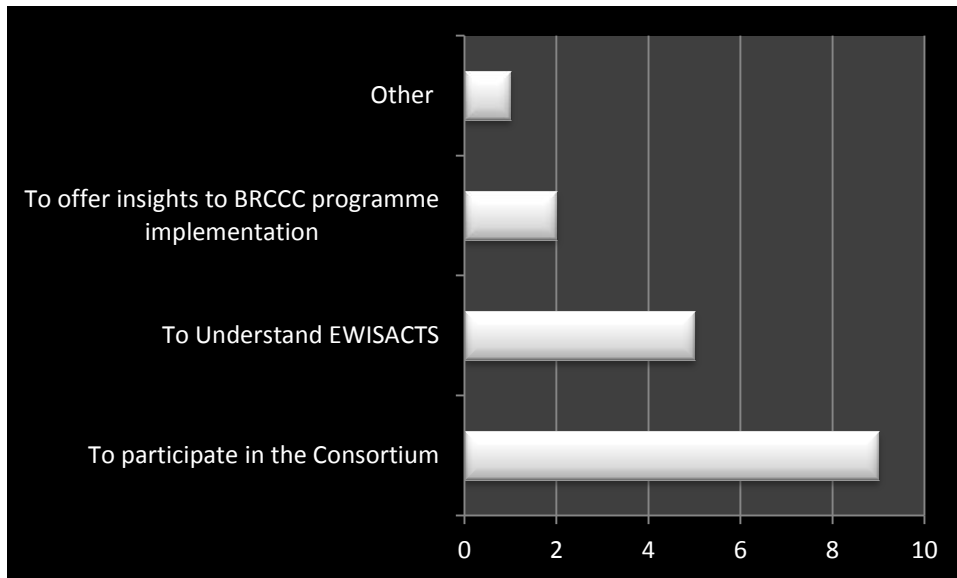


Figure 1. Reasons offered for attending the meeting

3.3 How useful were the presentations/exercises?

There were three options given for this question: “Very useful”, “fairly useful” and “not useful at all”. **All** but **one** respondent indicated that the presentations and exercises were **very useful**; the other response noted that they were useful. The exercises included review of the conceptual framework, terms of reference (TOR) as well as the Work and Implementation plan. Though the question did not allow participants to give more specific details of how useful the sessions were, it does suggest that the participants found value in the information presented.

3.4 How productive were the discussion segments?

Participants were near evenly split between two options with respect to how productive the discussion segments were. Six selected “very productive” and five respondents indicated “fairly productive”. No respondent voted that the sessions were unproductive (see figure 2). Notwithstanding, in a later question (see 3.9 below), respondents indicated that some aspects could be altered and gave suggestions of how the meeting and project in general could have been enhanced moving forward (see 3.10 and 3.11).

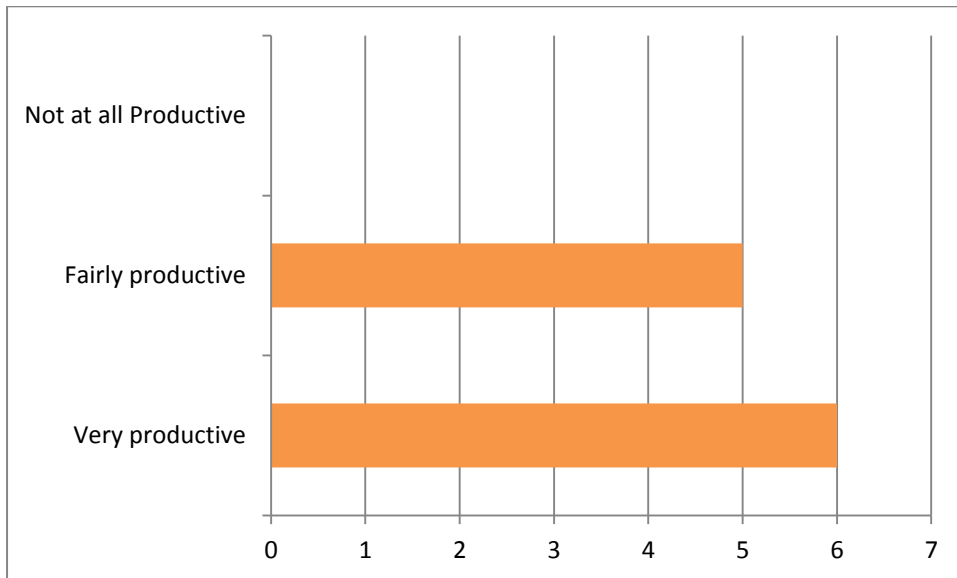


Figure 2. Responses to the productivity of discussion segments

3.5 Please rate the length of the event

A total of 7 of the 11 respondents felt the length of the meeting was “just right” while equal numbers (2) noted that it was either “too long”, or “too short” (see figure 3). This finding was very interesting given that the CIMH itself had much deliberation over the length before settling on two full days. More details about this are elaborated in the response to question 8 (see 3.9 below).

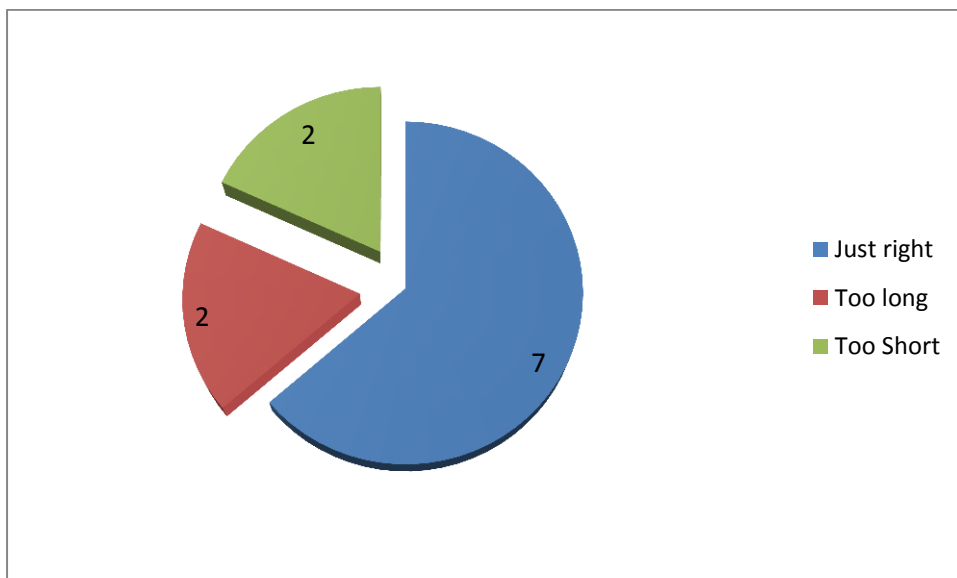


Figure 3. Respondents rating of the length of the meeting

3.6 Please rate the meeting venue and hotel accommodation

The meeting was hosted in the library conference room at CIMH, while participants were hosted at the Blue Horizon Hotel, Rockley. Most respondents (8) suggested that the venue and accommodation was “good”, while none selected “very good” or “poor” (see figure 4). This joint nature of this question did not allow for disaggregation of the response to either place (meeting venue or accommodation) so it is not possible to determine which was more pleasing. In future it may be necessary to provide separate ratings.

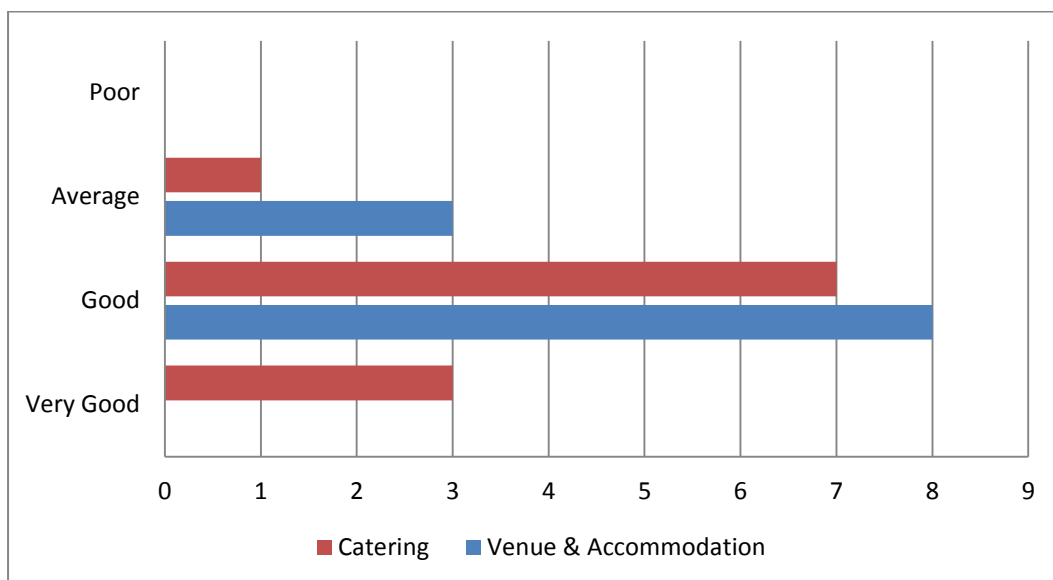


Figure 4. Rating of Meeting venue, hotel accommodation and catering services (questions 5 and 6)

3.7 Please rate the catering services

The catering services received a passing grade from most of the respondents with 3 and 7 respondents selecting “very good” and “good” respectively. One respondent regarded the service as average (see figure 4). The latter response could have been motivated by concerns expressed about the less than ideal meal temperature. This perhaps resulted from the time lapse between scheduled lunch breaks and when the actual breaks were taken, a situation exacerbated by the absence of food warmers.

3.8 What did you like most about the meeting?

This was the first of the four open-ended questions and gave very useful insights into how useful the meeting was to the respondents. All participants offered comments; among the favourable reviews expressed, were appreciation for the following:

- The presentations made by CIMH staff, national representatives and their relevance to the meeting;

- The opportunities for networking;
- The information provided and views expressed by sectoral representatives. Keen interest was focused on how the different sectors coped with climate variability.
- Exposure to the perceptions of policy makers as expressed through the CARICOM secretariat

Taken collectively, the respondents felt the interaction between the different sectors enhanced the meeting and contributed to its success.

3.9 What did you like least about the meeting?

This question drew feedback from six respondents. Two respondents felt that the days were too long given the nature of information presented. On this note, one respondent suggested the meeting could have been spread over three days. Two other respondents suggested that the times allotted for the workshop, and for presentations/discussion were too short. A desire was also expressed for discussion

among sector representative. Two other comments regarding what was least liked, warrant special mention and are stated verbatim:

- *"Discussion of draft conceptual framework and the fact that the time was not kept for each session."*

Response: It is conceded that time management was challenging especially at times when there were multiple requests for the floor and with high spirited discussions. The CIMH in this regard tried to accommodate as many responses as possible and to facilitate fulsome participation.

- *"Would have liked to have had time to share the information with my sector membership to get a broader insight of opinions"*

Response: Attempts were made to circulate the documents ahead of the meeting, however it is agreed that more timely dissemination could have been allowed for wider sector consultations.

3.10 State briefly your expectations moving forward?

All respondents gave feedback to this question and offered very useful suggestions for the way forward. In summary respondents expressed a desire to see the consortium formalized and actively carrying out its function, continued sharing of information and greater inter-agency collaboration. Specific comments were as follows:

- To realize a synergy between CDEMA's existing partnership platform and that of the project; or rather the dictates of the project that relates to the key sectors under the GFCS that must be engaged.
- Continued development of the DEWETRA and the Caribbean Climate Impacts Database (CID)
- Actionable items and useable data/impact information which translates to implementation of: preparedness, response, early warning and viable tools/products for the private sector to address climate based scenarios for the betterment of the region.
- Quick movement on the setting up of the consortium. To be followed by execution of the work plans
- My expectation is that there will be follow up communications and commitments by all the Consortium partners to kick start the initiative along with training to build capacity of the sectors that are less familiar with the topic.
- I expect to receive further useful information to be able to assist the tourism sector to make informed decisions
- Further clarification of agency roles in the consortium. An opportunity for deeper understanding of available data from the DEWETRA system.
- Climate change issues being more taken into consideration in regional development planning.
- A unified approach by all the relevant stakeholders where everyone is aware of what is going on and are all using the same tools.
- I think the representation for this Consortium should be at least 2 persons from each organization. That allows for possibly better participation at the meetings since persons have many responsibilities but at least one person should be available at a given time
- I expect that the barriers to data sharing will be removed and we will continue to develop sector specific reports which would aid in not only our daily and seasonal planning but hopefully emerging trends will allow us greater insights into the future.

3.11 Any other comments?

In addition to the views expressed above, five of the 11 respondents offered other comments. Commendation was offered for the work done in preparation for and hosting the workshop and optimism was expressed regarding the (success of) BRCCC programme. There were three other notable comments as follows:

- Looking forward to seeing actionable items to enhance the respective sectors and provide relevant information, education and training to strengthen the region on this subject matter.
- The meeting was well organized and there was a lot of interesting discussion and useful information shared to enhance understanding of key issues that

need to be addressed in the various sectors. The need for collaboration between the sectors was also recognized and the Consortium will be a good platform for this. The possibility of linking with the existing CDEMA CDM CHC mechanism was also discussed given overlaps in representation of some of the sectors being targeted for the BRCCC programme."

- Would like to see the development of water resources models specifically for small island states.

4. Conclusion

All the members who physically attended the meeting participated in the survey; the other members (CARILEC) who attend virtually did not. Overall the respondents noted that the workshop sessions were both useful and productive. While most respondents felt the duration of the meeting was right, there were some suggestions that it could have allotted more time for the deliberations. The consortium mechanism was embraced for project coordination. Expectations are high for the way forward and some very useful comments were offered for inter-agency and cross-sectoral collaboration. While five of the six consortium members participated in the survey, it would have been useful to receive feedback from other participants. The small sample size does limit the references that can be drawn, but it does capture the key messages of the coordinating unit, the consortium.