

Expected Result 2

ENHANCED CAPABILITIES OF MEMBERS TO PROVIDE BETTER CLIMATE PREDICTIONS AND ASSESSMENTS

Strategic Thrust 1: Science and Technology Development and Implementation

SUMMARY

ISSUES TO BE DISCUSSED:

1. Coordination and guidance for activities contributing to Expected Result 2
2. Climate monitoring and assessment
3. Climate modelling and prediction research
4. Operational climate prediction including Regional Climate Outlook Forums
5. Implementation of Regional Climate Centres
6. Preparations for World Climate Conference-3
7. Capacity building for improved climate prediction and assessments
8. WMO Initiative to support adaptation to climate variability and change

ADDITIONAL FINANCIAL IMPLICATION:

None for the budget considerations, but overall, there is much demand for Members, sponsors and donors to do more to meet the stated goals, and this has financial implications for them.

DECISIONS/ACTIONS REQUIRED:

- (a) To adopt the draft text for inclusion in the general summary of XV-RA IV given in Appendix A;
- (b) To adopt draft Resolution 4.2/1 (XV-RA IV) - Establishment of RCC Network in RA IV given in Appendix B.

REFERENCES:

1. Guidelines on Climate Watches, WCDMP No. 58, WMO/TD-No. 1269
2. Joint CCI/CLIVAR/JCOMM Expert Team on Climate Change Detection and Indices, WCDMP No. 64, WMO/TD-No. 1402
3. Abridged Final Report with Resolutions and Recommendations of the Fourteenth Session of the Commission for Climatology, (Beijing, 3-10 November 2005), WMO-No. 996
4. Abridged Final Report with Resolutions of the Fifteenth World Meteorological Congress (Geneva, 7-25 May 2007), WMO-No. 1026
5. Final report of the CCI-CBS Intercommission Technical Meeting (Geneva, 21-22 January 2008)
6. Abridged Final Report with Resolutions of the Sixtieth Session of the Executive Council (WMO-No. 1032)
7. Reports of the meetings of the International Organizing Committee on WCC-3 (WIOC)
8. WCRP Accomplishment Report 2007-2008
9. WCRP Position Paper on Seasonal Prediction. Report from the First WCRP Seasonal Prediction Workshop (Barcelona, Spain, 4-7 June 2007), WCRP Informal Report No. 3/2008

10. Future Climate Change Research and Observations: GCOS, WCRP and IGBP learning from the IPCC Fourth Assessment Report, January 2008, WMO/TD-No. 1418
11. Integrated Global Observing Strategy Cryosphere Theme Report, August 2007, WMO/TD-No. 1405
12. Global Precipitation Assessment: A Project of the GEWEX Radiation Panel (May 2008) (Available on CD only), WCRP-128, WMO/TD-No. 1430
13. World Modelling Summit for Climate Prediction, Reading, UK, 6-9 May 2008, Workshop Report (January 2009), WCRP-131, WMO/TD-No. 1468

CONTENT OF DOCUMENT:

Appendices for inclusion in the final report:

- A. Draft text for inclusion in the general summary of XV-RA IV
- B. Draft Resolution 4.2/1 (XV-RA IV) – Establishment of a Regional Climate Centre Network in RA IV

Appendix for information:

XV-RA IV/Rep. 4.2: Progress/Activity Report

DRAFT TEXT FOR INCLUSION IN THE GENERAL SUMMARY OF XV-RA IV

4.2 ENHANCED CAPABILITIES OF MEMBERS TO PROVIDE BETTER CLIMATE PREDICTIONS AND ASSESSMENTS (*agenda item 4.2*)

4.2.0 Introduction

4.2.0.1 The Association recognized that WMO's climate initiatives include the observations that sustain the climate models and underpin assessments, the research that develops climate science and models, specialized knowledge of the treatment and use of climate information for analysis and products, the operational activities that assess and serve the needs of users for decisions relevant to climate risk management and adaptation to climate variability and change (predictions, products and services, etc.), partnerships with organizations in climate-sensitive sectors and the enhancements of the capacity of the Members, particularly in developing and least developed countries. The Association noted that the WMO's climate activities are duly presented with respect to Expected Results 2, 5, 6, 7, 8 and 9.

4.2.0.2 The Association recognized the need to systematically assess the basic capability of NMHSs in the Region for making observations to monitor climate change and climate variability and for providing long-range forecasts and future projections. The Association agreed that the needs of Members who have not fully developed these capabilities will have to be addressed as an important part of WMO's ER 2-relevant activities in the Region.

4.2.1 Coordination and Guidance for ER 2

4.2.1.1 Noting that climate activities that fall under ER 2 are guided by a number of WMO and co-sponsored constituent bodies, including CCI, CAgM, CBS and WCRP JSC, the Association urged enhanced interaction and coordination between these bodies, including those at regional and national levels.

4.2.1.2 The Association recognized that climate adaptation is an emerging priority, and that considerable effort and coordination will be required across the Region to establish operational climate services that will support effective decision-making on matters of adaptation to climate variability and change. The Association agreed that the existing rapporteurs and working groups related to climate and agrometeorology would be consolidated in an RA IV Working Group on Climate Services, Adaptation and Agricultural Meteorology [*see Doc. 5.1*].

4.2.2 Climate Monitoring and Assessment

4.2.2.1 The Association was informed on the CLIMSOFT training workshop held at the Caribbean Meteorological Organization (CMO) headquarters in Trinidad and Tobago (May/June 2006), and the Advanced CLIDATA Training for countries in the Caribbean (Caribbean Institute of Meteorology and Hydrology (CIMH), 19-30 May 2008), and it welcomed the WMO plan to undertake data rescue and the analysis of climate variability and change as a joint theme in WMO seminars and workshops related to climate data management. This strategy allows increased appreciation of the value of historical climate data in climate-development issues and therefore the need for accelerating data rescue process in the countries. The Association was also informed of the data rescue process launched in the Mediterranean Basin (MEDARE) to increase multi-national and regional collaboration in rescuing and digitizing old climate records that are needed for climate research, monitoring and climate change adaptation studies, and urged Members to undertake a similar collaborative approach in Region IV.

4.2.2.2 The Association appreciated the efforts of the Joint CCI/CLIVAR/JCOMM Expert Team of Climate Change Detection and Indices (ETCCDI) to promote cooperative development of indices on extremes. The Association called on Members to sustain and further develop this work to become a part of a new climate monitoring product for decision- and policy-makers.

4.2.2.3 The Association noted with appreciation the continuous contribution of RA IV Members in the WMO statements on the status of the global climate system as well as in the WMO climate review publications. The Association agreed that all Members should contribute to provide relevant climate information based on their monitoring activities to enhance the coverage of WMO's annual statements on the status of the global climate system, particularly with respect to extremes.

4.2.2.4 The Association, noting that a process was underway to evaluate the feasibility of a WMO Global Cryosphere Watch (GCW), expressed support for the GCW concept, and urged the Secretary-General to strengthen the relevant mechanisms to guide GCW development and potential implementation.

4.2.3 Climate Prediction and Modelling Research

4.2.3.1 The Association expressed satisfaction with the continuing WCRP's progress in international coordination and integration of climate research, and particularly its key contributions to the IPCC AR4 and WMO/UNEP 2006 ozone assessment; search for sources of predictability on seasonal to decadal time scales, and development of coupled climate system models. The Association noted with interest the outcomes of the World Modelling Summit for Climate Prediction (Reading, UK, May 2008), the WCRP Seasonal Prediction Workshop (Barcelona, Spain, June 2007), and the GCOS, WCRP and IGBP Workshop "Learning from the IPCC Fourth Assessment Report" (Sydney, Australia, October 2007). It requested WCRP to ensure full and active participation of scientists from RA IV in the emerging Climate Prediction Project.

4.2.3.2 The Association noted with satisfaction the progress in predicting and modelling of the North and South American monsoons through the WCRP CLIVAR Variability of the American Monsoon Systems project and encouraged Members to continue their support for the archiving and analysis of the resulting data and for the associated field experiments.

4.2.3.3 The Association recognized the many contributions of the WCRP Global Energy and Water Cycle Experiment (GEWEX) and noted with particular appreciation the recent analysis of global precipitation products. The Association urged Members to continue their support for the collection, processing and analysis of the precipitation, cloud and radiation data from satellite and in situ measurements.

4.2.4 Operational Climate Prediction

4.2.4.1 The Association recognized the need for Members to develop/improve their national capabilities in climate prediction, in order to improve their ability to support applications of climate information to key socio-economic sectors for adaptation to climate variability and change. Further recognizing a need to foster the transition of results from climate research to the operational practices of regional and national centres, the Association urged the Secretary-General, CCI and the WCRP JSC to facilitate the development and operational implementation by Members of new or improved climate prediction techniques, and to provide technical guidance to NMHSs through closer coordination of their activities at the regional and national levels.

4.2.4.2 The Association was informed of WMO activities relevant to Climate Watches and noted the urgent need for NMHSs and regional climate institutions to make use of best practices in the delivery, provision and evaluation of Climate Watches, and in managing efficiently and seamlessly the interaction among regional institutions, NMHSs and end-users. The Association agreed on the benefits of early warnings of extreme weather and climate, and urged Members and the Secretariat to help developing countries in the Region to implement Climate Watches.

4.2.4.3 The Association expressed deep appreciation to Members for their support and leadership in the establishment of Regional Climate Outlook Forums (RCOFs) for Central America (Foro del Clima de América Central (FCAC)), and noted the growing benefits of RCOFs in

fostering networking amongst climate experts, and in development of consensus-based forecasts for the subregion. The Association noted with satisfaction that FCAC participated in the international expert review meeting on RCOFs organized by WMO and shared its experiences with the global RCOF community (Arusha, United Republic of Tanzania, November 2008). The Association agreed that the RA IV RCOF efforts need to be expanded to establish additional subregional RCOFs as needed, and to expand the process to include assessments of climate change for the Region. The Association urged Members to support these initiatives, and to seek low-cost options and user support to enhance their sustainability.

4.2.4.4 Noting with appreciation the new initiative to extend the CLIPS project to polar regions through a WMO WCRP IPY Workshop on CLIPS in polar regions, and the agreement to work towards establishment of a Polar Climate Outlook Forum (PCOF), the Association urged all Members with polar interests in either hemisphere to actively contribute to the relevant efforts to identify the priority user requirements in the polar regions for climate information.

4.2.4.5 The Association expressed appreciation to Members contributing to developing consensus-based updates of El Niño and La Niña issued by WMO. The Association noted the urgent need for consistent analysis and forecast techniques related to El Niño and La Niña, and requested that the CCI Expert Team on El Niño and La Niña continue its efforts to develop a common understanding of, and a common public relations approach to, El Niño and La Niña as a high priority. In addition, the Association urged expansion of this process by the CCI and WCRP CLIVAR to include development of updates on other major oscillations that affect climate of the Region.

4.2.4.6 The Association noted the importance of the activities of the Global Producing Centres for Long-range Forecasts (GPCs) and the joint Lead Centre for the Standard Verification System for LRF (LC-SVSLRF), and the importance of verification of operational LRF techniques to the work of RCCs, RCOFs and NMHSs. The Association urged all Members in the Region to optimally utilize the GPC products.

4.2.4.7 RA IV Members reaffirmed their support for the implementation of the WMO CLIPS project, and agreed to support the initiation and conduct of regionally-organized CLIPS activities including any required resource mobilization; to enhance coordination of climate information and services in the Region, and to ensure close collaboration between CLIPS activities and eventual RCC activities in the Region. The Association urged its Members to each identify a national focal point that would be responsible for monitoring and reporting on CLIPS-relevant activities in the country, to provide the focal point with the facilities and support necessary to fulfil this responsibility, and to inform the WMO Secretariat of the names and contact information for each national focal point for CLIPS, and of any subsequent changes within the upcoming intersessional period. Noting the establishment of a new RA IV Working Group on Climate Services, Adaptation and Agrometeorology (WGCAA) (see *Doc. 5.1*), the Association urged all national CLIPS focal points to collaborate closely with and support the activities of the Theme Leader on 'CLIPS including RCCs and RCOFs' of the WGCAA sub-group on Climate Applications and Services (CAS).

4.2.5 Regional Climate Centres (RCCs)

4.2.5.1 The Association noted the significant progress made by WMO, through the joint efforts of the Commission for Climatology (CCI) and the Commission for Basic Systems (CBS) towards development of a formal designation process for Establishment and Implementation of Regional Climate Centres. Recalling the early efforts taken within RA IV (2003) to establish a regional Advisory Group on RCCs (AG-RCCs), and noting with appreciation the launch of the RA IV RCC Pilot Project sponsored by the United States of America and implemented by the Central American Regional Committee of Hydrological Resources (2005) and of a project in 2007 to initiate RCC activities for Central America (supported by the Inter-American Development Bank and the European Union), the Association urged Members to take into account the latest WMO Guidance on Establishment and Implementation of RCCs, and to ensure that all mandatory requirements for

formal designation as 'WMO RCCs' are fulfilled by the potential centres in the Region interested in seeking such designation.

4.2.5.2 The Association reaffirmed its intent to establish an RCC network to serve the climate information needs of RA IV Members. The Association urged the president of RA IV to work with the RA IV Working Group on Climate Services, Adaptation and Agrometeorology (WGCAA) to assess the needs and capabilities in the Region for climate services (by organizing an appropriate survey, if required), and to develop an implementation plan for the establishment of an RCC network in the Region. The Association urged potential RCC hosts to build, under the guidance of the RA IV WGCAA, CCI, CBS and WMO Secretariat, demonstrable and sustainable capacity for all the mandatory RCC functions defined in the proposed amendments to GDPFS Manual and, where possible, the highly recommended functions. Accordingly, the Association adopted draft Resolution 4.2/1 (XV-RA IV) on Establishment of a Regional Climate Centre Network in RA IV (RCC-RA IV).

4.2.5.3 The Association urged GPCs to continue and to reinforce their inputs to RCCs [*Cross reference XV-RA IV/Doc. 4.1*]. The Association urged Members to extend their active support to the implementation of RCC network in RA IV and requested the potential RCC hosts to adequately address the needs of the Members in the Region while planning their operational activities.

4.2.6 World Climate Conference-3 (WCC-3)

4.2.6.1 The Association noted that the World Climate Conference-3 (WCC-3) (Geneva, 1 August-4 September 2009) had a high potential to enhance the visibility of WMO, and to contribute to the efforts of Members and users to address both disaster risk reduction and adaptation to climate variability and change, and to highlight WMO's contribution to the implementation of the UNFCCC Bali Action Plan, especially on risk management and adaptation. The Association further noted that skilful seasonal to interannual climate predictions, which form the focus of WCC-3, were essential to national efforts in adaptation to climate variability and change since they provide the society, governments and climate-sensitive sectors with the tools to identify areas and periods of potential risks, activities that could cope with the expected climate conditions and help them take appropriate contingency measures for the benefit of the society and institutions.

4.2.6.2 The Association noted that the proposed outcomes of the conference aimed to bridge the gap between IPCC assessment reports and the sector-specific climate information needs, to support adaptation to climate variability and change at regional and national levels. Furthermore, they should also address the observational and data needs, which influence adaptation strategies, impact assessments, and climate diagnostics and projections. The Association recognized that the conference programme and identification of the expected outcomes in a concrete form were crucial to attracting participation at the ministerial level and for resource mobilization. The Association noted with satisfaction that a number of experts from the Region contributed to the WCC-3 International Organizing Committee (WIOC), and urged Members to give their full support to ensure the success of WCC-3.

4.2.7 Capacity Building for Improved Climate Prediction and Assessments

4.2.7.1 The Association noted with appreciation that RA IV had actively contributed to CLIPS training activities, recalling that the fifth workshop on 'Regional climate prediction and applications - Circum-Indian Ocean' was held at the Cooperative Institute for Mesoscale Meteorological Studies, University of Oklahoma (Oklahoma, USA, 2005). The Association further appreciated the efforts of NOAA in capacity building in both regional and extra-regional projects. Notwithstanding these efforts, Members recognized the special and ongoing technical training needs of developing countries in the Region for provision of a full range of climate predictions and assessments.

4.2.7.2 The Association agreed that the current components of the CLIPS Curriculum needed to be further developed into complete, self-contained modules that could be integrated into regular

training activities, and urged members and the new WGCAA to formulate a coordinated strategy to meet this need.

4.2.8 Adaptation to Climate Variability and Change

4.2.8.1 The Association, noting the great concern the governments in the Region had on climate change and related environmental issues, recognized that NMHSs needed to have the capability to provide relevant advice to their government policy-makers. For this purpose, the Association agreed that NMHSs needed to be closely involved in the development of future climate scenarios in a regional context, and to focus on near-term projections.

4.2.8.2 The Association noted that EC-LX endorsed the concept of a new WMO initiative to support adaptation to climate variability and change, with the mission 'To strengthen coordination and enhance the provision of user-oriented climate information, products, advisories and services and to thereby support national and regional climate-risk assessment, climate adaptation planning and implementation practices for sustainable development'. The Association noted the needs of key socio-economic sectors across the Region for climate information for climate-risk management, the requirements of RA IV Members for developing reliable climate scenarios, and assessing the inherent uncertainty, and the vulnerability of Members in the Region to climate-related hazards. The Association therefore urged the Secretary-General to support the initiative, using the financial flexibility that might exist within the programme and budget for 2008–2011, to identify the resources needed to fulfill the proposed objectives, and to identify and make use of extrabudgetary resources.

4.2.8.3 The Association recognized the benefits to the Region of establishment and sustained operation of global and regional mechanisms for climate (e.g., GPCs, RCCs, RCOFs), for improving capability of Members to support adaptation to climate variability and change, in particular to engage in and improve user liaison and development and delivery of products and services to users at national and local scales. The Association therefore urged the Secretary-General to strongly promote these mechanisms as part of the overall WMO initiative.

4.2.8.4 The Association further recognized the need to promote climate applications in key socio-economic sectors and appreciated the CCI initiatives to support climate applications in health, energy, tourism, urban and building sectors. The Association, noting the need for partnerships with user sectors to realize more effective climate applications, appreciated the efforts of WMO to sustain longstanding partnerships with UN agencies such as WHO, UNWTO, UNEP and other international organizations. The Association urged Members to complement these efforts by working towards strengthening partnerships between NMHSs and user agencies at the national level.

4.2.8.5 Recognizing the need to establish a baseline for the extent to which WMO Members are currently engaged in sector-specific activities relevant to Adaptation to Climate Variability and Change, the Association urged all RA IV Members to participate in the on-line survey launched in October 2008 by the WMO Secretariat. The Questionnaire facilitated the assessment of current and potential future role of NMHSs in adaptation to climate variability and change in their respective countries. Furthermore, the Association noted that the outcomes of the survey would address key gaps and build on current strengths of efforts for adaptation measures.

DRAFT RESOLUTION

Res. 4.2/1 (XV-RA IV) - ESTABLISHMENT OF A REGIONAL CLIMATE CENTRE NETWORK IN RA IV (RCC-RA IV)

REGIONAL ASSOCIATION IV,

Noting:

- (1) The Abridged Final Report with Resolutions of the Fourteenth Session of Regional Association IV (North America, Central America and The Caribbean) (San José, Costa Rica, 5-15 April 2005),
- (2) The Abridged Final Report with Resolutions of the Fifteenth World Meteorological Congress 2007,
- (3) The Proceedings of the Meeting of the CCI Implementation Coordination Team (October 2007),
- (4) The Proceedings of the CCI/CBS Intercommission Technical Meeting on Designation of Regional Climate Centres (January 2008),
- (5) The Interim Guidance on Establishment and Designation of WMO Regional Climate Centres (RCCs),
- (6) The establishment of the RA IV Working Group on Climate Services, Adaptation and Agrometeorology (WGCAA), with a subgroup on Climate Applications and Services (WGCAA-CAS),

Recognizing:

- (1) The enhanced worldwide attention to climate change, the associated vulnerabilities in the Region and the need to support decision-making for adaptation to climate change and variability with more detailed regional climate information,
- (2) The setting up of a regional expert Advisory Group on RCCs (AG-RCCs) in 2003 to supervise the establishment of RCCs in RA IV,
- (3) The near-final development of the WMO Technical Regulations to include a formal WMO mechanism for designation of RCCs,

Decides:

- (1) To ensure that all RA IV Members are aware of the latest guidance on "Establishment and Designation of WMO Regional Climate Centres (RCCs)";
- (2) To ensure that all RCCs and RCC proponents comply with the definitions of RCCs and RCC-Networks and the CCI-CBS recommended mandatory functions and criteria for designation; adhere to the relevant WMO Technical Regulations;
- (3) To ensure that all regional RCC activities include a pilot phase as a means to demonstrate the capabilities of centres in the Region aspiring to be designated as WMO RCCs, under the guidance of the WGCAA-CAS;

Urges:

- (1) RCC proponents to undertake a self-appraisal prior to submitting their proposals, to determine their capabilities to fulfill the requirements of RCC designation criteria, develop implementation plans and submit these to the RA IV WGCAA-CAS for their assessment and advice on commencing a pilot phase;
 - (2) RCCs in pilot phase to submit activity reports on an annual basis to RA IV WGCAA-CAS, and to undertake recommended remedial actions during the pilot phase, to ensure fulfillment of WMO designation criteria;
 - (3) RCCs to additionally include as many as possible of the 'highly recommended' functions in their activities, particularly those related to downscaling, to climate change and to organize RCOFs;
 - (4) RCCs to closely integrate the implementation of their mandatory as well as recommended functions with CLIPS activities in the Region, to enable NMHSs to develop user-targeted climate information products and services;
 - (5) RCCs and RCC proponents to make all efforts to highlight their role in providing climate information for decision-making at World Climate Conference-3 (WCC-3) and to use WCC-3 outcomes to guide their future operational activities;
 - (6) RA IV WGCAA-CAS to assist the president of RA IV on all matters related to RCC implementation;
 - (7) The president of RA IV to consult with CCI, CBS, WMO Secretariat and RA IV WGCAA-CAS in the effective implementation of RCCs and in determining the eligibility of new RCC proponents;
 - (8) All Members to support RA IV RCC activities, use the products and to provide feedback to RCCs and GPCs on effectiveness, improvement and tailoring.
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World Meteorological Organization

XV-RA IV/Rep. 4.2

**REGIONAL ASSOCIATION IV
(NORTH AMERICA, CENTRAL
AMERICA AND THE CARIBBEAN)**

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Expected Result 2

ENHANCED CAPABILITIES OF MEMBERS TO PROVIDE BETTER CLIMATE PREDICTIONS AND ASSESSMENTS

Strategic Thrust 1: Science and Technology Development and Implementation

PROGRESS/ACTIVITY REPORT

SUMMARY

Reference: XV-RA IV/Doc. 4.2

CONTENT OF DOCUMENT:

Appendix:

- Progress/Activity Report

PROGRESS/ACTIVITY REPORT

1. WMO is organizing the World Climate Conference-3, (Geneva, 31 August-4 September 2009), with the overarching theme "Climate prediction and information for decision-making". An International Organizing Committee for WCC-3 (WIOC) has been established by the Secretary-General to make preparations for the Conference consisting of the following four subsidiary bodies: The Programme Sub-committee, High Level Sub-committee, Linkage and Interactions Sub-committee and Resource Mobilization Committee. Furthermore, WMO has established a secretariat to support the organization of WCC-3 and follow-up actions recommended by WIOC.

2. Foro del Clima de América Central (FCAC), the Central American Climate Outlook Forum, has been in successful operation since 1998, and currently produces three Climate Outlooks per year. So far, 25 Climate Outlooks have been produced and disseminated in the Region. The steps taken by FCAC include integration of a working group open to experts from NMHSs, universities and private sector to optimize regional collaboration, increase capacities for climate analysis, training FCAC members in climate analysis tools and outreach to stakeholders in climate sensitive sectors.

3. WMO organized an international expert review meeting on RCOFs (Arusha, United Republic of Tanzania, 3-7 November 2008) on the occasion of the completion of RCOF operations around the world. All the currently active RCOFs, including FCAC, were represented at this meeting which reviewed the current status and discussed possible approaches for future evolution of the RCOF process.

4. RA IV was interested in the Regional Climate Centre (RCC) concept right from the very beginning, and took early steps by setting up an ad-hoc expert Advisory Group on RCCs (AG-RCC) in 2003 to supervise the establishment of RCCs in RA IV. The RA IV AG-RCC proposed that a virtual RCC structure would best serve the needs of the Region. Such a structure would leverage the Region's existing resources like the Caribbean Institute of Meteorology and Hydrology (CIMH), the Central American Regional Committee of Hydrological Resources (CRRH), the Caribbean Committee Climate Change Center (CCCCC), the International Research Institute for Climate and Society (IRI), National Climatic Data Center (NCDC), the Climate Prediction Center (CPC), the University of the West Indies (UWI), University of Costa Rica (UCR) and additional expertise from Canada, Mexico, and the United States of America.

5. The Caribbean Institute for Meteorology and Hydrology (CIMH) as well as the Central American Regional Committee of Hydrological Resources (CRRH) produce seasonal precipitation outlooks for the Caribbean countries. Some progress has also been made in the implementation of a regional database for the Central American countries to support regional climate activities. A project for the implementation of a Central American regional climate centre activity started in 2007, with the support of the Inter-American Development Bank (IDB) and the European Union (EU).

6. A WMO Conference on Living with Climate Variability and Change (LWCVC): Understanding the uncertainties and managing the risks was held in Espoo, Finland (July 2006). Cg-XV endorsed the Espoo Statement, and the findings applicable to the roles and functions of NMHSs as identified in the final report. It urged all Members to support climate-related risk management activities and to develop climate services and tailored climate products. Cg-XV stressed the importance of developing local capacity within NMHSs in this regard.

7. WMO co-sponsored a UNFCCC expert meeting (Mexico, 4-7 March 2008), which discussed the ways in which data and observation, as well as methods and tools, can contribute to adaptation practices, most especially, the implementation of the Nairobi Work Programme on vulnerability and adaptation to climate change.

8. NMHSs, agencies and universities, and scientists from RA IV continued to make extremely valuable contributions to the climate science. The period from the previous session was marked by the continuing progress of WCRP in international coordination and integration of climate research, and particularly its key contributions to the IPCC Fourth Assessment Report (AR4) and WMO/UNEP 2006 ozone assessment; search for sources of predictability on seasonal to decadal time scales, and development of coupled climate system models. The most important recent meetings included WCRP Seasonal Prediction Workshop (Barcelona, Spain, June 2007), GCOS, WCRP and IGBP Workshop "Learning from the IPCC Fourth Assessment Report" (Sydney, Australia, October 2007), and the World Modelling Summit for Climate Prediction (Reading, UK, May 2008), which called for a major Climate Prediction Project that required contributions from all Regions.

9. Two international project offices for the WCRP Projects are located in the Region. The Global Energy and Water Cycle Experiment (GEWEX) project office is based in Silver Spring, Maryland, USA and the SPARC office is based in Toronto, Canada. Significant contribution to the international activities of the CLIVAR project of WCRP is made by the US CLIVAR project and its office. During the intersessional period, the Region hosted dozens of WCRP and WCRP-affiliated meetings, as well as the forthcoming 2009 session of the WCRP Joint Scientific Committee (Washington, D.C., 4-9 April 2009).

10. Progress has been achieved in several regional activities of WCRP GEWEX in RA IV in the intersessional period. This includes advances in predicting and modelling of the North and South American monsoons through the WCRP CLIVAR Variability of the American Monsoon Systems project. This activity would benefit from continuing support of Members in archiving and analysis of the resulting data and associated field experiments.

11. Many contributions to the activities of the Region were made by the WCRP (GEWEX), which included a recently published analysis of global precipitation products. A continuation of the analysis requires further collection, processing and analysis of the precipitation, cloud and radiation data from satellite and in situ measurements.

12. The intersessional period was marked by an unprecedented scientific campaign in the polar regions, the International Polar Year 2007-2008, which was led by WMO and ICSU and actively participated in by scientists from the Region. Examples of success included the completion of the IGOS Theme on Cryosphere Report, which was led by Dr J. Key (USA), and a proposal by Canada to the WMO Congress (Cg-XV) to establish a WMO Global Cryosphere Watch, which was endorsed by Cg-XV and is being actively followed up.

13. At its sixtieth session, the WMO Executive Council (EC-LX, 2008) noted that WMO's climate activities are essential to development of the knowledge base and the internal and external linkages that underpin WMO's contribution to Members' capability to adapt to climate variability and change, and that development of effective strategies for adaptation requires understanding of the nature of climate variability and change, the climatic sensitivity of the system or Region in question, and the capacity to adapt to the projected changes. EC therefore urged Members to include the concept of adaptation into the Strategic Plan, under ER 2. Furthermore, EC noted the need to assist NMHSs in developing reliable climate scenarios, and to assess the inherent uncertainty; that these efforts must address WMO commitments to the UNFCCC Nairobi Work Programme on Impacts, Vulnerability and Adaptation to Climate Variability and Change, and cover Methods and Tools (e.g., RCOFs, CLIPS, downscaling, scenarios, etc.) and Data and Observations (DARE, data exchange, climate system monitoring, etc.); and that WMO and UNESCO have been assigned the lead role, jointly, to provide the knowledge base for adaptation in accordance with the UN system-wide coordination of climate activities.

14. EC therefore endorsed the mission of a new WMO initiative to support adaptation to climate variability and change, namely to 'strengthen coordination and enhance the provision of user-oriented climate information, products, advisories and services and to thereby support national and regional climate-risk assessment, climate adaptation planning and implementation

practices for sustainable development', and noted that it is in line with the expanded version of Expected Result 2, falls within the WMO mission/mandate, and is in line with WMO's role as UN lead agency for the climate knowledge base. EC urged the Secretary-General to develop the initiative as a matter of priority, under the World Climate Applications and Services Programme (WCASP), to support adaptation to climate variability and change, in consultation with the relevant technical commissions and the EC Working Group on Climate and Related Weather, Water and Environmental Matters (ECWG-CWE).

15. The CCI Expert Team on Research Needs for Intraseasonal, Seasonal and Interannual Prediction, including the Application of these Predictions (ET 3.1), met at the NOAA Headquarters to discuss its work plan and deliverables (Silver Spring, USA, 23-26 September 2008). On this occasion, a one-day WMO/CPC Open Seminar on "Recent Advances in Seasonal to Interannual Prediction: Regional and Applications Perspectives" was also organized. ET 3.1 is developing a guide to best practices in downscaling, multi-model ensemble approach and consensus process for seasonal prediction.

16. The CCI Expert Team on CLIPS Operations, Verification and Application Services (ET 3.2) held its first meeting in Guayaquil, Ecuador (25-28 September 2007), including a one-day seminar on CLIPS issues, mainly attended by participants drawn from the regional centres in south western America. ET 3.2 is working on the development of best practices for climate prediction with emphasis on RCOFs and their processes, and also on verification and user liaison.

17. The CCI Expert Team on El Niño and La Niña (ET 3.3) met and finalized its work plan and deliverables (Calverton, USA, 13-15 August 2007). The work plan included the development of a common language for El Niño and La Niña, and production of Version 0 of an Atlas of regional ENSO impacts. The ET also provided technical support to the organization of a CLIPS Workshop on "Communicating about ENSO: Toward Developing a Common Understanding" (Honolulu, USA, 8-10 April 2008) as part of its efforts to develop a common language for ENSO.

18. Six interregional workshops on Human Health Impacts from Climate Variability and Climate Change were organized between 2005 and 2008 by the World Health Organization (WHO), in collaboration with WMO and the United Nations Environment Programme (UNEP), with support from the US Environmental Protection Agency (USEPA). One of these workshops, "Climate Variability and Change and their Health Effects in Central America: Health Vulnerability and Adaptation Planning", was held in San José, Costa Rica (6-9 August 2007). These workshops focused on countries that are particularly climate-sensitive and vulnerable, raised awareness, and helped countries to formulate strategies on how to address additional health risks posed by climate change. These workshops significantly contributed to the partnership between WMO and WHO on regional aspects of climate and health. In addition, heat waves pose a current and future health risk in many countries in the Region. The CCI Expert Team on Climate and Health is working to publish the WMO-WHO Guideline on Heat-health Warning Systems (HHWS).

19. A new WMO Technical Note on "Weather and Climate Aspects of Renewable Energy: Solar and Wind" is being developed by the CCI Expert Team on Climate and Energy, composed of experts from Canada and the USA. This publication, which needs several years to develop and review, will target climate and weather services specialists in NMHSs, environmental prediction experts, research communities, engineers, risk managers, architects, etc.

20. Tourism, a vital part of the global economy, is an important contributor to poverty reduction. Transportation; tour operations; accommodation; and the food and product supply chain are highly sensitive to the impacts of climate variability and change. WMO collaborated with the UN World Tourism Organization (UNWTO) and the United Nations Environment Programme to publish a new report (August 2008) entitled. "Climate change and tourism: responding to global challenges". This publication contains key conclusions and the Conference Statement from the Second International Conference on Climate Change and Tourism (Davos, October 2007), as well as advances in climate change science and implications for the tourism sector; impacts and adaptation at tourism destinations; implications of climate change for tourism demand; emissions

from tourism (status and trends); mitigation policies and measures; and the way forward to adaptation and mitigation in tourism.

21. New updates to two Technical Notes on Building Climatology and Urban Climatology are being developed by the CCI Expert Team on Urban and Building Climatology. These updates cover the approaches to developing building climatology, including the development of basic regional climatology, local urban climatology and provision of micro climatic advice, and urban climatology and its relevance to urban design.
